



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Strengthening the food systems governance evidence base: Supporting commensurability of research through a systematic review of methods

Technical Report supporting Working Paper 167

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Agriculture and Food Security (CCAFS)

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Introduction

This document reports on a systematic review (SR) of food systems governance indicators. This review was undertaken by the Consultative Group on International Agriculture Research (CGIAR)'s Research Programme on Climate Change Agriculture and Food Security (CCAFS)-funded 13-member Working Group on Effective Indicators for food systems governance and a review team¹.

The purpose of this technical report is for archival records in line with the principles of full and transparent documentation of systematic reviews. This report is confined to details of the review method and results, with framing and interpretation and implications of results excluded. The latter are to be published as a CCAFS working paper.

Research questions and objectives

This review was undertaken in response to a lack of commensurability of existing research on food systems governance. It was proposed to address this knowledge gap through proposing core indicators to be used in future research, which it is hoped will be adopted in a more consolidated second generation of research on food systems governance designed to support subsequent comparison and aggregation of results. This core set of indicators are to be assembled through a systematic review of literature, conducted according to the following research question:

How can food systems governance be researched?

To operationalize this research question the following two sub-questions are formulated:

- a. What indicators are used in current research to operationalize (aspects of) food systems governance?
- b. What aspects of food systems governance are not currently operationalized?

To answer these questions, the key terms are defined as follows:

Food systems governance: We use a simplified representation of theories of food systems (Ericksen 2008) and governance (Candel 2014). Thus, food systems governance comprises seven governance levels (local, sub-national, national, regional, global, cross-scale, universal) and three food systems components (production, distribution,

¹ The full list of persons involved in the review is, in alphabetical order: Jordan Blekking; Michael Cox; Todd Crane; Aogán Delaney; Hallie Eakin; Tom Evans; Wiebke Foerch; Lindsey Jones; Kaisa Korhonen-Kurki; Leslie Lipper; Paul McCord; John McGreevy; Don Nelson; Christophe Oberlack; Lars Otto; Mark Purdon; Tyler Schlachter; Lance Robinson; Peter Tamás; Katie Thompson; Jacob Weger.

consumption). We use these levels and components to delimit *aspects of* food systems governance. This framework is displayed as a matrix below:

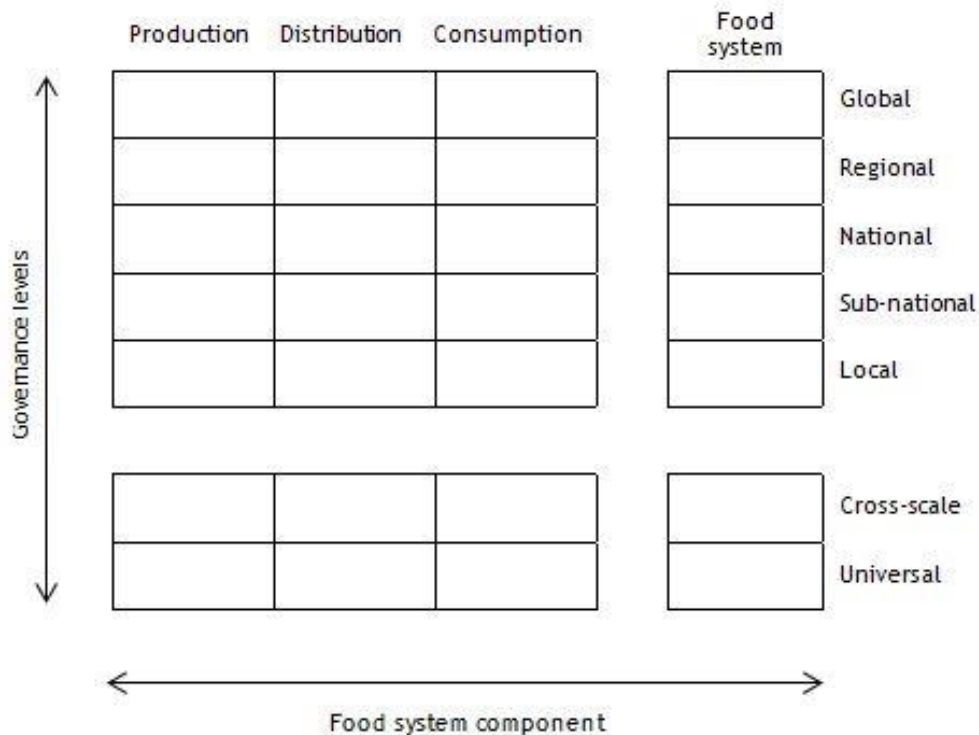


Figure 1 Theoretical framework: food system governance indicator matrix

Operationalization: refers to “the act of generating data to empirically represent or measure a construct, including both the intermediate steps of conceptual decomposition and the final act of measurement” (Delaney *et al.* 2016, p. 7).

Indicator: There is no consensus about what constitutes an indicator as distinct, for example, from questions on a data collection instrument or sub-constructs in a conceptual framework, nor are there stable reference points from which to create a definition, with different research designs conceptualising, instrumentising and reporting at different levels of abstraction. Therefore, we label as an ‘indicator’ a construct or instrument in an operationalization, at a harmonised level of abstraction which was agreed upon among the working group during a workshop.

It should be noted that these research objectives and RQs were settled on during the course of the review. At the outset, the review was structured around the following set of RQs:

RQ1: What are the main barriers, trade-offs and opportunities for governing food systems under climate change, as credibly reported?

RQ2: What are the governance arrangements credibly reported to best support food security goals?

sq1: How are particular conditions and mechanisms, institutions, interests and ideas—credibly reported to support forms of *effective (and ineffective)* governance arrangements?

sq2: What forms of coordination/collaboration across levels, sectors and scales are credibly reported to improve governance arrangements in food systems under climate change?

sq3: What governance arrangements are credibly reported to be most conducive to adaptive learning?

In operationalizing the first two RQs, specifically the term ‘credibly reported’, the review focused on describing methods used in empirical studies. During the early stages of the review it was concluded that the main RQs could not be answered beyond a narrative synthesis, due to reasons which are discussed in the CCAFS report of this study. During a workshop it was decided to revise the review objectives. Specifically, the focus was shifted to a sub-set of the original research questions (namely about research methods) but to conduct it over a broader sample of literature.

This presents an obvious limitation which is to be noted, namely in that the first part of literature gathering was designed and executed for different (a super-set of) goals than those used in final analysis.

Methodology

The overall methodology structuring our research is that of Systematic Review. More specifically, it is a Systematic Review of methods, rather than of evidence. SRs traditionally employ four general components, each of which requires composite methods and follows protocols (Magarey 2001). These four steps are:

1. Collection of Literature
2. Appraisal of Quality
3. Data extraction
4. Data analysis

In this review we collect literature through a structured consultation method called Delphi (Linstone and Turoff 1975).

We do not conduct quality appraisals due to resource constraints. Appraising quality of methods that derive from multiple disciplines and methodological traditions requires substantially more expertise than for evidence reviews in which all included studies use commensurable methods. Added to this is the issue of even treatment, which is difficult in reviews of mixed methods, as methods from different traditions of research require different quality assessment instruments.

Another issue is that of level of reporting and the expected possibility (which was eventually encountered) that reporting of methods in reports might not be sufficient for an examination of validity or other criteria. This is noted as a limitation and a priority area for improvement. More specifically, the methods that our review describes are taken and presented at face value. This should not be taken as an endorsement that they are fit for purpose.

Data extraction and analysis follows an adapted version of ‘construct-centred methods aggregation’ (Delaney *et al.* 2016). This method was designed as part of a previous review (Crane *et al.* Submitted, Delaney *et al.* 2014) and has the purpose of aggregating methods across fields characterised by instability of concepts and terminology. *Indicators* (as defined above), rather than *research question level constructs* are used as the organising unit of analysis, and are aggregated around the simplified representation of food systems framework, defined above.

Collection of literature

We gathered literature through a structured consultation and through drawing from the bibliographies of three recent systematic reviews on similar topics. Although database search is a frequently used replicable method of literature gathering in systematic reviews, we decided against using this method in this review because research on food systems governance has been conducted in many disciplines prior to the relatively recent pairing of these terms, and secondly because among the scholarship that does explicitly use complex frameworks based on FS and governance concepts, much continues to be discipline-specific while interdisciplinary research does not appear to have yet consolidated around a stable set of terminology (Candel 2014, Hospes and Brons 2016). Taken together, these two arguments lead us to doubt the capacity of traditional keyword-based database searches to generate literature pools that are not systematically biased (for example through drawing disproportionately from certain disciplines).

Another reason relates to the purposes of the review. As can be seen from the research questions, our interest is in differences between governance levels and food systems components in terms of operationalization, and in differences between (thematic) types of indicators used to research these aspects of FSG. In other words, we are interested in qualitative contrasts and as such we require a purposive sampling rationale that is thematically- or theory-driven rather than seeking statistical representation of a homogeneous population body of literature.

For these reasons we chose to gather literature using the Delphi structured communication method. A Delphi is a method of structured communication that facilitates knowledge elicitation among a group of experts (Linstone and Turoff 1975). It is characterised by participation of experts and the elicitation of ‘tacit knowledge’, anonymity of respondents, sharing of responses among the group of participants by a facilitator, and the possibility for adjustment of responses over multiple rounds as participants are shown arguments made by others. It differs from standard one-to-one consultation between the reviewer and experts chiefly as participants are

asked to comment the suggestions of others. On the other hand, it differs from focus group discussions in that participation is (nominally) anonymous, while sharing of individual contributions with the group is controlled by the facilitator to counteract relations of dominance and deference that can emerge in a focus group. It differs from ‘one-shot’ consultations as the round-based iterations in which participants first make suggestions and then comment and rate the suggestions of others, which are then fed back to the group in a subsequent round allow participants to adjust their ratings in light of these arguments. Overall, these elements are designed to optimise the tacit knowledge of collectively-held expertise.

Selection of participants

The review drew its panel of expertise primarily from the 13-member Working Group. Involvement of these experts was secured as part of the project design negotiated between the WG and the consultants. Choosing experts in this way was expected to result in a higher response rate and lower dropout rates than with unsolicited requests for participation. There were, however, drawbacks to this means of participant-selection, namely that it could lead to artificial consensus as the experts were already in close communication and, furthermore, the principle of anonymity is compromised. For these reasons, this initial group was asked to nominate additional experts who might be contacted, although the expectation was that the response rate for those outside the WG would be lower. Two additional experts were nominated and participated on this basis, bring the total expert group size to 15.

Topics of questionnaires

There were four topics covered in the Delphi questionnaires. First participants were asked for *keywords* to denote topical areas of relevance to the review. Second, *bibliographic references* to literature suitable for the review were requested. Third, participants were asked to conduct *subjective quality appraisals* on those literatures with which they were familiar, which was to function as a rudimentary quality screen. And fourth, *relevance of literature* was gauged through asking participants to rate the relevance of keywords, and then to match literature to these keywords. Taken together, these four elements were designed to conform to the sampling logic required to address our research objectives². First, asking for nominated articles from experts coming from different disciplines was expected to capture a breadth of research, pools of which would likely be systematically missed in a keyword-based database search. Secondly, article-nominations involved (an initial) theoretical sampling from the population of research, according to the tacit preferences of individual participants. This tacit sampling was then to be formalised

² Note that here we refer to the original RQs of the project. In terms of topical focus, the strategies outlined here remain valid for our revised RQ. The relevance questions, though, became redundant when the review decided to cover a broader sample of literature than initially intended.

through the relevance-rating of keywords which provided a framework for a more structured and consolidated theoretical sampling within the set of returned references.

Round structure

We used a three round Delphi design. This was motivated by (a) the need to gather literature relatively rapidly, and (b) still contain enough iterations to allow some sharing of arguments over disagreements and adjustment of ratings, in other words to get the value of a Delphi study. Questions for the three rounds were designed in outline prior to the commencement of the study, and these outlines were adjusted when constructing questionnaires between rounds taking into account some of the trends in responses received and issues identified during pre-testing of questionnaires. In this report we describe the questionnaires which were finally used. Questionnaires were online and live for one week per round (with some flexibility if respondents said they needed more time), with one week between rounds for analysis and questionnaire construction for the following round.

Round 1

In the first round participants were shown a description of the project and simply asked to submit up to five keywords. They were then asked to submit between 15 and 25 references to research reports, which should be empirical, topical, methodologically sound, and well documented.

For analysis, both sets of open-ended data were exported and cleaned. 14 responses were received for question 1, each submitting 5 keywords. The set of keywords was examined for duplications and possible mergers which were synthesised interpretively by a team member with SR experience (Aogán Delaney) with these mergers reviewed by a team member with topical expertise (Tom Evans). Two mergers were rejected and four were approved. Removing duplicates, synthesis, and addition of late responses (which were therefore not included in synthesis, but for which duplications could be removed) reduced the set from a raw 70 to 50. This final synthesised set of keywords was then brought forward for Round 2 and is shown in the table below:

Keyword	Number of nominations	Keyword	Number of nominations
food security	4	Governance for food and nutrition security	1
food systems	4	Governance for local and global public goods	1
governance	4	governance indicators	1

adaptive governance	3	information asymmetry	1
multi-level/polycentric governance	3	institutional barriers	1
adaptive capacity	2	institutional fit	1
cross-scale linkages	2	Investments in resources and food systems	1
equity & power	2	markets	1
Food sustainability	2	Modernization Theory	1
institutions	2	Multiple drivers of change, including climate change	1
political-economy	2	nutritional outcome	1
Access	1	Political Settlements	1
adaptive/social/transformational learning	1	Politics	1
Agricultural Inputs	1	Private sector regulation	1
Causality	1	property rights	1
Co-existing food systems	1	public-private partnerships	1
community	1	Reduction of poverty and inequality	1
coordination	1	Resilience	1
Cross-sectoral governance	1	Right to food	1
environmental impacts	1	risk management	1
experience-based food security	1	samaritan's dilemma	1
food policy	1	social-ecological resilience	1
food regimes	1	stakeholders/next users	1
Gender and governance	1	Subsidies	1
governance arrangements	1	Subsistence	1

10 participants submitted responses to question 2. Prior to removing duplicates, 118 references were received. These bibliographic references were assembled, duplications removed and a project index of subject literature was created. Removal of duplicates (Adger 2001, Sahley *et al.* 2005, Armitage 2007, Lang and Barling 2012, Pérez-Escamilla 2012, Esnouf *et al.* 2013, Jacobi, Schneider, Bottazzi, *et al.* 2015) reduced this set to 111 unique records, which were assigned a project index ID.

A fuller description of results and analysis of Round 1 can be found in Appendix A.

Round 2

In Round 2 participants were asked to rate the relevance of keywords (very relevant, some relevance, little or no relevance), and encouraged to provide justification for extreme ratings.

They were then given the opportunity to nominate additional keywords if they felt certain topical areas were underrepresented in the set of keywords generated in Round 1. In the next section, article references were shown and participants were asked to indicate how familiar they were with them, choosing from the values 'I have never heard of this study', 'I am aware of this study but have not read it properly', 'I know this study well', and 'I was involved in this study'. Depending on their responses, participants were then shown article title, authors, and abstracts of articles to which they were familiar (i.e. responded 'I know this study well') but not biased (i.e. did not respond 'I was involved in this study') and asked to provide a subjective quality rating, choosing from the values 'very poor', 'poor', 'mixed', 'good', or 'very good', and to explain their rating. Towards the end of the questionnaire respondents were asked to address any evidence gaps. This was done through presenting the respondent with a list of keywords they had rated as 'very relevant' and asking them for any keyword which they thought had not been adequately covered by the references they had seen to provide a bibliographic reference to an empirical report to partly fill that evidence gap. Finally, the chance was given for respondents to provide email contacts so we could tailor questionnaires in the following Round based on keyword and article ratings provided in this round.

It had originally been intended to include a question in this Round where respondents would match articles to keywords so as to determine relevance of articles. However, with 50 keywords to match to 105 references³ the task became too burdensome, both for respondents and for the survey software. This is because we expected considerable overlap in respondents' nominations in Round 1 which did not materialise. Therefore the task was deferred until Round 3 when it was expected that there would be less keywords and references after the ratings of Round 2.

10 respondents answered questions on keyword ratings, while eight answered questions on familiarity and quality of references. Analytically, the second Round had two purposes: (1) to streamline the questionnaire for Round 3 by excluding⁴ articles and keywords on the basis of relevance and quality so as to lower response burden; and (2) to gather and order ratings responses in such a way that they could be fed back to participants in Round 3. To pursue the first purpose, we designed the following three sets of protocols for keyword relevance, article familiarity, and article quality.

³ Although 111 references had been nominated in Round 1, six were submitted too late to be included in Round 2.

⁴ Note that by 'exclude' we mean to exclude from the Round 3 questionnaire, not necessarily from the project. For instance, including articles that only one person knows about in a Delphi questionnaire yields no value, while excluding them could reduce burden considerably. However, it makes no sense to exclude an article from the review just because only one person knows about it.

Protocols for exclusion of keywords based on relevance		
Protocol	Criteria	Result
KRP1.	A keyword receives both 'of little or no relevance' and 'very relevant' ratings.	Relevance level not yet determined. Results and commentary to be fed to respondents in Round 3. Keyword is brought forward for article-coverage ratings if respondent has rated as very relevant.
KRP2.	A keyword with more than 50% responses as 'somewhat relevant' with the remainder of responses either 'of little or no relevance' or 'very relevant' but not both.	Relevance level not yet determined. Results and commentary to be fed to respondents in Round 3.
KRP3.	A keyword has received 50% or more responses as 'of little or no relevance', and no ratings of 'very relevant'	Keyword is considered not relevant. Excluded from further analysis.
KRP4.	A keyword has received 50% or more responses as 'very relevant', and no ratings of 'of little or no relevance'.	Keyword is considered very relevant. Included in remainder of project, and exempt from repeat ratings in round 3. Keyword is automatically brought forward for article-coverage ratings.
KRP5.	A keyword receives 100% 'some relevance' ratings.	Keyword is considered somewhat relevant. Exempt from repeat ratings. Not included in article-coverage ratings.

Protocol for exclusion of articles from Delphi Round 3 according to article familiarity			
Protocol	Criteria	Result	Rationale
PRF1	No respondent has indicated that they know the study well or have been involved in the study.	Check for Protocol PRF2.	Delphi works best when combining knowledge of respondents. Based on the results of Round 2, those who have responded in this way cannot give us an indication of coverage.
PRF2	The study has met exclusion protocol PRF1 and further more than 50% of respondents have indicated that they never heard of the study.	Exclude this study from keyword-coverage ratings.	The familiarity level is quite low, indicating that the chances of getting two or more respondents from those who did not respond in R2 to be sufficiently familiar to be eligible for keyword-coverage ratings is also quite low.

Protocol for exclusion of articles based on quality ratings			
Protocol	Criteria	Result	Rationale
PQA1	One or less respondents rated the article.	Quality unknown.	More than one expert judgement is required in order for the Delphi results to be strong enough to be accepted.
PQA2	At least two respondents rated the	Quality unknown.	No indication has been given as to the quality of the article one way or

	article, all of whom rated 'mixed'.		the other, nor are comments provided likely to sway respondents.
PQA3	At least two respondents rated the article, with at least one rating 'very poor' or 'poor' and none rating 'good' or 'very good'.	Poor quality article. Remove from analysis.	There is a consensus among raters that the article is of poor quality.
PQA4	At least two respondents rated the article, with at least one rating 'very good' or 'good' and none rating 'poor' or 'very poor'.	Quality article	There is a consensus among raters that the article is of good quality.
PQA5	At least two respondents rated the article, with at least one rating 'very good' or 'good' and at least one rating 'poor' or 'very poor'.	Quality not yet determined. Repeat ratings if commentary for at least one rating has been given.	There is disagreement among respondents about the quality of the article. Commentary might persuade some respondents to re-evaluate their ratings.

Application of the keyword relevance protocol resulted in: the exclusion of one keyword from the remainder of the project; 13 keywords were considered very relevant and were to be used in article-coverage questions in Round 2 but exempt from further relevance-ratings; 23 keywords had significant disagreement, were to be subject to re-rating, with 14 of them to be used in article-coverage questions; and 8 keywords whose relevance was not determined but where there was a tendency towards 'somewhat relevant' – these were to be re-rated, and four of them to be used in article-coverage questions. In addition, 8 new keywords were nominated in Round 2, all of which were to be relevance-rated and article-coverage-rated in Round 3.

Application of reference familiarity protocol resulted in 56 references meeting PRF 1, which were further inspected for protocol PRF2, 4 of which were re-included on the bases of moderate levels of familiarity. Therefore, 52 out of 105 articles rated in Round 2 were to be excluded from Round 3. Recall that 6 references had been submitted in Round 1 after the deadline and were not included in the questionnaire for Round 2. These were to be included in familiarity and for those with appropriate levels of familiarity, keyword-coverage ratings in Round 3.

As for the quality protocol, of the 105 references in Round 2, only 42 received quality ratings. Among those articles which received ratings, 27 were rated by only one respondent, thus resulting in unknown quality according to PQA1. The remaining 15 were all rated as either 'good' or 'very good'. According to PQA4 these are being considered good quality articles. Therefore, none of the 105 articles from Round 2 were to be returned for repeat quality appraisals in Round 3, nor were any to be excluded from the project.

Finally, 31 additional references were nominated in Round 2 to address evidence gaps. 5 of these correspond to the 6 late nominations in Round 1, while within the set of new nominations, one reference was nominated by two different respondents. As such 25 new unique records were nominated. They were added to the project index and included in both familiarity and keyword-coverage ratings in Round 3.

A full account of protocols analysis and results for Round 2 is in Appendix B

Round 3

In Round 3 the participating experts were first asked to re-rate the relevance of keywords. For each keyword, the distribution of Round 2 responses was presented along with all arguments made in support of these ratings, and respondents were asked again to rate the relevance, choosing from the values ‘of little or no relevance’, ‘some relevance’, or ‘very relevant’. Following this, those keywords newly submitted in Round 2 to address topical gaps were presented, accompanied by the justification given by its nominator, and respondents were asked to rate relevance in the same way.

After keywords, the questionnaire moved on to references. In general, for each article the reference was provided and participants were asked ‘How familiar are you with this study?’, with the options ‘I know this study well’, ‘I was involved in this study’, or if they had never heard of it or not read it properly they were instructed to leave the question blank and click next, which brought them straight to the next reference. Where either of the above two values were selected, the 39 relevant (or potentially relevant) keywords were shown and the respondent was asked to choose 5 topics which the study covered best. In addition, for those who indicated ‘I know this study well’ they were asked to rate the study for quality, again using the values ‘very poor’, ‘poor’, ‘mixed’, ‘good’, or ‘very good’, although explanations were not asked for on this occasion as there would be no future Round to feed them back to participants. This general model was altered for those participants who had given emails in Round 2 and tailored questionnaires were given to them which excluded any repeat or irrelevant questions.

A full analysis of Round 3 was not performed. This is because at the time that R3 was closed, attention was focussed on conducting an analysis of the literature prior to a mid-term workshop. At the workshop it was decided to refine the project objectives and also to work with a broader set of literature. This effectively meant that relevance screening would not be required (thus eliminating the need to analyse responses to keyword relevance and article-keyword coverage). It was also observed in Round 2 that the low level of common knowledge of articles meant that the quality questions would not make good use of combined expertise. As such, the only results of relevance going forward were the total set of reference nominations. It is the intention of the authors to conduct a full diagnosis of this Delphi instrument, and for that the responses of Round 3 will be analysed. Readers interested in this analysis are advised to contact the authors for updates.

Templates of the questionnaires used in each of the Rounds can be found in Appendix C. Questionnaires were constructed with the software limesurvey, and googleforms. Responses were analysed using Excel and SPSS.

Results of consultation

Overall, 15 experts took part in the consultation (one of whom joined in Round 3). The response rates in for each of the rounds are given below:

Round	Invited	Responded to		Response rate	
		keywords	articles	keywords	articles
1	14	14	10	100%	71%
2	14	10	8	71%	57%
3	15	9	9	60%	60%

In total, we received 52 keywords which a majority of respondents considered at least of some relevance to the topic (although this has yet to be finalised with a proper analysis of the results of R3), and 136 articles. We did not go further to select most relevant articles based on keyword coverage because it was at the time that analysis of Round 3 was being done that the priorities of project were discussed and changed. The number and scope of research questions was narrowed, while *all* empirical references submitted were now to be analysed (plus additional references gathered through additional sampling; see below).

An immediate limitation is that of the 136 references nominated over the first two rounds, 70 (51.5%) were subsequently excluded as non-empirical, despite that the questionnaire asked specifically for empirical pieces. There are three possible explanations for this: First, the request for empirical references might not have been communicated well. A second possibility is that participants did not know of so many empirical studies. This could be because researchers rely on landmark summary or review articles to keep abreast of developments, rather than continuously reading new primary studies. A third explanation is that there are few empirical studies in existence. This latter possibility is supported by the SR by Candel, as our 51.5:48.5 percent split between non-empirical and empirical is roughly consistent with, but an improvement upon, the 69:31 split in his review (2014). At this time we are not in a position to make further comment on these possible explanations, but it is intended to examine this more thoroughly in the future.

The result with most significant implications is that of inter-group knowledge of works. Among the 118 references nominated individually in Round 1, only 7 were duplications, with the remaining 104 receiving only single nominations. Of the 105 references included in the Round 2 questionnaire, 52 received more than 50% of respondents indicating that they never heard of it and did not receive any respondents who indicated that they knew it well or that they were

involved in it. In other words, agreement on what counts as *key* works in the field of Food Systems Governance is extremely low, and roughly half of the articles submitted by the panel of experts were not known about to any significant extent by the others.

An unfortunate corollary is that we did not get full benefit of the Delphi in the area we expected: interaction and a group opinion on articles (although we did get this with keywords). As such, the Delphi instrument in practice was successful only for *nominating* references through consultation, but not for the screening of such references. We are not yet in a position to evaluate the value of this nomination exercise as a form of theoretical sampling, but we plan to do so in the near future and interested readers are advised to contact the authors for any updates.

However, one unexpected benefit of this consultation was that it revealed possible communities within the field. Even allowing for the effects of difference in response rates between rounds (we would naturally expect respondents to be more familiar with those references they had submitted themselves), if it is assumed that the Effective Indicators Working Group membership, plus 2 additional experts, is at least in any way indicative of food systems governance scholars more generally, then these results would indicate that works on food security or food systems governance are not widely known across a multi-disciplinary community of experts. What this would suggest, then, is a high degree of disciplinary-segregation and a lack of cross-disciplinary engagement with works (supporting an observation made by Candel (2014)) in what is often portrayed as a multi-disciplinary field.

On the one hand, we cannot be confident that all relevant communities have been sampled through the Delphi consultation (the low level of overlap between sets of nominations would suggest we are far from saturation). This remains a limitation until such time as this pilot application of the Delphi instrument for literature gathering can be evaluated.

On the other hand, it was suspected that had we opted to simply conduct a database search as is standard in SRs it is possible we would have found ourselves in one of those discreet communities. To test this hypothesis, we compared the literature we gathered with the literature examined in the SR of food systems governance (Hospes and Brons 2016), as this was the review of closest topical relevance to the present project. Only seven references were common to both sets (Lebel *et al.* 2006, Rocha and Lessa 2009, Termeer *et al.* 2010, Mount 2011, Pereira and Ruysenaar 2012, Candel 2014, Sonnino *et al.* 2014), meaning that there were 129 articles which were not picked up by their search. This result implies that there are significant works which are not being picked up through searches based on keywords deriving from ‘governance’, and ‘food systems’. On the other hand, Hospes and Brons’ review included around 80 articles which were not gathered through Delphi, indicating that our set of references is also a partial representation of the field (although the goal of the Delphi process was to generate a theoretically representative rather than comprehensive set of literature).

Sampling from SR bibliographies

Given this disconnect, it was then decided to sample articles from the bibliographies of the three recent SRs (Bizikova, Echeverría, *et al.* 2014, Candel 2014, Hospes and Brons 2016). We first expanded the diagnostic by comparing the Delphi-generated set of references with the total set of references included in the three SRs. Prior to removal of duplications, the three SRs yield 194 hits. 6 references were found to be in more than one SR (i.e. duplicates), while 20 (Sahley *et al.* 2005, Lebel *et al.* 2006, Koc *et al.* 2008, Rocha and Lessa 2009, von Braun 2009, Biermann and Boas 2010, Drimie and Ruysenaar 2010, Garcia and Rosenberg 2010, Termeer *et al.* 2010, Ziervogel and Ericksen 2010, Juhola and Westerhoff 2011, Mount 2011, Edwards 2012, Huntjens *et al.* 2012, Lang and Barling 2012, Pereira and Ruysenaar 2012, Pérez-Escamilla 2012, Galiè 2013, Candel 2014, Sonnino *et al.* 2014) were common with our pool of 136. Removing these yielded a total of 168 unique new references. These were added to the project index.

Each of these 168 articles was then abstract-screened to see whether or not it was empirical. Screening revealed 103 non-empirical articles, 54 empirical⁵, 5 references for which an abstract could not be found, and 6 which were ambiguous. References for these 54 empirical articles were then sent to the EIWG in one final round of consultation, asking each respondent to select up to five references which they considered to be particularly relevant, innovative, or path-breaking in terms of methods used. They were also given the opportunity to submit any new references, particularly those published since 2013 (i.e. published after the searches and which would therefore not have been found by the SRs). Four WG members responded, nominating 16 references⁶ out of the set of 54 (19 individual nominations prior to removal of duplications). Additionally, 4 new references were nominated. Around the same time, one author, who was contacted in order to request a copy of his article as it was not accessible to the review team, recommended an additional reference. This was also included in the project index (although it was not analysed according to protocol; see subsection: Chasing missing data).

Citations followed

One final source of articles was that during analysis, in some cases insufficient methodological detail was reported in the primary article, and following a protocol, cited references were consulted. The procedure for this is described in more detail in the section on Analysis. 38 references were followed in this way, of which 25 were accessible. Two further accessible references were tracked down through snowballing from these 25. Thus, these 27 were also

⁵ One of these (Vermeulen *et al.* 2012) was later found to be non-empirical (i.e. false positive). This non-empirical article was included in the set of articles from which a sample was drawn by the WG and so the figures reported on here are those which were believed to be the case at the time of sampling. Corrected figures are reported in the flow chart at the end of this section.

⁶ One of which was later found to be non-empirical. See previous footnote.

added to the project index, although their analysis did not follow the same protocol as for all other included articles – see sub-section ‘chasing missing data’ for reasons. This brought the total number of records which were at the very least screened in the project to 337. The project index can be found in Appendix D, which includes information on from where they were submitted, and on future screening through the review.

Screening

There were two criteria for full inclusion in the review: articles must be (a) accessible; and (b) empirical⁷.

Full text copies of 156 references were sought. This comprised all 136 references collected through Delphi, and all 16 references sampled from previous SRs, and the 4 additional nominations. Of the 4 new nominations, copies of three were submitted directly by nominators. 119 references were accessed either through our academic library or could be retrieved open access. Of the 34 remaining references, copies of 5 were acquired from the persons nominating them during the Delphi consultation. For the remaining 29, we set about contacting authors to request copies. To minimise burden on authors, only authors of empirical studies were to be contacted⁸, and only those in portable format – meaning not books – as copies were to be requested via email (exclusion of books might be a source of systematic bias. Some sub-fields may be more accustomed to publishing in books than in journal articles. Books may be preferable formats to document methods than journal articles. This is noted as a limitation). Therefore abstracts of these 29 were read to screen out non-empirical and non-portable publications. 20 references were excluded on this basis. Contact details for corresponding authors of the remaining 9 were then searched for. 8 email addresses were retrieved, while one article was excluded as no contact info could be found. Of those 8 authors contacted, 6 responded and provided a copy of the requested article⁹.

Thus, full-text copies of 133 references were accessed (119 through academic library or open access; 8 copies submitted by nominators; 6 shared by authors upon request).

Each of these was brought forward for coding. Those articles which had not been abstract-appraised as part of sampling from previous SRs were screened during the first step of coding to

⁷ Although logically it would make more sense to apply these filters in the opposite order, screening began during an early stage of the review with a broader set of research questions, and when conclusions of non-empirical articles were still to be reviewed. Therefore, initially, full text copies were downloaded and were subsequently coded. For the analysis recounted in this report, only empirical articles were used. For reasons of transparency, steps are reported in the order in which they were executed.

⁸ By the time this step was executed, the project objectives had been finalised and only empirical articles were to be included in the review.

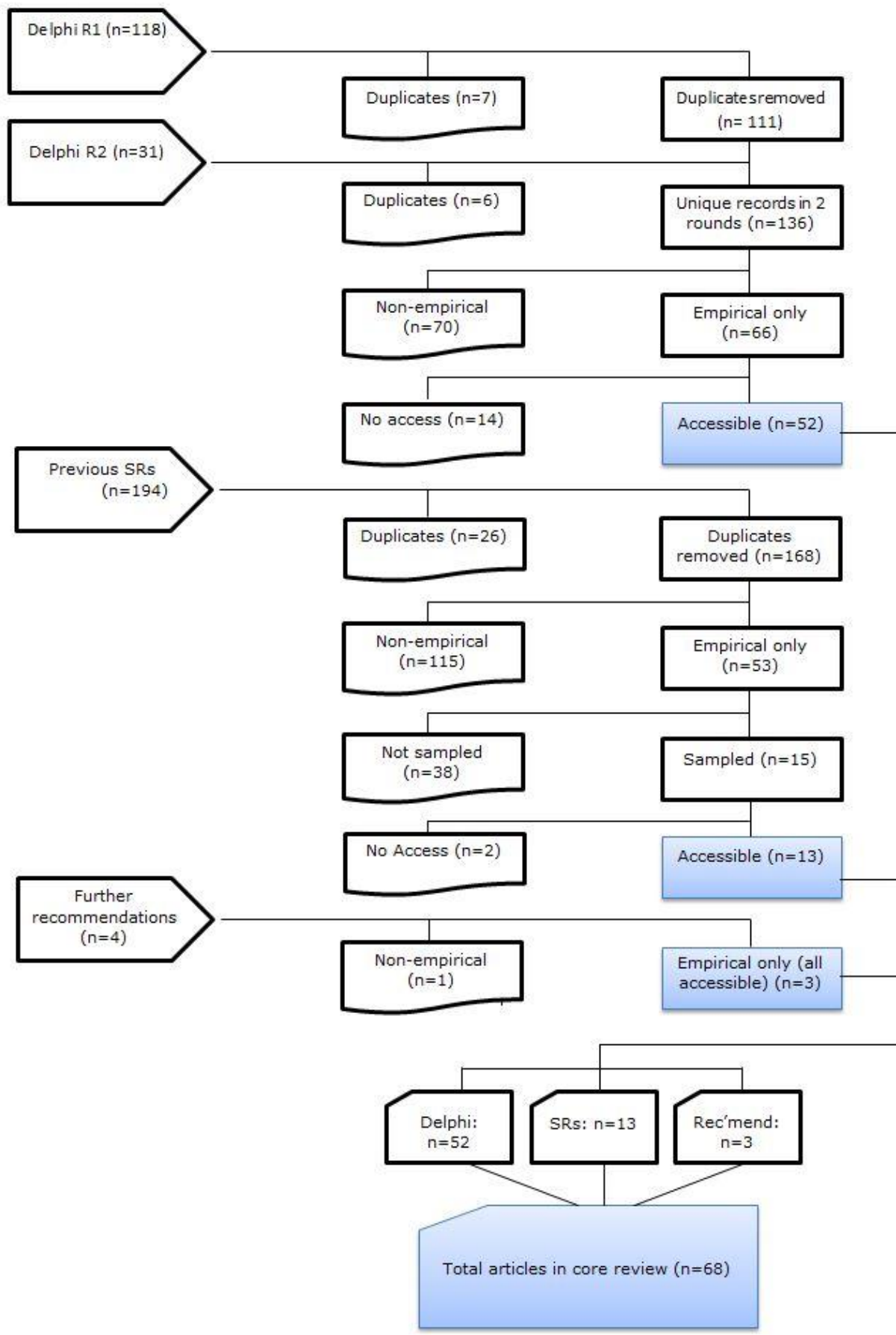
⁹ One of whom nominated an additional article. This is described in sub-section ‘Chasing missing data’

screen out non-empirical articles. Due to administrative practicalities of the project, appraisal was done in two batches. In the first batch, abstracts were coded (including abstract appraisal) by a team of 7 reviewers (Jordan Blekking; Aogán Delaney; Paul McCord; John McGreevy; Tyler Schlachter; Katie Thompson; Jacob Weger), and cross-checked by the lead reviewer (Aogán Delaney). Where there was disagreement, abstracts were sent to another member of the review team (Peter Tamás). In the second batch of coding, abstracts¹⁰ were only appraised by one reviewer.

Not counting the 20 references which were excluded as non-empirical or books prior to contacting authors, nor those not sampled from the previously SRs, 65 articles were excluded as they were not empirical. This includes 6 articles over which there was intercoder disagreement, which was finally resolved in classifications as non-empirical (see Appendix E for details of this resolution). 63 of the 65 were gathered in the Delphi process; one (Vermeulen *et al.* 2012) was a false positive from the SR bibliographies; and another (Leach *et al.* 2010) was from among the 4 new submissions.

Two further articles (Wertz-Kanounnikoff and McNeill 2012, Schader *et al.* 2014) were coded as non-empirical but subsequently re-included in the review as they constituted reviews of methods and would therefore contain descriptions of indicators of relevance to the project. This, therefore, left 68 articles included in the full review (66 empirical plus 2 methods reviews). The entire search and screening process is represented in the Prisma diagram below; these set of 68 included articles are listed in the table below; and details of screening for each reference of the project are contained in the project index in Appendix D.

¹⁰ During the review it became apparent to us that the abstract is not a reliable indicator of whether an article is empirical or not. This is partly to do with robustness and boundedness of our understanding of 'empirical': Many instances of uncertainty or disagreement surrounded articles which were reviews of evidence, position pieces which drew on research (often done by the same authors), and introductions to special issues, or articles which present a methodological framework and apply it only for illustrative purposes. However, there were other instances where abstracts simply did not provide enough information to make an inference.



List of records included in full review		
Project ID	Short reference	Full Reference
EGRRef#002	Adger <i>et al.</i> (2005)	Adger, W.N., Brown, K., and Thompkins, E.L., 2005. The political economy of cross-scale networks in resource co-management. <i>Ecology and Society</i> , 10 (2), 9.
EGRRef#005	Auld (2010)	Auld, G., 2010. Assessing certification as governance: effects and broader consequences for coffee. <i>The Journal of Environment & Development</i> , 19 (2), 215-241.
EGRRef#010	Biermann <i>et al.</i> (2012)	Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M.M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P.M., Jordan, A., Kanie, N., Kluvánková-Oravská, T., Lebel, L., Liverman, D., Meadowcroft, J., Mitchell, R.B., Newell, P., Oberthür, S., Olsson, L., Pattberg, P., Sánchez-Rodríguez, R., Schroeder, H., Underdal, A., Vieira, S.C., Vogel, C., Young, O.R., Brock, A., and Zondervan, R., 2012. Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project. <i>Current Opinion in Environmental Sustainability</i> , 4 (1), 51-60.
EGRRef#014	Boons and Mendoza (2010)	Boons, F. and Mendoza, A., 2010. Constructing sustainable palm oil: how actors define sustainability. <i>Journal of Cleaner Production</i> , 18 (16-17), 1686-1695.
EGRRef#017	Candel (2014)	Candel, J.J.L., 2014. Food security governance: a systematic literature review. <i>Food Security</i> , 6 (4), 585-601.
EGRRef#018	Chibinga <i>et al.</i> (2010)	Chibinga, O.C., Musimba, N.M., Nyangito, M., and Simbaya, J., 2010. Climate variability: pastoralists' perception, practices and enhancing adaptive pasture use for food security in Choma district, southern Zambia. In: <i>RUFORUM Second Biennial Meeting</i> . Presented at the RUFORUM, Entebbe, Uganda.
EGRRef#019	Clapp (2003)	Clapp, J., 2003. Transnational corporate interests and global environmental governance: negotiating rules for agricultural biotechnology and chemicals. <i>Environmental Politics</i> , 12 (4), 1-23.
EGRRef#020	Cooper and Wheeler (2015)	Cooper, S.J. and Wheeler, T., 2015. Adaptive governance: livelihood innovation for climate resilience in Uganda. <i>Geoforum</i> , 65, 96-107.
EGRRef#021	Douxchamps <i>et al.</i> (2015)	Douxchamps, S., Wijk, M.T.V., Silvestri, S., Moussa, A.S., Quiros, C., Ndour, N.Y.B., Buah, S., Somé, L., Herrero, M., Kristjanson, P., Ouedraogo, M., Thornton, P.K., Asten, P.V., Zougmore, R., and Rufino, M.C., 2015. Linking agricultural adaptation strategies, food security and vulnerability: evidence from West Africa. <i>Regional Environmental Change</i> , 1-13.
EGRRef#022	Drimie and Ruysenaar (2010)	Drimie, S. and Ruysenaar, S., 2010. The integrated food security strategy of South Africa: an institutional analysis.
EGRRef#023	DuPuis and Gillon (2008)	DuPuis, E.M. and Gillon, S., 2008. Alternative modes of governance: organic as civic engagement. <i>Agriculture and Human Values</i> , 26 (1-2), 43-56.
EGRRef#028	Evans (2011)	Evans, A., 2011. Governance for a resilient food system. <i>Oxfam Policy and Practice: Agriculture, Food and Land</i> , 11 (2), 63-92.
EGRRef#029	Finan and Nelson (2001)	Finan, T.J. and Nelson, D.R., 2001. Making rain, making roads, making do: public and private adaptations to drought in Ceará, northeast Brazil. <i>Climate Research</i> , 19 (2), 97-108.
EGRRef#031	Galiè (2013)	Galiè, A., 2013. Governance of seed and food security through participatory plant

		breeding: empirical evidence and gender analysis from Syria. <i>Natural Resources Forum</i> , 37 (1), 31-42.
EGRRef#037	Hesselberg and Yaro (2006)	Hesselberg, J. and Yaro, J.A., 2006. An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. <i>GeoJournal</i> , 67 (1), 41-55.
EGRRef#038	Holden and Lunduka (2010)	Holden, S. and Lunduka, R., 2010. <i>Too poor to be efficient? Impacts of the targeted fertilizer subsidy programme in Malawi on farm plot level input use, crop choice and land productivity</i> . Norway: Department of International Environment and Development Studies, Noragric, No. 55.
EGRRef#040	Huntjens et al. (2012)	Huntjens, P., Lebel, L., Pahl-Wostl, C., Camkin, J., Schulze, R., and Kranz, N., 2012. Institutional design propositions for the governance of adaptation to climate change in the water sector. <i>Global Environmental Change</i> , 22 (1), 67-81.
EGRRef#042	Jacobi, Schneider, Bottazzi, et al. (2015)	Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Calizaya, P., and Rist, S., 2015. Agroecosystem resilience and farmers' perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. <i>Renewable Agriculture and Food Systems</i> , 30 (02), 170-183.
EGRRef#043	Juhola and Westerhoff (2011)	Juhola, S. and Westerhoff, L., 2011. Challenges of adaptation to climate change across multiple scales: a case study of network governance in two European countries. <i>Environmental Science & Policy</i> , 14 (3), 239-247.
EGRRef#044	Kochar (2005)	Kochar, A., 2005. Can targeted food programs improve nutrition? An empirical analysis of India's public distribution system. <i>Economic Development and Cultural Change</i> , 54 (1), 203-235.
EGRRef#046	Korhonen-Kurki et al. (2014)	Korhonen-Kurki, K., Sehring, J., Brockhaus, M., and Gregorio, M.D., 2014. Enabling factors for establishing REDD+ in a context of weak governance. <i>Climate Policy</i> , 14 (2), 167-186.
EGRRef#047	Lebel et al. (2006)	Lebel, L., Anderies, J., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T., and Wilson, J., 2006. Governance and the capacity to manage resilience in regional social-ecological systems. <i>Ecology and Society</i> , 11 (1), 19.
EGRRef#048	Leith et al. (2012)	Leith, P., Jacobs, B., Brown, P.R., and Nelson, R., 2012. A participatory assessment of NRM capacity to inform policy and practice: cross-scale evaluation of enabling and constraining factors. <i>Society & Natural Resources</i> , 25 (8), 775-793.
EGRRef#052	Mandemaker et al. (2011)	Mandemaker, M., Bakker, M., and Stoorvogel, J., 2011. The role of governance in agricultural expansion and intensification: a global study of arable agriculture. <i>Ecology and Society</i> , 6 (12), 8.
EGRRef#053	Masiero (2015)	Masiero, S., 2015. Redesigning the Indian food security system through e-governance: the case of Kerala. <i>World Development</i> , 67, 126-137.
EGRRef#055	Minde et al. (2008)	Minde, I.J., Jayne, T., Crawford, E., Ariga, J., and Jones, G., 2008. <i>Promoting fertilizer use in Africa: current issues and empirical evidence from Malawi, Zambia, and Kenya</i> . East Lansing: Michigan State University, Department of Agricultural, Food, and Resource Economics, No. 54501.
EGRRef#057	Nelson and Finan (2009)	Nelson, D.R. and Finan, T.J., 2009. Praying for drought: persistent vulnerability and the politics of patronage in Ceará, northeast Brazil. <i>American Anthropologist</i> , 111 (3), 302-316.
EGRRef#059	Osborne et al. (2010)	Osborne, H., Twyman, C., Adger, W.N., and Thomas, D.S.G., 2010. Evaluating successful livelihood adaptation to climate variability and change in southern Africa. <i>Ecology and Society</i> , 15 (2), 27.
EGRRef#060	Osborne et al. (2008)	Osborne, H., Twyman, C., Neil Adger, W., and Thomas, D.S.G., 2008. Effective livelihood adaptation to climate change disturbance: scale dimensions of practice in Mozambique.

		<i>Geoforum</i> , 39 (6), 1951-1964.
EGRRef#062	Pedersen and Benjaminsen (2007)	Pedersen, J. and Benjaminsen, T.A., 2007. One leg or two? Food security and pastoralism in the northern Sahel. <i>Human Ecology</i> , 36 (1), 43-57.
EGRRef#065	Pesqueira and Glasbergen (2013)	Pesqueira, L. and Glasbergen, P., 2013. Playing the politics of scale: Oxfam's intervention in the Roundtable on Sustainable Palm Oil. <i>Geoforum</i> , 45, 296-304.
EGRRef#070	Poteete and Ostrom (2004)	Poteete, A.R. and Ostrom, E., 2004. Heterogeneity, group size and collective action: the role of institutions in forest management. <i>Development and Change</i> , 35 (3), 435-461.
EGRRef#071	Quinn <i>et al.</i> (2011)	Quinn, C.H., Ziervogel, G., Taylor, A., Takama, T., and Thomalla, F., 2011. Coping with multiple stresses in rural South Africa. <i>Ecology and Society</i> , 16 (3), 2.
EGRRef#074	Rocha and Lessa (2009)	Rocha, C. and Lessa, I., 2009. Urban governance for food security: the alternative food system in Belo Horizonte, Brazil. <i>International Planning Studies</i> , 14 (4), 389-400.
EGRRef#075	Sahley <i>et al.</i> (2005)	Sahley, C., Groelsema, B., Marchione, T., and Nelson, D., 2005. <i>The governance dimensions of food security in Malawi</i> . USAID.
EGRRef#076	Schader <i>et al.</i> (2014)	Schader, C., Grenz, J., Meier, M., and Stolze, M., 2014. Scope and precision of sustainability assessment approaches to food systems. <i>Ecology and Society</i> , 19 (3), 42.
EGRRef#077	Schouten <i>et al.</i> (2012)	Schouten, G., Leroy, P., and Glasbergen, P., 2012. On the deliberative capacity of private multi-stakeholder governance: the Roundtables on Responsible Soy and Sustainable Palm Oil. <i>Ecological Economics</i> , 83, 42-50.
EGRRef#078	Sonnino <i>et al.</i> (2014)	Sonnino, R., 2013. Local foodscapes: place and power in the agri-food system. <i>Acta Agriculturae Scandinavica, Section B – Soil & Plant Science</i> , 63 (sup1), 2-7.
EGRRef#079	Spielman <i>et al.</i> (2008)	Spielman, D.J., Cohen, M.J., and Moguees, T., 2008. <i>Mobilizing rural institutions for sustainable livelihoods and equitable development: a case study of local governance and smallholder cooperatives in Ethiopia</i> . Washington, DC: International Food Policy Research Institute.
EGRRef#081	Tompkins and Adger (2004)	Tompkins, E.L. and Adger, W.N., 2004. Does adaptive management of natural resources enhance resilience to climate change? <i>Ecology and Society</i> , 9 (2), 10.
EGRRef#083	Umali-Deininger and Deininger (2001)	Umali-Deininger, D.L. and Deininger, K.W., 2001. Towards greater food security for India's poor: balancing government intervention and private competition. <i>Agricultural Economics</i> , 25 (2-3), 321-335.
EGRRef#084	von Geibler (2013)	von Geibler, J., 2013. Market-based governance for sustainability in value chains: conditions for successful standard setting in the palm oil sector. <i>Journal of Cleaner Production</i> , 56, 39-53.
EGRRef#085	Wertz-Kanounnikoff and McNeill (2012)	Wertz-Kanounnikoff, S. and McNeill, D., 2012. Performance indicators and REDD+ implementation. In: A. Angelsen, M. Brockhaus, W.D. Sunderlin, and L. Verchot (eds), <i>Analysing REDD+: Challenges and Choices</i> (pp. 233-246). CIFOR, Bogor, Indonesia.
EGRRef#089	Acemoglu <i>et al.</i> (2009)	Acemoglu, D., Johnson, S., Robinson, J.A., and Yared, P., 2009. Reevaluating the modernization hypothesis. <i>Journal of Monetary Economics</i> , 56 (8), 1043-1058.
EGRRef#102	Jacobi, Schneider,	Jacobi, J., Schneider, M., Mariscal, M.P., Huber, S., Weidmann, S., Bottazzi, P., and Rist, S., 2015. Farm resilience in organic and nonorganic cocoa farming systems in Alto

	Mariscal, <i>et al.</i> (2015)	Beni, Bolivia. <i>Agroecology and Sustainable Food Systems</i> , 39 (7), 798-823.
EGRef#104	Kay (2002)	Kay, C., 2002. Why East Asia overtook Latin America: agrarian reform, industrialisation and development. <i>Third World Quarterly</i> , 23 (6), 1073-1102.
EGRef#105	Khan (2011)	Khan, M., 2011. <i>Political settlements and the governance of growth-enhancing institutions</i> . London: School of Oriental and Africa Studies.
EGRef#119	Füssel (2010)	Füssel, H.-M., 2010. How inequitable is the global distribution of responsibility, capability, and vulnerability to climate change: a comprehensive indicator-based assessment. <i>Global Environmental Change</i> , 20 (4), 597-611.
EGREF#123	Kabubo-Mariara (2007)	Kabubo-Mariara, J., 2007. Land conservation and tenure security in Kenya: Boserup's hypothesis revisited. <i>Ecological Economics</i> , 64 (1), 25-35.
EGREF#131	Purdon (2013)	Purdon, M., 2013. Land acquisitions in Tanzania: strong sustainability, weak sustainability and the importance of comparative methods. <i>Journal of Agricultural and Environmental Ethics</i> , 26 (6), 1127-1156.
EGREF#135	Wambugu <i>et al.</i> (2015)	Wambugu, S.W., Chomba, S.W., and Atela, J., 2015. Institutional arrangements for climate-smart landscapes. In: P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw, and D. Catacutan, editors. <i>Climate-Smart Landscapes: Multifunctionality in Practice</i> . Nairobi: World Agroforestry Centre (ICRAF).
EGREF#136	Wilbanks and Kates (2010)	Wilbanks, T.J. and Kates, R.W., 2010. Beyond adapting to climate change: embedding adaptation in responses to multiple threats and stresses. <i>Annals of the Association of American Geographers</i> , 100 (4), 719-728.
EGREF#145	Barungi (2013)	Barungi, J., 2013. <i>Agri-food system governance and service delivery in Uganda: a case study of Tororo District</i> . No. 61.
EGREF#152	Bizikova <i>et al.</i> (2014)	Bizikova, L., Nijnik, M., and Nijnik, A., 2014. Exploring institutional changes in agriculture to inform adaptation planning to climate change in transition countries. <i>Mitigation and Adaptation Strategies for Global Change</i> , 20 (8), 1385-1406.
EGREF#159	Brownhill and Hickey (2012)	Brownhill, L. and Hickey, G.M., 2012. Using interview triads to understand the barriers to effective food security policy in Kenya: a case study application. <i>Food Security</i> , 4 (3), 369-380.
EGREF#177	Duncan and Barling (2012)	Duncan, J. and Barling, D., 2012. Renewal through participation in global food security governance: implementing the international food security and nutrition civil society mechanism to the Committee on World Food Security. <i>International Journal of Sociology of Agriculture and Food</i> , 19 (2), 143-161.
EGREF#178	Eakin <i>et al.</i> (2011)	Eakin, H., Eriksen, S., Eikeland, P.-O., and Øyen, C., 2011. Public sector reform and governance for adaptation: implications of new public management for adaptive capacity in Mexico and Norway. <i>Environmental management</i> , 47 (3), 338-351.
EGREF#197	Gereffi <i>et al.</i> (2005)	Gereffi, G., Humphrey, J., and Sturgeon, T., 2005. The governance of global value chains. <i>Review of International Political Economy</i> , 12 (1), 78-104.
EGREF#225	Kirwan and Maye (2013)	Kirwan, J. and Maye, D., 2013. Food security framings within the UK and the integration of local food systems. <i>Journal of Rural Studies</i> , 29, 91-100.
EGREF#232	Lesnikowski <i>et al.</i> (2013)	Lesnikowski, A.C., Ford, J.D., Berrang-Ford, L., Barrera, M., Berry, P., Henderson, J., and Heymann, S.J., 2013. National-level factors affecting planned, public adaptation to health impacts of climate change. <i>Global Environmental Change</i> , 23 (5), 1153-1163.
EGREF#272	Schiff (2008)	Schiff, R., 2008. The role of food policy councils in developing sustainable food systems. <i>Journal of Hunger & Environmental Nutrition</i> , 3 (2-3), 206-228.
EGREF#276	Sietz <i>et al.</i>	Sietz, D., Boschütz, M., and Klein, R.J., 2011. Mainstreaming climate adaptation into

	(2011)	development assistance: rationale, institutional barriers and opportunities in Mozambique. <i>Environmental Science & Policy</i> , 14 (4), 493-502.
EGREF#283	Stringer <i>et al.</i> (2009)	Stringer, L.C., Dyer, J.C., Reed, M.S., Dougill, A.J., Twyman, C., and Mkwambisi, D., 2009. Adaptations to climate change, drought and desertification: local insights to enhance policy in southern Africa. <i>Environmental Science & Policy</i> , 12 (7), 748-765.
EGREF#290	Tirado <i>et al.</i> (2010)	Tirado, M.C., Cohen, M.J., Aberman, N., Meerman, J., and Thompson, B., 2010. Addressing the challenges of climate change and biofuel production for food and nutrition security. <i>Food Research International</i> , 43 (7), 1729-1744.
EGREF#302	Wilder <i>et al.</i> (2010)	Wilder, M., Scott, C.A., Pablos, N.P., Varady, R.G., Garfin, G.M., and McEvoy, J., 2010. Adapting across boundaries: climate change, social learning, and resilience in the US-Mexico border region. <i>Annals of the Association of American Geographers</i> , 100 (4), 917-928.
EGREF#307	Candel <i>et al.</i> (2015)	Candel, J.J.L., Breeman, G.E., and Termeer, C.J.A.M., 2015. The European Commission's ability to deal with wicked problems: an in-depth case study of the governance of food security. <i>Journal of European Public Policy</i> , DOI: 10.1080/13501763.2015.1068836.
EGREF#308	Gupta <i>et al.</i> (2010)	Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., Nootboom, S., and Bergsma, E., 2010. The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. <i>Environmental Science & Policy</i> , 13 (6), 459-471.
EGREF#309	Termeer <i>et al.</i> (2013)	Termeer, C.J.A.M., Dewulf, A., Breeman, G., and Stiller, S.J., 2013. Governance capabilities for dealing wisely with wicked problems. <i>Administration & Society</i> , 47 (6), 680-710.

Data extraction

The purpose of analysis was to integrate the governance indicators used in existing research into a common framework. Therefore, the *indicator* was to become the primary unit of analysis. However, we had defined an indicator as constructs at an agreed level of deconstruction, which is difficult to identify straight from research reports. Secondly, although our analysis was to be largely constrained to indicators themselves, any analysis or replication of methods - which we hope that our review will stimulate - would require more methodological detail than simply a set of constructs at a common level of abstraction. This was to be achieved through an intermediary stage of analysis in which a methodological summary would function as the units of analysis from which indicators would then be identified. Therefore, following (Delaney *et al.* 2016), data extraction and coding of primary reports of research, were to seek the following pieces of essential information: data collection methods; questions on data collection instruments (for

indicators harmonised to a higher level of abstraction). Additional contextual information includes: conceptual framework; data analysis methods; justification of inference; discussion of limitations. In order to provide transparency and methodical reliability to extraction and grouping of these elements, coding would start with identification of a research question, and within the research question, any governance-related constructs. The governance construct was to be used as the organising unit, around which the above-mentioned details on its operationalization would be gathered.

This constitutes the data to be extracted from articles. Extraction was done through coding in Atlas.ti, coding which is structured by a coding framework.

Coding

As previously mentioned, coding of articles took place in two stages. These are described in turn.

The first round of coding was designed and executed for an earlier set of research questions. Once the project objectives had been revised, a subset of coding from this first round was used and articles coded did not require any additional coding. Below is presented the steps for this first round of coding. Steps which became redundant following revision of project objectives are written in strikethrough text:

- 1.0 In any step in the coding process that follows, you may apply the code ‘Uncertain’ if you are unsure about the extent to which a particular code fits. When applying the code ‘Uncertain’, create a comment for the quotation and describe the cause of uncertainty.
- ~~1.1 Locate the conclusion section of the paper. This will usually be headed ‘Conclusion’ or will be the final section of the paper. Apply the code ‘Conclusion Section’ to the entire section.~~
- ~~1.2 In conclusion section code deductively sentences containing the key constructs from the project RQs about which the paper is making empirical claims deriving from the research on which the article reports. These key constructs comprise the following: governance/governance arrangements; food systems/food security; climate change; cross scale/multi level. Guidelines for recognizing these constructs and applying codes can be found in the box below. Apply these codes to the sentence in which the construct appears:~~

Construct code	Construct	Working definition	Indicator
Gov	governance /or governance arrangements)	“process by which the repertoire of rules, norms, and strategies that guide behaviour within a given realm of policy interactions are formed, applied, interpreted, and reformed” (McGinnis 2011, p. 171). Governance arrangements: “the	One or more of the following terms – either the terms themselves or specific contextual examples of them – appear in the sentence: <ul style="list-style-type: none"> • Governance • Rules

		repertoire of rules, norms and strategies that guide behaviour within a given realm of policy interactions” (McGinnis 2011, p. 171).	<ul style="list-style-type: none"> • Norms • Strategies • Institution
FoodSec/syst	food systems / food security	<p>A food system approach takes account of food-related activities (from production and distribution to consumption); outcomes of activities (including impacts on food security, the environment, and social welfare); interactions between the biophysical and human environments that shape activities; and other determinants of outcomes (Ericksen 2008).</p> <p><u>Food security</u> is defined by four dimensions: availability, access, utilization and stability (FAO 1996, FAO <i>et al.</i> 2013).</p> <p><u>Food security goals</u> include any goals aimed at increasing any of these four dimensions</p>	<p>One or more of the following terms – either the terms themselves or specific contextual examples of them – appear in the sentence and are used in relation to food:</p> <ul style="list-style-type: none"> - security - system - Production (including agriculture and farms/farmers) - consumption - distribution - availability - access - utilization
Climate Change	climate change	<p><u>Climate change</u>, as defined by the IPCC, refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC 2007).</p>	<p>One or more of the following terms – either the terms themselves or specific contextual examples of them – appear in the sentence:</p> <ul style="list-style-type: none"> • climate • climatic • weather system • extreme weather • adaptation (to climate change) • adaptive capacity • vulnerability (to climate change)
C-Scale/M-Level	Cross-scale/multi-level	<p><u>Multi-level Governance</u> is distinguished from government by a central state by allocating</p>	<p>One or more of the following terms – either the terms</p>

		<p>powers and competences to different territorial or sectoral jurisdictions (Hooghe and Marks 2003).</p> <p><u>Cross-scale governance</u>: Patterns of governance whereby actors from distinct scales, levels of social organization, or political jurisdiction are linked in order to address problems that overlap or cross boundaries between such scales, levels, or jurisdictions (Heikkila <i>et al.</i> 2011).</p>	<p>themselves or specific contextual examples of them – appear in the sentence and are used in relation to governance:</p> <ul style="list-style-type: none"> • multi-level • [scale]-level (e.g. household-level, local-level, regional-level, national-level, ...) • [scale]-scale • jurisdiction • territory/ territorial • sector/ sectoral • scale • stakeholder
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- ~~1.3 Identify text for each construct code in the conclusion. For each coded conclusion, decide what kind of claim is being made (causal, descriptive, theory building, or methodological). Apply the codes ‘causal claim’, ‘descriptive claim’, ‘theory building claim’, ‘methodological claim’, respectively, or ‘conclusion type unknown’ if the conclusion does not fit neatly into one of these four categories. If you think that the conclusion is probably one of the types identified, but you are not certain, apply the code you think best fits and the code ‘uncertain’.~~
- 1.4 Read the abstract and deduce if the paper reports on an empirical study. If yes apply the code ‘Empirical-Y’. If not apply the code ‘Empirical-N’, ignore steps 1.5-1.8, and proceed to the next article.
- 1.5 Read methods section and deduce what methodology is used in the article. Apply the code “methodology used” to the segment of text that best indicates which methodology is used. Create comment for that quotation and write a brief one-sentence, open-structured note to tell what methodology is used.
- 1.6 Identify each of the following items, which are probably located in the methods section: data collection methods; data analysis methods; theoretically-grounded justification of inference from raw data to conclusion; and discussion of limitations. Code item with the following codes: ‘DCMethods’ ‘DAnalysis’ ‘inference’ and ‘limit’. If for a given paper you cannot locate the necessary information for an item, do not apply coding for that item, and move on to the next item.
- 1.7 Read the introduction and theoretical sections of the article and identify a research question(s) and/or hypotheses which the article deals with. Apply the code ‘Clear RQ’ or ‘Unclear RQ’ to and/or hypothesis. When coding, use the framework in the box below. If no research question can be found, do not apply any of these codes and skip

all remaining steps and proceed to the next article.

Code	Meaning	Indicators
Clear RQ	The research is based on one or more clearly identifiable research question.	One or more explicitly stated research questions can be found.
Unclear RQ	The research is based on one or more research questions but they are not reported clearly.	No explicitly stated research question can be found but one or more of the following conditions hold: <ul style="list-style-type: none"> • Research objectives are stated • An implicit research question can be detected but is never stated. • Research question is stated in the article abstract but not in the body of the text.

1.8 Within the research question(s)/hypothesis, identify all constructs. For each construct, assess whether it is potentially equivalent to any of the Central project-constructs (governance; governance arrangements; food security; food system; climate change). Where a construct is potentially equivalent to one of these constructs, apply the construct code from the set of codes used in step 1.2 and create an in-vivo code of the form '[documentID] – [construct name]'¹¹. Repeat for each construct in the research question which is potentially relevant to one of the five central project-constructs.

1.9 Read the theoretical framework and methods section and for each construct coded in step 1.8, identify all additional sub-constructs that in some way relate to those coded in the research question. Using the same in-vivo technique, create new codes for each new construct identified.

1.10 Create relationships between the in-vivo codes created in steps 1.8 and 1.9 according to the following framework:

Relationship	Meaning	
Is part of	A is part of B implies that A is a sub-construct of B.	<ul style="list-style-type: none"> • A is a key construct in a definition of B. <p>OR</p> <ul style="list-style-type: none"> • A description or image of a theoretical framework indicates that A is a sub-construct of B

¹¹ For example, if I am working in document P5 and I find the construct *Access to Food*, I notice that access to food is a component of 'food security' in the working definition. I therefore apply the code *FoodSec/syst* from step 1.2 and create in-vivo the code 'P5 – Access to food'.

Indicates	A indicates B implies that A is used in a data collection instrument to empirically represent the construct B.	<ul style="list-style-type: none"> • A description of data collection methods describes A as part of the data collection instrument through which data is collected for B.
Causes	A causes B implies that A is an independent construct in an assumed or hypothesised causal model in which B is a dependent construct.	<ul style="list-style-type: none"> • In the theoretical framework, research question, or hypothesis, a relationship is posited or assumed in which A has a causal influence on B.
<p>1.11 Identify definitions for each construct in-vivo coded in steps 1.8 and 1.9. For each construct definition, apply your construct code and the code ‘definition’.</p>		

This set of step was executed by 7 coders (Jordan Blekking; Aogán Delaney; Paul McCord; John McGreevy; Tyler Schlachter; Katie Thompson; Jacob Weger). It was originally intended to blind-test this set of instructions to test for inter-coder agreement, to identify ambiguity, and to align interpretation. However, the logistical demands of the project, specifically the need for mid-term results, meant that there was no time for such testing. Instead the lead reviewer gave a training session to each of the other coders, and after coding was complete, he re-examined coded works and made corrections where instructions had been misinterpreted. Although this compromises the standards of replicability, it was a pragmatic solution in demanding circumstances.

In light of the revised project objectives, new coding instructions were drafted for all papers which had not been coded in the first round. In large part these new instructions constituted a subset of the original coding instructions. Some alterations in wording were also made in light of ambiguities identified in the first round. These ambiguities were identified through three sources: questions that coders had about how to execute the steps; feedback that coders gave following execution of the steps; and observations made when examining how documents had been coded. The main sources of ambiguity are listed:

- | |
|--|
| <ul style="list-style-type: none"> - While yes- and no- codes were used to indicate whether the article was empirical or not, only yes-codes were given for items such as data collection methods reported, etc. As such, where a code was not applied, it was unclear whether this indicated that an item was not reported, or that this step of instructions was skipped. Therefore, all coding for presence of items will now have yes- and no- codes. - Placing of yes-codes was not always on the correct place, particularly as some coders placed the ‘Empirical-Y’ code on the word ‘abstract’ or over the entire abstract, rather |
|--|

than over text in the abstract on which bases it was concluded that the article was empirical. This can be addressed with better wording and/or demonstration.

- It appears that in coding for RQs, some coders put a lot of thought into whether the RQ was clear or unclear, when the main thing that I wanted to know was whether an (clear or unclear) RQ was reported or not. This can be address with wording, and possibly through collapsing the clear/unclear distinction.
- Some coders expressed difficulty determining if certain types of articles should be classified as empirical or not. The most recurrent categories that were ambiguous were: reviews; introduction to special issues; articles based on author expertise accumulated through years of research. This will be improved (although probably not conclusively) through additional guidance in the instructions clarifying how such categories should be interpreted.
- Sub-constructs: there was a tendency sometimes to pick up every construct mentioned, or in some other way not to follow a mechanical deconstruction. I'm trying to think of ways to simplify this. There was also problems in use of construct relationships. Maybe a simplified system of relationships should be used. E.g. just one vertical relationship.
- IN general there was problems with *sections*. The instructions suggest sections where the information might be found. However, sometimes these sections don't exists (either because different wording is used, or because a different format is used, for example with book chapters, or with NGO reports), and other times the info is to be found in different sections. I try to clarify that sections are only guidelines in instructions.
- Whether there is more than one segment of text to be coded per item.
- Use of 'uncertain' and 'methodology used' and how to put comments so that they are article- and text-specific.

Based on these observations, the following set of instructions was drafted¹², with alterations written in bold:

- 1.0 In any step in the coding process that follows, you may apply the code 'Uncertain' if you are unsure about the extent to which a particular code fits. When applying the code 'Uncertain', create a comment for the quotation and describe the cause of uncertainty. **Don't forget to indicate in your comment which code you are uncertain about.**
- 1.1 Read the abstract and deduce if the paper reports on an empirical study. If yes apply the code 'Empirical-Y' **to the segment of text in the abstract from which you made your deduction.** If not apply the code 'Empirical-N', ignore **all further** steps, and proceed to the next article.
- 1.2 Read methods section and deduce what methodology is used in the article. Apply the code "methodology used" to the segment of text that best indicates which methodology is used. Create comment for that quotation **through right-clicking on the vertical bar in the right-hand margin, associated with the 'methodology used'**

¹² Definitions which are based on quoted text for which references cannot be found are blacked-out to avoid plagiarism in making this report accessible. For details of the actual definitions used during research, contact the authors.

code and write a brief one-sentence, open-structured note to tell what methodology is used. **Mention the authors and year of the article in your comment (e.g. ‘author (year): this paper uses randomised controlled trials as a methodology’).**

1.3 Identify each of the following items, which are probably located in the methods (**or equivalently named**) section (**but may appear in later sections such as discussion and conclusion or equivalently named sections, particularly for inference and limit**): data collection methods; data analysis methods; theoretically-grounded justification of inference from raw data to conclusion; and discussion of limitations. Code item with the following codes: ‘DCMethods’ ‘DAnalysis’ ‘inference’ and ‘limit’. If for a given paper you cannot locate the necessary information for an item, **apply the codes from the following set to the heading in the methods section, as suitable: DCMethods-NotReported; DAnalysis-NotReported; inference-NotReported; limit-NotReported.**, and move on to the next item.

1.4 Read the introduction and theoretical sections of the article and identify a research question(s) and/or hypotheses which the article deals with. Apply the code ‘Clear RQ’, ‘Unclear RQ’ to the research question and/or hypothesis. When coding, use the framework in the box below. If no research question can be found, **apply the code ‘NoRQ’ to the article title** and skip all remaining steps and proceed to the next article.

Code	Meaning	Indicators
Clear RQ	The research is based on one or more clearly identifiable research question.	One or more explicitly stated research questions can be found.
Unclear RQ	The research is based on one or more research questions but they are not reported clearly.	No explicitly stated research question can be found but one or more of the following conditions hold: <ul style="list-style-type: none"> • Research objectives are stated • An implicit research question can be detected but is never stated. • Research question is stated in the article abstract but not in the body of the text.
NoRQ	No research question has been reported in this article.	Indicators could not be located for the presence of either a clear or unclear research question.

1.5 Within the research question(s)/hypothesis, identify all constructs. For each construct, assess whether it is potentially equivalent to a **governance construct by checking if it fits any of the example definitions of governance in the table below or any of the indicators are satisfied**. Where a construct is potentially equivalent to one of these constructs, apply the ‘Gov’ code and create an in-vivo code of the form

in the research question. Using the same in-vivo technique, create new codes for each new construct identified.

1.7 Create relationships between the in-vivo codes created in **steps 1.5 and 1.6** according to the following framework:

Relationship	Meaning	
Is part of	A is part of B implies that A is a sub-construct of B or is used in a data collection instrument to empirically represent the construct B..	<ul style="list-style-type: none"> • A is a key construct in a definition of B. <p>OR</p> <ul style="list-style-type: none"> • A description or image of a theoretical framework indicates that A is a sub-construct of B <p>OR</p> <ul style="list-style-type: none"> • A description of data collection methods describes A as part of the data collection instrument through which data is collected for B.

1.8 Identify definitions for each construct in-vivo coded in **steps 1.5 and 1.6**. For each construct definition, apply your construct code and the code 'definition'.

On this occasion, only one team member was available for coding these instructions were executed on all remaining papers.

Data assemblage

Of the set of 68 articles included in the review, two (Wertz-Kanounnikoff and McNeill 2012, Schader *et al.* 2014) were not coded according to protocol as they constituted reviews of methods and the coding framework would therefore not make sense. However, following citations (step described in next subsection) identified two additional empirical articles (Donovan *et al.* 2010, Jawtusch *et al.* 2013), which were coded according to protocol.

Therefore, coding was carried out on 68 articles. In four articles no research question could be found and they were excluded from further analysis. In 12 further articles, the RQ did not contain a governance construct, and they were excluded from further analysis. In two articles, the RQ contained 2 governance constructs. The remaining 50 articles each contained one governance construct in the RQ. Therefore, our review identified 54 RQ-level governance constructs.

For each governance construct, a structured summary of its operationalization was created through extracting coded text and assembling into tables, modelled on the template below:

Structured summary of construct operationalization	
Construct:	
Research Question:	
Article reference:	
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ¹⁴)	
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

These structured summaries formed the organising unit of analysis for the intermediary stage of analysis, prior to extraction of *indicators*. They were carried forward to the next step.

Chasing missing data

In the first stage of coding, and as previously observed in a SR of methods to study climate change vulnerability, where this analysis method was previously used (Crane *et al.* Submitted, Delaney *et al.* 2014), it was observed that most reports did not contain sufficient information to reproduce the methods used. As such, we took the additional steps of following citations and contacting authors where the information taken from reports was not sufficient to fill all fields in the structured summaries of operationalization.

In the vulnerability review, we used the criterion that a page number must be provided in order to chase. This resulted in very few instances where the criterion was met and information was

¹⁴ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

chased. Reproducibility is important and so places limits on how checking citations can be done. In this review, we overcame this by requiring:

- a specific statement that more methodological info can be found in a particular citation, and
- that such information is missing from structured summaries.

Only when both conditions were met was further information sought. This occurred in 14 articles, two of which were themselves reviews of methods (mentioned earlier). When following references, only those references which were (a) in English and (b) immediately accessible were examined as time and resources did not permit examination of non-English language articles or asking among networks or authors for copies of inaccessible articles.

In two of the followed articles (Huntjens *et al.* 2011, Jawtusich *et al.* 2013), both conditions for chasing citations were again met, and the next set of citations was followed. For one article (Leith *et al.* 2012), a suitable reference (Brown *et al.* 2012) was suggested by the author when contacted requesting a copy of the primary article.

Each new reference which was accessed and reviewed was added to the project index (in Appendix D).

It is important to note that while codes in Atlas were used to identify and extract relevant material for the structured summaries of these chased citations, coding was not done according to the coding framework as it would not make sense, for instance for the coding of supplementary material which is not in report form, or when following a secondary analysis based around one research question and searching for details of primary data collection in a study structured around a different research question. The only exception to this was for citations taken from the two methods reviews. These yielded 7 articles which were coded by the protocol. However, 3 of these were not empirical while 2 contained no governance constructs, leaving only two of these articles yielding structured summaries of operationalizations.

In Appendix F you can see a record of the articles chased.

As a second step, authors were to be contacted for supplementary information. In order to preserve structure and reproducibility of the review, a standard questionnaire form and email template were used. The questionnaire form consisted of the structured summary with empty fields highlighted, while the email template can be seen below:

Dear [**author name**],

We are contacting you in relation to the methods you used in your study, reported in [**reference**].

We are conducting a review of food systems governance indicators. Our goal is to synthesise

indicators that have been used in different studies in order to identify a core set to be recommended for use in future studies. Our hope is that adoption, or failing that transparent discussion, of proposed common indicators will increase the comparability of the next generation of research on food systems governance.

We began by collecting information on methods from journal articles or research reports. Such reports need to conform to expectations like word limits and accessibility that at times make it difficult to fully report methods. To supplement what we have found in reports we are contacting authors to gather a fuller picture of their methods where possible.

Attached you can find a ‘structured summary’ of the research methods you reported to have used in operationalizing the concept [**name of construct operationalized**]. As you can see, we could find information for some but not all fields. Please complete the empty cells (highlighted in blue) using material documenting this project. If the required information is not documented but you clearly remember, please insert that information followed by the code (m).

At this point the systematic method we are using has us exclude from further consideration methods that are not adequately documented. Of course, we cannot yet guarantee that your methods will be described in our final report (we also face restrictions), but if you help us get a more complete picture of the methods, we will be able to consider your contribution and, as such, there is at least the possibility that the effort you put into developing your methods will be recognized through adoption by future researchers. Further, your insight may also assist researchers interpret your work and it will allow them to compare their own findings with those found through your methods. All of these will help to produce a more coherent body of knowledge on food governance.

Sincerely,

We constructed a minimum threshold of information to warrant contacting authors. This was that the structured summary included a minimum of items on data collection instruments and/or conceptual deconstruction following coding (and where appropriate chasing references), but had at least some blank cells. This was chosen as a minimum skeleton around which an operationalization is structured. Without this information it becomes very difficult to speak of or work with an operationalization as such.

8 summaries were excluded because they did not contain this minimum. 7 were not contacted because all fields were full using only reports or cited material. For 39 summaries contact details for authors were sought and where found authors were contacted using the standard method described above. At the time of writing, 6 summaries had been received filled in by authors, while a number of other responses were also received.

To protect the anonymity of those who did not (yet) respond, details are not reported here of responses. Including correspondence with authors as a step in SR thus raises difficulties not only in relation to SR protocols, but also in relation to ethics: through such a step authors who are contacted are being included in research without the opportunity to give or refuse consent.

In total, 46 structured summaries met the minimum threshold after all steps of data extraction. These were brought forward for analysis. The structured summaries of operationalizations can be seen in Appendix G.

Analysis

These structured summaries were then used as data sources from which *indicators* were identified and extracted. The indicators were then to be situated in the two-dimensional matrix representing a food systems governance framework. The largest challenge lay in identifying indicators at an agreed-upon, but not defined, level of conceptual abstraction. To compound this, summaries had to be inspected to see if they contained this level of abstraction, as some did not. Level of conceptual abstraction was not always even within a given paper, with the harmonised level appearing in multiple levels of deconstruction¹⁵. Another challenge lay in synthesising indicators. Our goal was to make broad comparisons of methods and as such too detailed an examination was not possible. In practical terms, this means that we were tasked with on the one hand managing a set of indicator names, and on the other hand to do so without inspecting definitions or further operationalization for commensurability¹⁶. This trade-off is accepted as a limitation. It was accomplished through using a startlist of codes, creating new codes where appropriate, and consolidating the list of codes through mergers periodically. This also leads to a limitation of the results: Through taking indicators out of their theoretical context and calling indicators which are

¹⁵ E.g. in (Donovan *et al.* 2010), two constructs were taken from the immediate sub-RQ level (strategic framework; Continuous multistakeholder consultation process), while 4 were taken from next level down for third component (governance). Of these four, two were later merged into one construct (involvement in supra-national institutions/agreements). This is to be expected. Conceptual levels are not objectively existing. Our focus on governance is much sharper than theirs, while their focus on financial mechanisms is much sharper than ours.

¹⁶ E.g. Trying to fit indicators into discreet categories is a challenge. This is illustrated with the indicator-labels 'learning', 'non-state self-organising', and 'use of knowledge and science'. In each category there exist some indicators which could be in more than one category. E.g. participation of farmers in courses could be both non-state self organising and learning. However, other examples of learning are clearly state-oriented, which other examples of self-organising are not related to learning. Similarly, some learning indicators could be part of use of knowledge and science, while there are examples in both categories which could clearly not be part of the other. e.g. double-loop learning is more learning based on experience than use of science. Similarly, use of independent evaluation is not an example of learning. These are examples of limitations of the task at hand.

designed to measure two rather distinct concepts the same term the methods are effectively theoretically disembodied. This has clear implications for methodological quality criteria such as validity.

Analysis was done according to the following set of steps:

- 3.1 Load all structured summary tables into Atlas as new analytical units.
- 3.2 For any table that does not include neither items on data collection instruments nor a conceptual deconstruction, apply the code ‘not-classifiable’ and remove from further analysis. For those that include one but not both of these items, code as ‘semi-classifiable’ and remove from further analysis¹⁷. For those that do include this minimum amount of data, apply the code ‘classifiable’.
- 3.3 For each classifiable table, examine the conceptual deconstruction and instrument questions and locate the level of abstraction that is most consistent with the initial set of indicators listed in the box below. Apply the code ‘harmonised’ to all constructs/indicators at this level of abstraction.

Initial set of indicator codes:	Participation; information use; information accessibility; salience; political settlements; agency; long-term policy; political representation; authority; learning; state capacity; accountability; political leadership; dialogue; multi-value; networks; coordination; centralization; facilitation; transparency; uncertainty management; social inclusion; flexibility; resilience/robustness; diversity; polycentricity; trust; commitment; fairness; legitimacy
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3.4 For each construct coded as ‘harmonised’, apply governance level codes according to the framework below:

Code	Definition	Coding instructions
Local	This operationalization examines an aspect of governance at the local level.	Application of code is interpretive. A universal set of definitions for all governance levels, which also fits all studies is elusive.
sub-national	This operationalization examines an aspect of governance at the sub-national level, but at a higher scale than local.	Application of code is interpretive.
National	This operationalization examines an aspect of governance at the national level.	Application of code is interpretive.
Regional	This operationalization examines an aspect of governance at the intra-national level.	Application of code is interpretive.
Global	This operationalization examines an aspect of governance at the global level.	Application of code is interpretive.
Cross-scale	This operationalization examines an aspect of governance involving connections or interactions across	Application of code is interpretive.

¹⁷ Semi-classifiable articles may be returned to later if resources and time permit.

	levels, i.e. which crosses levels, or which involves interactions across levels.	
Universal	This operationalization examines an aspect of governance at all levels of governance.	Application of code is interpretive.
NotGov	This operationalization does not examine an aspect of governance	Application of code is interpretive.

3.5 For each construct coded as ‘harmonised’, apply food systems codes according to the framework below:

Code	Definition	Coding instructions
Production	This operationalization examines an aspect of governance of <i>food production</i> .	<i>Food production</i> is understood as “all activities involved in the production of raw food materials”. These can range, for example “from the process of obtaining inputs such as land and labor, breeding animals, planting crops or obtaining young animal stock, caring for the growing food material and then harvesting or slaughtering it” (Ericksen 2008, p. 238).
Consumption	This operationalization examines an aspect of governance of <i>food consumption</i> .	<i>Food consumption</i> is understood as involving “everything from deciding what to select through to preparing, eating and digesting food. Prices are influential, as are income levels, cultural traditions or preferences, social values, education and health status” (Ericksen 2008, p. 238).
Distribution	This operationalization examines an aspect of governance of <i>distribution of food between production and consumption</i> .	<i>Distribution</i> is understood here as involving both “moving the food from one place to another and marketing it” and “the various transformations that raw food material (vegetable, fruit, animal) undergoes before it is sent to the retail market”, all of which “‘add value’ to the raw material in an economic sense, but these activities may also significantly alter the appearance, storage life, nutritional value, and content of the raw materials” (Ericksen 2008, p. 238).
Miscellaneous		Apply this code if the component of the food system cannot be easily classified with the three labels above, or if it constitutes an additional component of a food system.
NotFS	This operationalization does not examine	Apply this code if the governance being researched is not of food systems.

	governance of food systems	
<p>3.6 For each construct coded as ‘harmonised’, apply an indicator code from the initial code set listed below, or generating a new code if the existing set does not adequately represent the operationalised construct</p>		
Initial set of indicator codes:	Participation; information use; information accessibility; salience; political settlements; agency; long-term policy; political representation; authority; learning; state capacity; accountability; political leadership; dialogue; multi-value; networks; coordination; centralization; facilitation; transparency; uncertainty management; social inclusion; flexibility; resilience/robustness; diversity; polycentricity; trust; commitment; fairness; legitimacy	
<p>3.7 Construct a 2-dimensional matrix using the governance-levels as one axis and food system components as the other. For each harmonised construct, situate it within the matrix according to the governance level and food system component codes that were applied to the table.</p>		
<p><i>4 Iterations¹⁸ of indicator-situation in matrix</i></p>		
<p>4.1 Assemble all indicators. For all unique indicators (i.e. those appearing only once), compare each with each other one and perform mergers where appropriate, viewing structured summaries from which indicators were taken for both indicators in each comparison.</p>		
<p>4.2 Assemble this new set of indicators and perform a larger comparison, this time including all indicators (i.e. those appearing in multiple structured summaries).</p>		
<p>4.3 On the first time following these steps, i.e. the 2nd iteration, assemble those structured summaries which had been coded as ‘semi-classifiable’ and for each determine whether the target level of harmonisation is present in the available information. For those which contain the appropriate level of abstraction for harmonisation, load into Atlas, code as ‘contains harmonised level’ and execute the steps 3.3 to 3.6. For those which do not contain the appropriate level of abstraction, code as ‘does not contain harmonised level’. This step is only to be executed once, and not repeated in subsequent iterations.</p>		
<p>4.4 For each structured summary for which a new information has been shared by an author since the previous iteration, examine to determine if it contains new information which would allow better classification (i.e. new information on conceptual deconstruction or indicators on data collection instruments), and for those that do, execute steps 3.3 to 3.6.</p>		
<p>4.5 Update the ‘conservative’ matrix with any results from this iteration.</p>		

By the end of the first iteration (i.e. Step 3.7), 80 individual indicators had been identified and when assigned indicator-names they counted 47:

¹⁸ The need for iterations was not foreseen until step 3.7 was reached. At this stage, the steps for iteration was drafted.

Indicator-name	Counts	Source
access to and control of inputs	1	31 Galiè 2013
Accountability	1	52 Mandemaker 2011
adaptive capacity	2	48 Leith et al 2012
		102 Jabobi et al 2015
commitment	1	232 Lesnikowski et al 2013
Common Pool Resource management design		40 Huntjens et al 2012
corruption	2	232 Lesnikowski et al 2013
		52 Mandemaker 2011
Country size	1	232 Lesnikowski et al 2013
cross-scale interaction	2	31 Galiè 2013
		20 Cooper & Wheeler 2015
Deliberation	1	77 Schouten et al 2012
distribution of responsibilities across levels	1	152 Bizikova et al 2015
Domestic ownership	1	46 Korhonen-Kurki et al 2014
Electorally democratic	1	Acemoglu et al 2009
fairness	2	308 Gupta et al 2010
		135 Wambugu et al 2015
gender-sensitivity	2	31 Galiè 2013
		135 Wambugu et al 2015
governance framework	2	31 Galiè 2013
		327 Donovan et al 2010
Implementation	1	152 Bizikova et al 2015
informal rules	2	31 Galiè 2013
		79 Spielman et al 2008
Institutional mainstreaming	3	152 Bizikova et al 2015
		276 Sietz et al 2011
		135 Wambugu et al 2015
involvement in supra-national institutions/agreements	2	232 Lesnikowski et al 2013
		327 Donovan et al 2010
knowledge sharing	2	152 Bizikova et al 2015
		20 Cooper & Wheeler 2015
leadership	2	308 Gupta et al 2010
		20 Cooper & Wheeler 2015
Learning	3	308 Gupta et al 2010
		42 Jacobi et al 2015
		178 Eakin et al 2011
Legal Framework	2	46 Korhonen-Kurki et al 2014
		135 Wambugu et al 2015

Motivation	1	152 Bizikova et al 2015
Multi-stakeholder networks	2	20 Cooper & Wheeler 2015
		327 Donovan et al 2010
Non-state self-organising	3	20 Cooper & Wheeler 2015
		42 Jacobi et al 2015
		20 Cooper & Wheeler 2015
Participation	3	102 Jabobi et al 2015
		46 Korhonen-Kurki et al 2014
		178 Eakin et al 2011
performance of governance programme(s)	1	135 Wambugu et al 2015
Policy change recognising Food Systems	2	55 Minde et al 2008
		46 Korhonen-Kurki et al 2014
Policy framework	3	327 Donovan et al 2010
		46 Korhonen-Kurki et al 2014
		60 Osbahr et al 2008
political stability	1	135 Wambugu et al 2015
polycentricity	1	52 Mandemaker 2011
public pressure	1	20 Cooper & Wheeler 2015
public social commitments	2	232 Lesnikowski et al 2013
		52 Mandemaker 2011
reflexivity	2	307 Candel et al 2015
		309 Termeer et al 2015
rescaling	1	307 Candel et al 2015
resilience/robustness	2	307 Candel et al 2015
		309 Termeer et al 2015
resources	3	308 Gupta et al 2010
		232 Lesnikowski et al 2013
		178 Eakin et al 2011
responsiveness	2	307 Candel et al 2015
		309 Termeer et al 2015
revitalization	2	307 Candel et al 2015
		309 Termeer et al 2015
room for autonomous change	1	308 Gupta et al 2010
Rule of Law	1	52 Mandemaker 2011
state capacity	2	232 Lesnikowski et al 2013
		52 Mandemaker 2011
support for individual/household action	1	71 Quinn et al 2011
Use of science and research	3	152 Bizikova et al 2015

		327 Donovan et al 2010
		135 Wambugu et al 2015
Variety	1	308 Gupta et al 2010

From this, a first version of the matrix was created:

	Food Production	Food Distribution	Food Consumption	Food System	Miscellaneous	Not FS
Global Governance				Deliberation (Schouten et al 2012)		
Regional Governance	Distribution of responsibilities across levels (Bizikova et al 2015); Implementation (Bizikova et al 2015); Institutional mainstreaming (Bizikova et al 2015); knowledge sharing (Bizikova et al 2015); Motivation (Bizikova et al 2015); Reflexivity (Termeer et al 2015); Resilience/robustness (Termeer et al 2015); responsiveness (Termeer et al 2015); revitalization (Termeer et al 2015); use of science and research (Bizikova et al 2015)				reflexivity (Candel et al 2015); rescaling (Candel et al 2015); resilience/robustness (Candel et al 2015); responsiveness (Candel et al 2015); revitalization (Candel et al 2015);	

<p>National Governance</p>	<p>accountability (Mandemaker 2011); corruption (Mandemaker 2011); Distribution of responsibilities across levels (Bizikova et al 2015); Implementation (Bizikova et al 2015); knowledge sharing (Bizikova et al 2015); Motivation (Bizikova et al 2015); performance of governance programme(s) (Minde et al 2008); policy framework (Osbaehr et al 2008); Political stability (Mandemaker 2011); public social commitment (Mandemaker 2011); Rule of law (Mandemaker 2011); state capacity (Mandemaker 2011); use of science and research (Bizikova et al 2015)</p>				<p>Legal framework (Korhonen-Kurki et al 2014); participation (Korhonen-Kurki et al 2014); Policy change recognising Food Systems (Korhonen-Kurki et al 2014); state capacity (Lesnikowski et al 2013)</p>	<p>commitment (Lesnikowski et al 2013); corruption (Lesnikowski et al 2013); country size (Lesnikowski et al 2013); Domestic ownership (Korhonen-Kurki et al 2014); Electorally democratic (Acemoglu et al 2009; Boix et al 2013); governance frameworks (Donovan et al 2010); involvement in supra-national institutions/agreements (Lesnikowski et al 2013)/(Donovan et al 2010); multi-stakeholder (Donovan et al 2010); Policy change recognising Food Systems (Donovan et al 2010); policy framework (Korhonen-Kurki et al 2014); public pressure (Lesnikowski et al 2013); public social commitments (Lesnikowski et al 2013); resources (Lesnikowski et</p>
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						al 2013)
sub-national Governance	Distribution of responsibilities across levels (Bizikova et al 2015); Implementation (Bizikova et al 2015); knowledge sharing (Bizikova et al 2015); Learning (Jacobi, Schneider, Botazzi et al 2015); Motivation (Bizikova et al 2015); non-state self-organising (Jacobi, Schneider, Botazzi et al 2015); use of science and research (Bizikova et al 2015)					adaptive capacity (Leith et al 2012; Brown et al 2012); learning (Eakin et al 2011); participation (Eakin et al 2011); resources (Eakin et al 2011); support for individual/household action (Quinn et al 2011)
Local Governance	access to an control of inputs (Galiè 2013); gender-sensitivity (Galiè 2013); Informal Rules (Galiè 2013)/(Spielman et al 2008); knowledge sharing (Cooper & Wheeler 2015); Leadership (Cooper & Wheeler 2015); Learning (Jacobi, Schneider, Botazzi et al 2015); Multi-				participation (Korhonen-Kurki et al 2014)	adaptive capacity (Leith et al 2012; Brown et al 2012); Fairness (Wambugu et al 2015); Gender-sensitivity (Wambugu et al 2015); Institutional mainstreaming (Wambugu et al 2015); Legal framework (Wambugu et al 2015); participation (Wambugu et al 2015); policy framework (Wambugu et al 2015); support

	stakeholder (Cooper & Wheeler 2015); networks (Cooper & Wheeler 2015); non-state self-organising (Jacobi, Schneider, Botazzi et al 2015);					for individual/household action (Quinn et al 2011)
Cross-scale	adaptive capacity (Leith et al 2012; Brown et al 2012); cross-scale interaction (Galiè 2013); Distribution of responsibilities across levels (Bizikova et al 2015); governance frameworks (Galiè 2013); polycentricity (Cooper & Wheeler 2015)					
Universal					Common Pool Resource management design (Huntjens et al 2012); Fairness (Gupta et al 2010); Leadership (Gupta et al 2010); Learning (Gupta et al 2010); resources (Gupta et al 2010); room for autonomous change (Gupta et al 2010); variety (Gupta	Institutional mainstreaming (Sietz et al 2011)

					et al 2010)	
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In the 2nd iteration, step 4.1 saw 4 mergers being made:

- *accountability* (Mandemaker) and *Electoral democracy* (Acemoglu et al). To be called 'electorally democratic'
- *'commitment'* (Lesnikowski) and *'performance of governance programmes'* (Minde). Both are about looking at programme outcomes. Such programmes may not necessarily be related to FS and be used as a sign of commitment. As in you could substitute Minde's indicator into Lesnikowski's framework, but not vice versa. To be called 'outcomes of similar programmes'.
- *'distribution of responsibilities across levels'* (Bizikova et al) and *domestic ownership* (Korhonen-Kurki et al). The latter seems to be a special case of the former. Also these can be merged with *'room for autonomous change'*, since they are observing something similar, but valuing it slightly differently. Also, *'support for individual/household action'* would be a special case of *'room for autonomous change'* in that it follows a similar logic. By the same logic as used earlier, it is also broadly consistent in which it seeks to measure with *'distribution...'* even though it has a different implicit value. It is also not inconsistent with *'domestic ownership'* since they look at very different scales and from different perspectives (the latter looking from local scale down, the former looking from national scale up). *'rescaling'* (Candel) also looks at something similar, albeit in motion. Gupta's *'variety'* also fits, although this indicator places quite different values. Merge as 'distribution of responsibilities across levels'.
- *'motivation'* (Bizikova) and *'public pressure'* (Lesnikowski). Both look at factors which might lead to favourable policy change. To be called 'factors leading to policy change'

In step 4.2, the following mergers were made:

- *'access to and control of inputs'* with *'distribution of responsibilities across scales'*. Latter is a special case of the former. Also *'polycentricity'* can be merged with these. To be called 'scale-specific responsibilities and competences'.
- *'cross-scale interaction'* and *'involvement in supra-national institutions/agreements'*. The latter is a specific case of the former, which can only occur at national level. To be called 'cross-scale interaction'.
- *'factors leading to policy change'* and *'implementation'*. To be called 'implementation-supporting conditions'.
- *'informal rules'* with *'networks'*. To be called 'informal governance'.
- 4.2: merge *'knowledge sharing'* with *'use of science and research'*. To be called 'use of knowledge and science'.

- 4.2: suspect merger of ‘*multi-stakeholder*’ and ‘*participation*’. To be called ‘participation and multi-stakeholder engagement’
- 4.2: rename ‘*policy change recognising Food Systems*’ to ‘favorable initial policy change’. This is to clarify how it is distinct from ‘policy framework’.

34 new individual indicators were identified, all from summaries previously coded as ‘semi-classifiable’. No responses were received from authors that altered how summaries would be classified. When assigned indicator names they counted 23:

Indicator-name	Counts	Source
accountability	2	47 Lebel et al 2006
		318 Jawtusich et al 2013
centralisation	1	187 Gereffi et al 2005
Common Pool Resource management design	1	70 Poteete & Ostrom 2004
cross-scale interaction	1	43 Juhola & Westerhoff 2011
deliberation	1	47 Lebel et al 2006
Discursive framing	2	14 Boons & Mendoza 2010
		65 Pesqueira & Glasbergen 2013
Effective	1	84 von Geibler
Electorally democratic	1	47 Lebel et al 2006
empowerment	1	47 Lebel et al 2006
fairness	2	47 Lebel et al 2006
		318 Jawtusich et al 2013
governance frameworks	1	43 Juhola & Westerhoff 2011
Holistic	1	318 Jawtusich et al 2013
implementation-supporting conditions	1	159 Brownhill & Hickey 2012
Informal governance	2	59 Osbahr et al 2010
		43 Juhola & Westerhoff 2011
learning	2	47 Lebel et al 2006
		302 Wilder et al. 2010
Legal Framework	1	123 Kabubo-Mariara 2007
Legitimacy	1	84 von Geibler
networks	2	65 Pesqueira & Glasbergen 2013
		43 Juhola & Westerhoff 2011
participation and multi-stakeholder engagement	3	47 Lebel et al 2006
		65 Pesqueira & Glasbergen 2013
		318 Jawtusich et al 2013
polycentricity	1	47 Lebel et al 2006

resilience/robustness	1	47 Lebel et al 2006
Rule of Law	1	318 Jawtusich et al 2013
scale-specific responsibilities and competences	1	47 Lebel et al 2006

During coding of these new indicators, certain indicator-codes which had been discarded during mergers were re-introduced. The following reflections were noted about this re-introduction:

- Examined re-introduced constructs:
- Accountability: merged with ‘Electorally democratic’ in 2nd iteration. At that stage only one article carried it (Mandemaker). In 4.3, two new articles had ‘accountability’ indicators. Inspection of these showed that they were not synonymous with ‘electorally democratic’. Inspection was possible with Lebel et al (as they defined the construct) but not really with Jawtusich et al. Therefore it was decided that re-introduction of ‘accountability’ was justified. Moreover, it was decided that Mandemaker was closer to ‘electorally democratic’ than to ‘accountability’.
- Polycentricity: One new article suggesting the re-introduction of polycentricity (Lebel et al). Polycentricity had previously been used in one article (Cooper & Wheeler) but was merged with ‘scale-sensitive responsibilities and competences’. The definition of Lebel et al does certainly not fit a hierarchical scheme, and is genuinely about multiple centres. Therefore it justifies the re-introduction. I examined Cooper & Wheeler, the construct is not well-defined, contains both elements of polycentricity and scalar nesting, and could defensibly be categorised as either polycentricity or scale-sensitive... . Examining the other articles coded as ‘scale-sensitive...’, Galiè, Quinn et al, Candel et al, Bizikova et al, Gupta et al, Korhonen-Kurki are all not polycentricity. Since Cooper could be classified either way, I decide that the interests of the project in exploring difference is best served with it being classified as polycentric.
- Networks: 2 new articles (Pesqueira & Glasbergen);(Juhola & Westerhoff). ‘networks’ had previously been merged with ‘informal governance’. Constructs in Pesqueira & Glasbergen and in Juhola & Westerhoff are readily distinguishable from ‘informal governance’. There is little informal in the definition of Pesqueira & Glasbergen, while Juhola & Westerhoff situate their construct alongside another construct concerned with informal institutions. Thus the re-introduction of ‘networks’ is justified. Cooper & Wheeler had been coded as ‘networks’ prior to merge. Inspection of their definition suggests that the construct contains elements of networks and elements of informal relationships. Therefore it could be classified as both. Examining the other constructs that have been coded as ‘informal governance’, Galiè, Spielman et al, and Juhola & Westerhoff (‘informal institutions’ NOT ‘networks in governance’) are more concerned with informal rules, or with procedures in informal institutions. Therefore they are quite distinct from ‘networks’. However, Osbahr et al 2010 do have a strong network dimension to their concept of informal governance. Like Cooper et al they could be classified as either. The most logical move to make is to classify Cooper & Wheeler as ‘networks’ and Osbahr et al as ‘informal governance’. This is because while both constructs look at both elements, it would appear that Cooper & Wheeler are primarily interested in networks (which can be informal), while Osbahr et al are interested in informal institutions (an element of which is social networks).

Taking account of these changes, the matrix for the second iteration looked like this:

	Food Production	Food Distribution	Food Consumption	Food System	Miscellaneous	Not FS
Global Governance	Effective (von Geibler 2013); Legitimacy (von Geibler 2013)	centralisation (Gereffi et al 2005);		Deliberation (Schouten et al 2012); Discursive framing (Pesqueira & Glasbergen 2013); networks (Pesqueira & Glasbergen 2013); participation and multi-stakeholder engagement (Pesqueira & Glasbergen 2013)		
Regional Governance	implementation-supporting conditions (Bizikova et al 2015 (x2)); Institutional mainstreaming (Bizikova et al 2015); knowledge sharing (Bizikova et al 2015); Reflexivity (Termeer et al				reflexivity (Candel et al 2015); resilience/robustness (Candel et al 2015); responsiveness (Candel et al 2015); revitalization (Candel et al 2015); scale-specific responsibilities and	learning (Wilder et al. 2010);

	2015); Resilience/robustness (Termeer et al 2015); responsiveness (Termeer et al 2015); revitalization (Termeer et al 2015); scale-specific responsibilities and competences (Bizikova et al 2015); use of knowledge and science (Bizikova et al 2015 (x2))				competences (Candel et al 2015)	
National Governance	corruption (Mandemaker 2011); Discursive framing (Boons & Mendoza 2010); Electorally democratic (Mandemaker 2011); implementation-supporting conditions (Bizikova et al 2015); knowledge sharing (Bizikova et al 2015); Legal Framework (Kabubo-Mariara 2007); outcomes of similar programmes (Minde et al 2008); policy framework (Osbaahr et al 2008); Political stability (Mandemaker	Discursive framing (Boons & Mendoza 2010);			favorable initial policy change (Korhonen-Kurki et al 2014); Legal framework (Korhonen-Kurki et al 2014); participation and multi-stakeholder engagement (Korhonen-Kurki et al 2014)	corruption (Lesnikowski et al 2013); country size (Lesnikowski et al 2013); cross-scale interaction (Lesnikowski et al 2013)/(Donovan et al 2010); Electorally democratic (Acemoglu et al 2009; Boix et al 2013); favorable initial policy change (Donovan et al 2010); governance frameworks (Donovan et al 2010); implementation-supporting conditions

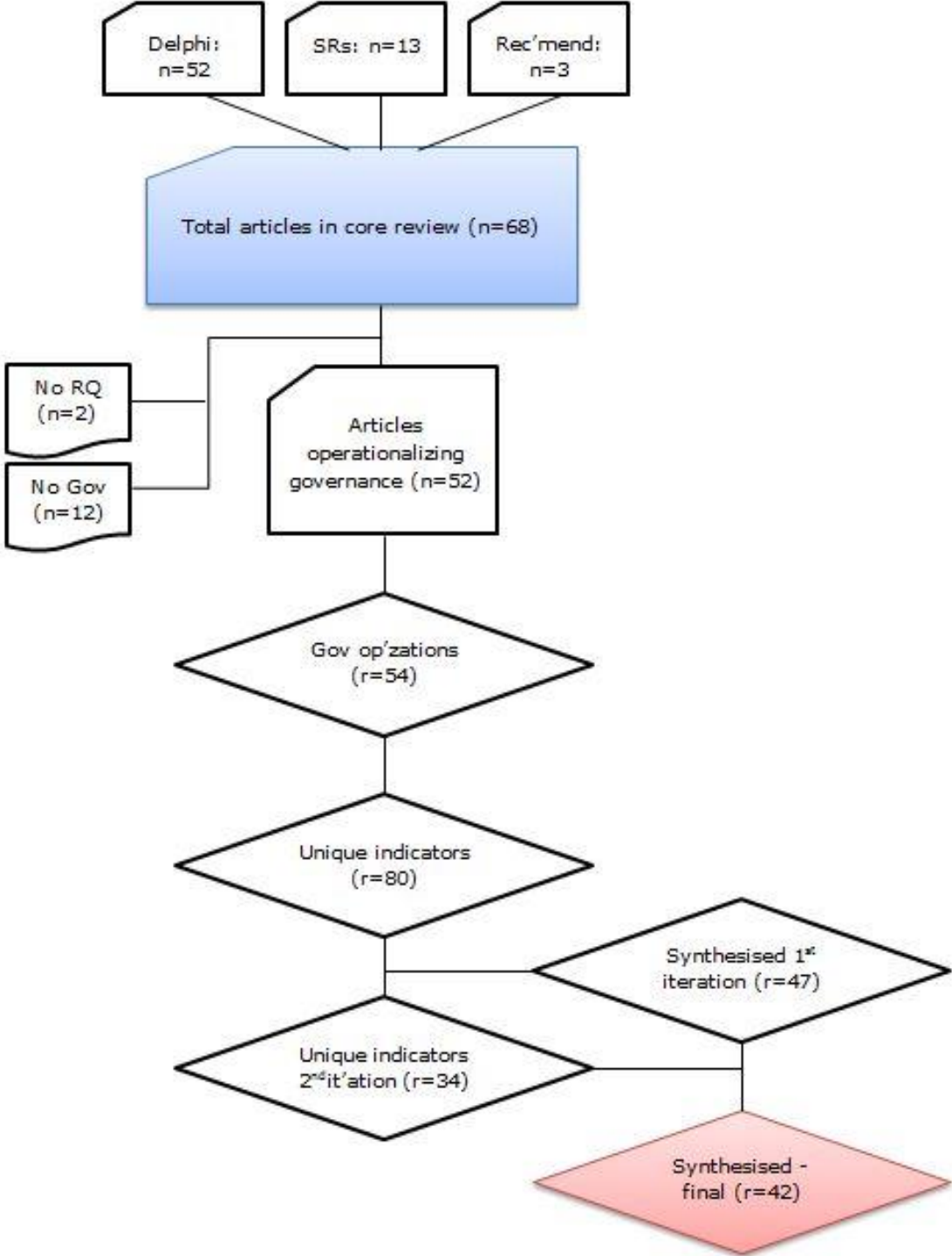
	2011); public social commitment (Mandemaker 2011); Rule of law (Mandemaker 2011); scale-specific responsibilities and competences (Bizikova et al 2015 (x2)); state capacity (Mandemaker 2011); use of knowledge and science (Bizikova et al 2015 (x2))					(Lesnikowski et al 2013); outcomes of similar programmes (Lesnikowski et al 2013); participation and multi-stakeholder engagement (Donovan et al 2010); policy framework (Korhonen-Kurki et al 2014); public social commitments (Lesnikowski et al 2013); resources (Lesnikowski et al 2013); scale-specific responsibilities and competences (Korhonen-Kurki et al 2014); state capacity (Lesnikowski et al 2013); use of knowledge and science (Donovan et al 2010)
sub-national Governance	accountability (Lebel et al 2006)/(Jawtuschet al 2013); deliberation (Lebel et al 2006); Electorally democratic				implementation-supporting conditions (Brownhill & Hickey 2012)	adaptive capacity (Leith et al 2012; Brown et al 2012); learning (Eakin et al 2011); participation

	<p>(Lebel et al 2006); empowerment (Lebel et al 2006); fairness (Lebel et al 2006)/(Jawtuschet al 2013); Holistic (Jawtuschet al 2013); implementation-supporting conditions (Bizikova et al 2015 (x2)); knowledge sharing (Bizikova et al 2015); Learning (Jacobi, Schneider, Botazzi et al 2015)/(Lebel et al 2006); non-state self-organising (Jacobi, Schneider, Botazzi et al 2015); participation and multi-stakeholder engagement (Lebel et al 2006)/(Jawtuschet al 2013); polycentricity (Lebel et al 2006); resilience/robustness (Lebel et al 2006); Rule of Law (Jawtuschet al 2013); scale-specific responsibilities and competences (Bizikova et al 2015)/(Lebel et al 2006); use of</p>					<p>and multi-stakeholder engagement (Eakin et al 2011); resources (Eakin et al 2011); scale-specific responsibilities and competences (Quinn et al 2011)</p>
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	knowledge and science (Bizikova et al 2015 (x2))					
Local Governance	<p>accountability (Jawtusch et al 2013); fairness (Jawtusch et al 2013); gender-sensitivity (Galiè 2013); Holistic (Jawtusch et al 2013); informal governance (Galiè 2013)/(Spielman et al 2008); Leadership (Cooper & Wheeler 2015); Learning (Jacobi, Schneider, Botazzi et al 2015); networks (Cooper & Wheeler 2015); non-state self-organising (Jacobi, Schneider, Botazzi et al 2015)/(Cooper & Wheeler 2015); participation and multi-stakeholder engagement (Cooper & Wheeler 2015)/(Jawtusch et al 2013); Rule of Law (Jawtusch et al 2013); scale-specific responsibilities and competences (Galiè 2013); use of knowledge and science (Cooper & Wheeler 2015)</p>				<p>participation and multi-stakeholder engagement (Korhonen-Kurki et al 2014)</p>	<p>adaptive capacity (Leith et al 2012; Brown et al 2012); Common Pool Resource management design (Poteete & Ostrom 2005); Fairness (Wambugu et al 2015); Gender-sensitivity (Wambugu et al 2015); Informal governance (Osbaehr et al 2010); Institutional mainstreaming (Wambugu et al 2015); Legal framework (Wambugu et al 2015); participation (Wambugu et al 2015); policy framework (Wambugu et al 2015); scale-specific responsibilities and competences (Quinn et al 2011); use of</p>

						knowledge and science (Wambugu et al 2015)
Cross-scale	adaptive capacity (Jacobi, Schneider, Mariscal et al 2015); cross-scale interaction (Galiè 2013)/(Cooper & Wheeler 2015); governance frameworks (Galiè 2013); Non-state self-organising (Jacobi, Schneider, Mariscal et al 2015); polycentricity (Cooper & Wheeler 2015); scale-specific responsibilities and competences (Bizikova et al 2015)					cross-scale interaction (Juhola & Westerhoff 2011); governance frameworks (Juhola & Westerhoff 2011); Informal governance (Juhola & Westerhoff 2011); networks (Juhola & Westerhoff 2011)
Universal					Common Pool Resource management design (Huntjens et al 2012); Fairness (Gupta et al 2010); Leadership (Gupta et al 2010); Learning (Gupta et al 2010); resources (Gupta et al 2010); scale-specific responsibilities and competences (Gupta et al 2010 (x2))	Institutional mainstreaming (Sietz et al 2011)

In the 3rd iteration, no mergers were made and no new indicators were identified. Therefore the matrix from the second iteration was unchanged. The final set of results was thus arrived at. The entire analysis process is illustrated in the flow chart below, while the full list of 42 indicators is given in the table following it. A more detailed list of all individual indicators, including governance and FS classification, original names, and sources can be seen in Appendix H.



Indicator	Source
Accountability	(Lebel <i>et al.</i> 2006, Jawtusch <i>et al.</i> 2013)
Adaptive capacity	(Leith <i>et al.</i> 2012, Jacobi, Schneider, Mariscal, <i>et al.</i> 2015)
Centralisation	(Gereffi <i>et al.</i> 2005)
Common Pool Resource management design	(Poteete and Ostrom 2004, Huntjens <i>et al.</i> 2012)
Corruption	(Mandemaker <i>et al.</i> 2011, Lesnikowski <i>et al.</i> 2013)
Country size	(Lesnikowski <i>et al.</i> 2013)
Cross-scale interaction	(Donovan <i>et al.</i> 2010, Juhola and Westerhoff 2011, Galiè 2013, Lesnikowski <i>et al.</i> 2013, Cooper and Wheeler 2015)
Deliberation	(Lebel <i>et al.</i> 2006, Schouten <i>et al.</i> 2012)
Discursive framing	(Boons and Mendoza 2010, Pesqueira and Glasbergen 2013)
Effective	(von Geibler 2013)
Electorally democratic	(Lebel <i>et al.</i> 2006, Acemoglu <i>et al.</i> 2009, Mandemaker <i>et al.</i> 2011)
Empowerment	(Lebel <i>et al.</i> 2006)
Fairness	(Lebel <i>et al.</i> 2006, Gupta <i>et al.</i> 2010, Jawtusch <i>et al.</i> 2013, Wambugu <i>et al.</i> 2015)
Favorable initial policy change	(Donovan <i>et al.</i> 2010, Korhonen-Kurki <i>et al.</i> 2014)
Gender-sensitivity	(Galiè 2013, Wambugu <i>et al.</i> 2015)
Governance frameworks	(Donovan <i>et al.</i> 2010, Juhola and Westerhoff 2011, Galiè 2013)
Holistic	(Jawtusch <i>et al.</i> 2013)
Implementation-supporting conditions	(Brownhill and Hickey 2012)
Implementation-supporting conditions	(Lesnikowski <i>et al.</i> 2013, Bizikova, Nijnik, <i>et al.</i> 2014)
Informal governance	(Spielman <i>et al.</i> 2008, Osbahr <i>et al.</i> 2010, Juhola and Westerhoff 2011, Galiè 2013)
Institutional mainstreaming	(Sietz <i>et al.</i> 2011, Bizikova, Nijnik, <i>et al.</i> 2014, Wambugu <i>et al.</i> 2015)
Leadership	(Gupta 2007, Cooper and Wheeler 2015)
Learning	(Lebel <i>et al.</i> 2006, Gupta 2007, Wilder <i>et al.</i> 2010, Eakin <i>et al.</i> 2011, Jacobi, Schneider, Bottazzi, <i>et al.</i> 2015)
Legal Framework	(Kabubo-Mariara 2007, Korhonen-Kurki <i>et al.</i> 2014, Wambugu <i>et al.</i> 2015)
Legitimacy	(von Geibler 2013)
Networks	(Juhola and Westerhoff 2011, Pesqueira and Glasbergen 2013, Cooper and Wheeler 2015)

Non-state self-organising	(Cooper and Wheeler 2015, Jacobi, Schneider, Bottazzi, <i>et al.</i> 2015, Jacobi, Schneider, Mariscal, <i>et al.</i> 2015)
Outcomes of similar programmes	(Minde <i>et al.</i> 2008, Lesnikowski <i>et al.</i> 2013)
Participation and multi-stakeholder engagement	(Lebel <i>et al.</i> 2006, Donovan <i>et al.</i> 2010, Eakin <i>et al.</i> 2011, Jawtusich <i>et al.</i> 2013, Pesqueira and Glasbergen 2013, Korhonen-Kurki <i>et al.</i> 2014, Cooper and Wheeler 2015, Wambugu <i>et al.</i> 2015)
Policy framework	(Osbahn <i>et al.</i> 2008, Korhonen-Kurki <i>et al.</i> 2014, Wambugu <i>et al.</i> 2015)
Political stability	(Mandemaker <i>et al.</i> 2011)
Polycentricity	(Lebel <i>et al.</i> 2006, Cooper and Wheeler 2015)
Public social commitments	(Mandemaker <i>et al.</i> 2011, Lesnikowski <i>et al.</i> 2013)
Reflexivity	(Termeer <i>et al.</i> 2013, Candel <i>et al.</i> 2015)
Resilience/robustness	(Lebel <i>et al.</i> 2006, Termeer <i>et al.</i> 2013, Candel <i>et al.</i> 2015)
Resources	(Gupta <i>et al.</i> 2010, Eakin <i>et al.</i> 2011, Lesnikowski <i>et al.</i> 2013)
Responsiveness	(Termeer <i>et al.</i> 2013, Candel <i>et al.</i> 2015)
Revitalization	(Termeer <i>et al.</i> 2013, Candel <i>et al.</i> 2015)
Rule of Law	(Mandemaker <i>et al.</i> 2011, Jawtusich <i>et al.</i> 2013)
Scale-specific responsibilities and competences	(Lebel <i>et al.</i> 2006, Gupta <i>et al.</i> 2010, Quinn <i>et al.</i> 2011, Galiè 2013, Bizikova, Nijnik, <i>et al.</i> 2014, Korhonen-Kurki <i>et al.</i> 2014, Candel <i>et al.</i> 2015)
State capacity	(Mandemaker <i>et al.</i> 2011, Lesnikowski <i>et al.</i> 2013)
Use of science and research	(Donovan <i>et al.</i> 2010, Bizikova, Nijnik, <i>et al.</i> 2014, Cooper and Wheeler 2015, Wambugu <i>et al.</i> 2015)

A cleaner version of the matrix is presented below.

	Food Production	Food Distribution	Food Consumption	Food System
Global Governance	Effective Legitimacy	Centralisation		Deliberation Discursive framing Networks Participation and multi-stakeholder engagement
Regional Governance	Implementation-supporting conditions Institutional mainstreaming Knowledge sharing Reflexivity Resilience/robustness Responsiveness			

	<ul style="list-style-type: none"> Revitalization Scale-specific responsibilities and competences Use of knowledge and science 	
National Governance	<ul style="list-style-type: none"> Corruption Discursive framing Electoral democracy Implementation-supporting conditions Knowledge sharing Legal Framework Outcomes of similar programmes Policy framework Political stability Public social commitment Rule of law Scale-specific responsibilities and competences state capacity Use of knowledge and science 	Discursive framing
sub-national Governance	<ul style="list-style-type: none"> Accountability Deliberation Electoral democracy Empowerment Fairness Holistic Implementation-supporting conditions Knowledge sharing Learning Non-state self-organising Participation and multi-stakeholder engagement Polycentricity Resilience/robustness Rule of Law Scale-specific responsibilities and competences Use of knowledge and science 	
Local Governance	<ul style="list-style-type: none"> Accountability Fairness Gender-sensitivity Holistic Informal governance Leadership Learning Networks Non-state self-organising Participation and multi-stakeholder engagement Rule of Law Scale-specific responsibilities and competences Use of knowledge and science 	

Cross-scale	Adaptive capacity Cross-scale interaction Governance frameworks Non-state self-organising Polycentricity Scale-specific responsibilities and competences
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In addition, a further examination of indicators coded as ‘Miscellaneous’ and ‘NotFS’. This examination resulted in the following two tables, although caution should be exercised when interpreting this latter set of results as they are considerably more speculative than those presented thus far:

Indicator name	Source	Governance level	Reason for miscellaneous classification
Common Pool Resource management design	(Huntjens <i>et al.</i> 2012)	Universal	Indicator comes from comparative study of common pool resource regimes, some of which directly relate to food and other not.
Fairness	(Gupta <i>et al.</i> 2010)	Universal	Taken from study on institutional characteristics facilitating adaptive capacity. It is operationalized across a wide range of societal sectors, including agriculture (production). The research framework was intentionally designed to be applicable to any level of governance and can examine any FS component
Implementation-supporting conditions	(Brownhill and Hickey 2012)	sub-national	Focus is on food security. Could be applied to FS in general, although operationalized at geographically constrained site.
Leadership	(Gupta <i>et al.</i> 2010)	Universal	See: <i>Fairness</i>
Learning	(Gupta <i>et al.</i> 2010)	Universal	See: <i>Fairness</i>
Reflexivity	(Candel <i>et al.</i> 2015)	Regional	Governance in this paper deals with Food Security in a broad sense. It does not fit into discreet FS components, nor does it correspond to systems thinking
Resilience/ robustness	(Candel <i>et al.</i> 2015)	Regional	See: <i>Reflexivity</i>
Resources	(Gupta <i>et al.</i> 2010)	Universal	See: <i>Fairness</i>
Responsiveness	(Candel <i>et al.</i> 2015)	Regional	See: <i>Reflexivity</i>
Revitalization	(Candel <i>et al.</i> 2015)	Regional	See: <i>Reflexivity</i>
Scale-specific responsibilities and competences	(Candel <i>et al.</i> 2015)	Regional	See: <i>Reflexivity</i>
	(Gupta <i>et al.</i> 2010)	Universal	See: <i>Fairness</i>

Indicator name	Source	Indicator name	Source
Adaptive capacity	(Leith <i>et al.</i> 2012)	Learning	(Eakin <i>et al.</i> 2011)
Common Pool Resource management design	(Poteete and Ostrom 2004)		(Wilder <i>et al.</i> 2010)
Corruption	(Lesnikowski <i>et al.</i> 2013)	Legal Framework	(Wambugu <i>et al.</i> 2015)
Country size	(Lesnikowski <i>et al.</i> 2013)		(Korhonen-Kurki <i>et al.</i> 2014)
Cross-scale interaction	(Lesnikowski <i>et al.</i> 2013)	Networks	(Juhola and Westerhoff 2011)
	(Donovan <i>et al.</i> 2010)	Outcomes of similar programmes	(Lesnikowski <i>et al.</i> 2013)
	(Juhola and Westerhoff 2011)	Participation and multi-stakeholder engagement	(Wambugu <i>et al.</i> 2015)
Electorally democratic	(Acemoglu <i>et al.</i> 2009)		(Eakin <i>et al.</i> 2011)
Fairness	(Wambugu <i>et al.</i> 2015)		(Donovan <i>et al.</i> 2010)
Favorable initial policy change	(Donovan <i>et al.</i> 2010)		(Korhonen-Kurki <i>et al.</i> 2014)
	(Korhonen-Kurki <i>et al.</i> 2014)	Policy framework	(Wambugu <i>et al.</i> 2015)
Gender-sensitivity	(Wambugu <i>et al.</i> 2015)		(Korhonen-Kurki <i>et al.</i> 2014)
Governance framework	(Donovan <i>et al.</i> 2010)	Public social commitments	(Lesnikowski <i>et al.</i> 2013)
	(Juhola and Westerhoff 2011)	Resources	(Eakin <i>et al.</i> 2011)
Implementation-supporting conditions	(Lesnikowski <i>et al.</i> 2013)		(Lesnikowski <i>et al.</i> 2013)
Informal governance	(Juhola and Westerhoff 2011)	Scale-specific responsibilities and competences	(Korhonen-Kurki <i>et al.</i> 2014)
	(Osbaahr <i>et al.</i> 2010)		(Quinn <i>et al.</i> 2011)
Institutional mainstreaming	(Wambugu <i>et al.</i> 2015)	State capacity	(Lesnikowski <i>et al.</i> 2013)
	(Sietz <i>et al.</i> 2011)	Use of knowledge and science	(Wambugu <i>et al.</i> 2015)
			(Donovan <i>et al.</i> 2010)

Appendix A: Results of Delphi Round 1

Survey sent to: 13 members of WG. (WG members were free, and invited, to pass link on to other experts. This makes accurate response rate impossible to calculate. I suspect that it is 100% response rate from WG, plus one additional respondent).

Total responses received: 19

of questionnaires returned with at least one answer: 14

of respondents returning references in Q2: 10 (8 by survey; 2 by email)

Q1 - responses

The table below shows the full list of keywords by the 12 respondents who submitted keywords.

	Keyword 1	Keyword 2	Keyword 3	Keyword 4	Keyword 5
	governance	food security	cross-scale	coordination	risk management
	governance indicators	cross-scale linkages	governance arrangements	multilevel governance	food systems
	property rights	markets	samaritan's dilemma	information asymmetry	adaptability
	governance	food systems	food security	community	institutions
	Food sustainability	Co-existing food systems	Multiple drivers of change, including climate change	Investments in resources and food systems	Polycentric governance
	governance	food systems	food security	institutions	adaptive capacity
	food regimes	institutional fit	public-private partnerships	political-economy	adaptive governance
	experience-based food security	adaptation	governance	risk management	food policy
	Politics	Causality	Power	Political Settlements	Modernization Theory
	Subsistence	Subsidies	Agricultural Inputs	Access	Resilience
	food security	adaptive governance	political economy	food system	nutritional outcome
	multi-level/polycentric governance	stakeholders/next users	adaptive/social/transformational learning	equity & power	institutional barriers
	Food sustainability	Right to food	Reduction of poverty and inequality	environmental impacts	social-ecological

					resilience
	Private sector regulation	Gender and governance	Cross-sectoral governance	Governance for food and nutrition security	Governance for local and global public goods

Q1 – synthesis

Moves towards synthesis were begun. However, during synthesis process, 2 additional responses were received. Therefore the process involved the following:

- Raw merger of responses received within deadline
- Identification of non-identically named suspected equivalents
- Submission of non-identically named suspected equivalents to SME for verification
- Receipt of two additional responses
- Receipt of verification by SME
- Synthesis according to SME comments
- Raw addition of two late responses (10 keywords)

Raw merging, where keywords were only merged if they had identical names, gave 48 keywords, including 6 suspected possible mergers.

The SME rejected two mergers ('food systems' with 'food regimes'; 'governance indicators' with 'governance arrangements') and approved 4 (4 keywords were collapsed into two clusters 'adaptive governance' and 'adaptive capacity'; 2 keywords were collapsed into 'cross-scale linkages'; 2 into 'equity and power'; 3 into 'multi-level/polycentric governance').

All these suggestions were accepted by the lead reviewer. This brought the number of keywords down to 41.

Raw addition of two late responses yielded a final set of 50 keywords (9 new, one identically named as an existing keyword (food sustainability)). These are listed below including the number of times nominated.

Keyword	Number of nominations	Keyword	Number of nominations
food security	4	Governance for food and nutrition security	1
food systems	4	Governance for local and global public goods	1
governance	4	governance indicators	1
adaptive governance	3	information asymmetry	1
multi-level/polycentric governance	3	institutional barriers	1
adaptive capacity	2	institutional fit	1
cross-scale linkages	2	Investments in resources and food systems	1

equity & power	2	markets	1
Food sustainability	2	Modernization Theory	1
institutions	2	Multiple drivers of change, including climate change	1
political-economy	2	nutritional outcome	1
Access	1	Political Settlements	1
adaptive/social/transformational learning	1	Politics	1
Agricultural Inputs	1	Private sector regulation	1
Causality	1	property rights	1
Co-existing food systems	1	public-private partnerships	1
community	1	Reduction of poverty and inequality	1
coordination	1	Resilience	1
Cross-sectoral governance	1	Right to food	1
environmental impacts	1	risk management	1
experience-based food security	1	samaritan's dilemma	1
food policy	1	social-ecological resilience	1
food regimes	1	stakeholders/next users	1
Gender and governance	1	Subsidies	1
governance arrangements	1	Subsistence	1

Q2 – responses

of respondents submitting references: 10

Total # of references received (before removing duplicates): 118

Resp.	# of refs	Full reference
1	15	Eakin, H., Winkels, A., & Sendzimir, J. (2009). Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems. <i>Environmental Science & Policy</i> , 12(4), 398-412.
		Termeer, C. J. A. M., Dewulf, A., & Van Lieshout, M. (2010). Disentangling scale approaches in governance research: comparing monocentric, multilevel, and adaptive governance. <i>Ecology and Society</i> , 15(4), 29.
		Adger, W. N. (2001). Scales of governance and environmental justice for adaptation and mitigation of climate change. <i>Journal of International Development</i> , 13(7), 921-931.
		Osbah, H., Twyman, C., Adger, W. N., & Thomas, D. S. (2008). Effective livelihood adaptation to climate change disturbance: scale dimensions of practice in Mozambique. <i>Geoforum</i> , 39(6), 1951-1964.
		Pereira, L. M., & Ruysenaar, S. (2012). Moving from traditional government to new adaptive governance: The changing face of food security responses in South Africa. <i>Food Security</i> , 4(1), 41-58.
		Tompkins, E. L., & Adger, W. (2004). Does adaptive management of natural resources enhance resilience to climate change?. <i>Ecology and society</i> , 9(2), 10.
		Osbah, H., Twyman, C., Adger, W. N., & Thomas, D. S. (2010). Evaluating successful livelihood adaptation to climate variability and change in southern Africa. <i>Ecology and Society</i> , 15(2), 27.
		Leith, P., Jacobs, B., Brown, P. R., & Nelson, R. (2012). A participatory assessment of NRM capacity to inform policy and practice: Cross-scale evaluation of enabling and constraining factors. <i>Society & Natural Resources</i> , 25(8), 775-793.
		Cooper, S. J., & Wheeler, T. (2015). Adaptive governance: Livelihood innovation for climate resilience in Uganda. <i>Geoforum</i> , 65, 96-107.
		Candel, J. J. (2014). Food security governance: a systematic literature review. <i>Food Security</i> , 6(4), 585-601.
		Thornton, P., & Lipper, L. (2014). How does climate change alter agricultural strategies to support food

		<p>security?.</p> <p>Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., ... & Torquebiau, E. F. (2014). Climate-smart agriculture for food security. <i>Nature Climate Change</i>, 4(12), 1068-1072.</p> <p>Pokorny, B., de Jong, W., Godar, J., Pacheco, P., & Johnson, J. (2013). From large to small: Reorienting rural development policies in response to climate change, food security and poverty. <i>Forest Policy and Economics</i>, 36, 52-59.</p> <p>Poppy, G. M., Jepson, P. C., Pickett, J. A., & Birkett, M. A. (2014). Achieving food and environmental security: new approaches to close the gap. <i>Philosophical Transactions of the Royal Society of London B: Biological Sciences</i>, 369(1639), 20120272.</p> <p>Lele, U., Klousia-Marquis, M., & Goswami, S. (2013). Good governance for food, water and energy security. <i>Aquatic Procedia</i>, 1, 44-63.</p>
2	9	<p>Adger, W.N., Brown, K., Tompkins, E.L., 2005, 'The political economy of cross-scale networks in resource co-management', <i>Ecology and Society</i> 10(2), 9.</p> <p>Armitage, D., 2008, 'Governance and the commons in a multilevel world', <i>International Journal of the Commons</i> 2, 7–32.</p> <p>Gibson, C.C., Ostrom, E., Ahn, T.K., 2000, 'The concept of scale and the human dimensions of global change', <i>Ecological Economics</i> 32, 217–239.</p> <p>Korhonen-Kurki, K., Seiring, J., Brockhaus, M., DiGreggio, M., 2014, 'Enabling factors for establishing REDD+ in a context of weak governance: a qualitative comparative analysis', <i>Climate Policy</i> 14(2), 167–186.</p> <p>Poteete, A., 2012, 'Levels, scales, linkages, and other 'multiples' affecting natural resources', <i>International Journal of the Commons</i> 6, 134–150.</p> <p>Poteete, A.R., Ostrom, E., 2004, 'Heterogeneity, group size and collective action: the role of institutions in forest management', <i>Development and Change</i> 35, 437–461</p> <p>Wertz-Kanounnikoff, S., McNeill, D. 2012, Performance indicators and REDD+ implementation. In A. Angelsen, M. Brockhaus, W.D. Sunderlin and L. Verchot (eds), <i>Analysing REDD+: Challenges and Choices</i> (pp. 233–246). CIFOR, Bogor, Indonesia.</p> <p>Young, O.R., 2008, Institutions and environmental change: the scientific legacy of a decade of IDGEC research. Pages 3–45 In O.R. Young, L.A. King and H. Schroeder, (eds.) <i>Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers</i>. MIT Press, Cambridge, MA, USA.</p> <p>Hooghe, L., Marks, G., 2003, 'Unraveling the Central State, but how? Types of multilevel governance. <i>American Political Science Review</i>', 97(2), 233–243.</p>
3	3	<p>Esnouf C, Russel B, Bricas N. 2013. <i>Food System Sustainability</i>. Cambridge University Press.</p> <p>Schader, C, Grenz J, Meier MS, and Stolze M. 2014. Scope and precision of sustainability assessment approaches to food systems. <i>Ecology and Society</i> 19(3):42.</p> <p>Jacobi J; Schneider M; Bottazzi P; Pillco M; Calizaya P; Rist S. 2013. Agroecosystem resilience and farmers' perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. <i>Renewable Agriculture and Food Systems</i> 30(2), 170-183.</p>
4	10	<p>Rocha, C. and I. Lessa. 2009. <i>Urban Governance for Food Security: The Alternative Food System in Belo Horizonte, Brazil</i>. <i>International Planning Studies</i>. doi: 10.1080/13563471003642787</p> <p>Perez, Escamilla, R. 2012. Can experience-based household food security scales help improve food security governance? <i>Global food Security</i>. http://dx.doi.org/10.1016/j.gfs.2012.10.006</p> <p>Garcia, S.M. 2010. <i>Food Security and Marine Capture Fisheries</i>. <i>Philosophical Transactions of the Royal Society B</i>. doi: 10.1098/rstb.2010.0171</p> <p>Sonnino, R. 2014. Reflexive governance for food security: The example of school feeding in Brazil. <i>Journal of Rural Studies</i>. http://dx.doi.org/10.1016/j.jrurstud.2014.06.003</p> <p>Maseiro, S. 2015. Redesigning the Indian Food Security System through E-Governance: The Case of Kerala. <i>World Development</i> doi:10.1016/j.worlddev.2014.10.014 –</p> <p>Edwards, M. E. (2012). Food Insecurity in Western US States: Increasing Collaboration between State Agencies and Nonprofit Organizations. <i>Food Culture & Society</i>, 15(1), 93–112.</p> <p>Galiè, A. (2013). Governance of seed and food security through participatory plant breeding: Empirical evidence and gender analysis from Syria. <i>Natural Resources Forum</i>, 37(1), 31–42.</p> <p>Koc, M., Macrae, R., Desjardins, E., & Roberts, W. (2008). Getting civil about food: The interactions between civil society and the state to advance sustainable food systems in Canada. <i>Journal of Hunger and Environmental Nutrition</i>, 3(2–3), 122– 144.</p> <p>von Braun, J. (2009). Addressing the food crisis: governance, market functioning, and investment in public goods. <i>Food Security</i>, 1(1), 9–15.</p> <p>http://pdf.usaid.gov/pdf_docs/PNADE034.pdf</p>

5	14	<p>Azmat, F., & Coghill, K. (2005). Good governance and market-based reforms: a study of Bangladesh. <i>International Review of Administrative Sciences</i>, 71(4), 625–638. http://doi.org/10.1177/0020852305059602</p> <p>Drimie, S. (2010). The Integrated Food Security Strategy of South Africa : an institutional analysis. Retrieved from http://reference.sabinet.co.za/sa_epublication_article/agrekon_v49_n3_a3</p> <p>Evans, A. (2011). Governance for a Resilient Food System. <i>Oxfam Policy and Practice: Agriculture, Food and Land</i>, 11(2), 63–92.</p> <p>Holden, S., & Lunduka, R. (2010). Too poor to be efficient? Impacts of the targeted fertilizer subsidy programme in Malawi on farm plot level input use, crop choice and land productivity. <i>Noragric Report</i>, 55.</p> <p>Kochar, A. (2005). Can Targeted Food Programs Improve Nutrition? An Empirical Analysis of India’s Public Distribution System. <i>Economic Development and Cultural Change</i>, 54(1), 203–235. http://doi.org/10.1086/431260</p> <p>Lio, M., & Liu, M.-C. (2008). Governance and agricultural productivity: A cross-national analysis. <i>Food Policy</i>, 33(6), 504–512. http://doi.org/10.1016/j.foodpol.2008.06.003</p> <p>Mandemaker, M., Bakker, M., & Stoorvogel, J. (2011). The role of governance in agricultural expansion and intensification: a global study of arable agriculture. <i>Ecology and Society</i>, 16(2), 8.</p> <p>Minde, I., Jayne, T. S., Crawford, E., Ariga, J., & Govereh, J. (2008). Promoting fertilizer use in Africa: current issues and empirical evidence from Malawi, Zambia, and Kenya (No. 54509). Michigan State University, Department of Agricultural, Food, and Resource Economics.</p> <p>Nelson, R., Howden, M., & Smith, M. S. (2008). Using adaptive governance to rethink the way science supports Australian drought policy. <i>Environmental Science & Policy</i>, 11(7), 588–601. http://doi.org/10.1016/j.envsci.2008.06.005</p> <p>Pérez-Escamilla, R. (2012). Can experience-based household food security scales help improve food security governance? <i>Global Food Security</i>, 1(2), 120–125. http://doi.org/10.1016/j.gfs.2012.10.006</p> <p>Ricker-Gilbert, J., Jayne, T., & Shively, G. (2013). Addressing the “Wicked Problem” of Input Subsidy Programs in Africa. <i>Applied Economic Perspectives and Policy</i>, 35(2), 322–340. http://doi.org/10.1093/aep/ppt001</p> <p>Sahley, C., Groelsema, B., Marchione, T., & Nelson, D. (2005). The governance dimensions of food security in Malawi: US AID.</p> <p>Spielman, D. J., Cohen, M. J., & Mogues, T. (2008). Mobilizing Rural Institutions for Sustainable Livelihoods and Equitable Development: a case study of local governance and smallholder cooperatives in Ethiopia. Washington, DC: International Food Policy Research Institute.</p> <p>Umali-Deininger, D. L., & Deininger, K. W. (2001). Towards greater food security for India’s poor: balancing government intervention and private competition. <i>Agricultural Economics</i>, 25(2-3), 321–335. http://doi.org/10.1111/j.1574-0862.2001.tb00212.x</p>
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Q2 - synthesis

Removing Duplicates yields: 111

These are given unique project IDs and archived in the project index of articles¹⁹. To summarise an extract is taken from this index:

¹⁹ Note that synthesis was begun soon after the deadline for responses for the Delphi R1. However, two late responses were subsequently received. Thus the synthesis was performed first on 92 nominations, which after removing duplicates yielded 88 unique records. These were assigned project IDs. Then an additional 26 nominations (received from two late

Project ID	Author year	Full reference	Nominated by
EGRRef#1	Adger 2001	Adger, W.Neil. 2001. "Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change." <i>Journal of International Development</i> 13 (7): 921–31. doi:10.1002/jid.833.	2
EGRRef#2	Adger et al 2005	Adger, W.Neil, Katrina Brown, and Emma L. Thompkins. 2005. "The Political Economy of Cross-Scale Networks in Resource Co- Management." <i>Ecology and Society</i> 10 (2): 9.	1
EGRRef#3	Agrawal 2001	Agrawal, Arun. 2001. "Common Property Institutions and Sustainable Governance of Resources." <i>World Development</i> 29 (10): 1649–72. doi:10.1016/S0305-750X(01)00063-8.	1
EGRRef#4	Armitage 2007	Armitage, Derek. 2007. "Governance and the Commons in a Multi-Level World." <i>International Journal of the Commons</i> 2 (1): 7–32.	2
EGRRef#5	Auld 2010	Auld, Graeme. 2010. "Assessing Certification as Governance: Effects and Broader Consequences for Coffee." <i>The Journal of Environment & Development</i> 19 (2): 215–41. doi:10.1177/1070496510368506.	1
EGRRef#6	Azmat & Cogill 2005	Azmat, Fara, and Ken Coghill. 2005. "Good Governance and Market-Based Reforms: A Study of Bangladesh." <i>International Review of Administrative Sciences</i> 71 (4): 625–38. doi:10.1177/0020852305059602.	1
EGRRef#7	Bacon 2010	Bacon, Christopher M. 2010. "Who Decides What Is Fair in Fair Trade? The Agri-Environmental Governance of Standards, Access, and Price." <i>The Journal of Peasant Studies</i> 37 (1): 111–47. doi:10.1080/03066150903498796.	1
EGRRef#8	Berkes 2009	Berkes, Fikret. 2009. "Evolution of Co-Management: Role of Knowledge Generation, Bridging Organizations and Social Learning." <i>Journal of Environmental Management</i> 90 (5): 1692–1702. doi:10.1016/j.jenvman.2008.12.001.	1
EGRRef#9	Biermann 2007	Biermann, Frank. 2007. "'Earth System Governance' as a Crosscutting Theme of Global Change Research." <i>Global Environmental Change</i> 17 (3–4): 326–37. doi:10.1016/j.gloenvcha.2006.11.010.	1
EGRRef#10	Biermann et al 2012	Biermann, Frank, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michele M Betsill, Harriet Bulkeley, et al. 2012. "Transforming Governance and Institutions for Global Sustainability: Key Insights from the Earth System Governance Project." <i>Current Opinion in Environmental Sustainability</i> , Open issue, 4 (1): 51–60. doi:10.1016/j.cosust.2012.01.014.	1
EGRRef#11	Biermann et al 2010	Biermann, Frank, Michele M. Betsill, Joyeeta Gupta, Norichika Kanie, Louis Lebel, Diana Liverman, Heike Schroeder, Bernd Siebenhüner, and Ruben Zondervan. 2010. "Earth System Governance: A Research Framework." <i>International Environmental Agreements: Politics, Law and Economics</i> 10 (4): 277–98. doi:10.1007/s10784-010-9137-3.	1
EGRRef#12	Biermann & Boas 2010	Biermann, Frank, and Ingrid Boas. 2010. "Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees." <i>Global Environmental Politics</i> 10 (1): 60–88. doi:10.1162/glep.2010.10.1.60.	1
EGRRef#13	Biermann & Gupta 2010	Biermann, Frank, and Aarti Gupta. 2011. "Accountability and Legitimacy in Earth System Governance: A Research Framework." <i>Ecological Economics</i> , Special Section - Earth System Governance: Accountability and Legitimacy, 70 (11): 1856–64. doi:10.1016/j.ecolecon.2011.04.008.	1
EGRRef#14	Boons & Mendoza 2010	Boons, Frank, and Angelica Mendoza. 2010. "Constructing Sustainable Palm Oil: How Actors Define Sustainability." <i>Journal of Cleaner Production</i> 18 (16–17): 1686–95. doi:10.1016/j.jclepro.2010.07.003.	1
EGRRef#15	Braun 2009	Braun, Joachim von. 2009. "Addressing the Food Crisis: Governance, Market Functioning, and Investment in Public Goods." <i>Food Security</i> 1 (1): 9–15. doi:10.1007/s12571-008-0001-z.	1
EGRRef#16	Brunner et	Brunner, Ronald D., Toddi A. Steelman, Lindy Coe-Juell, Christina Cromley, Christine M.	1

respondents) were examined. Of these 26, two were collapsed prior to synthesis with the others (the reference had been nominated twice by the same respondent). During synthesis, two further duplicate was identified –a book which had already been nominated (Esnouf et al), and an article (Jacobi et al). Thus the total yields from the first round of the delphi are 111.

	al 2005	Edwards, and Donna W. Tucker. 2005. <i>Adaptive Governance: Integrating Science, Policy, and Decision Making</i> . New York: Columbia University Press.	
EGRRef#17	Candel 2014	Candel, Jeroen J. L. 2014. "Food Security Governance: A Systematic Literature Review." <i>Food Security</i> 6 (4): 585–601. doi:10.1007/s12571-014-0364-2.	1
EGRRef#18	Chibinga et al 2010	Chibinga, O. C., N. M. Musimba, M. Nyangito, and J. Simbaya. 2010. "Climate Variability: Pastoralists' Perception, Practices and Enhancing Adaptive Pasture Use for Food Security in Choma District, Southern Zambia." In <i>RUFORUM Second Biennial Meeting</i> . Entebbe, Uganda. http://repository.ruforum.org/documents/climate-variability-pastoralists-perception-practices-and-enhancing-adaptive-pasture-use .	1
EGRRef#19	Clapp 2003	Clapp, Jennifer. 2003. "Transnational Corporate Interests and Global Environmental Governance: Negotiating Rules for Agricultural Biotechnology and Chemicals." <i>Environmental Politics</i> 12 (4): 1–23. doi:10.1080/09644010412331308354.	1
EGRRef#20	Cooper & Wheeler 2015	Cooper, Sarah J., and Tim Wheeler. 2015. "Adaptive Governance: Livelihood Innovation for Climate Resilience in Uganda." <i>Geoforum</i> 65 (October): 96–107. doi:10.1016/j.geoforum.2015.07.015.	1
EGRRef#21	Douxchamps et al 2015	Douxchamps, Sabine, Mark T. Van Wijk, Silvia Silvestri, Abdoulaye S. Moussa, Carlos Quiros, Ndèye Yacine B. Ndour, Saaka Buah, et al. 2015. "Linking Agricultural Adaptation Strategies, Food Security and Vulnerability: Evidence from West Africa." <i>Regional Environmental Change</i> , September, 1–13. doi:10.1007/s10113-015-0838-6.	1
EGRRef#22	Drimie 2010	Drimie, Scott. 2010. "The Integrated Food Security Strategy of South Africa : An Institutional Analysis." http://reference.sabinet.co.za/sa_epublication_article/agrekon_v49_n3_a3 .	1
EGRRef#23	DuPuis & Gillon 2008	DuPuis, E. Melanie, and Sean Gillon. 2008. "Alternative Modes of Governance: Organic as Civic Engagement." <i>Agriculture and Human Values</i> 26 (1-2): 43–56. doi:10.1007/s10460-008-9180-7.	1
EGRRef#24	Eakin et al 2009	Eakin, Hallie, Alexandra Winkels, and Jan Sendzimir. 2009. "Nested Vulnerability: Exploring Cross-Scale Linkages and Vulnerability Teleconnections in Mexican and Vietnamese Coffee Systems." <i>Environmental Science & Policy</i> , Special Issue: Food Security and Environmental Change Food Security and Environmental Change: Linking Science, Development and Policy for Adaptation, 12 (4): 398–412. doi:10.1016/j.envsci.2008.09.003.	1
EGRRef#25	Edwards 2012	Edwards, Mark Evan. 2012. "Food Insecurity in Western US States." <i>Food, Culture & Society</i> 15 (1): 93–112. doi:10.2752/175174412X13190510222020.	1
EGRRef#26	Ellis & Sumberg 1998	Ellis, Frank, and James Sumberg. 1998. "Food Production, Urban Areas and Policy Responses." <i>World Development</i> 26 (2): 213–25. doi:10.1016/S0305-750X(97)10042-0.	1
EGRRef#27	Esnouf et al 2013	Esnouf, Catherine, Marie Russel, and Nicolas Bricas. 2013. <i>Food System Sustainability</i> . Cambridge University Press.	2
EGRRef#28	Evans 2011	Evans, Alex. 2011. "Governance for a Resilient Food System." <i>Oxfam Policy and Practice: Agriculture, Food and Land</i> 11 (2): 63–92.	1
EGRRef#29	Finan & Nelson 2001	Finan, Timothy J., and Donald R. Nelson. 2001. "Making Rain, Making Roads, Making Do: Public and Private Adaptations to Drought in Ceará, Northeast Brazil." <i>Climate Research</i> 19 (2): 97–108. doi:10.3354/cr019097.	1
EGRRef#30	Folke et al 2005	Folke, Carl, Thomas Hahn, Per Olsson, and Jon Norberg. 2005. "Adaptive Governance of Social-Ecological Systems." <i>Annual Review of Environment and Resources</i> 30 (1): 441–73. doi:10.1146/annurev.energy.30.050504.144511.	1
EGRRef#31	Galiè 2013	Galiè, Alessandra. 2013. "Governance of Seed and Food Security through Participatory Plant Breeding: Empirical Evidence and Gender Analysis from Syria." <i>Natural Resources Forum</i> 37 (1): 31–42. doi:10.1111/1477-8947.12008.	1
EGRRef#32	Garcia & Rosenberg 2010	Garcia, Serge M., and Andrew A. Rosenberg. 2010. "Food Security and Marine Capture Fisheries: Characteristics, Trends, Drivers and Future Perspectives." <i>Philosophical Transactions of the Royal Society of London B: Biological Sciences</i> 365 (1554): 2869–80. doi:10.1098/rstb.2010.0171.	1
EGRRef#33	Gibson et al 2000	Gibson, Clark C., Elinor Ostrom, and T. K. Ahn. 2000. "The Concept of Scale and the Human Dimensions of Global Change: A Survey." <i>Ecological Economics</i> 32 (2): 217–39. doi:10.1016/S0921-8009(99)00092-0.	1
EGRRef#34	Giovannucci & Ponte	Giovannucci, Daniele, and Stefano Ponte. 2005. "Standards as a New Form of Social Contract? Sustainability Initiatives in the Coffee Industry." <i>Food Policy</i> , Private Agri-	1

	2005	food Standards: Implications for Food Policy and Agri-food Systems, 30 (3): 284–301. doi:10.1016/j.foodpol.2005.05.007.	
EGRRef#35	Grindle 2004	Grindle, Merilee S. 2004. "Good Enough Governance: Poverty Reduction and Reform in Developing Countries." <i>Governance</i> 17 (4): 525–48. doi:10.1111/j.0952-1895.2004.00256.x.	1
EGRRef#36	Gupta 2007	Gupta, Joyeeta. 2007. "The Multi-Level Governance Challenge of Climate Change." <i>Environmental Sciences</i> 4 (3): 131–37. doi:10.1080/15693430701742669.	1
EGRRef#37	Hesselberg & Yaro 2006	Hesselberg, Jan, and Joseph A. Yaro. 2006. "An Assessment of the Extent and Causes of Food Insecurity in Northern Ghana Using a Livelihood Vulnerability Framework." <i>GeoJournal</i> 67 (1): 41–55. doi:10.1007/s10708-006-9007-2.	1
EGRRef#38	Holden & Lunduka 2010	Holden, Stein, and Rodney Lunduka. 2010. "Too Poor to Be Efficient? Impacts of the Targeted Fertilizer Subsidy Programme in Malawi on Farm Plot Level Input Use, Crop Choice and Land Productivity." 55. Noragric Report. Norway: Department of International Environment and Development Studies, Noragric. http://www.umb.no/statisk/noragric/publications/reports/2010_nor_rep_55.pdf .	1
EGRRef#39	Hooge & Marks 2003	Hooge, L., and G. Marks. 2003. "Unraveling the Central State, but How? Types of Multilevel Governance." <i>American Political Science Review</i> 97 (2): 233–43.	1
EGRRef#40	Huntjens et al 2012	Huntjens, Patrick, Louis Lebel, Claudia Pahl-Wostl, Jeff Camkin, Roland Schulze, and Nicole Kranz. 2012. "Institutional Design Propositions for the Governance of Adaptation to Climate Change in the Water Sector." <i>Global Environmental Change</i> 22 (1): 67–81. doi:10.1016/j.gloenvcha.2011.09.015.	1
EGRRef#41	Ison et al 2013	Ison, Ray, Chris Blackmore, and Benjamin L. Iaquinto. 2013. "Towards Systemic and Adaptive Governance: Exploring the Revealing and Concealing Aspects of Contemporary Social-Learning Metaphors." <i>Ecological Economics</i> 87 (March): 34–42. doi:10.1016/j.ecolecon.2012.12.016.	1
EGRRef#42	Jacobi et al 2015	Jacobi, Johanna, Monika Schneider, Patrick Bottazzi, Maria Pillco, Patricia Calizaya, and Stephan Rist. 2015. "Agroecosystem Resilience and Farmers' Perceptions of Climate Change Impacts on Cocoa Farms in Alto Beni, Bolivia." <i>Renewable Agriculture and Food Systems</i> 30 (02): 170–83. doi:10.1017/S174217051300029X.	2
EGRRef#43	Juhola & Westerhoff 2011	Juhola, Sirkku, and Lisa Westerhoff. 2011. "Challenges of Adaptation to Climate Change across Multiple Scales: A Case Study of Network Governance in Two European Countries." <i>Environmental Science & Policy</i> 14 (3): 239–47. doi:10.1016/j.envsci.2010.12.006.	1
EGRRef#44	Kochar 2005	Kochar, Anjini. 2005. "Can Targeted Food Programs Improve Nutrition? An Empirical Analysis of India's Public Distribution System." <i>Economic Development and Cultural Change</i> 54 (1): 203–35. doi:10.1086/431260.	1
EGRRef#45	Koc et al 2008	Koc, Mustafa, Rod MacRae, Ellen Desjardins, and Wayne Roberts. 2008. "Getting Civil About Food: The Interactions Between Civil Society and the State to Advance Sustainable Food Systems in Canada." <i>Journal of Hunger & Environmental Nutrition</i> 3 (2-3): 122–44. doi:10.1080/19320240802243175.	1
EGRRef#46	Korhonen-Kurki et al 2014	Korhonen-Kurki, Kaisa, Jenniver Sehring, Maria Brockhaus, and Monica Di Gregorio. 2014. "Enabling Factors for Establishing REDD+ in a Context of Weak Governance." <i>Climate Policy</i> 14 (2): 167–86. doi:10.1080/14693062.2014.852022.	1
EGRRef#47	Lebel et al 2006	Lebel, L., J. Anderies, B. Campbell, C. Folke, S. Hatfield-Dodds, T. Hughes, and James Wilson. 2006. "Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems." <i>Ecology and Society</i> , June. http://digitalcommons.library.umaine.edu/sms_facpub/52 .	1
EGRRef#48	Leith et al 2012	Leith, Peat, Brent Jacobs, Peter R. Brown, and Rohan Nelson. 2012. "A Participatory Assessment of NRM Capacity to Inform Policy and Practice: Cross-Scale Evaluation of Enabling and Constraining Factors." <i>Society & Natural Resources</i> 25 (8): 775–93. doi:10.1080/08941920.2011.637548.	1
EGRRef#49	Lele et al 2013	Lele, U., M. Klousia-Marquis, and S. Goswami. 2013. "Good Governance for Food, Water and Energy Security." <i>Aquatic Procedia</i> , At the Confluence - Selection from the 2012 World Water Week in Stockholm, 1: 44–63. doi:10.1016/j.aqpro.2013.07.005.	1
EGRRef#50	Lio & Liu 2008	Lio, Monchi, and Meng-Chun Liu. 2008. "Governance and Agricultural Productivity: A Cross-National Analysis." <i>Food Policy</i> , Food Product Composition, Consumer Health, and Public Policy, 33 (6): 504–12. doi:10.1016/j.foodpol.2008.06.003.	1
EGRRef#51	Lipper et al	Lipper, Leslie, Philip Thornton, Bruce M. Campbell, Tobias Baedeker, Ademola	1

	2014	Braimoh, Martin Bwalya, Patrick Caron, et al. 2014. "Climate-Smart Agriculture for Food Security." <i>Nature Climate Change</i> 4 (12): 1068–72. doi:10.1038/nclimate2437.	
EGRRef#52	Mandemaker 2011	Mandemaker, Menno, Martha Bakker, and Jetse Stoorvogel. 2011. "The Role of Governance in Agricultural Expansion and Intensification: A Global Study of Arable Agriculture." <i>Ecology and Society</i> 6 (12): 8.	1
EGRRef#53	Masiero 2015	Masiero, Silvia. 2015. "Redesigning the Indian Food Security System through E-Governance: The Case of Kerala." <i>World Development</i> 67 (March): 126–37. doi:10.1016/j.worlddev.2014.10.014.	1
EGRRef#54	Mearns & Norton 2010	Mearns, Robin, and Andrew Norton. 2010. <i>The Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World</i> . Edited by Robin Mearns and Andrew Norton. The World Bank. Washington DC: The International Bank for Reconstruction and Development / The World Bank. http://elibrary.worldbank.org/doi/book/10.1596/978-0-8213-7887-8 .	1
EGRRef#55	Minde et al 2008	Minde, Isaac J., Thomas Jayne, Eric Crawford, Joshua Ariga, and Govere Jones. 2008. "Promoting Fertilizer Use in Africa: Current Issues and Empirical Evidence from Malawi, Zambia, and Kenya." 54501. Food Security International Development Policy Syntheses. Michigan: Michigan State University, Department of Agricultural, Food, and Resource Economics.	1
EGRRef#56	Mount 2011	Mount, Phil. 2011. "Growing Local Food: Scale and Local Food Systems Governance." <i>Agriculture and Human Values</i> 29 (1): 107–21. doi:10.1007/s10460-011-9331-0.	1
EGRRef#57	Nelson & Finan 2009	Nelson, Donald R., and Timothy J. Finan. 2009. "Praying for Drought: Persistent Vulnerability and the Politics of Patronage in Ceará, Northeast Brazil." <i>American Anthropologist</i> 111 (3): 302–16. doi:10.1111/j.1548-1433.2009.01134.x.	1
EGRRef#58	Nelson et al 2008	Nelson, Rohan, Mark Howden, and Mark Stafford Smith. 2008. "Using Adaptive Governance to Rethink the Way Science Supports Australian Drought Policy." <i>Environmental Science & Policy</i> 11 (7): 588–601. doi:10.1016/j.envsci.2008.06.005.	1
EGRRef#59	Osborne et al 2010	Osborne, Henny, Chasca Twyman, W. Neil Adger, and David S. G. Thomas. 2010. "Evaluating Successful Livelihood Adaptation to Climate Variability and Change in Southern Africa." <i>Ecology and Society</i> 15 (2): 27.	1
EGRRef#60	Osborne et al 2008	Osborne, Henny, Chasca Twyman, W. Neil Adger, and David S. G. Thomas. 2008. "Effective Livelihood Adaptation to Climate Change Disturbance: Scale Dimensions of Practice in Mozambique." <i>Geoforum</i> , Placing Splintering Urbanism, 39 (6): 1951–64. doi:10.1016/j.geoforum.2008.07.010.	1
EGRRef#61	Pahl-Wostl 2009	Pahl-Wostl, Claudia. 2009. "A Conceptual Framework for Analysing Adaptive Capacity and Multi-Level Learning Processes in Resource Governance Regimes." <i>Global Environmental Change</i> 19 (3): 354–65. doi:10.1016/j.gloenvcha.2009.06.001.	1
EGRRef#62	Pedersen & Benjaminsen 2007	Pedersen, Jon, and Tor A. Benjaminsen. 2007. "One Leg or Two? Food Security and Pastoralism in the Northern Sahel." <i>Human Ecology</i> 36 (1): 43–57. doi:10.1007/s10745-007-9136-3.	1
EGRRef#63	Pereira & Ruysenaar 2012	Pereira, Laura M., and Shaun Ruysenaar. 2012. "Moving from Traditional Government to New Adaptive Governance: The Changing Face of Food Security Responses in South Africa." <i>Food Security</i> 4 (1): 41–58. doi:10.1007/s12571-012-0164-5.	1
EGRRef#64	Pérez-Escamilla 2012	Pérez-Escamilla, Rafael. 2012. "Can Experience-Based Household Food Security Scales Help Improve Food Security Governance?" <i>Global Food Security</i> 1 (2): 120–25. doi:10.1016/j.gfs.2012.10.006.	2
EGRRef#65	Pesqueira & Glasbergen 2013	Pesqueira, Luli, and Pieter Glasbergen. 2013. "Playing the Politics of Scale: Oxfam's Intervention in the Roundtable on Sustainable Palm Oil." <i>Geoforum</i> , Risky natures, natures of risk, 45 (March): 296–304. doi:10.1016/j.geoforum.2012.11.017.	1
EGRRef#66	Pokorny et al 2013	Pokorny, Benno, Wil de Jong, Javier Godar, Pablo Pacheco, and James Johnson. 2013. "From Large to Small: Reorienting Rural Development Policies in Response to Climate Change, Food Security and Poverty." <i>Forest Policy and Economics</i> , Forest and conservation policy in a changing climate, 36 (November): 52–59. doi:10.1016/j.forpol.2013.02.009.	1
EGRRef#67	Ponte & Cheyns 2013	Ponte, Stefano, and Emmanuelle Cheyns. 2013. "Voluntary Standards, Expert Knowledge and the Governance of Sustainability Networks." <i>Global Networks</i> 13 (4): 459–77. doi:10.1111/glob.12011.	1
EGRRef#68	Poppy et al 2014	Poppy, G. M., P. C. Jepson, J. A. Pickett, and M. A. Birkett. 2014. "Achieving Food and Environmental Security: New Approaches to Close the Gap." <i>Philosophical</i>	1

		<i>Transactions of the Royal Society of London B: Biological Sciences</i> 369 (1639): 20120272. doi:10.1098/rstb.2012.0272.	
EGRef#69	Poteete 2012	Poteete, Amy R. 2012. "Levels, Scales, Linkages, and Other 'Multiples' Affecting Natural Resources." <i>International Journal of the Commons</i> 6 (2): 134–50.	1
EGRef#70	Poteete & Ostrom 2004	Poteete, Amy R., and Elinor Ostrom. 2004. "Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management." <i>Development and Change</i> 35 (3): 435–61. doi:10.1111/j.1467-7660.2004.00360.x.	1
EGRef#71	Quinn et al 2011	Quinn, Claire H., Gina Ziervogel, Anna Taylor, Takeshi Takama, and Frank Thomalla. 2011. "Coping with Multiple Stresses in Rural South Africa." <i>Ecology and Society</i> 16 (3): 2.	1
EGRef#72	Ricker-Gilbert et al 2013	Ricker-Gilbert, Jacob, Thomas Jayne, and Gerald Shively. 2013. "Addressing the 'Wicked Problem' of Input Subsidy Programs in Africa." <i>Applied Economic Perspectives and Policy</i> 35 (2): 322–40. doi:10.1093/aep/ppt001.	1
EGRef#73	Rijke et al 2012	Rijke, Jeroen, Rebekah Brown, Chris Zevenbergen, Richard Ashley, Megan Farrelly, Peter Morison, and Sebastiaan van Herk. 2012. "Fit-for-Purpose Governance: A Framework to Make Adaptive Governance Operational." <i>Environmental Science & Policy</i> 22 (October): 73–84. doi:10.1016/j.envsci.2012.06.010.	1
EGRef#74	Rocha & Lessa 2009	Rocha, Cecilia, and Iara Lessa. 2009. "Urban Governance for Food Security: The Alternative Food System in Belo Horizonte, Brazil." <i>International Planning Studies</i> 14 (4): 389–400. doi:10.1080/13563471003642787.	1
EGRef#75	Sahley et al 2005	Sahley, Caroline, Bob Groelsema, Tom Marchione, and David Nelson. 2005. "The Governance Dimensions of Food Security in Malawi." USAID. http://pdf.usaid.gov/pdf_docs/PNADE034.pdf .	2
EGRef#76	Schader et al 2014	Schader, Christian, Jan Grenz, Matthias Meier, and Matthias Stolze. 2014. "Scope and Precision of Sustainability Assessment Approaches to Food Systems." <i>Ecology and Society</i> 19 (3): 42.	1
EGRef#77	Schouten et al 2012	Schouten, Greetje, Pieter Leroy, and Pieter Glasbergen. 2012. "On the Deliberative Capacity of Private Multi-Stakeholder Governance: The Roundtables on Responsible Soy and Sustainable Palm Oil." <i>Ecological Economics, Sustainability in Global Product Chains</i> , 83 (November): 42–50. doi:10.1016/j.ecolecon.2012.08.007.	1
EGRef#78	Sonnino et al 2014	Sonnino, Roberta, Camilo Lozano Torres, and Sergio Schneider. 2014. "Reflexive Governance for Food Security: The Example of School Feeding in Brazil." <i>Journal of Rural Studies</i> 36 (October): 1–12. doi:10.1016/j.jrurstud.2014.06.003.	1
EGRef#79	Spielman et al 2008	Spielman, David J., Marc J. Cohen, and Tewodaj Mogues. 2008. "Mobilizing Rural Institutions for Sustainable Livelihoods and Equitable Development: A Case Study of Local Governance and Smallholder Cooperatives in Ethiopia." Washington DC: International Food Policy Research Institute.	1
EGRef#80	Termeer et al 2010	Termeer, Catrien J. A. M., Art Dewulf, and Maartje van Lieshout. 2010. "Disentangling Scale Approaches in Governance Research: Comparing Monocentric, Multilevel, and Adaptive Governance." <i>Ecology and Society</i> 15 (4): 29.	1
EGRef#81	Thompkins & Adger 2004	Thompkins, Emma L., and W. Neil Adger. 2004. "Does Adaptive Management of Natural Resources Enhance Resilience to Climate Change?" <i>Ecology and Society</i> 9 (2): 10.	1
EGRef#82	Thornton & Lipper 2014	Thornton, Philip, and Leslie Lipper. 2014. "How Does Climate Change Alter Agricultural Strategies to Support Food Security?" SSRN Scholarly Paper ID 2423763. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=2423763 .	1
EGRef#83	Umali-Deininger & Dininger 2001	Umali-Deininger, Dina L., and Klaus W. Deininger. 2001. "Towards Greater Food Security for India's Poor: Balancing Government Intervention and Private Competition." <i>Agricultural Economics</i> 25 (2-3): 321–35. doi:10.1111/j.1574-0862.2001.tb00212.x.	1
EGRef#84	von Geibler 2013	von Geibler, Justus. 2013. "Market-Based Governance for Sustainability in Value Chains: Conditions for Successful Standard Setting in the Palm Oil Sector." <i>Journal of Cleaner Production, Sustainability management beyond corporate boundaries</i> , 56 (October): 39–53. doi:10.1016/j.jclepro.2012.08.027.	1
EGRef#85	Wertz-Kanounnikoff & McNeill 2012	Wertz-Kanounnikoff, Sheila, and Desmond McNeill. 2012. "Performance Indicators and REDD+ Implementation." In A. Angelsen, M. Brockhaus, W.D. Sunderlin and L. Verchot (eds), <i>Analysing REDD+: Challenges and Choices</i> (pp. 233–246). CIFOR, Bogor, Indonesia.	1

EGRRef#86	Young 2008	Young, Oran R. 2008. "Institutions and Environmental Change: The Scientific Legacy of a Decade of IDGEC Research." In <i>In O.R. Young, L.A. King and H. Schroeder, (eds.) Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers.</i> MIT Press, Cambridge, MA, USA., 3–45.	1
EGRRef#87	Young 2010	Young, Oran R. 2010. "Institutional Dynamics: Resilience, Vulnerability and Adaptation in Environmental and Resource Regimes." <i>Global Environmental Change, Governance, Complexity and Resilience</i> , 20 (3): 378–85. doi:10.1016/j.gloenvcha.2009.10.001.	1
EGRRef#88	Ziervogel & Eriksen 2010	Ziervogel, Gina, and Polly J. Ericksen. 2010. "Adapting to Climate Change to Sustain Food Security." <i>Wiley Interdisciplinary Reviews: Climate Change</i> 1 (4): 525–40. doi:10.1002/wcc.56.	1
EGRRef#89	Acemoglu et al 2009	Acemoglu, Daron, Simon Johnson, James A. Robinson, and Pierre Yared. 2009. "Reevaluating the Modernization Hypothesis." <i>Journal of Monetary Economics</i> 56 (8): 1043–58. doi:10.1016/j.jmoneco.2009.10.002.	1
EGRRef#90	Aiking & De Boer 2004	Aiking, Harry, and Joop de Boer. 2004. "Food Sustainability: Diverging Interpretations." <i>British Food Journal</i> 106 (5): 359–65. doi:10.1108/00070700410531589.	1
EGRRef#91	Altieri 2004	Altieri, Miguel A. 2004. "Linking Ecologists and Traditional Farmers in the Search for Sustainable Agriculture." <i>Frontiers in Ecology and the Environment</i> 2 (1): 35–42. doi:10.1890/1540-9295(2004)002[0035:LEATF]2.0.CO;2.	1
EGRRef#92	Altieri & Toledo 2011	Altieri, Miguel A., and Victor Manuel Toledo. 2011. "The Agroecological Revolution in Latin America: Rescuing Nature, Ensuring Food Sovereignty and Empowering Peasants." <i>The Journal of Peasant Studies</i> 38 (3): 587–612. doi:10.1080/03066150.2011.582947.	1
EGRRef#93	Bates 1981	Bates, Robert H. 1981. <i>Markets and States in Tropical Africa: The Political Basis of Agricultural Policies.</i> Berkeley: University of California Press.	1
EGRRef#94	Boserup 1965	Boserup, Ester. 1965. <i>The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure.</i> London: George Allen & Unwin Ltd. http://www.biw.kuleuven.be/aee/clo/idessa_files/boserup1965.pdf .	1
EGRRef#95	Colonna et al 2013	Colonna, P., S. Fournier, and J. Touzard. 2013. "Food Systems." In <i>Esnouf, Catherine, Marie Russel, and Nicolas Bricas (eds) Food System Sustainability: Insights from duALIne.</i> Cambridge University Press.	1
EGRRef#96	De Schutter 2010	De Schutter, Olivier. 2010. "Agroecology and the Right to Food." A/HRC/16/49. Washington DC: United Nations Human Rights Commission. http://www2.ohchr.org/english/issues/food/docs/A-HRC-16-49.pdf .	1
EGRRef#97	De Schutter 2014	De Schutter, Olivier. 2014. "Final Report: The Transformative Potential of the Right to Food." A/HRC/25/57. New York: UN General Assembly, Human Rights Council. http://www.ohchr.org/EN/HRBodies/HRC/RegularSessions/Session25/Pages/ListReports.aspx .	1
EGRRef#98	Garnett 2013	Garnett, Tara. 2013. "Food Sustainability: Problems, Perspectives and Solutions." <i>Proceedings of the Nutrition Society</i> 72 (01): 29–39. doi:10.1017/S0029665112002947.	1
EGRRef#99	Godfray et al 2010	Godfray, H. Charles J., John R. Beddington, Ian R. Crute, Lawrence Haddad, David Lawrence, James F. Muir, Jules Pretty, Sherman Robinson, Sandy M. Thomas, and Camilla Toulmin. 2010. "Food Security: The Challenge of Feeding 9 Billion People." <i>Science</i> 327 (5967): 812–18. doi:10.1126/science.1185383.	1
EGRRef#100	Golay 2010	Golay, Christophe. 2010. "The Food Crisis and Food Security: Towards a New World Food Order?" Translated by Noal Mellott. <i>International Development Policy Revue Internationale de Politique de Développement</i> , no. 1 (March): 215–32. doi:10.4000/poldev.145.	1
EGRRef#101	Golay & Büschi 2012	Golay, Christophe, and Michaela Büschi. 2012. "The Right to Food and Global Strategic Frameworks: The Global Strategic Framework for Food Security and Nutrition (GSF) and the UN Comprehensive Framework for Action (CFA)." 20. Rome: International Federation of Organic Agricultural Movements (IFOAM). Food Security-People before commodities. http://www.fao.org/fileadmin/templates/righttofood/documents/RTF_publications/EN/rtf_study_global-strategic-frameworks_en.pdf .	1
EGRRef#102	Jacobi et al 2015	Jacobi, Johanna, Monika Schneider, Maria Pillco Mariscal, Stephanie Huber, Simon Weidmann, Patrick Bottazzi, and Stephan Rist. 2015. "Farm Resilience in Organic and Nonorganic Cocoa Farming Systems in Alto Beni, Bolivia." <i>Agroecology and Sustainable Food Systems</i> 39 (7): 798–823. doi:10.1080/21683565.2015.1039158.	1

EGRRef#103	Jones et al 2010	Jones, Gareth A., and Stuart Corbridge. 2010. "The Continuing Debate about Urban Bias the Thesis, Its Critics, Its Influence and Its Implications for Poverty-Reduction Strategies." <i>Progress in Development Studies</i> 10 (1): 1–18. doi:10.1177/146499340901000101.	1
EGRRef#104	Kay 2002	Kay, Cristóbal. 2002. "Why East Asia Overtook Latin America: Agrarian Reform, Industrialisation and Development." <i>Third World Quarterly</i> 23 (6): 1073–1102. doi:10.1080/0143659022000036649.	1
EGRRef#105	Khan 2011	Khan, Mushtaq. 2011. "Political Settlements and the Governance of Growth-Enhancing Institutions." SOAS Draft Paper in Research Paper Series on Growth-Enhancing Governance. London: School of Oriental and Africa Studies. http://eprints.soas.ac.uk/9968/ .	1
EGRRef#106	Lang & Barling 2012	Lang, Tim, and David Barling. 2012. "Food Security and Food Sustainability: Reformulating the Debate." <i>The Geographical Journal</i> 178 (4): 313–26. doi:10.1111/j.1475-4959.2012.00480.x.	1
EGRRef#107	Lawrence et al 2011	Lawrence, D., S. J. Beddington, C. Godfray, I. Crute, L. Haddad, J. Muir, J. Pretty, S. Robinson, and C. Toulmin. 2011. "Special Issue: The Challenge of Global Food Sustainability." <i>Special Issue: The Challenge of Global Food Sustainability</i> . 36 (S1): S1–113.	1
EGRRef#108	Maye & Kirwan 2013	Maye, Damian, and James Kirwan. 2013. "Food Security: A Fractured Consensus." <i>Journal of Rural Studies</i> , Food Security, 29 (January): 1–6. doi:10.1016/j.jrurstud.2012.12.001.	1
EGRRef#109	Paillard et al 2011	Paillard, Sandrine, Sebastien Treyer, and Bruno Dorin. 2011. <i>Agrimonde – Scenarios and Challenges for Feeding the World</i> . Editions Quae. http://www.springer.com/us/book/9789401787444 .	1
EGRRef#110	Wendt 1998	Wendt, Alexander. 1998. "On Constitution and Causation in International Relations." <i>Review of International Studies</i> 24 (05): 101–18. doi:null.	1
EGRRef#111	Ziegler et al 2011	Ziegler, Jean, Christophe Golay, Claire Mahon, and Sally-Anne Way. 2011. <i>The Fight for the Right to Food</i> . Palgrave Macmillan. http://www.palgrave.com%2Fpage%2Fdetail%2Fthe-fight-for-the-right-to-food-jean-ziegler%2F%3Fk%3D9780230284647%26loc%3Dus .	1

Appendix B: Results Delphi Round 2

Survey sent to 14 respondents.

Number of responses answering at least first question (keyword relevance): 10

Number of responses answering familiarity with references: 8

Number of responses providing email addresses: 6

Protocols for analysis:

Section 1 – Keyword relevance:

Protocol	Criteria	Result
KRP1.	A keyword receives both 'of little or no relevance' and 'very relevant' ratings.	Relevance level not yet determined. Results and commentary to be fed to respondents in Round 3. Keyword is brought forward for article-coverage ratings if respondent has rated as very relevant.
KRP2.	A keyword with more than 50% responses as 'somewhat relevant' with the remainder of responses either 'of little or no relevance' or 'very relevant' but not both.	Relevance level not yet determined. Results and commentary to be fed to respondents in Round 3.
KRP3.	A keyword has received 50% or more responses as 'of little or no relevance', and no ratings of 'very relevant'	Keyword is considered not relevant. Excluded from further analysis.
KRP4.	A keyword has received 50% or more responses as 'very relevant', and no ratings of 'of little or no relevance'.	Keyword is considered very relevant. Included in remainder of project, and exempt from repeat ratings in round 3. Keyword is automatically brought forward for article-coverage ratings.
KRP5.	A keyword receives 100% 'some relevance' ratings.	Keyword is considered somewhat relevant. Exempt from repeat ratings. Not included in article-coverage ratings.

These protocols are based only on quantitative ratings. In cases where keywords are to be fed back to respondents following KRP1 or KRP2, if for any particular extreme rating qualitative commentary are not provided in sufficient number to justify the re-rating exercise, they will be forfeited and retreated according to these protocols with un-supported extreme ratings removed.

For instance, if one keyword is rated as ‘some relevance’ by 8 respondents, and ‘very relevant’ by 2 respondents, it would be fed back in R3 according to KRP2. However, if neither of those respondents who rated the keyword as ‘very relevant’ provided a justification of their rating, there is little point in asking respondents to re-evaluate their ratings. Therefore the keyword would be re-subjected to the protocols, this time with both ‘very relevant’ ratings discounted. This results in a 100% rating as ‘some relevance’ and so according to P5 is treated as somewhat relevant.

Similarly, if a keyword has a ratio of 6:2:2 across the three ratings, and if on closer inspection after passing KRP1, neither of those who provided ‘very relevant’ ratings offered justification, it would be re-submitted to the protocols, with a 6:2 ratio, or 75%:25% ratio. Thus it would fall to KRP3 and be excluded from further analysis.

If, however, a keyword with a ratio of 2:5:3 across the three ratings turned after closer inspection into 5:3, this would be counted as KRP2, and would be returned to respondents for re-rating, although with only one extreme rating rather than both.

Section 2 – Familiarity of references

Although we don’t have a 100% response rate, it was decided to exclude from article-coverage ratings all references for which no respondents in R2 rated their familiarity as either ‘I know it well’ or ‘I was involved’, and further in such cases that more than 50% of respondents indicated that they never heard of it. Although it is possible that of those 4 respondents who participated in Round 1 but not Round 2 might have greater familiarity, it seems to be a good decision for two reasons: a) the response rate among those four is expected to continue to be lower in R3 than for those who did participate in R2; and b) with familiarity rates already low among those who participated in R2 a given article is likely to be not well-known and it is unlikely to get more than one participant to rate article coverage. The Delphi method is premised on combining knowledge of experts, and is least effective when only one participant answers a given question. On the other side, removing such articles is expected to lower the total number of questions and variables (which is already large) and therefore to reduce response burden.

However, this is not to suggest that these references will be excluded from the review – just that they will be excluded from keyword-coverage ratings. Coverage of these articles will therefore need to be established by the reviewers.

Therefore, the protocol is specified as follows:

Protocol	Criteria	Result	Rationale
PRF1	No respondent has indicated that they know the study well or have been involved in the study.	Check for Protocol PRF2.	Delphi works best when combining knowledge of respondents. Based on the results of Round 2, those who have responded in this way cannot give us an indication of coverage.
PRF2	The study has met exclusion	Exclude this study from	The familiarity level is quite

	protocol PRF1 and further more than 50% of respondents have indicated that they never heard of the study.	keyword-coverage ratings.	low, indicating that the chances of getting two or more respondents from those who did not respond in R2 to be sufficiently familiar to be eligible for keyword-coverage ratings is also quite low.
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Section 3 – Quality appraisals:

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- Where articles have been given conflicting quality ratings (i.e. at least two ratings with at least one of these as ‘very poor’ or ‘poor’ and at least one as ‘good’ or ‘very good’), these references will be given back to those who rated them so, plus comments.

Protocol	Criteria	Result	Rationale
PQA1	One or less respondents rated the article.	Quality unknown.	More than one expert judgement is required in order for the Delphi results to be strong enough to be accepted.
PQA2	At least two respondents rated the article, all of whom rated ‘mixed’.	Quality unknown.	No indication has been given as to the quality of the article one way or the other, nor are comments provided likely to sway respondents.
PQA3	At least two respondents rated the article, with at least one rating ‘very poor’ or ‘poor’ and none rating ‘good’ or ‘very good’.	Poor quality article. Remove from analysis.	There is a consensus among raters that the article is of poor quality.
PQA4	At least two respondents rated the article, with at least one rating ‘very good’ or ‘good’ and none rating ‘poor’ or ‘very poor’.	Quality article	There is a consensus among raters that the article is of good quality.
PQA5	At least two respondents rated the article, with at least one rating ‘very good’ or ‘good’ and at least one rating ‘poor’ or ‘very poor’.	Quality not yet determined. Repeat ratings if commentary for at least one rating has been given.	There is disagreement among respondents about the quality of the article. Commentary might persuade some respondents to re-evaluate their ratings.

Section 1 – Keyword relevance

The table below summarises frequency tables for the rating of each keyword. In addition, scorings for the 4 protocols on keyword relevance are given, followed by relevance conclusions and implications for Round 3.

Keyword		Frequency	Percent	P1	P2	P3	P4	Conclusion	Round 3.
institutions	very relevant	10	100.0				1	Very Relevant	Exempt
	little or no relevance	1	10.0					Not determined	Repeat
Investments in resources and food systems	some relevance	7	70.0	1					
	very relevant	2	20.0						
governance indicators	some relevance	2	20.0				1	Very Relevant	Exempt
	very relevant	8	80.0						
Food systems	some relevance	3	30.0				1	Very Relevant	Exempt
	very relevant	7	70.0						
food security	some relevance	3	30.0				1	Very Relevant	Exempt
	very relevant	7	70.0						
Access	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	6	60.0						
Agricultural inputs	very relevant	3	30.0						
	little or no relevance	4	40.0		1			Not determined	Repeat
Subsidies	some relevance	6	60.0						
	little or no relevance	1	10.0	1				Not determined	Repeat
Resilience	little or no relevance	5	50.0						
	some relevance	3	30.0						
	very relevant	1	10.0						
Resilience	some relevance	6	60.0		1			Not determined	Repeat
	very relevant	4	40.0						
Subsistence	little or no relevance	1	10.0		1			Not determined	Repeat
	some relevance	6	60.0						
markets	little or no relevance	3	30.0						
	some relevance	6	60.0						
	very relevant	1	10.0	1				Not determined	Repeat
markets	little or no relevance	2	20.0						
	some relevance	4	40.0						
	very relevant	3	30.0						

Multiple drivers of change, including climate change	some relevance	6	60.0					Not determined	Repeat
	very relevant	4	40.0						
adaptive governance	some relevance	3	30.0				1	Very Relevant	Exempt
	very relevant	7	70.0						
governance arrangements	some relevance	1	10.0				1	Very Relevant	Exempt
	very relevant	9	90.0						
political-economy	some relevance	4	40.0				1	Very Relevant	Exempt
	very relevant	6	60.0						
adaptive capacity	some relevance	8	80.0				1	Not determined	Repeat
	very relevant	2	20.0						
Politics	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	4	40.0						
community	little or no relevance	3	30.0				1	Not determined	Repeat
	some relevance	7	70.0						
Co-existing food systems		1	10.0	1				Not determined	Repeat
	little or no relevance	3	30.0						
	some relevance	5	50.0						
	very relevant	1	10.0						
property rights		1	10.0	1				Not determined	Repeat
	little or no relevance	2	20.0						
	some relevance	5	50.0						
	very relevant	2	20.0						
Political Settlements	little or no relevance	4	40.0	1				Not determined	Repeat
	some relevance	4	40.0						
	very relevant	2	20.0						
stakeholders/next users		1	10.0	1				Not determined	Repeat
	little or no relevance	1	10.0						
	some relevance	6	60.0						
	very relevant	2	20.0						
adaptive/social/transformational learning	some relevance	5	50.0				1	Very Relevant	Exempt
	very relevant	5	50.0						
multi-	very relevant	10	100.0				1	Very	Exempt

level/polycentric governance								Relevant	
experience-based food security	little or no relevance	2	20.0			1		Not determined	Repeat
	some relevance	8	80.0						
governance	some relevance	1	10.0				1	Very Relevant	Exempt
	very relevant	9	90.0						
Modernization Theory	little or no relevance	4	40.0	1				Not determined	Repeat
	some relevance	4	40.0						
	very relevant	2	20.0						
food policy	some relevance	4	40.0				1	Very Relevant	Exempt
	very relevant	6	60.0						
samaritan's dilemma	little or no relevance	6	60.0				1	Little or no relevance	Excluded
	some relevance	4	40.0						
information asymmetry	little or no relevance	3	30.0	1				Not determined	Repeat
	some relevance	6	60.0						
	very relevant	1	10.0						
food regimes	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	7	70.0						
	very relevant	2	20.0						
cross-scale linkages	some relevance	1	10.0				1	Very Relevant	Exempt
	very relevant	9	90.0						
Causality	some relevance	7	70.0			1		Not determined	Repeat
	very relevant	3	30.0						
nutritional outcome	little or no relevance	4	40.0	1				Not determined	Repeat
	some relevance	4	40.0						
	very relevant	2	20.0						
coordination	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	4	40.0						
equity & power	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	3	30.0						
	very relevant	6	60.0						
risk management	little or no relevance	2	20.0	1				Not determined	Repeat

	some relevance	6	60.0						
	very relevant	2	20.0						
institutional barriers	some relevance	2	20.0				1	Very Relevant	Exempt
	very relevant	8	80.0						
Food sustainability	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	6	60.0						
	very relevant	3	30.0						
public-private partnerships	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	7	70.0						
	very relevant	2	20.0						
institutional fit	little or no relevance	1	10.0	1				Not determined	Repeat
	some relevance	3	30.0						
	very relevant	6	60.0						
Right to food	little or no relevance	2	20.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	3	30.0						
Reduction of poverty and inequality	little or no relevance	2	20.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	3	30.0						
environmental impacts	little or no relevance	3	30.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	2	20.0						
social-ecological resilience	little or no relevance	2	20.0	1				Not determined	Repeat
	some relevance	5	50.0						
	very relevant	3	30.0						

As a result, the following table summarises which keywords fall to which conclusions and implications.

Conclusion	Number of keywords	Keywords	Action
Keywords of little relevance	1	samaritan's dilemma	Exclude from remainder of project
Very relevant	13	institutions	Exempt from further relevance rating. To be used in article-
		governance indicators	
		Food systems	

		food security adaptive governance governance arrangements political-economy adaptive/social/transformational learning multi-level/polycentric governance governance food policy cross-scale linkages institutional barriers	coverage
Relevance not determined; wide variance	23	Investments in resources and food systems Access Subsidies Markets Politics Co-existing food systems property rights Political Settlements stakeholders/next users Modernization Theory information asymmetry food regimes nutritional outcome Coordination equity & power risk management Food sustainability public-private partnerships institutional fit Right to food Reduction of poverty and inequality environmental impacts social-ecological resilience	All participants will re-rate. Those (highlighted) keywords with a) at least two 'very relevant' ratings, and b) more 'very relevant' ratings than 'little or no relevance' will be used in article-coverage questions.
Relevance not determined; tendence towards 'somewhat relevant'	8	Agricultural inputs Resilience Subsistence Multiple drivers of change, including climate change adaptive capacity community experience-based food security Causality	Participants rating 'somewhat relevant' will re-rate. Used on article-coverage for those (highlighted) keywords with no 'little or no relevance' ratings.

After checking for supporting commentary, none of those qualifying by protocols 1 or 2 were subsequently found to be insufficiently supported by commentary. Therefore no re-assignments were made to the conclusion in the box above.

Some reflections on quantitative results:

These seem to demonstrate that it is easier for the group to decisively label a keyword as very relevant than as of little or no relevance.

The fact that the largest number to fall within one result is that of the widest variance suggests that there is some disagreement. Hopefully this can be resolved to an extent in the third round.

Additional keywords

The following keywords were also nominated in Round 2, plus justification.

Keyword	Justification
Barriers, trade-offs and opportunities for climate change adaptation.	May provide a process-oriented benchmark to assess 'effectiveness' of governance arrangements.
Rural Bias	Theory that it is important to promote rural development as governments tend to exploit rural poor. Problem is that it overlooks a dynamic relationship between urban and rural areas and how interventions in both areas are need to promote development and food security
Urbanization	as developing countries develop, they tend to become more urban which changes the food system in ways not fully understood. So important to focus on urban issues like market access and transport to market and not simply focus on things like increasing yield.
International Food Policy	food security is not only a local problem and it would be important to consider international dimensions like agricultural subsidies in rich countries, land acquisitions and biofuel production.
Land Acquisitions	a controversial issue that is often linked to food security given that large tracts of land are increasingly being purchased/acquired by foreign investors. This could be good or bad, depending on the circumstances.
Investment	where is the money going to come from to promote food security? We need to think about these bigger picture issues.
Effective governance	It seems we need to ask what metrics have been used already to evaluate effective governance and assess these metrics for applicability to food system analysis
Commodity chain governance / Global value chain	There are a plethora of studies on the governance of global value chains. A subset of this literature focusing on those chains most linked to food security objectives might be critical.

These keywords, plus justifications, will be carried forward to Round 3 for relevance rating. They will also be used for article-coverage ratings.

Section 2 – reference familiarity

56 references met PRF 1. These were further inspected for protocol PRF2. Of these, 4 were re-included on the bases of moderate levels of familiarity. As such of the 105 articles included in Round 2, 52 are to be excluded from keyword-coverage ratings in Round 3.

However, it is important to note that there were 6 references submitted in Round 1 after the deadline which did not make it into the questionnaire for Round 2. These will be included in familiarity and for those with appropriate levels of familiarity, keyword-coverage ratings.

In addition, the following 30 additional references were nominated in Round 2 to address evidence gaps (5 of which correspond to the 6 late nominations in Round 1; within the set of new nominations, one reference was nominated by two different respondents). They are added to the project index and will be included in both familiarity and keyword-coverage ratings.

Short reference	Long reference	Keyword	Duplicate?
	Acemoglu D and Robinson J (2012) <i>Why Nations Fail: The Origins of Power, Prosperity and Poverty</i> , Crown Publishing, New York.	Modernization Theory	
	Acemoglu D, Johnson S, Robinson JA and Yared P (2009) Reevaluating the modernization hypothesis. <i>Journal of Monetary Economics</i> 56:1043-1058.	Modernization Theory	Y
	Boserup E (1965) <i>The Conditions of Agricultural Growth: the economics of agrarian change under population pressure</i> , Aldine Press, New York.	political-economy	Y
	Bromley, D. W. 1989. <i>Economic Interests and Institutions: Property Rights and Public Policy</i> . Basil Blackwell, Ltd., Oxford.	property rights	
	Byres TJ (1979) Of neo-populist pipe-dreams: Daedalus in the Third World and the myth of urban bias. <i>Journal of Peasant Studies</i> 6:210-244.	Modernization Theory	
	Dupuis J and Biesbroek R (2013) Comparing apples and oranges: The dependent variable problem in comparing and evaluating climate change adaptation policies. <i>Global Environmental Change</i> 23:1476-1487.	Causality	
	Eisenack, K., Moser, S., Hoffmann, E., Klein, R.J.T., Oberlack, C., Pechan, A., Rotter, M., Termeer, C.J.A.M. (2014) Explaining and overcoming barriers to climate change adaptation. <i>Nature Climate Change</i> 4, 867-872.	Causality	
	Epstein et al. (2015) Institutional fit and the sustainability of social-ecological systems.	institutional fit	

	Current Opinion in Environmental Sustainability 2015, 14:34-40		
	Fässel, H.-M. 2010. How inequitable is the global distribution of responsibility, capability, and vulnerability to climate change: A comprehensive indicator-based assessment. Global Environmental Change 20(4):597-611.	equity & power	
	Fafchamps M (2004) Market institutions in Sub-Saharan Africa: theory and evidence, MIT Press, Cambridge, MA.	markets	
	Gehring, T., and S. Oberthür. 2009. The Causal Mechanisms of Interaction between International Institutions. European Journal of International Relations 15(1):125-156.	equity & power	
	Hinkel, J. (2011) Indicators of vulnerability and adaptive capacity: Towards a clarification of the science-policy-interface. Global Environmental Change 21(1), 198-208.	governance indicators	
	Hirschman AO (1997 [1977]) The Passions and the Interests: political arguments for capitalism before its triumph, Princeton University Press, Princeton.	Modernization Theory	
	Jones GA and Corbridge S (2010) The continuing debate about urban bias: the thesis, its critics, its influence and its implications for poverty-reduction strategies. Progress in Development Studies 10:1-18.	Modernization Theory	Y
	Kabubo-Mariara J (2007) Land conservation and tenure security in Kenya: Boserup's hypothesis revisited. Ecological Economics 64:25-35.	political-economy	
	Kay C (2002) Why East Asia overtook Latin America: agrarian reform, industrialisation and development. Third World Quarterly 23:1073-1102.	Modernization Theory	Y
	Kay C (2009) Development strategies and rural development: exploring synergies, eradicating poverty. Journal of Peasant Studies 36:103-137.	Modernization Theory	
	Khan MH (2010) Political Settlements and the Governance of Growth-Enhancing Institutions, SOAS Draft Paper in Research Paper Series on "Growth-Enhancing Governance", London.	Political Settlements	Y
	Khan MH and Jomo KS (1999) Rents, Rent-Seeking and Economic Development: Theory and Evidence in Asia, Cambridge University	Political Settlements	

	Press, Cambridge.		
	Mahoney J (2010) After KKV: The new methodology of qualitative research. <i>World Politics</i> 62:120-147.	Causality	
	Mearsheimer JJ (1994) The false promise of international institutions. <i>International Security</i> 19:5-49.	Institutions	
	Mollinga, P. P., R. S. Meinzen-Dick, and D. J. Merrey. 2007. Politics, Plurality and Problemsheds: A Strategic Approach for Reform of Agricultural Water Resources Management. <i>Development Policy Review</i> 25(6):699-719.	property rights	
	Ostrom, E. (2010) Polycentric systems for coping with collective action and global environmental change. <i>Global Environmental Change</i> 20, 550-557.	multi-level/polycentric governance	
	Polanyi K (2001 [1944]) <i>The Great Transformation: the political and economic origins of our time</i> , Beacon Press, Boston.	political-economy	
	Purdon M (2013) Land Acquisitions in Tanzania: strong sustainability, weak sustainability and the importance of comparative methods. <i>Journal of Agricultural and Environmental Ethics</i> 26:1127-1156.	Causality	
	Purdon M (2014) <i>The Comparative Turn in Climate Change Adaptation and Food Security Governance</i> , CCAFS Working Paper no. 92, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen.	Politics	
	Purdon M (2015) <i>Advancing Comparative Climate Change Politics: Theory & Method</i> . <i>Global Environmental Politics</i> 15:1-26.	Politics	
	Steinberg PF (2015) Can We Generalize from Case Studies? <i>Global Environmental Politics</i> 15:152-175.	Causality	
	Wambugu, S. W., S. W. Chomba, and J. Atela. 2015. Institutional arrangements for climate-smart landscapes. Pages 257-273 in P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw, and D. Catacutan, editors. <i>Climate-Smart Landscapes: Multifunctionality in Practice</i> . World Agroforestry Centre (ICRAF), Nairobi.	property rights; equity & power	
	Wambugu, S. W., S. W. Chomba, and J. Atela. 2015. Institutional arrangements for climate-		Y

	smart landscapes. Pages 257–273 in P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw, and D. Catacutan, editors. <i>Climate-Smart Landscapes: Multifunctionality in Practice</i> . World Agroforestry Centre (ICRAF), Nairobi.		
	Wilbanks, T.J., Kates, R.W. (2010) Beyond adapting to climate change: Embedding adaptation in responses to multiple threats and stresses. <i>Annals of the Association of American Geographers</i> 100(4), 719-728.	Multiple drivers of change, including climate change	

Section 3 – Quality appraisals

Of the 105 references included in the Round 2 questionnaire, only 42 received quality ratings. This is slightly less than the 49 references for which at least one person reported to know it well or be involved in it. Among those articles which received ratings, 27 were rated by only one respondent, thus resulting in unknown quality according to PQA1. The remaining 15 were all rated as either ‘good’ or ‘very good’. According to PQA4 these are being considered good quality articles. None of the 105 articles from Round 2 will therefore be returned for repeat quality appraisals in Round 3.

Short reference	PQA1	PQA4
Adgeretal2005		1
Agrawal2001		1
Armitage2007		1
Auld2010	1	
Bacon2010	1	
Berkes2009		1
BiermannampGupta2010	1	
Biermann2007	1	
Biermannetal2010	1	
Biermannetal2012	1	
Candel2014	1	
Colonnaetal2013	1	
DeSchutter2010	1	
DeSchutter2014	1	
Douxchampsetal2015	1	
Eakinetal2009		1
FinanampNelson2001		1
Folkeetal2005		1
Gibsonetal2000	1	
Grindle2004	1	
Gupta2007	1	
HoogeampMarks2003		1
Huntjensetal2012	1	
Jacobietal2015	1	
Jacobietal2015	1	
JuholaampWesterhoff2011		1
Lawrenceetal2011	1	
Lebeletal2006		1
MearnsampNorton2010	1	
NelsonampFinan2009		1
Osbahretal2008	1	
Osbahretal2010	1	
PahlWostl2009		1
PedersenampBenjaminsen2007	1	
Poteete2012	1	
Quinnetal2011	1	

Rijkeetal2012	1	
ThomkinsampAdger2004		1
WertzKanounnikoffampMcNeill2012	1	
Young2008		1
Young2010		1
ZiervogelampEriksen2010	1	

Reflection on quality screening

Although this quality instrument was always highly subjective, after using it seems its value is minimal for the purposes of our project. Delphi works on the basis of collecting differing opinions from experts. However, with such low overlap in familiarity there were very few cases where differing opinion would be theoretically possible. Moreover, where such overlap occurred, opinions did not differ. We are not in a position to say whether this is as a result of the design of the quality instrument or of the literature gathering instrument in Round 1.

Appendix C: Delphi Questionnaire templates

Round 1

EffectiveGovernance - Delphi R1

Round 1 Questionnaire of Delphi lit gathering for Effective Governance review

0% 100%

Question 1
Keyword nominations

*** This review was motivated by the following concern.**

Considerable research has been conducted on food security research but despite the dramatic influence governance regimes have on food production, food availability and food access there is a lack of understanding of what governance arrangements are suited to what social and ecological conditions. Furthermore, it is commonly noticed that a lack of multilevel governance and coordination is a huge problem that needs to be tackled to achieve the outcomes of any program or mechanism in food systems or natural resource management. This is particularly critical given the potential impacts of climate change and climate variability on food systems as governance is promoted as one of the few mechanisms to mitigate the negative consequences of climate change.

Although there are several studies on multilevel governance, we feel that there is a continued need to study cross-scale linkages in a comparative manner in order to deepen knowledge on theoretical and methodological groundings and enhance the understanding of the role of food systems governance across social and ecological contexts. Food systems are by definition complex given the diverse array of factors driving food systems and the multiple entry-points where governance may influence those systems - we aim to focus on critical gaps in existing food systems/governance indicators research. This will be done by identifying governance factors that are associated with food security outcomes through an analysis of quality primary empirical literature.

In the spaces provided below, please write down five keywords that capture the most important topical areas that you consider should be covered by a review as described in the paragraphs above. These keywords can denote specific topics mentioned in the text above that you think are particularly relevant, or topical areas overlooked that you consider important to include in such a study.

Keyword 1

Keyword 2

Keyword 3

Keyword 4

Keyword 5

? By "governance" we refer both to formal and informal rules and actors in a food system. Also, we intentionally want to capture literature that is focused on different analytical scales (local to regional) as there is lack of consensus regarding at which scale governance can be most effective in promoting resilient food systems. Note also that we have shifted our language from a focus on food security to a more general attention on food systems. This is simply because a focus on food security may be overly limiting.

EffectiveGovernance - Delphi R1

Round 1 Questionnaire of Delphi lit gathering for Effective Governance review

0%  100%

Question 2

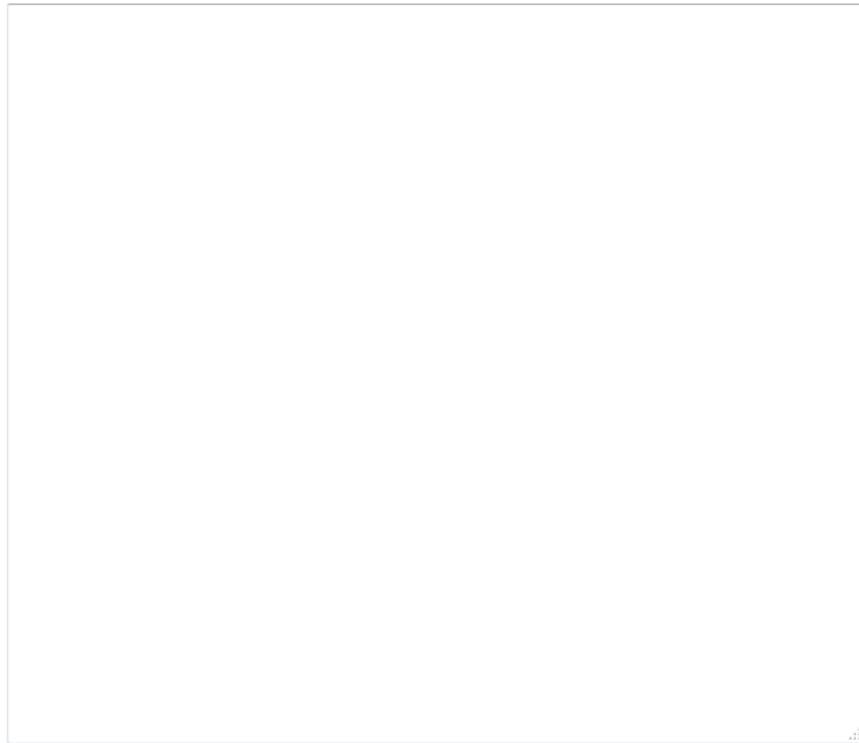
Nomination of references

Please nominate 15-25 empirical research reports that our review must cover.

Reports should be empirical, topical, methodologically sound, and document well the research they report.

Please provide bibliographic references to your nominations by EITHER pasting references in text form in the space below OR email a file from your reference manager to [Mailto://aogan.delaney@gmail.com](mailto:aogan.delaney@gmail.com) (RIS or Bibtex file types are accepted).

Note: if you send your nominations by email, remember that you still need to click 'submit' below for us to receive your answers to Question 1.



Round 2

EffectiveGovernance - Delphi R2

0%
100%

Keyword relevance

In the previous round you were asked to nominate keywords to denote topical areas the review should look at. In this round we aim to identify the most important of those topical areas by asking you to rate the relevance of keywords. This will help us achieve an appropriate topical focus in our review.

You are presented below with the set of keywords collected in the 1st round. For each keyword please tell us whether you consider the topical area represented by the keyword to be: of little relevance; of some relevance; or 'very relevant'.

For any new respondents who have not seen round 1, a description of the project can be seen below under the help button.

	little or no relevance	some relevance	very relevant
institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investments in resources and food systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
governance indicators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
food systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
food security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agricultural Inputs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsidies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resilience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsistence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multiple drivers of change, including climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
adaptive governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
governance arrangements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
political-economy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
adaptive capacity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Politics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Co-existing food systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
property rights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Political Settlements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
stakeholders/next users	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
adaptive/social /transformative learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
multi-level/polycentric governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
experience-based food security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

security	little or no relevance	some relevance	very relevant
governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modernization Theory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
food policy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
samaritan's dilemma	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
information asymmetry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
food regimes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cross-scale linkages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Causality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nutritional outcome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
coordination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
equity & power	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
risk management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
institutional barriers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
public-private partnerships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
institutional fit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Right to food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduction of poverty and inequality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
environmental impacts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
social-ecological resilience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

? Considerable research has been conducted on food security research but despite the dramatic influence governance regimes have on food production, food availability and food access there is a lack of understanding of what governance arrangements are suited to what social and ecological conditions. Furthermore, it is commonly noticed that a lack of multilevel governance and coordination is a huge problem that needs to be tackled to achieve the outcomes of any program or mechanism in food systems or natural resource management. This is particularly critical given the potential impacts of climate change and climate variability on food systems as governance is promoted as one of the few mechanisms to mitigate the negative consequences of climate change.

Although there are several studies on multilevel governance, we feel that there is a continued need to study cross-scale linkages in a comparative manner in order to deepen knowledge on theoretical and methodological groundings and enhance the understanding of the role of food systems governance across social and ecological contexts. Food systems are by definition complex given the diverse array of factors driving food systems and the multiple entry-points where governance may influence those systems - we aim to focus on critical gaps in existing food systems/governance indicators research. This will be done by identifying governance factors that are associated with food security outcomes through an analysis of quality primary empirical literature.

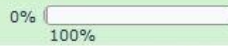
EffectiveGovernance - Delphi R2



Keywords of little relevance

Please use the space below to provide a one sentence summarizing why you identified terms as of '**little or no relevance**'. Your comments will be read by others in the next round. The purpose of reading these comments in the next round will be to encourage participants to rethink their ratings. Please do not include information that would identify you to other raters unless you are comfortable being so identified. These keywords will be used to stratify the literature we use in our review.

EffectiveGovernance - Delphi R2



Keywords of high relevance

Please use the space below to provide a one sentence summarizing why you identified terms as '**very relevant**'. Your comments will be read by others in the next round. The purpose of reading these comments in the next round will be to encourage participants to rethink their ratings. Again, please do not include information that would identify you to other raters unless you are comfortable being so identified. These keywords will be used to stratify the literature we use in our review.

EffectiveGovernance - Delphi K2



Opportunity to nominate additional keywords

If you consider that the keywords identified thus far miss topics that are relevant, please use the space below to both suggest and argue for the relevance of new keywords.

Keyword 1 + explanation

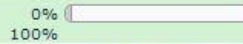
Keyword 2 + explanation

Keyword 3 + explanation

Keyword 4 + explanation

Keyword 5 + explanation

EffectiveGovernance - Delphi R2



Familiarity with references

In the first round we received over 100 references. Thank you to all who contributed. In order to make this set manageable, we intend to focus the review on the studies which are of the highest methodological quality and of most immediate relevance to the project. For this we are consulting with you for your informed judgement.

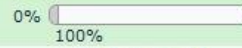
As it is impossible to make reasonable assessments on material that you are unfamiliar with you are first asked to indicate your own familiarity with the references. For each reference please indicate how well you know the study by using the following options: 'I have never heard of this study'; 'I am aware of this study but have not read it properly'; 'I know this study well'; or 'I was involved in this study'.

How familiar are you with each of the following studies?

Tip: to make navigation easier, use the tab key to move from reference to reference, and use the up and down arrow keys to choose your answers.

Adger, W.Neil. 2001. "Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change." <i>Journal of International Development</i> 13 (7)	Please choose...
Adger, W.Neil, Katrina Brown, and Emma L. Thompkins. 2005. "The Political Economy of Cross-Scale Networks in Resource Co-Management." <i>Ecology and Society</i> 10 (2): 9.	Please choose...
Agrawal, Arun. 2001. "Common Property Institutions and Sustainable Governance of Resources." <i>World Development</i> 29 (10): 1649-72.	Please choose...
Aiking H. and de Boer, J. 2004. Food sustainability: Diverging interpretations. <i>British Food Journal</i> , 106(5):359-365.	Please choose...
Altieri M.A. and Toledo, V.M. 2011. The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. <i>Journal of Peasant Studies</i> , 38(3):587-612.	Please choose...
Altieri M.A. 2004. Linking ecologists and traditional farmers in the search for sustainable agriculture. <i>Frontiers In Ecology And The Environment</i> , 2(1):35-42.	Please choose...
Armitage, Derek. 2007. "Governance and the Commons in a Multi-Level World." <i>International Journal of the Commons</i> 2 (1): 7-32.	Please choose...
Auld, Graeme. 2010. "Assessing Certification as Governance: Effects and Broader Consequences for Coffee." <i>The Journal of Environment & Development</i> 19 (2): 215-41.	Please choose...
Azmat, Fara, and Ken Coghill. 2005. "Good Governance and Market-Based Reforms: A Study of Bangladesh." <i>International Review of Administrative Sciences</i> 71 (4): 625-38.	Please choose...
Bacon, Christopher M. 2010. "Who Decides What Is Fair in Fair Trade? The Agri-Environmental Governance of Standards, Access, and Price." <i>The Journal of Peasant Studies</i> 37 (1): 111-47.	Please choose...
Berkes, Fikret. 2009. "Evolution of Co-Management: Role of Knowledge Generation, Bridging Organizations and Social Learning." <i>Journal of Environmental Management</i> 90 (5): 1692-1702.	Please choose...
Biermann, Frank, and Ingrid Boas. 2010. "Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees." <i>Global Environmental Politics</i> 10 (1): 60-88.	Please choose...
Biermann, Frank, and Aarti Gupta. 2011. "Accountability and Legitimacy in Earth System Governance: A Research Framework." <i>Ecological Economics, Special Section - Earth System Governance: Accountability and Legitimacy</i> , 70 (11): 1856-64.	Please choose...
Biermann, Frank. 2007. "'Earth System Governance' as a Crosscutting Theme of Global Change Research." <i>Global Environmental Change</i> 17 (3-4): 326-37.	Please choose...

EffectiveGovernance - Delphi R2



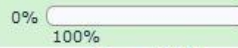
Adger 2001

In this step you will rate the quality of studies you know. Your rating will guide selection and prioritization of articles for our review.

The questions on this page concern the following study:

Adger, W.Neil. 2001. "Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change." *Journal of International Development* 13 (7): 921-31. doi:10.1002/jid.833.

EffectiveGovernance - Delphi R2



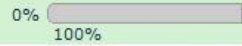
Adger 2001

**How do you consider the quality of this research? Please explain.
Choose one of the following answers**

- very poor
- poor
- mixed
- good
- very good

Please enter your comment here:

EffectiveGovernance - Delphi R2



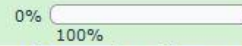
Ziervogel & Eriksen 2010

In this step you will rate the quality of studies you know. Your rating will guide selection and prioritization of articles for our review.

The questions on this page concern the following study:

Ziervogel, Gina, and Polly J. Eriksen. 2010. "Adapting to Climate Change to Sustain Food Security." *Wiley Interdisciplinary Reviews: Climate Change* 1 (4): 525–40. doi:10.1002/wcc.56.

EffectiveGovernance - Delphi R2



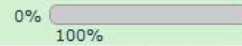
Ziervogel & Eriksen 2010

How do you consider the quality of this research? Please explain.
Choose one of the following answers

- very poor
- poor
- mixed
- good
- very good

Please enter your comment here:

EffectiveGovernance - Delphi R2



Evidence Gaps

In this final set of questions we are interested to know if, having seen the set of literature we have to work with, are there topical areas relevant to the review which are not adequately covered by this literature.

Below is a list of keywords which you rated as very relevant to this review. For any keyword which you think has not been adequately covered by the references you have seen, please provide a bibliographic reference to an empirical report to partly fill this evidence gap.

For any keyword which you consider to be adequately covered, or if you don't know of an appropriate study, leave the box blank.

Round 3

Effective Governance Delphi Round 3

Keyword relevance

In the previous round you were asked to rate the relevance of keywords. This helps us identify those keywords which are widely considered highly relevant, and those that are considered of little relevance. However, we also encountered some keywords over which there was disagreement. Here we present you with those keywords, accompanied by the breakdown of ratings and arguments made in support of or against each keyword. You are asked to evaluate the opinions of your peers and re-rate these keywords.

Investments in resources and food systems

In round 2, the distribution of ratings for this keyword was 1 little relevance : 7 some relevance : 2 very relevant.

The following arguments were made in support of these ratings:

"Not strong as a keyword";

"A key driver of change in many contemporary food systems"; and

"Key driver (good or bad) with regards to food system governance".

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Access

In round 2, the distribution of ratings for this keyword was 1 little relevance : 6 some relevance : 3 very relevant.

The following arguments were made in support of these ratings:

"Central to question";

"Central to the means by which governance affects food security is through institutional mechanisms that shape food access";

"While clearly important, the label here is a little too vague in its description. Can relate to multiple different factors and therefore difficult to assess its overall relevance";

"access to power, information, food, etc. as a key aspect of governance".

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Agricultural Inputs

In round 2, the distribution of ratings for this keyword was 4 little relevance : 6 some relevance : 0 very relevant.

The following arguments were made in support of these ratings:

"Too specific";

"Little relevance. It's a technical issue connected to, but not central to, the topic here. One of MANY technical issues in food systems that may be affected by governance, so probably shouldn't be used as a keyword for this study";

"As a topical area of literature, I fear that this would bring into consideration a wealth of literature that pays little explicit attention to governance, and cross-scale governance in food systems"

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Subsidies

In round 2, the distribution of ratings for this keyword was 5 little relevance : 3 some relevance : 1 very relevant.

The following arguments were made in support of these ratings:

"Too specific";

"One particular policy instrument in a portfolio of policy instruments and governance arrangements";

"Little relevance. It's a technical issue connected to, but not central to, the topic here. One of MANY technical issues in food systems that may be affected by governance, so probably shouldn't be used as a keyword for this study";

"key institution within food systems - though need to look carefully at the assumptions made regarding subsidies and their impacts"

"I was thinking these words as key words for our subject and I think this is not in the core of our subject"

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Effective Governance Delphi Round 3

Keyword relevance - new keywords

In the previous round some of you nominated additional keywords to denote topics which you felt were missing. Here we present you with those keywords, accompanied by the arguments made justifying the need to be included in the study. You are now asked to rate these keywords.

Barriers, trade-offs and opportunities for climate change adaptation.

Justification: May provide a process-oriented benchmark to assess 'effectiveness' of governance arrangements.

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Rural Bias

Justification: Theory that it is important to promote rural development as governments tend to exploit rural poor. Problem is that it overlooks a dynamic relationship between urban and rural areas and how interventions in both areas are need to promote development and food security

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Urbanization

as developing countries develop, they tend to become more urban which changes the food system in ways not fully understood. So important to focus on urban issues like market access and transport to market and not simply focus on things like increasing yield.

How relevant do you consider this keyword?

- of little or no relevance
- some relevance
- very relevant

Effective Governance Delphi Round 3

Acemoglu & Robinson 2012

In this section our aim is to match the keywords you have identified as relevant with the articles that have been submitted. This will guide the review towards those studies which are of most immediate relevance to the project.

There are 84 articles in this section. Thank you for submitting so many references. While this means we have a large number of articles to work with, the down-side is you now have more work to do. We expect it to take you half an hour to work through the rest of this survey. Thanks in advance for your patience.

The questions on this page concern the following study:

Acemoglu, Daron, and James A. Robinson. 2012. Why Nations Fail: The Origins of Power, Prosperity and Poverty. New York: Crown Publishing.

How familiar are you with this study?

Please select from the list. If you have never heard of this study or have not read it properly, then leave this question blank and click Continue to proceed.

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Effective Governance Delphi Round 3

Acemoglu & Robinson 2012

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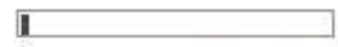
The questions on this page concern the following study:

Acemoglu, Daron, and James A. Robinson. 2012. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. New York: Crown Publishing.

How do you consider the quality of this research?

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Effective Governance Delphi Round 3

Acemoglu & Robinson 2012

In this section our aim is to match the keywords you have identified as relevant with the articles that have been submitted. This will guide the review towards those studies which are of most immediate relevance to the project.

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The questions on this page concern the following study:

Acemoglu, Daron, and James A. Robinson. 2012. Why Nations Fail: The Origins of Power, Prosperity and Poverty. New York: Crown Publishing.

Which topics does this study cover best?

Please select up to 5 keywords which this article covers well

- institutions
- governance indicators
- Food systems
- food security
- adaptive governance
- governance arrangements
- political-economy
- adaptive/social/transformational learning
- multi-level/polycentric governance
- governance
- food policy
- cross-scale linkages
- institutional barriers
- Investments in resources and food systems
- Access
- markets
- Politics

Appendix D: Project Index of Articles

Project Reference	Full Reference	Sampled through	Access	Empirical (1 st Coding)?	Empirical (2 nd coding)?	Research Question	Governance construct	Classifiable	# of indicators	Original indicator names	Synthesised names
EGRef #001	Adger, W.N., 2001. Scales of governance and environmental justice for adaptation and mitigation of climate change. <i>Journal of International Development</i> , 13 (7), 921–931.	Delphi R1 (2 nominations)	BnL	Disagreement Resolved: No							
EGRef #002	Adger, W.N., Brown, K., and Thompkins, E.L., 2005. The Political Economy of Cross-Scale Networks in Resource Co-Management. <i>Ecology and Society</i> , 10 (2), 9.	Delphi R1 (1 nomination)	BnL	Yes		Yes	2: governance of socio-ecological systems; cross scale linkages	No			
EGRef #003	Agrawal, A., 2001. Common Property Institutions and Sustainable Governance of Resources. <i>World Development</i> , 29 (10), 1649–1672.	Delphi R1 (1 nomination)	BnL	No							

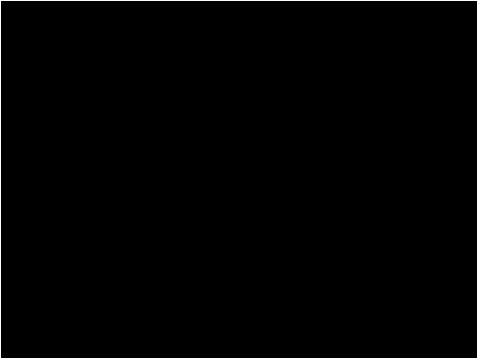
EGRef #004	Armitage, D., 2007. Governance and the Commons in a Multi-Level World. <i>International Journal of the Commons</i> , 2 (1), 7–32.	Delphi R1 (2 nominations)	Open Access	No					
EGRef #005	Auld, G., 2010. Assessing Certification as Governance: Effects and Broader Consequences for Coffee. <i>The Journal of Environment & Development</i> , 19 (2), 215–241.	Delphi R1 (1 nomination)	BnL	Yes		Yes	certification as governance	No	
EGRef #006	Azmat, F. and Coghill, K., 2005. Good governance and market-based reforms: a study of Bangladesh. <i>International Review of Administrative Sciences</i> , 71 (4), 625–638.	Delphi R1 (1 nomination)	BnL	No					
EGRef #007	Bacon, C.M., 2010. Who decides what is fair in fair trade? The agri-environmental governance of standards, access, and price. <i>The Journal of Peasant Studies</i> , 37 (1), 111–147.	Delphi R1 (1 nomination)	Open Access	No					

EGRef #008	Berkes, F., 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. <i>Journal of Environmental Management</i> , 90 (5), 1692-1702.	Delphi R1 (1 nomination)	NO. (not empirical/book)				
EGRef #009	Biermann, F., 2007. 'Earth system governance' as a crosscutting theme of global change research. <i>Global Environmental Change</i> , 17 (3-4), 326-337.	Delphi R1 (1 nomination)	Open Access	No			

EGrRef #010	<p>Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M.M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P.M., Jordan, A., Kanie, N., Kluvánková-Oravská, T., Lebel, L., Liverman, D., Meadowcroft, J., Mitchell, R.B., Newell, P., Oberthür, S., Olsson, L., Pattberg, P., Sánchez-Rodríguez, R., Schroeder, H., Underdal, A., Vieira, S.C., Vogel, C., Young, O.R., Brock, A., and Zondervan, R., 2012. Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project. <i>Current Opinion in Environmental Sustainability</i>, 4 (1), 51–60.</p>	Delphi R1 (1 nomina tion)	BnL	Yes	No RQ	
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EGRef #011	Biermann, F., Betsill, M.M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., and Zondervan, R., 2010. Earth system governance: a research framework. <i>International Environmental Agreements: Politics, Law and Economics</i> , 10 (4), 277–298.	Delphi R1 (1 nomination)	BnL	No							
EGRef #012	Biermann, F. and Boas, I., 2010. Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees. <i>Global Environmental Politics</i> , 10 (1), 60–88.	Delphi R1 (1 nomination)	BnL	No							
EGRef #013	Biermann, F. and Gupta, A., 2011. Accountability and legitimacy in earth system governance: A research framework. <i>Ecological Economics</i> , 70 (11), 1856–1864.	Delphi R1 (1 nomination)	Open Access	n/coded	No						
EGRef #014	Boons, F. and Mendoza, A., 2010. Constructing sustainable palm oil: how actors define sustainability. <i>Journal of Cleaner Production</i> , 18 (16–17), 1686–1695.	Delphi R1 (1 nomination)	Copy acquired through network	n/coded	YES	Yes	definitions of sustainability	Semi	1	definitions of sustainability	Discursive framing

EGRef #015	Braun, J. von, 2009. Addressing the food crisis: governance, market functioning, and investment in public goods. <i>Food Security</i> , 1 (1), 9–15.	Delphi R1 (1 nomination)	BnL	No					
EGRef #016	Brunner, R.D., Steelman, T.A., Coe-Juell, L., Cromley, C., Edwards, C.M., and Tucker, D.W., 2005. <i>Adaptive governance: Integrating science, policy, and decision making</i> . New York: Columbia University Press.	Delphi R1 (1 nomination)	NO. (not empirical/book)						
EGRef #017	Candel, J.J.L., 2014. Food security governance: a systematic literature review. <i>Food Security</i> , 6 (4), 585–601.	Delphi R1 (1 nomination)	BnL	Yes		Yes	None		
EGRef #018	Chibinga, O.C., Musimba, N.M., Nyangito, M., and Simbaya, J., 2010. Climate variability: pastoralists' perception, practices and enhancing adaptive pasture use for food security in Choma district, southern Zambia. In: <i>RUFORUM Second Biennial Meeting</i> . Presented at the RUFORUM, Entebbe, Uganda.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	None		

EGRef #019	Clapp, J., 2003. Transnational corporate interests and global environmental governance: negotiating rules for agricultural biotechnology and chemicals. <i>Environmental Politics</i> , 12 (4), 1-23.	Delphi R1 (1 nomination)	Copy acquired through network	n/coded	YES	Yes	role of the agricultural input industry in the negotiation of two environmental treaties	No	
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EGRef #020	Cooper, S.J. and Wheeler, T., 2015. Adaptive governance: Livelihood innovation for climate resilience in Uganda. <i>Geoforum</i> , 65, 96–107.	Delphi R1 (1 nomination)	NO. Requested from author. Received	n/coded	YES	Yes	adaptive governance mechanisms	Yes	7	self-organisation; diversity of state and non-state multi-stakeholder engagement and interaction; knowledge sharing; Bridging and bonding ties; polycentric decision-making in nested institutional hierarchies; stronger leadership & shadow networks; multi-scale networks & linkages	Non-state self-organising; participation and multi-stakeholder engagement; use of knowledge and science; Networks; Polycentricity; Leadership; cross-scale interaction
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EGRef #021	Douxchamps, S., Wijk, M.T.V., Silvestri, S., Moussa, A.S., Quiros, C., Ndour, N.Y.B., Buah, S., Somé, L., Herrero, M., Kristjanson, P., Ouedraogo, M., Thornton, P.K., Asten, P.V., Zougmore, R., and Rufino, M.C., 2015. Linking agricultural adaptation strategies, food security and vulnerability: evidence from West Africa. <i>Regional Environmental Change</i> , 1-13.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	adoption of agricultural adaptation strategies	No	
EGRef #022	Drimie, S. and Ruysenaar, S., 2010. The Integrated Food Security Strategy of South Africa: an institutional analysis.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	institutional arrangements	No	
EGRef #023	DuPuis, E.M. and Gillon, S., 2008. Alternative modes of governance: organic as civic engagement. <i>Agriculture and Human Values</i> , 26 (1-2), 43-56.	Delphi R1 (1 nomination)	BnL	n/coded	YES	No RQ			

EGRef #024	Eakin, H., Winkels, A., and Sendzimir, J., 2009. Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems. <i>Environmental Science & Policy</i> , 12 (4), 398–412.	Delphi R1 (1 nomination)	BnL	No					
EGRef #025	Edwards, M.E., 2012. Food Insecurity in Western US States. <i>Food, Culture & Society</i> , 15 (1), 93–112.	Delphi R1 (1 nomination)	NO. Requested from author. Unsuccessful						
EGRef #026	Ellis, F. and Sumberg, J., 1998. Food production, urban areas and policy responses. <i>World Development</i> , 26 (2), 213–225.	Delphi R1 (1 nomination)	Open Access	No					
EGRef #027	Esnouf, C., Russel, M., and Bricas, N., 2013. <i>Food System Sustainability: Insights from duALIne</i> . Cambridge University Press.	Delphi R1 (2 nominations)	NO. (not empirical/book)						
EGRef #028	Evans, A., 2011. Governance for a Resilient Food System. <i>Oxfam Policy and Practice: Agriculture, Food and Land</i> , 11 (2), 63–92.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	None		

EGRef #029	Finan, T.J. and Nelson, D.R., 2001. Making rain, making roads, making do: public and private adaptations to drought in Ceará, Northeast Brazil. <i>Climate Research</i> , 19 (2), 97-108.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	None		
EGRef #030	Folke, C., Hahn, T., Olsson, P., and Norberg, J., 2005. Adaptive Governance of Social-Ecological Systems. <i>Annual Review of Environment and Resources</i> , 30 (1), 441-473.	Delphi R1 (1 nomination)	BnL	No					

EGRref #031	Galiè, A., 2013. Governance of seed and food security through participatory plant breeding: Empirical evidence and gender analysis from Syria. <i>Natural Resources Forum</i> , 37 (1), 31-42.	Delphi R1 (1 nomination)	BnL	Yes	Yes	Seed governance	Yes	5	informal rules regulating seed management at community and intra-household level; seed governance frameworks; rights, access to and control of seed; international, national, local and individual levels; Gender-sensitive seed governance	informal governance; governance framework; scale-specific responsibilities and competences; cross-scale interaction; gender-sensitivity
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EGRef #032	Garcia, S.M. and Rosenberg, A.A., 2010. Food security and marine capture fisheries: characteristics, trends, drivers and future perspectives. <i>Philosophical Transactions of the Royal Society of London B: Biological Sciences</i> , 365 (1554), 2869–2880.	Delphi R1 (1 nomination)	BnL	No			
EGRef #033	Gibson, C.C., Ostrom, E., and Ahn, T.K., 2000. The concept of scale and the human dimensions of global change: a survey. <i>Ecological Economics</i> , 32 (2), 217–239.	Delphi R1 (1 nomination)	Open Access	No			
EGRef #034	Giovannucci, D. and Ponte, S., 2005. Standards as a new form of social contract? Sustainability initiatives in the coffee industry. <i>Food Policy</i> , 30 (3), 284–301.	Delphi R1 (1 nomination)	Open Access	Disagreement Resolved: No			
EGRef #035	Grindle, M.S., 2004. Good Enough Governance: Poverty Reduction and Reform in Developing Countries. <i>Governance</i> , 17 (4), 525–548.	Delphi R1 (1 nomination)	BnL	No			

EGRef #036	Gupta, J., 2007. The multi-level governance challenge of climate change. <i>Environmental Sciences</i> , 4 (3), 131-137.	Delphi R1 (1 nomination)	Open Access	No					
EGRef #037	Hesselberg, J. and Yaro, J.A., 2006. An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. <i>GeoJournal</i> , 67 (1), 41-55.	Delphi R1 (1 nomination)	BnL	Yes		Yes	None		
EGRef #038	Holden, S. and Lunduka, R., 2010. <i>Too poor to be efficient? Impacts of the targeted fertilizer subsidy programme in Malawi on farm plot level input use, crop choice and land productivity</i> . Norway: Department of International Environment and Development Studies, Noragric, No. 55.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	None		
EGRef #039	Hooge, L. and Marks, G., 2003. Unraveling the Central State, but how? Types of multilevel governance. <i>American Political Science Review</i> , 97 (2), 233-243.	Delphi R1 (1 nomination)	Open Access	Disagreement Resolved: No					

EGRef #040	Huntjens, P., Lebel, L., Pahl-Wostl, C., Camkin, J., Schulze, R., and Kranz, N., 2012. Institutional design propositions for the governance of adaptation to climate change in the water sector. <i>Global Environmental Change</i> , 22 (1), 67–81.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	Institutional design for climate change adaptation strategy	Yes	1	Institutional design for climate change adaptation strategy	Common Pool Resource management design
EGRef #041	Ison, R., Blackmore, C., and Iaquinto, B.L., 2013. Towards systemic and adaptive governance: Exploring the revealing and concealing aspects of contemporary social-learning metaphors. <i>Ecological Economics</i> , 87, 34–42.	Delphi R1 (1 nomination)	NO. (not empirical/book)								
EGRef #042	Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Calizaya, P., and Rist, S., 2015. Agroecosystem resilience and farmers' perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. <i>Renewable Agriculture and Food Systems</i> , 30 (02), 170–183.	Delphi R1 (2 nominations)	Open Access	n/coded	YES	Yes	self-organization and learning capacities (for agroecosystem resilience)	Yes	1	self-organization and learning capacities (for agroecosystem resilience)	[split]: Non-state self-organising; learning

EGRef #043	Juhola, S. and Westerhoff, L., 2011. Challenges of adaptation to climate change across multiple scales: a case study of network governance in two European countries. <i>Environmental Science & Policy</i> , 14 (3), 239–247.	Delphi R1 (1 nomination)	BnL	Yes (agreement doubleblind)	Yes	adaptation governance	Yes	4	formal institutions; informal institutions; networks in governance; formal institutions and informal networks interact across different scales	governance frameworks; Informal governance; Networks; cross-scale interaction
EGRef #044	Kochar, A., 2005. Can Targeted Food Programs Improve Nutrition? An Empirical Analysis of India's Public Distribution System. <i>Economic Development and Cultural Change</i> , 54 (1), 203–235.	Delphi R1 (1 nomination)	BnL	n/coded	YES	Yes	None			
EGRef #045	Koc, M., MacRae, R., Desjardins, E., and Roberts, W., 2008. Getting Civil About Food: The Interactions Between Civil Society and the State to Advance Sustainable Food Systems in Canada. <i>Journal of Hunger & Environmental Nutrition</i> , 3 (2-3), 122–144.	Delphi R1 (1 nomination)	Open Access	No						

EGrRef #046	Korhonen-Kurki, K., Sehring, J., Brockhaus, M., and Gregorio, M.D., 2014. Enabling factors for establishing REDD+ in a context of weak governance. <i>Climate Policy</i> , 14 (2), 167–186.	Delphi R1 (1 nomination)	Open Access	YES	Yes	factors facilitate enabling policy processes	Yes	6	Pressure from shortage of forest resources (PRES); Key features of effective forest legislation, policy and governance (EFF); Already initiated policy change (CHA); National ownership (OWN); Inclusiveness of the policy process (INCL); establishment of comprehensive policies targeting transformational change in the REDD+ policy domain	Legal Framework; favourable initial policy change; scale-specific responsibilities and competences; participation and multi-stakeholder engagement; Policy framework
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EGRef #047	Lebel, L., Anderies, J., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T., and Wilson, J., 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. <i>Ecology and Society</i> .	Delphi R1 (1 nomination)	Open Access	YES		Yes	governance	Yes	10	Representation; Accountability; Multilayered; Polycentric; Participation; social justice; Deliberation; Empowerment; adaptation and learning; capacity for self-organizing	Electorally democratic; Accountability; scale-specific responsibilities and competences; Polycentricity; participation and multi-stakeholder engagement; Fairness; Deliberation; Empowerment; Learning; resilience/robustness
EGRef #048	Leith, P., Jacobs, B., Brown, P.R., and Nelson, R., 2012. A Participatory Assessment of NRM Capacity to Inform Policy and Practice: Cross-Scale Evaluation of Enabling and Constraining Factors. <i>Society & Natural Resources</i> , 25 (8), 775–793.	Delphi R1 (1 nomination)	NO. Requested from author. Received	n/coded	YES	Yes	capacity to manage natural resources	Yes	1	self-assessed adaptive capacity of natural resource managers	Adaptive capacity
EGRef #049	Lele, U., Klousia-Marquis, M., and Goswami, S., 2013. Good Governance for Food, Water and Energy Security. <i>Aquatic Procedia</i> , 1, 44–63.	Delphi R1 (1 nomination)	BnL	No							

EGRef #050	Lio, M. and Liu, M.-C., 2008. Governance and agricultural productivity: A cross-national analysis. <i>Food Policy</i> , 33 (6), 504–512.	Delphi R1 (1 nomination)	NO. Contact info not found								
EGRef #051	Lipper, L., Thornton, P., Campbell, B.M., Baedeker, T., Braimoh, A., Bwalya, M., Caron, P., Cattaneo, A., Garrity, D., Henry, K., Hottle, R., Jackson, L., Jarvis, A., Kossam, F., Mann, W., McCarthy, N., Meybeck, A., Neufeldt, H., Remington, T., Sen, P.T., Sessa, R., Shula, R., Tibu, A., and Torquebiau, E.F., 2014. Climate-smart agriculture for food security. <i>Nature Climate Change</i> , 4 (12), 1068–1072.	Delphi R1 (1 nomination)	BnL	No							
EGRef #052	Mandemaker, M., Bakker, M., and Stoorvogel, J., 2011. The Role of Governance in Agricultural Expansion and Intensification: a Global Study of Arable Agriculture. <i>Ecology and Society</i> , 6 (12), 8.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	governance characteristics	Yes	6	Voice and accountability; Government effectiveness; Regulatory quality; Rule of law; Political stability and absence of violence; Control of corruption	Electorally democratic; public social commitments; state capacity; Rule of Law; political stability; corruption

EGRef #053	Masiero, S., 2015. Redesigning the Indian Food Security System through E-Governance: The Case of Kerala. <i>World Development</i> , 67, 126–137.	Delphi R1 (1 nomination)	Open Access	YES		Yes	e-governance adoption	No			
EGRef #054	Mearns, R. and Norton, A., 2010. <i>The Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World</i> . Washinton DC: The International Bank for Reconstruction and Development / The World Bank.	Delphi R1 (1 nomination)	NO. (not empirical/book)								
EGRef #055	Minde, I.J., Jayne, T., Crawford, E., Ariga, J., and Jones, G., 2008. <i>Promoting fertilizer use in Africa: current issues and empirical evidence from Malawi, Zambia, and Kenya</i> . Michigan: Michigan State University, Department of Agricultural, Food, and Resource Economics, No. 54501.	Delphi R1 (1 nomination)	BnL	Yes		Yes	fertilizer subsidy program	Yes	1	fertilizer subsidy programme	outcomes of similar programmes
EGRef #056	Mount, P., 2011. Growing local food: scale and local food systems governance. <i>Agriculture and Human Values</i> , 29 (1), 107–121.	Delphi R1 (1 nomination)	BnL	No							

EGRef #057	Nelson, D.R. and Finan, T.J., 2009. Praying for Drought: Persistent Vulnerability and the Politics of Patronage in Ceará, Northeast Brazil. <i>American Anthropologist</i> , 111 (3), 302–316.	Delphi R1 (1 nomination)	BnL	Yes		Yes	policies intended to promote rural development	No			
EGRef #058	Nelson, R., Howden, M., and Smith, M.S., 2008. Using adaptive governance to rethink the way science supports Australian drought policy. <i>Environmental Science & Policy</i> , 11 (7), 588–601.	Delphi R1 (1 nomination)	BnL	No							
EGRef #059	Osbaahr, H., Twyman, C., Adger, W.N., and Thomas, D.S.G., 2010. Evaluating successful livelihood adaptation to climate variability and change in southern Africa. <i>Ecology and Society</i> , 15 (2), 27.	Delphi R1 (1 nomination)	Open Access	YES		Yes	informal and formal institutions	Yes	1	informal and formal institutions	Informal governance
EGRef #060	Osbaahr, H., Twyman, C., Neil Adger, W., and Thomas, D.S.G., 2008. Effective livelihood adaptation to climate change disturbance: Scale dimensions of practice in Mozambique. <i>Geoforum</i> , 39 (6), 1951–1964.	Delphi R1 (1 nomination)	BnL	Yes		Yes	agricultural policy initiatives	Yes	1	agricultural policy initiatives	Policy framework

EGRef #061	Pahl-Wostl, C., 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. <i>Global Environmental Change</i> , 19 (3), 354-365.	Delphi R1 (1 nomination)	Open Access	No					
EGRef #062	Pedersen, J. and Benjaminsen, T.A., 2007. One Leg or Two? Food Security and Pastoralism in the Northern Sahel. <i>Human Ecology</i> , 36 (1), 43-57.	Delphi R1 (1 nomination)	BnL	n/coded	YES	Yes	None		
EGRef #063	Pereira, L.M. and Ruysenaar, S., 2012. Moving from traditional government to new adaptive governance: the changing face of food security responses in South Africa. <i>Food Security</i> , 4 (1), 41-58.	Delphi R1 (1 nomination)	BnL	No					
EGRef #064	Pérez-Escamilla, R., 2012. Can experience-based household food security scales help improve food security governance? <i>Global Food Security</i> , 1 (2), 120-125.	Delphi R1 (2 nominations)	BnL	Disagreement Resolved: No					

EGRef #065	Pesqueira, L. and Glasbergen, P., 2013. Playing the politics of scale: Oxfam's intervention in the Roundtable on Sustainable Palm Oil. <i>Geoforum</i> , 45, 296–304.	Delphi R1 (1 nomination)	BnL	n/coded	YES	Yes	participation of NGOs in private governance arrangements	Yes	3	creation of a space of engagement; creation of connecting spaces; creation of a space of formal interdependence	Discursive framing; participation and multi-stakeholder engagement; networks
EGRef #066	Pokorny, B., de Jong, W., Godar, J., Pacheco, P., and Johnson, J., 2013. From large to small: Reorienting rural development policies in response to climate change, food security and poverty. <i>Forest Policy and Economics</i> , 36, 52–59.	Delphi R1 (1 nomination)	BnL	No							
EGRef #067	Ponte, S. and Cheyns, E., 2013. Voluntary standards, expert knowledge and the governance of sustainability networks. <i>Global Networks</i> , 13 (4), 459–477.	Delphi R1 (1 nomination)	BnL	Disagreement Resolved: No							

EGRef #068	Poppy, G.M., Jepson, P.C., Pickett, J.A., and Birkett, M.A., 2014. Achieving food and environmental security: new approaches to close the gap. <i>Philosophical Transactions of the Royal Society of London B: Biological Sciences</i> , 369 (1639), 20120272.	Delphi R1 (1 nomination)	BnL	No							
EGRef #069	Poteete, A.R., 2012. Levels, scales, linkages, and other 'multiples' affecting natural resources. <i>International Journal of the Commons</i> , 6 (2), 134-150.	Delphi R1 (1 nomination)	Open Access	n/coded	No						
EGRef #070	Poteete, A.R. and Ostrom, E., 2004. Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management. <i>Development and Change</i> , 35 (3), 435-461.	Delphi R1 (1 nomination)	BnL	YES		Yes	collective action for sustainable management	Yes	1	collective action for sustainable management	Common Pool Resource management design
EGRef #071	Quinn, C.H., Ziervogel, G., Taylor, A., Takama, T., and Thomalla, F., 2011. Coping with Multiple Stresses in Rural South Africa. <i>Ecology and Society</i> , 16 (3), 2.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	ability of local institutions to support individual/household adaptation strategies	Yes	1	ability of local institutions to support individual/household adaptation strategies	scale-specific responsibilities and competences

EGRef #072	Ricker-Gilbert, J., Jayne, T., and Shively, G., 2013. Addressing the 'Wicked Problem' of Input Subsidy Programs in Africa. <i>Applied Economic Perspectives and Policy</i> , 35 (2), 322-340.	Delphi R1 (1 nomination)	BnL	No					
EGRef #073	Rijke, J., Brown, R., Zevenbergen, C., Ashley, R., Farrelly, M., Morison, P., and van Herk, S., 2012. Fit-for-purpose governance: A framework to make adaptive governance operational. <i>Environmental Science & Policy</i> , 22, 73-84.	Delphi R1 (1 nomination)	BnL	No					
EGRef #074	Rocha, C. and Lessa, I., 2009. Urban Governance for Food Security: The Alternative Food System in Belo Horizonte, Brazil. <i>International Planning Studies</i> , 14 (4), 389-400.	Delphi R1 (1 nomination)	NO. Requested from author. Received	n/coded	YES	Yes	urban governance in the creation of an alternative food system	No	
EGRef #075	Sahley, C., Groelsema, B., Marchione, T., and Nelson, D., 2005. <i>The Governance Dimensions of Food Security in Malawi</i> . USAID.	Delphi R1 (2 nominations)	Open Access	YES		Yes	underlying governance causes of food security problems	No	

EGRef #076	Schader, C., Grenz, J., Meier, M., and Stolze, M., 2014. Scope and precision of sustainability assessment approaches to food systems. <i>Ecology and Society</i> , 19 (3), 42.	Delphi R1 (1 nomination)	Open Access	no - but does examine metrics. Include	Review of methods. Relevant methods in Jawtusich et al. (2013); Van Cauwenbergh et al. (2007); Giovannucci et al. (2008).						
EGRef #077	Schouten, G., Leroy, P., and Glasbergen, P., 2012. On the deliberative capacity of private multi-stakeholder governance: The Roundtables on Responsible Soy and Sustainable Palm Oil. <i>Ecological Economics</i> , 83, 42-50.	Delphi R1 (1 nomination)	Copy acquired through network	n/coded	YES	Yes	Democracy as the deliberative capacity	Yes	1	Democracy as the deliberative capacity	Deliberation
EGRef #078	Sonnino, R., 2013. Local foodscapes: place and power in the agri-food system. <i>Acta Agriculturae Scandinavica, Section B – Soil & Plant Science</i> , 63 (sup1), 2-7.	Delphi R1 (1 nomination)	Open Access	n/coded	YES	No RQ					

EGRef #079	Spielman, D.J., Cohen, M.J., and Mogues, T., 2008. <i>Mobilizing Rural Institutions for Sustainable Livelihoods and Equitable Development: a case study of local governance and smallholder cooperatives in Ethiopia</i> . Washinton DC: International Food Policy Research Institute.	Delphi R1 (1 nomination)	BnL	Yes (aggreement doubleblind)	Yes	formal and informal governance	Yes	1	Informal governance systems	informal governance
EGRef #080	Termeer, C.J.A.M., Dewulf, A., and van Lieshout, M., 2010. Disentangling scale approaches in governance research: comparing monocentric, multilevel, and adaptive governance. <i>Ecology and Society</i> , 15 (4), 29.	Delphi R1 (1 nomination)	Open Access	No						
EGRef #081	Tompkins, E.L. and Adger, W.N., 2004. Does adaptive management of natural resources enhance resilience to climate change? <i>Ecology and Society</i> , 9 (2), 10.	Delphi R1 (1 nomination)	Open Access	Yes		Yes	co-management	No		

EGRef #082	Thornton, P. and Lipper, L., 2014. How Does Climate Change Alter Agricultural Strategies to Support Food Security? Rochester, NY: Social Science Research Network, SSRN Scholarly Paper No. ID 2423763.	Delphi R1 (1 nomination)	Open Access	n/coded	No						
EGRef #083	Umali-Deininger, D.L. and Deininger, K.W., 2001. Towards greater food security for India's poor: balancing government intervention and private competition. <i>Agricultural Economics</i> , 25 (2-3), 321-335.	Delphi R1 (1 nomination)	BnL	n/coded	YES	Yes	food grain policy environment (in India)	No			
EGRef #084	von Geibler, J., 2013. Market-based governance for sustainability in value chains: conditions for successful standard setting in the palm oil sector. <i>Journal of Cleaner Production</i> , 56, 39-53.	Delphi R1 (1 nomination)	Copy acquired through network	n/coded	YES	Yes	Legitimacy and effectiveness of standard setting	Yes	2	Legitimacy ; Effective	Legitimacy; Effective

EGRef #085	Wertz-Kanounnikoff, S. and McNeill, D., 2012. Performance indicators and REDD+ implementation. <i>In: A. Angelsen, M. Brockhaus, W.D. Sunderlin and L. Verchot (eds), Analysing REDD+: Challenges and Choices (pp. 233–246). CIFOR, Bogor, Indonesia.</i>	Delphi R1 (1 nomination)	BnL	no - but does examine metrics. Include	Review of methods. Relevant methods in Donovan et al. (2010); Guyana–Norway Joint Concept Note (2011); Government of DRC (2010); Indonesia–Norway Joint Concept Note (2010)	
EGRef #086	Young, O.R., 2008. Institutions and environmental change: the scientific legacy of a decade of IDGEC research. <i>In: In O.R. Young, L.A. King and H. Schroeder, (eds.) Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers. MIT Press, Cambridge, MA, USA. 3–45.</i>	Delphi R1 (1 nomination)	NO. (not empirical/book)			
EGRef #087	Young, O.R., 2010. Institutional dynamics: Resilience, vulnerability and adaptation in environmental and resource regimes. <i>Global Environmental Change</i> , 20 (3), 378–385.	Delphi R1 (1 nomination)	Open Access	No		

EGRef #088	Ziervogel, G. and Ericksen, P.J., 2010. Adapting to climate change to sustain food security. <i>Wiley Interdisciplinary Reviews: Climate Change</i> , 1 (4), 525–540.	Delphi R1 (1 nomination)	Open Access	No								
EGRef #089	Acemoglu, D., Johnson, S., Robinson, J.A., and Yared, P., 2009. Reevaluating the modernization hypothesis. <i>Journal of Monetary Economics</i> , 56 (8), 1043–1058.	Delphi R1 (1 nomination)	Open Access	n/coded	YES	Yes	transitions to and from democracy	Yes	1	Democracy	Electoral democracy	
EGRef #090	Aiking, H. and de Boer, J., 2004. Food sustainability: Diverging interpretations. <i>British Food Journal</i> , 106 (5), 359–365.	Delphi R1 (1 nomination)	BnL	No								
EGRef #091	Altieri, M.A., 2004. Linking ecologists and traditional farmers in the search for sustainable agriculture. <i>Frontiers in Ecology and the Environment</i> , 2 (1), 35–42.	Delphi R1 (1 nomination)	NO. (not empirical/book)									
EGRef #092	Altieri, M.A. and Toledo, V.M., 2011. The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. <i>The Journal of Peasant Studies</i> , 38 (3), 587–612.	Delphi R1 (1 nomination)	BnL	No								

EGRef #093	Bates, R.H., 1981. <i>Markets and States in Tropical Africa: The Political Basis of Agricultural Policies</i> . Berkeley: University of California Press.	Delphi R1 (1 nomination)	NO. (not empirical/book)			
EGRef #094	Boserup, E., 1965. <i>The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure</i> . London: George Allen & Unwin Ltd.	Delphi R1 (1 nomination)	Open Access	Disagreement Resolved: No		
EGRef #095	Colonna, P., Fournier, S., and Touzard, J., 2013. Food Systems. In: <i>Esnouf, Catherine, Marie Russel, and Nicolas Bricas (eds) Food System Sustainability: Insights from duALIne</i> . Cambridge University Press.	Delphi R1 (1 nomination)	NO. (not empirical/book)			
EGRef #096	De Schutter, O., 2010. <i>Agroecology and the Right to Food</i> . Washinton DC: United Nations Human Rights Commission, No. A/HRC/16/49.	Delphi R1 (1 nomination)	Open Access	No		
EGRef #097	De Schutter, O., 2014. <i>Final report: The transformative potential of the right to food</i> . New York: UN General Assambly, Human Rights Council, No. A/HRC/25/57.	Delphi R1 (1 nomination)	Open Access	No		

EGRef #098	Garnett, T., 2013. Food sustainability: problems, perspectives and solutions. <i>Proceedings of the Nutrition Society</i> , 72 (01), 29-39.	Delphi R1 (1 nomination)	Open Access	n/coded	No		
EGRef #099	Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M., and Toulmin, C., 2010. Food Security: The Challenge of Feeding 9 Billion People. <i>Science</i> , 327 (5967), 812-818.	Delphi R1 (1 nomination)	BnL	No			
EGRef #100	Golay, C., 2010. The Food Crisis and Food Security: Towards a New World Food Order? <i>International Development Policy Revue internationale de politique de développement</i> , (1), 215-232.	Delphi R1 (1 nomination)	NO. (not empirical/book)				

EGRef #101	Golay, C. and Büschi, M., 2012. <i>The right to food and global strategic frameworks: The Global Strategic Framework for Food Security and Nutrition (GSF) and the UN Comprehensive Framework for Action (CFA)</i> . Rome: International Federation of Organic Agricultural Movements (IFOAM). Food Security-People before commodities, No. 20.	Delphi R1 (1 nomination)	Open Access	No							
EGRef #102	Jacobi, J., Schneider, M., Mariscal, M.P., Huber, S., Weidmann, S., Bottazzi, P., and Rist, S., 2015. Farm Resilience in Organic and Nonorganic Cocoa Farming Systems in Alto Beni, Bolivia. <i>Agroecology and Sustainable Food Systems</i> , 39 (7), 798–823.	Delphi R1 (1 nomination)	NO. Requested from author. Received	n/coded	YES	Yes	social–ecological resilience	Yes	3	buffer capacity; self-organization; adaptive capacity	Non-state self-organising; adaptive capacity
EGRef #103	Jones, G.A. and Corbridge, S., 2010. The continuing debate about urban bias the thesis, its critics, its influence and its implications for poverty-reduction strategies. <i>Progress in Development Studies</i> , 10 (1), 1–18.	Delphi R1 (1 nomination)	BnL	No							

EGRef #104	Kay, C., 2002. Why East Asia overtook Latin America: Agrarian reform, industrialisation and development. <i>Third World Quarterly</i> , 23 (6), 1073–1102.	Delphi R1 (1 nomination)	BnL	Yes		Yes	state policy	No	
EGRef #105	Khan, M., 2011. <i>Political Settlements and the Governance of Growth-Enhancing Institutions</i> . London: School of Oriental and Africa Studies.	Delphi R1 (1 nomination)	Open Access	Yes		No RQ			
EGRef #106	Lang, T. and Barling, D., 2012. Food security and food sustainability: reformulating the debate. <i>The Geographical Journal</i> , 178 (4), 313–326.	Delphi R1 (2 nomination)	BnL	No					
EGRef #107	Lawrence, D., Beddington, S.J., Godfray, C., Crute, I., Haddad, L., Muir, J., Pretty, J., Robinson, S., and Toulmin, C., 2011. Special Issue: The challenge of global food sustainability. <i>Special Issue: The challenge of global food sustainability.</i> , 36 (S1), S1–S113.	Delphi R1 (1 nomination)	NO. (not empirical/book)						

EGRef #108	Maye, D. and Kirwan, J., 2013. Food security: A fractured consensus. <i>Journal of Rural Studies</i> , 29, 1-6.	Delphi R1 (1 nomination)	NO. (no abstract. Likely not empirical)			
EGRef #109	Paillard, S., Treyer, S., and Dorin, B., 2011. <i>Agrimonde – Scenarios and Challenges for Feeding the World</i> . Editions Quae.	Delphi R1 (1 nomination)	NO. (not empirical/book)			
EGRef #110	Wendt, A., 1998. On constitution and causation in International Relations. <i>Review of International Studies</i> , 24 (05), 101-118.	Delphi R1 (1 nomination)	Copy acquired through network	n/coded	No	
EGRef #111	Ziegler, J., Golay, C., Mahon, C., and Way, S.-A., 2011. <i>The Fight for the Right to Food</i> . Palgrave Macmillan.	Delphi R1 (1 nomination)	NO. (not empirical/book)			
EGRef #112	Acemoglu, D. and Robinson, J.A., 2012. <i>Why Nations Fail: The Origins of Power, Prosperity and Poverty</i> . New York: Crown Publishing.	Delphi R2 (1 nomination)	Open Access	n/coded	No	

EGRef #113	Bromley, D., 1989. <i>Economic Interests and Institutions: Property Rights and Public Policy</i> . Oxford, UK: Basil Blackwell.	Delphi R2 (1 nomination)	NO. (not empirical/book)			
EGRef #114	Byres, T.J., 1979. Of neo-populist pipe-dreams: Daedalus in the Third World and the myth of urban bias. <i>The Journal of Peasant Studies</i> , 6 (2), 210–244.	Delphi R2 (1 nomination)	NO. (no abstract. Likely not empirical)			
EGRef #115	Dupuis, J. and Biesbroek, R., 2013. Comparing apples and oranges: The dependent variable problem in comparing and evaluating climate change adaptation policies. <i>Global Environmental Change</i> , 23 (6), 1476–1487.	Delphi R2 (1 nomination)	Open Access	n/coded	No	
EGRef #116	Eisenack, K., Moser, S.C., Hoffmann, E., Klein, R.J.T., Oberlack, C., Pechan, A., Rotter, M., and Termeer, C.J.A.M., 2014. Explaining and overcoming barriers to climate change adaptation. <i>Nature Climate Change</i> , 4 (10), 867–872.	Delphi R2 (1 nomination)	BnL	n/coded	No	

EGRef #117	Epstein, G., Pittman, J., Alexander, S.M., Berdej, S., Dyck, T., Kreitmair, U., Rathwell, K.J., Villamayor-Tomas, S., Vogt, J., and Armitage, D., 2015. Institutional fit and the sustainability of social-ecological systems. <i>Current Opinion in Environmental Sustainability</i> , 14, 34-40.	Delphi R2 (1 nomination)	Open Access	n/coded	No				
EGRef #118	Fafchamps, M., 2004. <i>Market institutions in Sub-Saharan Africa: theory and evidence</i> . Cambridge, MA: MIT Press.	Delphi R2 (1 nomination)	NO. (not empirical/book)						
EGRef #119	Füssel, H.-M., 2010. How inequitable is the global distribution of responsibility, capability, and vulnerability to climate change: A comprehensive indicator-based assessment. <i>Global Environmental Change</i> , 20 (4), 597-611.	Delphi R2 (1 nomination)	Open Access	n/coded	Yes	Yes	None		

EGREF #120	Gehring, T. and Oberthür, S., 2009. The Causal Mechanisms of Interaction between International Institutions. <i>European Journal of International Relations</i> , 15 (1), 125–156.	Delphi R2 (1 nomination)	BnL	n/coded	No						
EGREF #121	Hinkel, J., 2011. Indicators of vulnerability and adaptive capacity: Towards a clarification of the science–policy interface. <i>Global Environmental Change</i> , 21 (1), 198–208.	Delphi R2 (1 nomination)	Open Access	n/coded	No						
EGREF #122	Hirschman, A.O., 1997. <i>The Passions and the Interests: political arguments for capitalism before its triumph</i> . Princeton University Press: Princeton.	Delphi R2 (1 nomination)	NO. (not empirical/book)								
EGREF #123	Kabubo-Mariara, J., 2007. Land conservation and tenure security in Kenya: Boserup’s hypothesis revisited. <i>Ecological Economics</i> , 64 (1), 25–35.	Delphi R2 (1 nomination)	Open Access	Yes		Yes	Property rights in land	Yes	1	Property rights in land	Legal Framework

EGREF #124	Kay, C., 2009. Development strategies and rural development: exploring synergies, eradicating poverty. <i>The Journal of Peasant Studies</i> , 36 (1), 103–137.	Delphi R2 (1 nomination)	BnL	No		
EGREF #125	Khan, M., 1995. State Failure in Weak States: A Critique of New Institutional Explanations. In: J. Harriss, J. Hunter, and C. Lewis, eds. <i>New Institutional Economics and Third World Development</i> . London: Routledge, 71–86.	Delphi R2 (1 nomination)	NO. (not empirical/book)			
EGREF #126	Mahoney, J., 2010. After KKV: The New Methodology of Qualitative Research. <i>World Politics</i> , 62 (01), 120–147.	Delphi R2 (1 nomination)	BnL	n/coded	No	
EGREF #127	Mearsheimer, J.J., 1994. The False Promise of International Institutions. <i>International Security</i> , 19 (3), 5–49.	Delphi R2 (1 nomination)	BnL	n/coded	No	

EGREF #128	Mollinga, P.P., Meinzen-Dick, R.S., and Merrey, D.J., 2007. Politics, Plurality and Problemsheds: A Strategic Approach for Reform of Agricultural Water Resources Management. <i>Development Policy Review</i> , 25 (6), 699–719.	Delphi R2 (1 nomination)	BnL	No				
EGREF #129	Ostrom, E., 2010. Polycentric systems for coping with collective action and global environmental change. <i>Global Environmental Change</i> , 20 (4), 550–557.	Delphi R2 (1 nomination)	BnL	No				
EGREF #130	Polanyi, K., 2001. <i>The Great Transformation: the political and economic origins of our time</i> . Boston: Beacon Press.	Delphi R2 (1 nomination)	Open Access	n/coded	No			
EGREF #131	Purdon, M., 2013. Land Acquisitions in Tanzania: Strong Sustainability, Weak Sustainability and the Importance of Comparative Methods. <i>Journal of Agricultural and Environmental Ethics</i> , 26 (6), 1127–1156.	Delphi R2 (1 nomination)	BnL	Yes		Yes	None	

EGREF #132	Purdon, M., 2014. <i>The Comparative Turn in Climate Change Adaptation and Food Security Governance Research</i> . Copenhagen: CGIAR Research Programme on Climate Change Agriculture and Food Security (CAAFS), No. 92.	Delphi R2 (1 nomination)	Open Access	No			
EGREF #133	Purdon, M., 2015. Advancing Comparative Climate Change Politics: Theory and Method. <i>Global Environmental Politics</i> , 15 (3), 1-26.	Delphi R2 (1 nomination)	BnL	No			
EGREF #134	Steinberg, P.F., 2015. Can We Generalize from Case Studies? <i>Global Environmental Politics</i> , 15 (3), 152-175.	Delphi R2 (1 nomination)	Open Access	n/coded	No		

EGREF #135	Wambugu, S.W., Chomba, S.W., and Atela, J., 2015. Institutional arrangements for climate-smart landscapes. In: P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw, and D. Catacutan, editors. <i>Climate-Smart Landscapes: Multifunctionality in Practice</i> . Nairobi: World Agroforestry Centre (ICRAF).	Delphi R2 (2 nominations)	Open Access	n/coded	YES	Yes	benchmarks on institutional arrangements for climate-smart agriculture and forestry landscapes)	Yes	7	Participatory and collaborative processes; Secure tenure; Equitable benefit-sharing mechanisms; Gender consideration; Strategic targeting of investments; Monitoring and evaluation of impacts; Explicitly addressing mitigation and adaptation needs	participation and multi-stakeholder engagement; Legal Framework; Fairness; gender-sensitivity; Institutional mainstreaming; use of knowledge and science; Policy framework
EGREF #136	Wilbanks, T.J. and Kates, R.W., 2010. Beyond Adapting to Climate Change: Embedding Adaptation in Responses to Multiple Threats and Stresses. <i>Annals of the Association of American Geographers</i> , 100 (4), 719–728.	Delphi R2 (1 nomination)	BnL	Yes		Yes	None				

EGREF #137	Adger, W.N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D.R., Naess, L.O., Wolf, J., and Wreford, A., 2009. Are there social limits to adaptation to climate change? <i>Climatic change</i> , 93 (3-4), 335-354.	Previous SRs (not empirical)			
EGREF #138	Adger, W.N., 2010. Climate change, human well-being and insecurity. <i>New Political Economy</i> , 15 (2), 275-292.	Previous SRs (not empirical)			
EGREF #139	Agrawal, A., Chhatre, A., and Hardin, R., 2008. Changing governance of the world's forests. <i>Science</i> , 320 (5882), 1460-1462.	Previous SRs (not empirical)			
EGREF #140	Amalric, F., 2001. Strategically Speaking: The World Food Summit, five years later and Responses to Franck Amalric. <i>Development</i> , 44 (4), 6-16.	Previous SRs (not empirical)			
EGREF #141	Anderson, M.D., 2008. Rights-based food systems and the goals of food systems reform. <i>Agriculture and Human Values</i> , 25 (4), 593-608.	Previous SRs (not empirical)			

EGREF #142	Ayers, J.M. and Huq, S., 2009. The value of linking mitigation and adaptation: A case study of Bangladesh. <i>Environmental Management</i> , 43 (5), 753–764.	Previous SRs (empirical; not sampled)							
EGREF #143	Barclay, K. and Epstein, C., 2013. Securing Fish for the Nation: Food Security and Governmentality in Japan. <i>Asian Studies Review</i> , 37 (2), 215–233.	Previous SRs (not empirical)							
EGREF #144	Barling, D., Lang, T., and Caraher, M., 2002. Joined-up food policy? The trials of governance, public policy and the food system. <i>Social Policy & Administration</i> , 36 (6), 556–574.	Previous SRs (not empirical)							
EGREF #145	Barungi, J., 2013. <i>Agri-Food System Governance and Service Delivery in Uganda: A Case Study of Tororo District</i> . No. 61.	Sampled from Previous SRs	Open Access	n/a	YES	Yes	governance aspects of Uganda's local agri-food systems	No	
EGREF #146	Bavorová, M., Hirschauer, N., and Martino, G., 2014. Food safety and network governance structure of the agri-food system. <i>European Journal of Law and Economics</i> , 37 (1), 1–11.	Previous SRs (not empirical)							

EGREF #147	Behnassi, M. and Yaya, S., 2011. Food Crisis Mitigation: The Need for an Enhanced Global Food Governance. <i>In</i> : M. Behnassi, S. Draggan, and S. Yaya, eds. <i>Global Food Insecurity</i> . Dordrecht: Springer Netherlands, 93–125.	Previous SRs (not empirical)			
EGREF #148	Biermann, F., Betsill, M.M., Vieira, S.C., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., Yanda, P.Z., and others, 2010. Navigating the anthropocene: the Earth System Governance Project strategy paper. <i>Current Opinion in Environmental Sustainability</i> , 2 (3), 202–208.	Previous SRs (not empirical)			
EGREF #149	Biermann, F., 2009. Earth system governance: People, places, and the planet: Science and implementation plan of the earth system governance project. IDEP, The Earth System Governance Project.	Previous SRs (not empirical)			

EGREF #150	Biesbroek, G.R., Swart, R.J., Carter, T.R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M.D., and Rey, D., 2010. Europe adapts to climate change: comparing national adaptation strategies. <i>Global environmental change</i> , 20 (3), 440–450.	Previous SRs (empirical; not sampled)			
EGREF #151	Bizikova, L., Boettcher, E.C., and Nijnik, M.S.R., 2011. <i>Review of key national and regional policies and incentives to support adaptation and adaptive capacity in the agricultural sector</i> . Policy Research Initiative.	Previous SRs (empirical; not sampled)			

EGREF #152	Bizikova, L., Nijnik, M., and Nijnik, A., 2014. Exploring institutional changes in agriculture to inform adaptation planning to climate change in transition countries. <i>Mitigation and Adaptation Strategies for Global Change</i> , 20 (8), 1385–1406.	Sampled from Previous SRs	BnL	n/a	YES	Yes	planning for adaptation to climate change	Yes	6	motivation behind (adaptation policy development); the interaction between science, policy and research coordination; communication and knowledge exchange; the ways in which various tasks and responsibilities are distributed between different levels of governance; institutional arrangements for incorporating adaptation into sectorial/cross-sectorial policies; approaches to whether (and how) countries can ensure that their	implementation-supporting conditions; Use of science and research; use of knowledge and science; scale-specific responsibilities and competences; Institutional mainstreaming; implementation-supporting conditions
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EGREF #153	Blanc, J. and Kledal, P.R., 2012. The Brazilian organic food sector: Prospects and constraints of facilitating the inclusion of smallholders. <i>Journal of Rural Studies</i> , 28 (1), 142–154.	Previous SRs (empirical; not sampled)				
EGREF #154	Blay-Palmer, A., Knezevic, I., Andrée, P., Ballamingie, P., Landman, K.E., Mount, P.A., and Skinner, K., 2013. Future food system research priorities: A sustainable food systems perspective from Ontario, Canada. <i>Journal of Agriculture, Food Systems and Community Development</i> , 3 (4), 227–234.	Previous SRs (not empirical)				
EGREF #155	Blay-Palmer, A., ed., 2010. <i>Imagining sustainable food systems: theory and practice</i> . Surrey: Ashgate Publishing, Ltd.	Sampled from Previous SRs	NO. (not empirical/book)			
EGREF #156	Born, B. and Purcell, M., 2006. Avoiding the local trap scale and food systems in planning research. <i>Journal of Planning Education and Research</i> , 26 (2), 195–207.	Previous SRs (not empirical)				

EGREF #157	Boyd, M. and Wang, H.H., 2011. The role of public policy and agricultural risk management in food security Public policy: implications for food security. <i>China Agricultural Economic Review</i> , 3 (4).	Previous SRs (not empirical)									
EGREF #158	Brinkley, C., 2013. Avenues into food planning: a review of scholarly food system research. <i>International planning studies</i> , 18 (2), 243–266.	Previous SRs (not empirical)									
EGREF #159	Brownhill, L. and Hickey, G.M., 2012. Using interview triads to understand the barriers to effective food security policy in Kenya: a case study application. <i>Food Security</i> , 4 (3), 369–380.	Sample d from Previous SRs (2 nominations)	BnL	n/a	YES	Yes	food security policy barriers	Yes	1	food security policy barriers	implementati on-supporting conditions
EGREF #160	Butler, C.D., 2009. Food security in the Asia-Pacific: climate change, phosphorus, ozone and other environmental challenges. <i>Asia Pacific journal of clinical nutrition</i> , 18 (4), 590.	Previous SRs (not empirical)									

EGREF #161	Carpenter, S., Walker, B., Anderies, J.M., and Abel, N., 2001. From metaphor to measurement: resilience of what to what? <i>Ecosystems</i> , 4 (8), 765–781.	Previous SRs (empirical; not sampled)			
EGREF #162	Challies, E., Newig, J., and Lenschow, A., 2014. What role for social–ecological systems research in governing global teleconnections? <i>Global Environmental Change</i> , 27, 32–40.	Previous SRs (not empirical)			
EGREF #163	Challies, E., 2013. The Limits to Voluntary Private Social Standards in Global Agri-food System Governance. <i>International Journal of Agriculture and Food</i> , 2 (2), 175–195.	Previous SRs (not empirical)			
EGREF #164	Clancy, K., 2004. Potential contributions of planning to community food systems. <i>Journal of Planning Education and Research</i> , 23 (4), 435–438.	Previous SRs (empirical; not sampled)			
EGREF #165	Clancy, K., 2012. Digging Deeper: Bringing a systems approach to food systems. <i>Journal of Agriculture, Food Systems, and Community Development</i> , 3 (1), 21–23.	Previous SRs (not empirical)			

EGREF #166	Clapp, J. and Cohen, M.J., eds., 2009. <i>The global food crisis: Governance challenges and opportunities</i> . Waterloo: Wilfrid Laurier Univ. Press.	Previous SRs (not empirical)			
EGREF #167	Clapp, J. and Fuchs, D., 2009. Agrifood corporations, global governance and sustainability: A framework for analysis. In: J. Clapp and D. Fuchs, eds. <i>Corporate power in global agrifood governance</i> . Cambridge, MA: MIT Press, 1-26.	Previous SRs (not empirical)			
EGREF #168	Clapp, J. and Murphy, S., 2013. The G20 and Food Security: a Mismatch in Global Governance? <i>Global Policy</i> , 4 (2), 129-138.	Previous SRs (not empirical)			
EGREF #169	Clark, P., 2010. Sowing the Oil? The Chavez Government's Policy Framework for an Alternative Food System in Venezuela. <i>Humboldt Journal of Social Relations</i> , 135-165.	Previous SRs (not empirical)			

EGREF #170	Coleman, W.D. and Gabler, M., 2002. Agricultural Biotechnology and Regime Formation: A Constructivist Assessment of the Prospects. <i>International Studies Quarterly</i> , 46 (4), 481–506.	Previous SRs (not empirical)			
EGREF #171	Colonnelli, E. and Simon, G., n.d. <i>Food Security Governance: History, Definitions, and Insitutions</i> .	Previous SRs (not empirical)			
EGREF #172	Committee on World Food Security (2012). Global Strategic Framework for Food Security and Nutrition. http://www.fao.org/fileadmin/templates/cfs/Docs1112/WGs/GSF/MD976E_GSF_Draft_Two.pdf	Previous SRs (not empirical)			
EGREF #173	Daniell, K.A., Costa, M.A.M., Ferrand, N., Kingsborough, A.B., Coad, P., and Ribarova, I.S., 2011. Aiding multi-level decision-making processes for climate change mitigation and adaptation. <i>Regional Environmental Change</i> , 11 (2), 243–258.	Previous SRs (empirical; not sampled)			

EGREF #174	Deere-Birkbeck, C., 2009. Global governance in the context of climate change: the challenges of increasingly complex risk parameters. <i>International Affairs</i> , 85 (6), 1173-1194.	Previous SRs (not empirical)							
EGREF #175	Dubuisson-Quellier, S. and Lamine, C., 2008. Consumer involvement in fair trade and local food systems: delegation and empowerment regimes. <i>GeoJournal</i> , 73 (1), 55-65.	Previous SRs (empirical; not sampled)							
EGREF #176	Duit, A., Galaz, V., Eckerberg, K., and Ebbesson, J., 2010. Governance, complexity, and resilience. <i>Global Environmental Change</i> , 20 (3), 363-368.	Previous SRs (not sampled)							
EGREF #177	Duncan, J. and Barling, D., 2012. Renewal through Participation in Global Food Security Governance: Implementing the International Food Security and Nutrition Civil Society Mechanism to the Committee on World Food Security. <i>International Journal of Sociology of Agriculture and Food</i> , 19 (2), 143-161.	Sampled from Previous SRs	BnL	n/a	YES	Yes	participation in the Committee on World Food Security	No	

EGREF #178	Eakin, H., Eriksen, S., Eikeland, P.-O., and Øyen, C., 2011. Public sector reform and governance for adaptation: implications of new public management for adaptive capacity in Mexico and Norway. <i>Environmental management</i> , 47 (3), 338–351.	Sampled from Previous SRs	BnL	n/a	YES	Yes	Institutional fit between New Public Management and Adaptation Governance	Yes	3	participation, empowerment and accountability; technical and financial capacity; learning, institutional memory and knowledge	participation and multi-stakeholder engagement; Resources; Learning
EGREF #179	Edralin, J.S. and Collado, C.M., 2005. Decentralized governance and food security: Perceptions from rural local governments and communities in Bulacan Province, the Philippines. <i>Regional Development Dialogue</i> , 26 (2), 61–89.	Previous SRs (not empirical)									
EGREF #180	Edwards, F., Dixon, J., Friel, S., Hall, G., Larsen, K., Lockie, S., Wood, B., Lawrence, M., Hanigan, I., Hogan, A., and others, 2011. Climate change adaptation at the intersection of food and health. <i>Asia-Pacific Journal of Public Health</i> , 23 (2 suppl), 91S–104S.	Previous SRs (not empirical)									

EGREF #181	Ericksen, P.J., Ingram, J.S., and Liverman, D.M., 2009. Food security and global environmental change: emerging challenges. <i>Environmental Science & Policy</i> , 12 (4), 373–377.	Previous SRs (not empirical)			
EGREF #182	Ericksen, P.J., 2008. Conceptualizing food systems for global environmental change research. <i>Global Environmental Change</i> , 18 (1), 234–245.	Previous SRs (not empirical)			
EGREF #183	European Science Foundation, 2009. <i>European Food Systems in a Changing World</i> . Strasbourg: European Science Foundation.	Previous SRs (not empirical)			
EGREF #184	FAO, 2012. FAO - News Article: FAO calls for strengthened food security governance [online]. Available from: http://www.fao.org/news/story/en/item/162391/icode/ [Accessed 25 Nov 2015].	Previous SRs (not empirical)			

EGREF #185	FAO, 2010. FAO - News Article: Towards improved governance of global food security [online]. Available from: http://www.fao.org/news/story/en/item/46353/icode/ [Accessed 25 Nov 2015].	Previous SRs (not empirical)			
EGREF #186	FAO, 2011a. <i>Food, agriculture, and cities: The challenges of food and nutrition security, agriculture, and ecosystem management in an urbanizing world</i> . FAO Food for the Cities - Multidisciplinary Initiative.	Previous SRs (not empirical)			
EGREF #187	FAO, 2009. <i>Global governance of food security</i> .	Previous SRs (not empirical)			
EGREF #188	FAO, 2011b. <i>Good Food Security Governance: The Crucial Premise to the Twin-Track Approach - Background paper</i> . FAO.	Previous SRs (empirical; not sampled)			
EGREF #189	FAO, 2011c. <i>Good Food Security Governance: The Crucial Premise to the Twin-Track Approach - Workshop Report</i> . FAO.	Previous SRs (not empirical)			

EGREF #190	FAO, 1996. World Food Summit: Rome Declaration and Plan of Action [online]. Available from: http://www.fao.org/docrep/003/w3613e/w3613e00.HTM [Accessed 25 Nov 2015].	Previous SRs (not empirical)			
EGREF #191	Folke, C., Jansson, Åsa, Rockström, J., Olsson, P., Carpenter, S.R., Chapin III, F.S., Crépin, A.-S., Daily, G., Danell, K., Ebbesson, J., and others, 2011. Reconnecting to the biosphere. <i>Ambio</i> , 40 (7), 719–738.	Previous SRs (not empirical)			
EGREF #192	Folke, C., 2006. Resilience: The emergence of a perspective for social-ecological systems analyses. <i>Global environmental change</i> , 16 (3), 253–267.	Previous SRs (not empirical)			
EGREF #193	Forster, T. and Escudero, A.G., 2014. <i>City Regions as Landscapes for People, Food and Nature</i> . Washington DC: EcoAgriculture Partners.	Previous SRs (not empirical)			

EGREF #194	Fridman, J. and Lenters, L., 2013. Kitchen as food hub: adaptive food systems governance in the City of Toronto. <i>Local Environment</i> , 18 (5), 543–556.	Previous SRs (not empirical)									
EGREF #195	Gallopín, G.C., 2006. Linkages between vulnerability, resilience, and adaptive capacity. <i>Global environmental change</i> , 16 (3), 293–303.	Previous SRs (not empirical)									
EGREF #196	Ganry, J., Egal, F., and Taylor, M., 2010. Fruits and vegetables: a neglected wealth in developing countries. <i>In: XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): International Symposium on 921</i> . 105–109.	Previous SRs (not empirical)									
EGREF #197	Gereffi, G., Humphrey, J., and Sturgeon, T., 2005. The governance of global value chains. <i>Review of International Political Economy</i> , 12 (1), 78–104.	Sampled from Previous SRs	Open Access	n/a	YES	Yes	global value chain governance	Yes	4	types of value chain governance; complexity of transactions; capability of suppliers; codifiability of information	centralisation

EGREF #198	Gerlach, S.C. and Loring, P.A., 2013. Rebuilding northern foodsheds, sustainable food systems, community well-being, and food security. <i>International journal of circumpolar health</i> , 72.	Previous SRs (empirical; not sampled)			
EGREF #199	Gillespie Jr, G.W., 2010. 2009 AFHVS presidential address: the steering question: challenges to achieving food system sustainability. <i>Agriculture and human values</i> , 27 (1), 3–12.	Previous SRs (not empirical)			
EGREF #200	Glaas, E. and Juhola, S., 2013. New levels of climate adaptation policy: analyzing the institutional interplay in the Baltic Sea Region. <i>Sustainability</i> , 5 (1), 256–275.	Previous SRs (empirical; not sampled)			
EGREF #201	Goldstein, J., 1999. Emergence as a construct: History and issues. <i>Emergence</i> , 1 (1), 49–72.	Previous SRs (not empirical)			
EGREF #202	González, H., 2010. Debates on food security and agrofood world governance: Debates on food security. <i>International Journal of Food Science & Technology</i> , 45 (7), 1345–1352.	Previous SRs (not empirical)			

EGREF #203	Gupta, J. and Lebel, L., 2010. Access and allocation in earth system governance: Water and climate change compared. <i>International Environmental Agreements: Politics, Law and Economics</i> , 10 (4), 377–395.	Previous SRs (not empirical)			
EGREF #204	Haddad, L., 2011. Why India needs a national nutrition strategy. <i>BMJ</i> , 343 (nov11 1), d6687–d6687.	Previous SRs (not empirical)			
EGREF #205	Haddad, M., 2012. An Islamic perspective on food security management. <i>Water Policy</i> , 14, 121–135.	Previous SRs (not empirical)			
EGREF #206	Hall, D., 2010. Food with a visible face: Traceability and the public promotion of private governance in the Japanese food system. <i>Geoforum</i> , 41 (5), 826–835.	Previous SRs (not empirical)			
EGREF #207	Hammond, R.A. and Dubé, L., 2012. A systems science perspective and transdisciplinary models for food and nutrition security. <i>Proceedings of the National Academy of Sciences</i> , 109 (31), 12356–12363.	Previous SRs (not empirical)			

EGREF #208	Hanjra, M.A. and Qureshi, M.E., 2010. Global water crisis and future food security in an era of climate change. <i>Food Policy</i> , 35 (5), 365–377.	Previous SRs (empirical; not sampled)			
EGREF #209	Hardee, K. and Mutunga, C., 2010. Strengthening the link between climate change adaptation and national development plans: lessons from the case of population in National Adaptation Programmes of Action (NAPAs). <i>Mitigation and Adaptation Strategies for Global Change</i> , 15 (2), 113–126.	Previous SRs (empirical; not sampled)			
EGREF #210	Haysom, G., 2014. Food system governance for urban sustainability in the global South.	Previous SRs (not empirical)			
EGREF #211	Henson, S., 2011. Private agrifood governance: conclusions, observations and provocations. <i>Agriculture and human values</i> , 28 (3), 443–451.	Previous SRs (not empirical)			

EGREF #212	Herforth, A., Frongillo, E.A., Sassi, F., Mclean, M.S., Arabi, M., Tirado, C., Remans, R., Mantilla, G., Thomson, M., and Pingali, P., 2014. Toward an integrated approach to nutritional quality, environmental sustainability, and economic viability: research and measurement gaps. <i>Annals of the New York Academy of Sciences</i> , 1332 (1), 1–21.	Previous SRs (not empirical)			
EGREF #213	High-level task force on the global food security crisis, 2010. <i>Updated Comprehensive Framework for Action</i> .	Previous SRs (not empirical)			
EGREF #214	Hipel, K.W., Fang, L., and Heng, M., 2010. System of systems approach to policy development for global food security. <i>Journal of Systems Science and Systems Engineering</i> , 19 (1), 1–21.	Previous SRs (empirical; not sampled)			
EGREF #215	Hospes, O., 2014. Food sovereignty: the debate, the deadlock, and a suggested detour. <i>Agriculture and Human Values</i> , 31 (1), 119–130.	Previous SRs (not empirical)			

EGREF #216	Humphrey, J. and Schmitz, H., 2000. <i>Governance and upgrading: linking industrial cluster and global value chain research</i> . Institute of Development Studies Brighton.	Previous SRs (not empirical)			
EGREF #217	Ingram, J., Ericksen, P., and Liverman, D., 2012. <i>Food Security and Global Environmental Change</i> . Routledge.	Previous SRs (not empirical)			
EGREF #218	Ingram, J., 2011a. A food systems approach to researching food security and its interactions with global environmental change. <i>Food Security</i> , 3 (4), 417-431.	Previous SRs (not empirical)			
EGREF #219	Ingram, J.S.I., 2011b. <i>From food production to food security: developing interdisciplinary, regional-level research</i> . publisher not identified.	Previous SRs (not empirical)			
EGREF #220	International Human Dimensions Programme, 2009. <i>Governance as a Crosscutting Theme in Human Dimensions Science</i> .	Previous SRs (not empirical)			

EGREF #221	Ison, R.L., Maiteny, P.T., and Carr, S., 1997. Systems methodologies for sustainable natural resources research and development. <i>Agricultural systems</i> , 55 (2), 257–272.	Previous SRs (not empirical)			
EGREF #222	Jarosz, L., 2011. Defining World Hunger: Scale and Neoliberal Ideology in International Food Security Policy Discourse. <i>Food, Culture and Society: An International Journal of Multidisciplinary Research</i> , 14 (1), 117–139.	Previous SRs (empirical; not sampled)			
EGREF #223	Jarosz, L., 2009. The political economy of global governance and the world food crisis the case of the FAO. <i>Review</i> , 32 (1), 37–60.	Previous SRs (empirical; not sampled)			
EGREF #224	Johns, T., Powell, B., Maundu, P., and Eyzaguirre, P.B., 2013. Agricultural biodiversity as a link between traditional food systems and contemporary development, social integrity and ecological health. <i>Journal of the Science of Food and Agriculture</i> , 93 (14), 3433–3442.	Previous SRs (not empirical)			

EGREF #225	Kirwan, J. and Maye, D., 2013. Food security framings within the UK and the integration of local food systems. <i>Journal of Rural Studies</i> , 29, 91–100.	Sampled from Previous SRs	NO. Requested from author. Received	n/a	YES	Yes	framing of local food systems within food security debates	No	
EGREF #226	Konefal, J., Mascarenhas, M., and Hatanaka, M., 2005. Governance in the global agro-food system: Backlighting the role of transnational supermarket chains. <i>Agriculture and Human Values</i> , 22 (3), 291–302.	Previous SRs (empirical; not sampled)							
EGREF #227	La Via Campesina, 1996. Food Sovereignty: A Future without Hunger. Statement by the NGO Forum to the World Food Summit.	Previous SRs (not empirical)							
EGREF #228	Lang, T., Barling, D., and Caraher, M., 2001. Food, Social Policy and the Environment: Towards a New Model. <i>Social Policy & Administration</i> , 35 (5), 538–558.	Previous SRs (not empirical)							

EGREF #229	Lang, T., 2005b. Food control or food democracy? Re-engaging nutrition with society and the environment. <i>Public Health Nutrition</i> , 8 (6a), 730–737.	Previous SRs (not empirical)			
EGREF #230	Lang, T., 2005a. What is Food and Farming For?-The (Re) emergence of Health as a Key Policy Driver. <i>Research in Rural Sociology and Development</i> , 11, 123.	Previous SRs (not empirical)			
EGREF #231	Leach, M., Scoones, I., and Stirling, A., 2010. <i>Dynamic Sustainabilities: Technology, Environment, Social Justice</i> . Earthscan.	Previous SRs (empirical; not sampled)			

EGREF #232	Lesnikowski, A.C., Ford, J.D., Berrang-Ford, L., Barrera, M., Berry, P., Henderson, J., and Heymann, S.J., 2013. National-level factors affecting planned, public adaptation to health impacts of climate change. <i>Global Environmental Change</i> , 23 (5), 1153-1163.	Sampled from Previous SRs (2 nominations)	NO. Requested from author. Received	n/a	YES	Yes	core aspects of adaptive capacity	Yes	8	Country size; public social commitments; public pressure; availability of national resources for addressing environmental and health externalities; institutional capacity; commitment to mitigation of future climate change; quality of governance; participation in institutions of global governance	Country size; public social commitments ; implementation-supporting conditions; Resources; state capacity; outcomes of similar programmes; Corruption; cross-scale interaction
EGREF #233	Liverman, D. and Billett, S., 2010. Copenhagen and the governance of adaptation. <i>Environment: Science and Policy for Sustainable Development</i> , 52 (3), 28-36.	Previous SRs (not empirical)									

EGREF #234	MacRae, R. and Donahue, K., 2013. <i>Municipal food policy entrepreneurs: A preliminary analysis of how Canadian cities and regional districts are involved in food system change.</i>	Previous SRs (empirical; not sampled)			
EGREF #235	MacRae, R., 2011. A joined-up food policy for Canada. <i>Journal of Hunger & Environmental Nutrition</i> , 6 (4), 424–457.	Previous SRs (not empirical)			
EGREF #236	MacRae, R., 1999. Not just what, but how: Creating agricultural sustainability and food security by changing Canada's agricultural policy making process. <i>Agriculture and Human Values</i> , 16 (2), 187–201.	Previous SRs (not empirical)			
EGREF #237	Makhura, M.T., 1998. The development of food security policy for South Africa (SAFSP): a consultative process. <i>Food Policy</i> , 23 (6), 571–585.	Previous SRs (not empirical)			
EGREF #238	Maluf, R.S., 1998. Economic development and the food question in Latin America. <i>Food Policy</i> , 23 (2), 155–172.	Previous SRs (empirical; not sampled)			

EGREF #239	Mansfield, B. and Mendes, W., 2013. Municipal food strategies and integrated approaches to urban agriculture: Exploring three cases from the global north. <i>International Planning Studies</i> , 18 (1), 37-60.	Previous SRs (empirical; not sampled)			
EGREF #240	Margulis, M., 2012. Global food security governance: the Committee on World Food Security, Comprehensive Framework for Action and the G8/G20. In: <i>The Challenge of Food Security: International Policy and Regulatory Frameworks</i> . 231-254.	Previous SRs (not empirical)			
EGREF #241	Margulis, M., 2013. The regime complex for food security: Implications for the global hunger challenge. <i>Global Governance</i> , 19 (1), 53-67.	Previous SRs (not empirical)			
EGREF #242	Margulis, M.E., 2011. <i>Research Paper - Global Governance: The Evolving Global Governance of Food Security</i> .	Previous SRs (not empirical)			

EGREF #243	Marsden, T., 2013. From post-productionism to reflexive governance: Contested transitions in securing more sustainable food futures. <i>Journal of Rural Studies</i> , 29, 123-134.	Sampled from Previous SRs	NO. Requested from author. Unsuccessful			
EGREF #244	Marzeda-Mlynarska, K., 2011. The Application of the Multi-Level Governance Model outside the EU context - The Case of Food Security.	Previous SRs (not empirical)				
EGREF #245	Maxwell, S. and Slater, R., 2003. Food Policy Old and New. <i>Development Policy Review</i> , 21 (5-6), 531-553.	Previous SRs (not empirical)				
EGREF #246	McKeon, N., 2013. 'One Does Not Sell the Land Upon Which the People Walk': Land Grabbing, Transnational Rural Social Movements, and Global Governance. <i>Globalizations</i> , 10 (1), 105-122.	Previous SRs (not empirical)				
EGREF #247	McKeon, N., 2011. Global Governance for World Food Security: A Scorecard Four Years After the Eruption of the Food Crisis.	Previous SRs (not empirical)				

EGREF #248	McMichael, P., 2011. Food system sustainability: Questions of environmental governance in the new world (dis) order. <i>Global Environmental Change</i> , 21 (3), 804–812.	Previous SRs (not empirical)			
EGREF #249	Miller, M., Anderson, M., Francis, C.A., Kruger, C., Barford, C., Park, J., and McCowng, B.H., 2013. Critical research needs for successful food systems adaptation to climate change. <i>Journal of Agriculture, Food Systems, and Community Development</i> , 3 (4), 161–175.	Previous SRs (not empirical)			
EGREF #250	Millstone, E., 2009. Science, risk and governance: Radical rhetorics and the realities of reform in food safety governance. <i>Research policy</i> , 38 (4), 624–636.	Previous SRs (empirical; not sampled)			

EGREF #251	Misselhorn, A., Aggarwal, P., Ericksen, P., Gregory, P., Horn-Phathanothai, L., Ingram, J., and Wiebe, K., 2012. A vision for attaining food security. <i>Current Opinion in Environmental Sustainability</i> , 4 (1), 7–17.	Previous SRs (not empirical)			
EGREF #252	Nelson, R., Howden, M., and Smith, M.S., 2008. Using adaptive governance to rethink the way science supports Australian drought policy. <i>Environmental Science & Policy</i> , 11 (7), 588–601.	Previous SRs (not empirical)			
EGREF #253	Nigh, R. and González Cabañas, A.A., 2015. Reflexive Consumer Markets as Opportunities for New Peasant Farmers in Mexico and France: Constructing Food Sovereignty Through Alternative Food Networks. <i>Agroecology and Sustainable Food Systems</i> , 39 (3), 317–341.	Previous SRs (empirical; not sampled)			

EGREF #254	O'Brien, K., Hayward, B., Berkes, F., and others, 2009. Rethinking social contracts: building resilience in a changing climate. <i>Ecology and Society</i> , 14 (2), 12.	Previous SRs (not empirical)			
EGREF #255	Olson, J., Clay, P.M., and da Silva, P.P., 2014. Putting the seafood in sustainable food systems. <i>Marine Policy</i> , 43, 104-111.	Previous SRs (not empirical)			
EGREF #256	Orsini, A., Morin, J.F., and Young, O., 2013. Regime complexes: A buzz, a boom, or a boost for global governance? <i>Global Governance</i> , 19 (1), 27-39.	Previous SRs (not empirical)			
EGREF #257	Paarlberg, R.L., 2002. <i>Governance and food security in an age of globalization</i> . Washington, D.C: International Food Policy Research Institute.	Previous SRs (not empirical)			
EGREF #258	Paavola, J., 2008. Science and social justice in the governance of adaptation to climate change. <i>Environmental Politics</i> , 17 (4), 644-659.	Previous SRs (not empirical)			

EGREF #259	Pereira, L., Da Fontoura, Y., and Da Fontoura, C., 2013. Strategic CSR shifts towards adaptive food governance under environmental change: A comparison between South African and Brazilian retailers. <i>Revista de Gestao Social e Ambiental</i> , 7 (1), 100–112.	Previous SRs (empirical; not sampled)			
EGREF #260	Pereira, L., 2014. The Future of South Africa's Food System: What is research telling us? Southern Africa Food Lab, South Africa. (Citations include: Laker 2005 in Carter & Gulati 2014.	Previous SRs (empirical; not sampled)			
EGREF #261	Pereira, L.M., 2013. The future of the food system: Cases involving the private sector in South Africa. <i>Sustainability</i> , 5 (3), 1234–1255.	Previous SRs (empirical; not sampled)			
EGREF #262	Pimbert, M., 2012. <i>Putting citizens at the heart of food system governance</i> . IIED - International Institute for Environment and Development, No. 17125IIED.	Previous SRs (not empirical)			
EGREF #263	Pittock, J., 2011. National climate change policies and sustainable water management, conflicts and synergies.	Previous SRs (empirical; not sampled)			

EGREF #264	Pol, J.L.V., 2014. The Food Commons Transition: collective actions for food and nutrition security. Presented at the Food Sovereignty: A Critical Dialogue. International Institute of Social Studies (ISS), The Hague.	Previous SRs (not empirical)			
EGREF #265	Preston, B.L., Westaway, R.M., and Yuen, E.J., 2011. Climate adaptation planning in practice: an evaluation of adaptation plans from three developed nations. <i>Mitigation and Adaptation Strategies for Global Change</i> , 16 (4), 407-438.	Previous SRs (empirical; not sampled)			
EGREF #266	Redman, C.L., Grove, J.M., and Kuby, L.H., 2004. Integrating social science into the long-term ecological research (LTER) network: social dimensions of ecological change and ecological dimensions of social change. <i>Ecosystems</i> , 7 (2), 161-171.	Previous SRs (not empirical)			

EGREF #267	Rice, J.C. and Garcia, S.M., 2011. Fisheries, food security, climate change, and biodiversity: characteristics of the sector and perspectives on emerging issues. <i>ICES Journal of Marine Science: Journal du Conseil</i> , 68 (6), 1343-1353.	Previous SRs (not empirical)			
EGREF #268	Rittel, H.W. and Webber, M.M., 1973. Dilemmas in a general theory of planning. <i>Policy sciences</i> , 4 (2), 155-169.	Previous SRs (not empirical)			
EGREF #269	Rodima-Taylor, D., Olwig, M.F., and Chhetri, N., 2012. Adaptation as innovation, innovation as adaptation: An institutional approach to climate change. <i>Applied Geography</i> , 33, 107-111.	Previous SRs (not empirical)			
EGREF #270	Rola, W.R., 2013. Research Development and Extension Agenda on the Role of Institutions and Governance for Philippine Upland Agricultural Development in Achieving Food Security. <i>Philippine Journal of Crop Science</i> , 38 (1), 1-11.	Previous SRs (empirical; not sampled)			

EGREF #271	Salih, M.A.M., 2009. Governance of Food Security in the 21st Century. <i>In</i> : H.G. Brauch, Ú.O. Spring, J. Grin, C. Mesjasz, P. Kameri-Mbote, N.C. Behera, B. Chourou, and H. Krummenacher, eds. <i>Facing Global Environmental Change</i> . Berlin, Heidelberg: Springer Berlin Heidelberg, 501-507.	Previous SRs (not empirical)							
EGREF #272	Schiff, R., 2008. The role of food policy councils in developing sustainable food systems. <i>Journal of Hunger & Environmental Nutrition</i> , 3 (2-3), 206-228.	Sampled from Previous SRs	Open Access	n/a	YES	Yes	organizational role of Food policy councils	No	
EGREF #273	Schneider, D., Rodgers, Y. van der M., and Cheang, J.M., 2008. Local government coordination of community food systems in distressed urban areas. <i>Journal of Poverty</i> , 11 (4), 45-69.	Previous SRs (empirical; not sampled)							

EGREF #274	Seed, B., Lang, T., Caraher, M., and Ostry, A., 2013. Integrating food security into public health and provincial government departments in British Columbia, Canada. <i>Agriculture and Human Values</i> , 30 (3), 457–470.	Previous SRs (empirical; not sampled)									
EGREF #275	Sharma, S.K., 2011. The political economy of climate change governance in the Himalayan region of Asia: a case study of Nepal. <i>Procedia-Social and Behavioral Sciences</i> , 14, 129–140.	Previous SRs (empirical; not sampled)									
EGREF #276	Sietz, D., Boschütz, M., and Klein, R.J., 2011. Mainstreaming climate adaptation into development assistance: rationale, institutional barriers and opportunities in Mozambique. <i>Environmental Science & Policy</i> , 14 (4), 493–502.	Sampled from Previous SRs	BnL	n/a	YES	Yes	Barriers to climate mainstreaming	Yes	1	Barriers to climate mainstreaming	Institutional mainstreaming

EGREF #277	Smith, M.S., Horrocks, L., Harvey, A., and Hamilton, C., 2011. Rethinking adaptation for a 4 C world. <i>Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences</i> , 369 (1934), 196–216.	Previous SRs (not empirical)			
EGREF #278	Smith, P. and Olesen, J.E., 2010. Synergies between the mitigation of, and adaptation to, climate change in agriculture. <i>The Journal of Agricultural Science</i> , 148 (05), 543–552.	Previous SRs (not empirical)			
EGREF #279	Sommerville, M., Essex, J., and Billon, P.L., 2014. The 'Global Food Crisis' and the Geopolitics of Food Security. <i>Geopolitics</i> , 19 (2), 239–265.	Previous SRs (not empirical)			
EGREF #280	Sonnino, R., 2013. Local foodscapes: place and power in the agri-food system. <i>Acta Agriculturae Scandinavica, Section B – Soil & Plant Science</i> , 63 (sup1), 2–7.	Previous SRs (empirical; not sampled)			

EGREF #281	Sowers, J., Vengosh, A., and Weinthal, E., 2011. Climate change, water resources, and the politics of adaptation in the Middle East and North Africa. <i>Climatic Change</i> , 104 (3-4), 599-627.	Previous SRs (empirical; not sampled)								
EGREF #282	Story, M., Hamm, M.W., and Wallinga, D., 2009. Research and action priorities for linking public health, food systems, and sustainable agriculture: recommendations from the Airlie Conference. <i>Journal of hunger & environmental nutrition</i> , 4 (3-4), 477-485.	Previous SRs (not empirical)								
EGREF #283	Stringer, L.C., Dyer, J.C., Reed, M.S., Dougill, A.J., Twyman, C., and Mkwambisi, D., 2009. Adaptations to climate change, drought and desertification: local insights to enhance policy in southern Africa. <i>Environmental Science & Policy</i> , 12 (7), 748-765.	Sampled from Previous SRs (2 nominations)	BnL	n/a	YES	Yes	Adaptations	No		

EGREF #284	Sundkvist, \AAsa, Milestad, R., and Jansson, A., 2005. On the importance of tightening feedback loops for sustainable development of food systems. <i>Food Policy</i> , 30 (2), 224–239.	Previous SRs (not empirical)			
EGREF #285	Termeer, C., Dewulf, A., van Rijswijk, H., van Buuren, A., Huitema, D., Meijerink, S., Rayner, T., and Wiering, M., 2011. The regional governance of climate adaptation: a framework for developing legitimate, effective, and resilient governance arrangements. <i>Climate law</i> , 2 (2), 159–179.	Previous SRs (empirical; not sampled)			
EGREF #286	Thompson, J. and Scoones, I., 2009. Addressing the dynamics of agri-food systems: an emerging agenda for social science research. <i>Environmental science & policy</i> , 12 (4), 386–397.	Previous SRs (not empirical)			
EGREF #287	Thomson, A.M., 2001. Food Security and Sustainable Livelihoods: The policy challenge. <i>Development</i> , 44 (4), 24–28.	Previous SRs (not empirical)			

EGREF #288	Thornton, P.K., Ericksen, P.J., Herrero, M., and Challinor, A.J., 2014. Climate variability and vulnerability to climate change: a review. <i>Global change biology</i> , 20 (11), 3313–3328.	Previous SRs (not empirical)							
EGREF #289	Thornton, P.K., Jones, P.G., Ericksen, P.J., and Challinor, A.J., 2011. Agriculture and food systems in sub-Saharan Africa in a 4 C+ world. <i>Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences</i> , 369 (1934), 117–136.	Previous SRs (not empirical)							
EGREF #290	Tirado, M.C., Cohen, M.J., Aberman, N., Meerman, J., and Thompson, B., 2010. Addressing the challenges of climate change and biofuel production for food and nutrition security. <i>Food Research International</i> , 43 (7), 1729–1744.	Sampled from Previous SRs	Open Access	n/a	YES	Yes	None		
EGREF #291	Treib, O., Bähr, H., and Falkner, G., 2007. Modes of governance: towards a conceptual clarification. <i>Journal of European public policy</i> , 14 (1), 1–20.	Previous SRs (not empirical)							

EGREF #292	Urwin, K. and Jordan, A., 2008. Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance. <i>Global environmental change</i> , 18 (1), 180–191.	Previous SRs (empirical; not sampled)				
EGREF #293	Vermeulen, S.J., Aggarwal, P.K., Ainslie, A., Angelone, C., Campbell, B.M., Challinor, A.J., Hansen, J.W., Ingram, J.S.I., Jarvis, A., Kristjanson, P., and others, 2012. Options for support to agriculture and food security under climate change. <i>Environmental Science & Policy</i> , 15 (1), 136–144.	Previous SRs (not sampled)				
EGREF #294	Vermeulen, S.J., Campbell, B.M., and Ingram, J.S.I., 2012. Climate Change and Food Systems. <i>Annual Review of Environment and Resources</i> , 37 (1), 195–222.	Sampled from Previous SRs (false positive empirical)	Open Access	n/a	No	

EGREF #295	Vervoort, J., Ingram, J., Ericksen, P., Chaudhury, M., Foerch, W., PhilipThornton, P.K., and Vervoort, J., 2012. Multi-actor scenarios to build capacity for food systems governance at the sub-continental level. Presented at the Earth Systems Governance conference, Lund, Sweden.	Previous SRs (not empirical)			
EGREF #296	Von Braun, J. & Islam, N., 2008. Toward a New Global Governance System for Agriculture, Food, and Nutrition IFPRI. <i>IFPRI Blogs</i> .	Previous SRs (not empirical)			
EGREF #297	Wahlqvist, M.L. and Lee, M.-S., 2007. Regional food culture and development. <i>Asia Pac J Clin Nutr</i> , 16 (Suppl 1), 2-7.	Previous SRs (not empirical)			
EGREF #298	Warner, K., 2010. Global environmental change and migration: Governance challenges. <i>Global environmental change</i> , 20 (3), 402-413.	Previous SRs (empirical; not sampled)			

EGREF #299	Wegener, J., Raine, K.D., and Hanning, R.M., 2012. Insights into the government's role in food system policy making: Improving access to healthy, local food alongside other priorities. <i>International journal of environmental research and public health</i> , 9 (11), 4103-4121.	Previous SRs (empirical; not sampled)			
EGREF #300	White, R., Stewart, B., and O'Neill, P., 2010. <i>Access to Food in a Changing Climate</i> . Global Environmental Change and Food Systems Oxford Environmental Change Institute.	Previous SRs (not empirical)			
EGREF #301	WHO, 2014. <i>European Food and Nutrition Action Plan 2015-2020</i> . Copenhagen: World Health Organization.	Previous SRs (not empirical)			

EGREF #302	Wilder, M., Scott, C.A., Pablos, N.P., Varady, R.G., Garfin, G.M., and McEvoy, J., 2010. Adapting across boundaries: climate change, social learning, and resilience in the US–Mexico border region. <i>Annals of the Association of American Geographers</i> , 100 (4), 917–928.	Sampled from Previous SRs	Open Access	n/a	YES	Yes	2: institutions ; capacity to build adaptive organizations within the Arizona–Sonora border region	No; Yes	1	social learning	learning
EGREF #303	WRR, 2014. <i>Naar een voedselbeleid</i> . Amsterdam: Wetenschappelijke Raad Voor Het Regeringsbeleid.	Previous SRs (not empirical)									
EGREF #304	Yu, Q., Wu, W., Yang, P., Li, Z., Xiong, W., and Tang, H., 2012. Proposing an interdisciplinary and cross-scale framework for global change and food security researches. <i>Agriculture, ecosystems & environment</i> , 156, 57–71.	Previous SRs (not empirical)									

EGREF #305	Leach, M., Scoones, I., and Stirling, A., 2010. Governing epidemics in an age of complexity: Narratives, politics and pathways to sustainability. <i>Global Environmental Change</i> , 20 (3), 369–377.	Newly nominated	Open Access	n/a	No						
EGREF #306	Brown, P.R., Jacobs, B., and Leith, P., 2012. Participatory monitoring and evaluation to aid investment in natural resource manager capacity at a range of scales. <i>Environmental Monitoring and Assessment</i> , 184 (12), 7207–7220.		Copy from Author	n/a	n/a	n/a	n/a				
EGREF #307	Candel, J.J.L., Breeman, G.E., and Termeer, C.J.A.M., 2015. The European Commission’s ability to deal with wicked problems: an in-depth case study of the governance of food security. <i>Journal of European Public Policy</i> , 0 (0), 1–25.	Newly nominated	Copy from Author	YES	Yes	capabilities to deal with wicked problems	Yes	5	Reflexivity; Resilience; Responsiveness; Revitalization; rescaling	Reflexivity; resilience/robustness; Responsiveness; Revitalization; scale-specific responsibilities and competences	

EGREF #308	Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., Nootboom, S., and Bergsma, E., 2010. The Adaptive Capacity Wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. <i>Environmental Science & Policy</i> , 13 (6), 459–471.	Newly nominated	Copy from Author	YES	Yes	inherent characteristics of institutions facilitating adaptive capacity	Yes	6	Variety; learning capacity; room for autonomous change; Leadership; Resources; fair governance	scale-specific responsibilities and competences; Learning; scale-specific responsibilities and competences; Leadership; Resources; fairness
EGREF #309	Termeer, C.J.A.M., Dewulf, A., Breeman, G., and Stiller, S.J., 2013. Governance Capabilities for Dealing Wisely With Wicked Problems. <i>Administration & Society</i> , 47 (6), 680–710.	Newly nominated	Copy from Author	YES	Yes	Four governance capabilities	Yes	4	Reflexivity; Resilience; Responsiveness; Revitalizing	Reflexivity; resilience/robustness; Responsiveness; revitalization
EGREF #310	Eakin, Hallie, and Kirsten Appendini. 2008. "Livelihood Change, Farming, and Managing Flood Risk in the Lerma Valley, Mexico." <i>Agriculture and Human Values</i> 25 (4): 555–66. doi:10.1007/s10460-008-9140-2.	Following citations	BnL		n/a		n/a			

EGREF #311	Sturgeon, Timothy J. 2002. "Modular Production Networks: A New American Model of Industrial Organization." <i>Industrial and Corporate Change</i> 11 (3): 451-96. doi:10.1093/icc/11.3.451.	Following citations	Open Access	n/a		n/a			
EGREF #312	Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Zsuzsanna Flacher, Susana Neto, Romana Koskova, Maja Schlueter, Issah NabideKiti, and Chris Dickens. 2008. "The Role of Adaptive and Integrated Water Management (AIWM) in Developing Climate Change Adaptation Strategies for Dealing with Floods and Droughts – a Formal Comparative Analysis of Eight Water Management Regimes in Europe, Asia, and Africa." Deliverable 1.7.9b of NeWater project. Germany: Institute of Environmental Systems Research, University of Osnabruck.	Following citations	Open Access	n/a		n/a			

EGREF #313	Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Maja Schlüter, Zsuzsanna Flachner, Susana Neto, Romana Koskova, Chris Dickens, and Isah Nabide Kiti. 2011. "Adaptive Water Management and Policy Learning in a Changing Climate: A Formal Comparative Analysis of Eight Water Management Regimes in Europe, Africa and Asia." <i>Environmental Policy and Governance</i> 21 (3): 145–63. doi:10.1002/eet.571.	Following citations	BnL		n/a		n/a					
EGREF #314	Juhola, Sirkku. 2010. "Mainstreaming Climate Change Adaptation: The Case of Multi-Level Governance in Finland." In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskitalo, 149–87. Springer Netherlands. http://link.springer.com/chapter/10.1007/978-90-481-9325-7_4 .	Following citations	BnL		n/a		n/a					

EGREF #315	Westerhoff, Lisa. 2010. "Planning for Today': The Nature and Emergence of Adaptation Measures in Italy." In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskitalo, 233-70. Springer Netherlands. http://link.springer.com.proxy.bnl.lu/chapter/10.1007/978-90-481-9325-7_6 .	Following citations	BnL		n/a		n/a					
EGREF #316	Ariga, Joshua, Thomas S. Jayne, Betty Kibaara, and James K. Nyoro. 2008. "Trends and Patterns in Fertilizer Use in Kenya, 1997-2007." 28/2008. Tegemeo Institute of Agricultural Policy and Development Working Paper Series. Nairobi: Tegemeo Institute of Agricultural Policy and Development.	Following citations	Open Access		n/a		n/a					

EGREF #317	Ariga, Joshua, Thomas S. Jayne, and James K. Nyoro. 2006. "Factors Driving the Growth in Fertilizer Consumption in Kenya, 1990-2005: Sustaining the Momentum in Kenya and Lessons for Broader Replicability in Sub-Saharan Africa." 20. Egerton University, Tegemeo Institute of Agricultural Policy and Development Working Paper. Nairobi: Egerton University, Tegemeo Institute. http://purl.umn.edu/55167 .	Following citations	Open Access	n/a		n/a				
EGREF #318	Jawtusich, Julia, Christian Schader, Matthias Stolze, Lukas Baumgart, and Urs Niggli. 2013. "Sustainability Monitoring and Assessment Routine: Results from Pilot Applications of the FAO SAFA Guidelines." In <i>Symposium International Sur L'Agriculture Biologique Méditerranéenne et Les Signes Distinctifs de Qualité Liée à l'Origine, 2-4 Décembre 2013, Agadir, Morocco</i> . http://orgprints.org/29547/ .	Following citations	Open Access	Yes	Yes	sustainability performances of food enterprises	Yes	5	Corporate ethics; Accountability; Participation; Rule of Law; Holistic Management	Fairness; Accountability; participation and multi-stakeholder engagement; Rule of Law; Holistic

EGREF #319	Van Cauwenbergh, N., K. Biala, C. Biolders, V. Brouckaert, L. Franchois, V. Garcia Ciudad, M. Hermy, et al. 2007. "SAFE—A Hierarchical Framework for Assessing the Sustainability of Agricultural Systems." <i>Agriculture, Ecosystems & Environment</i> 120 (2-4): 229-42. doi:10.1016/j.agee.2006.09.006.	Following citations	BnL		Yes		None		
EGREF #320	Giovannucci, Daniele, Jason Potts, Bernard Killian, Christopher Wunderlich, Susana Schuller, Gabriela Soto, Kira Schroeder, Isabelle Vagneron, and Fabrice Pinard. 2008. "Seeking Sustainability: COSA Preliminary Analysis of Sustainability Initiatives in the Coffee Sector." Winnipeg, Canada: Committee on Sustainability Assessment.	Following citations	Open Access		Yes		None		

EGREF #321	Brown, Katrina, W. Neil Adger, Emma Tompkins, Peter Bacon, David Shim, and Kathy Young. 2001. "Trade-off Analysis for Marine Protected Area Management." <i>Ecological Economics</i> 37 (3): 417-34. doi:10.1016/S0921-8009(00)00293-7.	Following citations	Open Access	n/a		n/a				
EGREF #322	Brown, Katrina, Emma Tompkins, and W. Neil Adger. 2001. "Trade-off Analysis for Participatory Coastal Zone Decisionmaking." Norwich: Overseas Development Group, University of East Anglia.	Following citations	Open Access	n/a		n/a				
EGREF #323	Atela, Joanes O. 2012. "The Politics of Agricultural Carbon Finance: The Case of the Kenya Agricultural Carbon Project." 49. STEPS Working Paper. Brighton, UK: STEPS Centre.	Following citations	Open Access	n/a		n/a				

EGREF #324	Atela, Joanes O. 2013. "Governing REDD+: Global Framings versus Practical Evidence from the Kasigau Corridor REDD+ Project, Kenya." 55. STEPS Working Paper. Brighton, UK: STEPS Centre. http://steps-centre.org/wp-content/uploads/Governing-REDD+.pdf .	Following citations	Open Access	n/a		n/a				
EGREF #325	Atela, Joanes O., Claire H. Quinn, and Peter A. Minang. 2014. "Are REDD Projects pro-Poor in Their Spatial Targeting? Evidence from Kenya." <i>Applied Geography</i> 52 (August): 14–24. doi:10.1016/j.apgeog.2014.04.009.	Following citations	Open Access	n/a		n/a				
EGREF #326	Chomba, Susan, Juliet Kariuki, Jens Friis Lund, and Fergus Sinclair. 2016. "Roots of Inequity: How the Implementation of REDD+ Reinforces Past Injustices." <i>Land Use Policy</i> 50 (January): 202–13. doi:10.1016/j.landusepol.2015.09.021.	Following citations	Open Access	n/a		n/a				

EGREF #327	Donovan, Richard Z., Gary Clarke, and Christian Sloth. 2010. "Verification of Progress Related to Enabling Activities for the Guyana-Norway REDD+ Agreement." USA: Rainforest Alliance.	Following citations	Open Access	Yes	Yes	REDD+ Enablers	Yes	6 Strategic framework; Continuous multistakeholder consultation process; REDD+ governance development plan (RGDP); independent forest monitoring; formal dialogue with the European Union, with the intent of joining the Forest Law Enforcement, Governance and Trade (FLEGT) processes towards a Voluntary Partnership Agreement (VPA).; engage in a formal dialogue with the Extractive Industries Transparency Initiative (EITI)	governance framework; participation and multi-stakeholder engagement; favourable initial policy change; use of knowledge and science; cross-scale interaction
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EGREF #328	Guyana-Norway. 2011. "Guyana-Norway Joint Concept Note 2011." https://www.regjeringen.no/globalassets/upload/md/2011/vedlegg/klima/klima_skogprosjektet/guyana/jointconceptnote_31mars2011.pdf .	Following citations	Open Access	No							
EGREF #329	Government of DRC. 2011. "Readiness Preparation Proposal (R-PP) - DRC."	Following citations	Open Access	No							
EGREF #330	Indonesia-Norway. 2010. "Indonesia-Norway Partnership Joint Concept Note." https://www.regjeringen.no/globalassets/upload/md/2011/vedlegg/klima/klima_skogprosjektet/indonesia/jcn_indonesia_norway_redd_partnership_2010.pdf .	Following citations	Open Access	No							
EGREF #331	Supplementary material with online version	Following citations	BnL		n/a		n/a				
EGREF #332	Barro, Robert J. 1999. "Determinants of Democracy." <i>Journal of Political Economy</i> 107 (S6): S158-83. doi:10.1086/250107.	Following citations	BnL		n/a		n/a				

EGREF #333	Boix, Carles, Michael Miller, and Sebastian Rosato. 2013. "A Complete Data Set of Political Regimes, 1800–2007." <i>Comparative Political Studies</i> 46 (12): 1523–54. doi:10.1177/0010414012463905.	Following citations	BnL		n/a		n/a					
EGREF #334	Schouten, Greetje, and Pieter Glasbergen. 2011. "Creating Legitimacy in Global Private Governance: The Case of the Roundtable on Sustainable Palm Oil." <i>Ecological Economics</i> , Special Section - Earth System Governance: Accountability and Legitimacy, 70 (11): 1891–99. doi:10.1016/j.ecolecon.2011.03.012.	Following citations	Open Access		n/a		n/a					

EGREF #335	Schouten, Greetje, and Pieter Glasbergen. 2012. "Private Multi-Stakeholder Governance in the Agricultural Market Place: An Analysis of Legitimization Processes of the Roundtables on Sustainable Palm Oil and Responsible Soy." <i>International Food and Agribusiness Management Review</i> 15 (Special Issue B): 63-88.	Following citations	Open Access	n/a		n/a				
EGREF #336	FAO. 2014. "SAFA: Sustainability Assessment of Food and Agriculture Systems - Guidelines Version 3.0." Rome: FAO.	Following citations	Open Access	n/a		n/a				
EGREF #337	Huntjens, P., Pahl-Wostl, C., and Grin, J., 2007. <i>Formal Comparative Analysis of Adaptive Capacity of Water Management Regimes in Four European Sub Basins</i> . Osnabruck: Institute of Environmental Systems Research, University of Osnabruck, No. Deliverable 1.7.9.	Following citations	Open Access	n/a		n/a				

Appendix E: Intercoder resolution

Displayed below is the filled in questionnaire resolving inter-coder resolution. Note that these assessments were done without information on authors and article title. References are included in this reproduction to avoid plagiarism. In the original questionnaire, only abstracts were contained.

Inter-coder disagreement.

Below are six abstracts for which two coders gave different ratings on whether the article was empirical. As a third rater, please read each abstract carefully and provide a final judgement as to whether the article reports on empirical research.

Reference (NOTE: Was not included in original questionnaire)	Abstract	Empirical? (Yes/No) (PT)	Comment (optional) (PT)	Empirical? (AD)	Comment (AD)
(Giovannucci and Ponte 2005)	In the former age of national capitalism, the achievement of market fairness was embedded in a normative framework generated by government, labor unions, and perhaps religious authority. In the current age of global capitalism, new actors such as NGOs, industry associations and public-private partnerships provide the normative framework that corporations use for social legitimacy. In this context, standard-setting processes operate as new forms of social contract where the state, rather than being directly involved between the parties, provides a form of basic guarantee while (more or less accountable) NGOs and Wrms are in charge of hammering out the bargains. This article examines the dynamics of this new conWguration through the case study of sustainability initiatives in the coVee sector. It addresses four questions: (1) Are these standards eVective in communicating information and creating new markets? (2) To what extent do they embed elements of collective and private interests? (3) Is sustainability content actually delivered to their intended beneWciaries? and (4) What is the role of public policy in addressing their shortcomings?	Insufficient data	As with previous, 'this article examines the dynamics of this new configuration through the case study of sustainability initiatives in the coffee sector.' Does not indicate if the data are primary or secondary	No	No description of methods given. The article appears to be based on a convenience review of literature.

(Hooghe and Marks 2003)	The reallocation of authority upward, downward, and sideways from central states has drawn Tattention fronz a growing number of scholars in political science. Yet beyond agreement that governance hus become (and should be) multi-level, there is no consensus about how it should be organized. This article draws on several literatures to distinguish two types of multi-level governance. One type conceives of dispersion of authority to general-purpose, nonintersecting, and durable jurisdictions. A second type of govrernance conceives of task-specijic, intersecting, and flexible jurisdictions. We conclude by specifying the virtues of each type of governance.	no			
(Pérez-Escamilla 2012)	Experience-based food security scales (EBFSSs) have been shown to be valid across world regions. EBFSSs are increasingly been included in national food and nutrition assessments and food hardship items have been added to regional and global public opinion polls. EBFSSs meet the SMART criteria for identifying useful indicators. And have the potential to help improve accountability, transparency, intersectoral coordination and a more effective and equitable distribution of resources. EBFSSs have increased awareness about food and nutrition insecurity in the court of public opinion. Thus, it's important to understand the potential that EBFSSs have for improving food and nutrition security governance within and across countries. The case of Brazil illustrates the strong likelihood that EBFSSs do have a strong potential to influence food and governance from the national to the municipal level. A recent Gallup World Poll data analysis on the influence of the "2008 food crisis" on food hardship illustrates how even a single item from EBFSSs can help examine if food security governance in different world regions modifies the impact ofcrises on household food insecurity. Systematic research that bridges across economics, political science, ethics, public health and program evaluation is needed to better understand if and how measurement in general and EBFSSs in particular affect food security governance	no			
(Ponte and Cheyns 2013)	Abstract Products certified according to their environmental and social sustainability are becoming an important feature of production, trade and consumption in the agro-food sector. 'Sustainability networks' are behind the emergence and growth of these new product forms, often evolving into multi-stakeholder initiatives that establish and manage base codes, standards, certifications and labels. As sustainability moves into the mainstream, understanding the governance of these networks is essential because they partly reshape the structure and characteristics of commodity flows. In this article, we examine the role of expert	Insufficient data	Statement . In this article, we examine the role of expert knowledge and process management in governing two multi-stakeholder initiatives	No	A look through the paper shows that there is no description of methods

	<p>knowledge and process management in governing two multi-stakeholder initiatives (the Marine Stewardship Council and the Roundtable for Sustainable Palm Oil) and in shaping their distributional effects. We find that the ability of developing countries, especially small-scale actors within them, to shape standard setting and management to their advantage depends not only on overcoming important structural differences in endowments and access to resources, but also on more subtle games. These include promoting the enrolment of one expert group or kind of expert knowledge over another, using specific formats of negotiation, and legitimating particular modes of engagement over others.</p>		<p>(the Marine Stewardship Council and the Roundtable for Sustainable Palm Oil) and in shaping their distributional effects does not discriminate between primary and secondary data.</p>		<p>(making it not useful for our goal of describing indicators), and their case studies are most probably derived from a convenience review of literature.</p>
<p>(Boserup 1965)</p>	<p>INTRODUCTION</p> <p>Ever since economists have taken an interest in the secular trends of human societies, they have had to face the problem of the interrelationship between population growth and food production. There are two fundamentally different ways of approaching this problem. On the one hand, we may want to know how changes in agricultural conditions affect the demographic situation. And, conversely, one may inquire about the effects of population change upon agriculture.</p> <p>To ask the first of these two questions is to adopt the approach of Malthus and his more or less faithful followers. Their reasoning is based upon the belief that the supply of food for the human race is inherently inelastic, and that this lack of elasticity is the main factor governing the rate of population growth. Thus, population growth is seen as the dependent variable, determined by preceding changes in agricultural productivity which, in their turn, are explained as the result of extraneous factors, such as the fortuitous factor of technical invention and imitation. In other words, for those who view the relationship between agriculture</p>	<p>no</p>			

	<p>and population in this essentially Malthusian perspective there is at any given time in any given community a warranted rate of population increase with which the actual growth of population tends to conform. The approach of the present study is the opposite one. It is based through-out upon the assumption which the author believes to be the more realistic and fruitful one that the main line of causation is in the opposite direction:</p> <p>population growth is here regarded as the independent variable which in its turn is a major factor determining agricultural developments. Actual events in the present period should go some way to make this change of perspective acceptable. Few observers would like to suggest that the tremendous increase in rates of population growth witnessed throughout the underdeveloped world in the two post-war decades could be explained as the result of changes in the conditions for food production. It is reasonably clear that the population explosion is a change in basic conditions which must be regarded as autonomous, in the sense that the explanation is to be sought, not in improved conditions of food production, but in medical invention and some other factors which the student of agricultural development would regard as independent variables.</p> <p>The burden of the present study is, then, to show that this line of causation, where agricultural developments are caused by population trends rather than the other way round, is the dominant one, not only in the special and obvious case of the two decades since 1945, but in agricultural development generally. The author hopes to have shown that this approach is conducive to a fuller understanding of the actual historical course of agriculture, including the development of patterns and techniques of cultivation as well as the social structures of agrarian communities.</p> <p>4The fact that attention was mainly focused on food production as a limiting factor for population growth in accordance with Malthus' main doctrine did not prevent economists also paying attention to the question of how population growth, in its turn, affects agricultural production. Indeed, the theory of</p>				
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	<p>rent as developed by the classical economists was one part of the answer to this question: what happens to food production when population increases? However, the particular way in which this problem was tackled by the classical economists was determined by somewhat special conditions for agriculture in the Western Hemisphere in their time and this resulted in an over-simplified account of the changes in agricultural patterns that are brought about by the pressure of population growth. This point is of crucial importance for everything that follows in the present study, and some further explanation must be offered already at this stage.</p> <p>The classical economists were writing at a time when the almost empty lands of the Western Hemisphere were gradually taken under cultivation by European settlers, and it was therefore natural that they should stress the importance of the reserves of virgin land and make a sharp distinction between two different ways to raise agricultural output: the expansion of production at the so-called extensive margin, by the creation of new fields, and the expansion of production by more intensive cultivation of existing fields.</p> <p>This over-simplified conception of agricultural expansion has lingered on in economic literature, and even today it is this type of analysis that is usually offered when problems of underdeveloped countries are discussed. Why this approach is unsuitable for a general theory of agricultural development is most easily understood if it is remembered that many types of primitive agriculture make no use of permanent fields, but shift cultivation from plot to plot. This fact, which seems to have been ignored by classical economists, is fundamental for our problem, for it follows from it that in primitive types of agriculture there is no sharp distinction between cultivated and uncultivated land, and that it is impossible, likewise, to distinguish clearly between the creation of new fields and the change of methods in existing fields.</p> <p>This study attempts to draw the full conclusion from this insight. The</p>				
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	<p>very distinction between fields and uncultivated land is discarded and instead emphasis is placed on the frequency with which the land is cropped. In other words, it is suggested that we consider a continuum of types of land use ranging from the extreme case of truly virgin land, i.e. land which is never cropped, through land cropped at shorter and shorter intervals, to that part of the territory in which a crop is sown as soon as the previous one has been harvested. It is the intention by this new approach to provide the framework for a dynamic analysis embracing all types of primitive agriculture, those which proceed by cropping a plot a single time after which it is left fallow for a generation or more, as well as types of agriculture with continuous cropping of virtually the whole area several times a year. Once the time-honoured distinction between cultivated and uncultivated land is replaced by the concept of frequency of cropping, the economic theory of agricultural development becomes compatible with the theories of changing landscape propounded by natural scientists.</p> <p>The fathers of the traditional economic theory in agreement with the natural scientists of their own time regarded as immutable natural conditions many features which scientists now consider to be man-made and, in particular, the distinction between naturally fertile land and less fertile land was considered a crucial element in the explanation of agricultural change. By contrast, when the analysis is based upon the concept of frequency of cropping, there can be no temptation to regard soil fertility exclusively as a gift of nature, bestowed upon certain lands once and for all. Thus, soil fertility, instead of being treated as an exogenous or even unchangeable 'initial condition' of the analysis, takes its place as a variable, closely associated with changes in population density and related changes in agricultural methods.</p> <p>One of the disadvantages of the usual type of analysis is that it leads to a one-sided conception of the agricultural enterprise. Attention is locality be focused upon what happens in the cultivated field, as distinguished from the whole group of activities that are needed in a given system of</p>					
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	<p>agriculture. Undue importance is often attached to the number of times the fields are ploughed or weeded while the changes which take place in the area classified as 'uncultivated land' tend to be overlooked. When attention is instead focused on the frequency with which the different parts of the area belonging to a given holding, village or tribal area is cropped, an important fact springs to the eye: most or all of the land added to the sown area as population increases in a given territory was used already, as fallow land, pasture, hunting ground, or otherwise. It follows that when a given area of land comes to be cropped more frequently than before, the purposes for which it was hitherto used must be taken care of in a new way, and this may create additional activities for which new tools and other investment are required. Thus, the new approach to agricultural development which is signalled by the concept of frequency of cropping draws the attention to the effects upon agricultural technology which are likely to result from population changes. This is in sharp contrast to the usual approach which takes agricultural technology as a largely autonomous factor in relation to population changes. It is an essential problem in the economics of population changes to find out how such changes are likely to affect investment and it is generally agreed that the degree of security of tenure for the cultivator is one of the important determinants of investment. One of the advantages of the concept of frequency of cropping, as suggested in the present study, is that it makes it possible to bring fallow land, pastures and animal husbandry within the purview of the analysis and thus to appreciate the close relationship between changes in technical and economic factors on one hand and changes in land tenure on the other. In short, this new approach enables us to treat land tenure as an endogenous factor, with the result that arbitrary or unrealistic assumptions about tenure can be avoided in the analysis of investment problems. The neo-Malthusian school has resuscitated the old idea that population growth must be regarded as a variable dependent mainly on agricultural output. I have reached the conclusion, to be substantiated in the following chapters, that in many cases the output from a given area of land responds far more generously to an additional input of labour than assumed by neo-</p>					
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	<p>Malthusian authors. If this is true, the low rates of population growth found (until recently) in preindustrial communities cannot be explained as the result of insufficient food supplies due to overpopulation, and we must leave more room for other factors in the explanation of demographic trends. It is outside the scope of the present study, however, to discuss these other factors [medical, biological, political, etc.] which may help to explain why the rate of growth of population in primitive communities was what it was. Throughout, our inquiry is concerned with the effects of population changes on agriculture and not with the causes of these population changes</p>				
(Adger 2001)	<p>Global climate change is a significant challenge to structures of governance at all temporal and spatial scales, particularly in the area of managing natural resources. Advances in understanding of the nature of observed and future climate change has led to a realization that significant future impacts are inevitable and increased efforts towards understanding the process of adaptation to the threatened impacts are required. This paper examines the issue of scale of governance relevant for adaptation. The UN Framework Convention on Climate Change is the primary mechanism for co-ordinating international action on the threat of global climate change. The Convention process perceives adaptation as a further rationale for international transfers, in this case to compensate for and prepare for potential or realised impacts. This approach can be justified by recourse to the idea that enhancing sustainable development will enhance adaptive capacity and that planned activities are a key part of overall adaptation. But many adaptations to climate change will be spontaneous actions to perceived and actual risks in the environment. Thus institutional and economic parameters determine the underlying vulnerability and adaptive capacity of societies. I therefore argue that an understanding of adaptation processes allows interventions and planned adaptations at the most appropriate scales. I illustrate these arguments with reference to adaptation in agriculture and outline the insights from interdisciplinary development studies that can inform the climate change debates</p>	No	<p>I see no evidence that anything was studied. All I see is that something was 'examined' I don't see discussion of the case in which that thing was 'examined'. I see reference to illustration from a few fields, but that sounds like cherry picking.</p>		

Appendix F: Details of references chased

Details of references chased					
Project ID	Ref	Governance construct	# relevant refs	Full references	Accessibility
EGREF #178	(Eakin et al. 2011)	Institutional fit between New Public Management and Adaptation Governance	3	Eriksen S, Øyen CF, Kasa S, Underthun A (2007) Klimatilpasning og fuksikring i typehussektoren (in Norwegian). Climate adaptation and moisture safety in the building sector. Climate 2000 project report 3. SINTEF Building and Infrastructure, Oslo	Norwegian
				Eriksen, Siri, Cecilie Øyen, Sjur Kasa, and Anders Underthun. 2009. "Weakening Adaptive Capacity? Effects of Organizational and Institutional Change on the Housing Sector in Norway." <i>Climate and Development</i> 1 (2): 111–29. doi:10.3763/cdev.2009.0014.	No access
				Eakin, Hallie, and Kirsten Appendini. 2008. "Livelihood Change, Farming, and Managing Flood Risk in the Lerma Valley, Mexico." <i>Agriculture and Human Values</i> 25 (4): 555–66. doi:10.1007/s10460-008-9140-2.	BnL
EGREF #197	(Gereffi, Humphrey, and Sturgeon 2005)	global value chain governance	2	Galvin, Peter, and André Morkel. 2001. "The Effect of Product Modularity on Industry Structure: The Case of the World Bicycle Industry." <i>Industry and Innovation</i> 8 (1). doi:10.1080/13662710120034392.	No access
				Sturgeon, Timothy J. 2002. "Modular Production Networks: A New American Model of Industrial Organization." <i>Industrial and Corporate Change</i> 11 (3): 451–96. doi:10.1093/icc/11.3.451.	Open access
EGRef #022	Drimie 2010	institutional arrangements	3	Ruysenaar, S.H., 2009. Silhouettes and Safety Nets: Unpacking National Food Security Policy and Agricultural Interventions in Gauteng, South Africa. Unpublished MSc. Johannesburg: University of the Witwatersrand.	No access
				Drimie, S. & Verduijn, R. (2007) Input for the presidency position paper on food security. Unpublished document. Pretoria	No access
				Misselhorn, A., Drimie, S., and Schwabe, C. (Eds) (2007) Achieving food security in South Africa: Characteristics, stressors and recommendations to 2019. Report to the Office of the Presidency. Pretoria: Human Science Research Council.	No access
EGRef #040	Huntjens et al 2012	Institutional design for climate change adaptation strategy	4 (+1)	Appendix A: Supplementary data	No access
				Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Zsuzsanna Flacher, Susana Neto, Romana Koskova, Maja Schlueter, Issah NabideKiti, and Chris Dickens. 2008. "The Role of Adaptive and Integrated Water Management (AIWM) in Developing Climate Change Adaptation Strategies for Dealing with Floods and Droughts – a Formal Comparative Analysis of Eight Water Management Regimes in Europe, Asia, and Africa." Deliverable 1.7.9b of NeWater project. Germany: Institute of Environmental Systems Research, University of Osnabruck.	Open access
				Huntjens, P., Pahl-Wostl, C., Schulze, R., Kranz, N., Camkin, J., Lebel, L., 2011a. Chapter 9: Institutional design principles for climate change adaptation. In: Huntjens, P. (Ed.), <i>Water Management and Water Governance in a Changing Climate – Experiences and insights on climate change adaptation in Europe, Asia, Africa and Asia</i> . Ph.D. Thesis. University of Osnabrueck, Institute for Environmental Systems Research, Germany. Eburon Academic Publishers.	Book
				Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Maja Schlüter, Zsuzsanna Flachner, Susana Neto, Romana Koskova, Chris Dickens, and Isah Nabide Kiti. 2011. "Adaptive Water Management and Policy Learning in a Changing Climate: A	BnL

				Formal Comparative Analysis of Eight Water Management Regimes in Europe, Africa and Asia." <i>Environmental Policy and Governance</i> 21 (3): 145–63. doi:10.1002/eet.571.	
				Huntjens, Patrick, Claudia Pahl-Wostl, and John Grin. 2007. "Formal Comparative Analysis of Adaptive Capacity of Water Management Regimes in Four European Sub Basins." Deliverable 1.7.9. NeWater Project. Osnabruck: Institute of Environmental Systems Research, University of Osnabruck.	Open access
EGRef #043	Juhola & Westerhoff 2011	adaptation governance	2	Juhola, Sirkku. 2010. "Mainstreaming Climate Change Adaptation: The Case of Multi-Level Governance in Finland." In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskkitalo, 149–87. Springer Netherlands. http://link.springer.com/chapter/10.1007/978-90-481-9325-7_4 .	BnL
				Westerhoff, Lisa. 2010. "'Planning for Today': The Nature and Emergence of Adaptation Measures in Italy." In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskkitalo, 233–70. Springer Netherlands. http://link.springer.com.proxy.bnl.lu/chapter/10.1007/978-90-481-9325-7_6 .	BnL
EGRef #048	Leith et al 2012	capacity to manage natural resources	1	Brown, Peter R., Brent Jacobs, and Peat Leith. 2012. "Participatory Monitoring and Evaluation to Aid Investment in Natural Resource Manager Capacity at a Range of Scales." <i>Environmental Monitoring and Assessment</i> 184 (12): 7207–20. doi:10.1007/s10661-011-2491-y.	Copy from author
EGRef #055	Minde et al 2008	fertilizer subsidy program	2	Ariga, Joshua, Thomas S. Jayne, Betty Kibaara, and James K. Nyoro. 2008. "Trends and Patterns in Fertilizer Use in Kenya, 1997- 2007." 28/2008. Tegemeo Institute of Agricultural Policy and Development Working Paper Series. Nairobi: Tegemeo Institute of Agricultural Policy and Development.	Open access
				Ariga, Joshua, Thomas S. Jayne, and James K. Nyoro. 2006. "Factors Driving the Growth in Fertilizer Consumption in Kenya, 1990-2005: Sustaining the Momentum in Kenya and Lessons for Broader Replicability in Sub-Saharan Africa." 20. Egerton University, Tegemeo Institute of Agricultural Policy and Development Working Paper. Nairobi: Egerton University, Tegemeo Institute. http://purl.umn.edu/55167 .	Open access
EGRef #076	Schader et al 2014	n/a: Review of methods.	3	Jawtusich, Julia, Christian Schader, Matthias Stolze, Lukas Baumgart, and Urs Niggli. 2013. "Sustainability Monitoring and Assessment Routine: Results from Pilot Applications of the FAO SAFA Guidelines." In <i>Symposium International Sur L'Agriculture Biologique Méditerranéenne et Les Signes Distinctifs de Qualité Liée à l'Origine, 2-4 Décembre 2013, Agadir, Morocco</i> . http://orgprints.org/29547/ .	Open access
				Van Cauwenbergh, N., K. Biala, C. Biellers, V. Brouckaert, L. Franchois, V. Garcia Ciudad, M. Hermy, et al. 2007. "SAFE—A Hierarchical Framework for Assessing the Sustainability of Agricultural Systems." <i>Agriculture, Ecosystems & Environment</i> 120 (2–4): 229–42. doi:10.1016/j.agee.2006.09.006.	BnL
				Giovannucci, Daniele, Jason Potts, Bernard Killian, Christopher Wunderlich, Susana Schuller, Gabriela Soto, Kira Schroeder, Isabelle Vagneron, and Fabrice Pinard. 2008. "Seeking Sustainability: COSA Preliminary Analysis of Sustainability Initiatives in the Coffee Sector." Winnipeg, Canada: Committee on Sustainability Assessment.	Open access
EGRef #081	Tompkins & Adger 2004	co-management	2	Brown, Katrina, W. Neil Adger, Emma Tompkins, Peter Bacon, David Shim, and Kathy Young. 2001. "Trade-off Analysis for Marine Protected Area Management." <i>Ecological Economics</i> 37 (3): 417–34. doi:10.1016/S0921-8009(00)00293-7.	Open access
				Brown, Katrina, Emma Tompkins, and W. Neil Adger. 2001. "Trade-off Analysis for Participatory Coastal Zone Decisionmaking." Norwich: Overseas Development Group, University of East Anglia.	Open access
EGRef #084	von Geibler 2013	Legitimacy and effectiveness of standard setting	1	Meuser, Michael, and Ulrike Nagel. 2002. "ExpertInneninterviews — vielfach erprobt, wenig bedacht." In <i>Das Experteninterview</i> , edited by Alexander Bogner, Beate Littig, and Wolfgang Menz, 71–93. VS Verlag für Sozialwissenschaften. http://link.springer.com/chapter/10.1007/978-3-322-93270-9_3 .	German

EGREF #135	Wambugu et al 2015	benchmarks on institutional arrangements for climate-smart agriculture and forestry landscapes)	6	Wambugu, S. (2012). Securing Tenure for Reducing Emissions from Deforestation and Forest Degradation (REDD+) in Kenya. Paper presented at the 'Beyond Carbon: Ensuring justice and equity in REDD+ across levels of governance', St. Anne's College, Oxford, UK.	No access
				Atela, Joanes O. 2012. "The Politics of Agricultural Carbon Finance: The Case of the Kenya Agricultural Carbon Project." 49. STEPS Working Paper. Brighton, UK: STEPS Centre.	Open access
				Atela, Joanes O. 2013. "Governing REDD+: Global Framings versus Practical Evidence from the Kasigau Corridor REDD+ Project, Kenya." 55. STEPS Working Paper. Brighton, UK: STEPS Centre. http://steps-centre.org/wp-content/uploads/Governing-REDD+.pdf .	Open access
				Atela, Joanes O., Claire H. Quinn, and Peter A. Minang. 2014. "Are REDD Projects pro-Poor in Their Spatial Targeting? Evidence from Kenya." <i>Applied Geography</i> 52 (August): 14–24. doi:10.1016/j.apgeog.2014.04.009.	Open access
				Chomba, S. (In press). Institutional Choices under REDD+ and their implications for local democracy: Lessons from Kasigau project in Kenya.	Not Found
				Chomba, Susan, Juliet Kariuki, Jens Friis Lund, and Fergus Sinclair. 2016. "Roots of Inequity: How the Implementation of REDD+ Reinforces Past Injustices." <i>Land Use Policy</i> 50 (January): 202–13. doi:10.1016/j.landusepol.2015.09.021.	Open access
EGRef #085	Wert-Kanounnikoff & McNeill 2012	n/a: Review of methods.	4	Donovan, Richard Z., Gary Clarke, and Christian Sloth. 2010. "Verification of Progress Related to Enabling Activities for the Guyana-Norway REDD+ Agreement." USA: Rainforest Alliance.	Open access
				Guyana-Norway. 2011. "Guyana-Norway Joint Concept Note 2011." https://www.regjeringen.no/globalassets/upload/md/2011/vedlegg/klima/klima_skogprosjektet/guyana/jointconceptnote_31mars2011.pdf .	Open access
				Government of DRC. 2011. "Readiness Preparation Proposal (R-PP) - DRC."	Open access
				Indonesia-Norway. 2010. "Indonesia-Norway Partnership Joint Concept Note." https://www.regjeringen.no/globalassets/upload/md/2011/vedlegg/klima/klima_skogprosjektet/indonesia/jcn_indonesia_norway_redd_partnership_2010.pdf .	Open access
EGRef #089	Acemoglu et al 2009	transitions to and from democracy	3	Supplementary material with online version	BnL
				Barro, Robert J. 1999. "Determinants of Democracy." <i>Journal of Political Economy</i> 107 (S6): S158–83. doi:10.1086/250107.	BnL
				Boix, Carles, Michael Miller, and Sebastian Rosato. 2013. "A Complete Data Set of Political Regimes, 1800–2007." <i>Comparative Political Studies</i> 46 (12): 1523–54. doi:10.1177/0010414012463905.	BnL
EGRef #77	Schouten et al 2012	Democracy as the deliberative capacity	2	Schouten, Greetje, and Pieter Glasbergen. 2011. "Creating Legitimacy in Global Private Governance: The Case of the Roundtable on Sustainable Palm Oil." <i>Ecological Economics</i> , Special Section - Earth System Governance: Accountability and Legitimacy, 70 (11): 1891–99. doi:10.1016/j.ecolecon.2011.03.012.	Open access
				Schouten, Greetje, and Pieter Glasbergen. 2012. "Private Multi-Stakeholder Governance in the Agricultural Market Place: An Analysis of Legitimization Processes of the Roundtables on Sustainable Palm Oil and Responsible Soy." <i>International Food and Agribusiness Management Review</i> 15 (Special Issue B): 63–88.	Open access
EGREF #318	Jawtusch et al 2013	sustainability performances of food enterprises	1	FAO. 2014. "SAFA: Sustainability Assessment of Food and Agriculture Systems - Guidelines Version 3.0." Rome: FAO.	Open access

Appendix G: Structured Summaries of Operationalizations

Acemoglu et al 2009

Structured summary of construct operationalization	
Construct:	transitions to and from democracy
Research Question:	“This paper is most closely related to Acemoglu et al. (2008) who also investigate the relationship between income and democracy. Whereas this work focuses on the effect of income on the level of democracy, the current paper focuses on the effect of income on transitions to and from democracy using a linear model as well as a double hazard model which accommodates fixed effects”
Article reference:	Acemoglu, Daron, Simon Johnson, James A. Robinson, and Pierre Yared. 2009. “Reevaluating the Modernization Hypothesis.” <i>Journal of Monetary Economics</i> 56 (8): 1043–58. doi:10.1016/j.jmoneco.2009.10.002.
Supporting literature	Barro, Robert J. 1999. “Determinants of Democracy.” <i>Journal of Political Economy</i> 107 (S6): S158–83. doi:10.1086/250107.
	Boix, Carles, Michael Miller, and Sebastian Rosato. 2013. “A Complete Data Set of Political Regimes, 1800–2007.” <i>Comparative Political Studies</i> 46 (12): 1523–54. doi:10.1177/0010414012463905.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	<p>“We follow the existing empirical research in the measurement of democracy. The first measure of democracy is the Freedom House Political Rights Index. This index ranges from 1 to 7, with 7 representing the least amount of political freedom and 1 the most freedom. Following Barro (1999), this index is supplemented with the related variable from Bollen (1990, 2001) for 1950, 1955, 1960, and 1965. As in Barro (1999), both indices are transformed so that they lie between 0 and 1, with 1 corresponding to the most democratic set of institutions.”</p> <p>[...]</p> <p>“results are presented using the Boix and Rosato (2001) dataset which extends the data of Przeworski et al. (2000) in which the index equals 1 if a country is a democracy and equals 0 otherwise. We also develop a simple double hazard model to deal with the simultaneous modeling of transitions to and from democracy. All of these exercises using the dichotomous measures give very similar results to those using the continuous measures.”</p> <p>[...]</p> <p>“Supplementary data associated with this article can be found in the online version at doi:10.1016/j.jmoneco.2009.10.002”</p>
Indicators/questions used in data collection instruments?	“Freedom House applied the concept of electoral rights on a subjective basis to classify countries annually into seven categories; group one is the highest level of rights and group seven is the lowest.”

(Barro 1999)

“We define a country as democratic if it meets the following conditions for both contestation and participation:

Contestation

1. The executive is directly or indirectly elected in popular elections and is responsible either directly to voters or to a legislature.
2. The legislature (or the executive if elected directly) is chosen in free and fair elections.

Participation

3. A majority of adult men has the right to vote.

To code country-years, we rely on a variety of sources, which change with the time period:

1. To establish whether the executive is directly or indirectly responsible to the electorate, we have relied on the worldwide constitutional legislation compiled in Blaustein and Flanz (various years), as well as specific regional collections of constitutions, such as López Guerra and Aguiar de Luque (2001) for Latin America. After 1950, we also employ Alvarez et al. (1996).

2. To determine the second condition, we define elections as free if voters are given multiple options on ballots and as fair if electoral fraud is absent and incumbents do not abuse government power to effectively eliminate the chance of opposition victory through peaceful contestation. To operationalize these two criteria, we rely primarily, but not exclusively, on the concept of electoral turnover emphasized in Przeworski et al. (2000). We take any instance of electoral executive turnover to an opposition party as a strong indicator of free and fair elections. However, the presence of electoral turnover is neither necessary nor sufficient to fulfill Condition 2. [...] Accordingly, we checked the history of those cases with no electoral turnover for a sufficiently long period of time (over two electoral terms) to examine whether internal coups, external interventions, abuses of state power, or reports of fraud could explain the prolonged control of the executive by the same party. If there were none and we observed contested elections, we coded the period as having free and fair elections. If a peaceful governmental turnover was observed, we applied the same check to determine how far back in time the condition of free and fair elections applied. [...]

Naturally, the sources used to establish whether Condition 2 holds change with the historical period. Regional and country histories were supplemented with information from Banks (1976; especially before 1950), Alvarez et al. (1996; covering 1950–1990), T. Beck, Clarke, Groff, Keefer, and Walsh (2001), Keefer (2005), Norris (2008),

	<p>country reports from Polity (Marshall & Jaggers, 2010) and Freedom House (2010), and election reports from the EU, the Organization for Security and Co-operation in Europe, and the Carter Center for the period after 1990.</p> <p>3. The suffrage condition tracks the substantial variation in the extension of the franchise prior to World War II. Since nearly all nations with free competitive elections (as well as most without) after 1946 had universal male suffrage, this is not a requirement in Cheibub et al. (2010). However, suffrage is also omitted from Polity. Defining the condition of participation as having at least half of men enfranchised is, in some sense, arbitrary (as any particular threshold must be).”</p> <p>(Boix et al 2013)</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized²⁰)</p>	<p>{transitions to and from democracy} <- {Freedom House Political Rights Index} <- {Electoral Rights}</p> <p>(Acemoglu et al 2009)</p> <hr/> <p>{Democracy} <- { {Contestation <- {executive elected; legislature elected}} ; {Participation <- majority of men have right to vote} }</p> <p>(Boix et al 2013)</p>
<p>Data analysis methods</p>	<p>“We begin by considering the effect of income on the level of democracy by estimating of the following simple linear regression model:</p> $d_{it} = \alpha d_{it-1} + \gamma y_{it-1} + \mathbf{x}'_{it-1} \beta + \mu_t + \delta_i + u_{it},$ <p>where d_{it} is the democracy score of country i in period t. The lagged value of this variable on the right-hand side is included to capture persistence in democracy and also potentially mean-reverting dynamics. The main variable of interest is y_{it-1}, the lagged value of log income per capita. The parameter γ therefore measures the impact of income per capita on democracy. Other covariates are captured by the vector \mathbf{x}_{it-1}</p> <p>0</p> <p>with coefficient vector β. In addition, the μ_t's denote a full set of time effects, which capture common shocks to (common trends in) the democracy score of all countries. Importantly, the equation also includes a full set of country dummies, the δ_i's. These country dummies capture any time-invariant country characteristics that</p>

²⁰ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

affect the equilibrium level of democracy. ϵ_{it} is an error term, capturing all other omitted factors, with $E\epsilon_{it} = 0$ for all i and t . The sample period is 1960–2000 and time periods correspond to five-year intervals.”

[...]

“This section investigates whether the findings in this literature are robust to the inclusion of fixed effects. This is first done using a linear model. We then develop and implement a double hazard model for the simultaneous estimation of transitions to democracy and transitions away from democracy.”

[...]

“4.1. Linear model

Standard analyses of transitions to and from democracy use dichotomous measures such as the Przeworski/Boix–Rosato data. This section starts with a more straightforward approach which allows us to also use the continuous democracy scores in the Freedom House and Polity data. The strategy is to modify the model in Eq. (1) as follows:

$$d_{it} = \alpha d_{it-1} + \gamma^{pos} I_{it-1} y_{it-1} + \gamma^{neg} (1 - I_{it-1}) y_{it-1} + \mathbf{x}'_{it-1} \beta + \mu_t + \delta_i + u_{it},$$

where $I_{it} = 1$ if d_{it} is below the sample mean and which equals 0 otherwise. This procedure implies that γ^{pos} represents the effect of income on democracy conditional on a country starting from a low level of democracy, capturing the extent to which higher income may promote democratization.

Analogously, γ^{neg} represents the effect of income on democracy conditional on a country starting from a high level of democracy, capturing the extent to which higher income may prevent coups.”

[...]

“The double hazard model can be expressed in terms of two conditional mean functions for the probability of transitioning to democracy and the probability of remaining in democracy:

$$\Pr(d_{it} = 1 | d_{it-1} = 0, y_{it-1}, t) = F(\gamma^{pos} y_{it-1} + \mu_t^{pos}),$$

$$\Pr(d_{it} = 1 | d_{it-1} = 1, y_{it-1}, t) = F(\gamma^{neg} y_{it-1} + \mu_t^{neg}),$$

where F is an increasing function with a range between 0 and 1. Eq. (3) describes the probability that a dictatorship collapses (transitions to democracy), and Eq. (4) describes the probability that a democracy survives, which is negatively related to the probability of a coup (transitions away from democracy). Together, these two equations characterize the law of motion of democracy for a given country, so that one can think of these equations as constituting a “double hazard model”. The parameters γ^{pos} and γ^{neg} represent the effect of income on positive and negative transitions,

	<p>respectively, and m_{pos} and m_{neg} represent the time effects on positive and negative transitions, respectively. Note that Eqs. (3) and (4) model the appropriate transitions to and away from democracy, but they do not yet introduce fixed country effects. To make further progress, let us also assume that</p> <hr/> <p>P is the normal cumulative distribution function, so that the system described by (3) and (4) is an exponential double hazard model. Since this system of equations characterizes the entire motion of democracy, it can easily be estimated by maximum likelihood.”</p>
Justification of inference from results to conclusions	<p>“In the Introduction, we argued that the fixed effects results are consistent with the hypothesis that the (long run) political and economic development paths of societies are intimately linked. There is a natural complementarity between political and economic institutions. Economies grow if their economic institutions encourage investment and innovation, for example, by providing secure property rights and equality before the law; but this can only happen when those controlling political power (the political elites) are constrained. One should thus expect democracy to be associated with economic institutions that foster growth. This reasoning implies that if events at some critical juncture create a divergence in the political and economic institutions of a set of societies, these differences should persist over time; some of these societies may embark on a path to high income and democracy, while others experience relative stagnation and non-democracy. Thus, according to this theory, democracy and income evolve jointly. Nevertheless, conditional on a given development path, economic growth does not necessarily lead to democratization.</p> <p>This reasoning suggests that the fixed effects estimated in the previous section should be closely linked to the underlying institutional development paths and to the factors affecting what type of path a society has followed. This section investigates this question by seeing whether the presence of historical variables in the pooled cross-sectional regression can remove the statistical association between income and democracy.”</p>
Discussion of limitations	<p>“These results should not be interpreted as implying that historical factors (or time-invariant factors captured by fixed effects) are the only or the major determinant of democracy today. There is a large amount of variability in democracy across countries that is not explained by the historical variables in this analysis and there is also a substantial amount of over-time variability in the democracy score of a country that still needs to be understood and accounted for. For example, it remains true that over time there is a general tendency towards greater incomes and education and increased political participation across the world. In the regressions of this paper, time effects capture these general (world-wide) tendencies. The estimates</p>

	of this paper suggest that these world-level movements in democracy are unlikely to be driven by the causal effect of income and education on democracy. The causes of these world-wide trends are an interesting area for future research”
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Adger et al 2005 a

Structured summary of construct operationalization	
Construct:	Governance of socio-ecological systems
Research Question:	“In this paper, we address in particular the links between elements of the governance of social-ecological systems”
Article reference:	Adger, W.Neil, Katrina Brown, and Emma L. Thompkins. 2005. “The Political Economy of Cross-Scale Networks in Resource Co- Management.” <i>Ecology and Society</i> 10 (2): 9.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	“The research used participatory methods including focus groups, ranking exercises, and consensus workshops. The initial interactions between stakeholders were based on trust built up over two years. Thus the observations on power relations and cross-scale linkages below are derived both from formally elicited perceptions of stakeholders themselves and from observations of the researchers acting as part of the management process”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ²¹)	
Data analysis methods	
Justification of inference from results to conclusions	<p>“The observations in this paper are an analysis of the linkages and process of management through the lens of power and its impacts outlined in the sections above.”</p> <p>[...]</p> <p>“The sections above highlight the role of knowledge and information in the exercise of power.”</p> <p>[...]</p> <p>“How do these observations tie with the suggestions in the previous</p>

²¹ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>section on the role of power in cross-scale linkages? It appears that once engaged in a process of co-management and rapidly evolving institutional structures, opportunities for cross-scale interactions and alliances abound.”</p> <p>[...]</p> <p>“Thus the political economy of cross-scale linkages requires systematic empirical evaluation, recognizing the role of power in all its manifestations within processes of negotiation.”</p>
Discussion of limitations	

Adger et al 2005 b

Structured summary of construct operationalization	
Construct:	Cross-scale linkages
Research Question:	<p>“In this paper, we address in particular the links between elements of the governance of social-ecological systems”</p> <p>[...]</p> <p>“We argue that part of the persistence and stability of the governance system depends on the distribution of benefits from cross-scale linkages, demonstrated by the ability of the system to command legitimacy and trust among the resource user and the governmental stakeholders. If the structure of cross-scale linkages reduces trust then the robustness of the system is in question. In empirical research, we examine the structure of interplay of cross-scale linkages in the context of a marine protected area in Tobago in the eastern Caribbean”</p>
Article reference:	Adger, W.Neil, Katrina Brown, and Emma L. Thompkins. 2005. “The Political Economy of Cross-Scale Networks in Resource Co- Management.” <i>Ecology and Society</i> 10 (2): 9.
Operationalization:	
Item	Quoted text
Construct definition	“An understanding of cross-scale linkages is important in managing multiple use resources. By linkages we mean direct interactions through networks to provide information or tangible resources related to the management system. Of course almost all possible natural resources systems involve multiple direct users. Even when direct users of resources are small in number or strictly limited, there are inevitably multiple external stakeholders making claims and calls on natural resources at numerous scales. Cross-scale institutional linkages are the norm and even universal in natural resource management”
Data collection methods	“The research used participatory methods including focus groups, ranking exercises, and consensus workshops. The initial interactions between stakeholders were based on trust built up over two years. Thus the observations on power relations and cross-scale linkages below are derived both from formally elicited perceptions of stakeholders themselves and from observations of the researchers acting as part of the management process”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ²²)	
Data analysis methods	
Justification of inference from	“The observations in this paper are an analysis of the linkages and

²² By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

<p>results to conclusions</p>	<p>process of management through the lens of power and its impacts outlined in the sections above.” [...] “The sections above highlight the role of knowledge and information in the exercise of power.” [...] “How do these observations tie with the suggestions in the previous section on the role of power in cross-scale linkages? It appears that once engaged in a process of co-management and rapidly evolving institutional structures, opportunities for cross-scale interactions and alliances abound.” [...] “Thus the political economy of cross-scale linkages requires systematic empirical evaluation, recognizing the role of power in all its manifestations within processes of negotiation.”</p>
<p>Discussion of limitations</p>	

Barungi 2013

Structured summary of construct operationalization	
Construct:	governance aspects of Uganda's local agri-food systems
Research Question:	"The overall objective of the study was to examine governance aspects of Uganda's local agri-food systems. The study had three specific objectives. First, to identify and examine the major existing local agri-food institutional mechanisms. Second, to analyse Tororo district's agri-food budget, budget governance and financing of agri-food service delivery. Third, as a way forward, to provide recommendations that can help to address the governance challenges facing Tororo district's agri-food system."
Article reference:	Barungi, J. Agri-Food System Governance and Service Delivery in Uganda: A Case Study of Tororo District [Internet]. 9 Nov 2015 [cited 9 Nov 2015]. Available: http://dspace.africaportal.org/jspui/bitstream/123456789/34656/1/PRS_61.pdf?1
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	"agri-food system governance refers to the formal and informal rules and procedures that organise and coordinate the elements of the agri-food system such as food production, processing, distribution, and consumption among the various stakeholders in the agri-food system. The formal and informal rules and procedures consist of institutional policies and practices among others. Ideally, an efficient agri-food system is supposed to guarantee both food security and environmental security"
Data collection methods	"The study largely employed qualitative methodology. Methods of data collection and analysis included key informant interviews, focus group discussions and review of relevant literature"
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ²³)	<pre> graph BT A[Barungi 2015 - agri-food system] -- is part of --> B[Barungi 2015 - governance aspects of Ugan.] C[Barungi 2015 - food security] -- is part of --> B D[Barungi 2015 - environmental security] -- is part of --> B </pre>
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

²³ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Boons & Mendoza 2010

Structured summary of construct operationalization	
Construct:	definitions of sustainability
Research Question:	<p>“The generic research question that drives our research is:</p> <p>How do definitions of sustainability become shared among actors in the biomass product chain?”</p>
Article reference:	Boons, Frank, and Angelica Mendoza. 2010. “Constructing Sustainable Palm Oil: How Actors Define Sustainability.” <i>Journal of Cleaner Production</i> 18 (16–17): 1686–95. doi:10.1016/j.jclepro.2010.07.003.
Operationalization:	
Item	Quoted text
Construct definition	<p>“The core of our approach is the acknowledgement that such values are not independently given nor objectively defined. Instead, definitions of sustainability are the result of activities of involved actors which over time construe criteria of what are relevant ecological impacts to consider, what social issues need to be addressed, and in what way economic value is to be measured”</p>
Data collection methods	<p>“Data were gathered during fieldwork in Colombia and The Netherlands. Seventeen interviews were held with actors that were part of the product chain of palm oil, or actors that sought to influence that chain through policy. We focused our interviews in Colombia because we were most interested in how actors there construct sustainability in relation to, or distinct from, the Dutch criteria. For the Netherlands, we could build on reports from policy makers, scientists involved in criteria development, and company reports and documents. We used a semi-structured approach to cover three main points:</p> <ol style="list-style-type: none"> 1. Perceived environmental impacts 2. Decision-making process and relations to other actors in the sector 3. Sustainability criteria <p>Respondents included representatives of large- and small-scale palmgrowers, process engineers at extraction plants, governmental agencies, non-governmental organizations and academic organizations. In Colombia two out of four producing regions were visited, the North and East region. During these field visits, the semi-structured interviews were supplemented with unstructured interviews with people present at plantations, milling facilities, a nursing laboratory, and one policy meeting. Field visits were documented through field notes and photographic material. In addition to interviews, documents were gathered that represent the position of actors towards the sustainability of their activities and product.”</p>
Indicators/questions used in data collection instruments?	“We used a semi-structured approach to cover three main points:

	<ol style="list-style-type: none"> 1. Perceived environmental impacts 2. Decision-making process and relations to other actors in the sector 3. Sustainability criteria”
Sub-constructs linking governance construct to indicators (unless directly operationalized ²⁴)	
Data analysis methods	“We start out by describing the physical streams that constitute the production and consumption chain of palm oil for energy production (Section 4.1). We then describe how definitions of sustainability are constructed in interactions among core actors. We present these interactions around six themes that we identified through the application of the action-in-context methodology (Section 4.2).”
Justification of inference from results to conclusions	
Discussion of limitations	

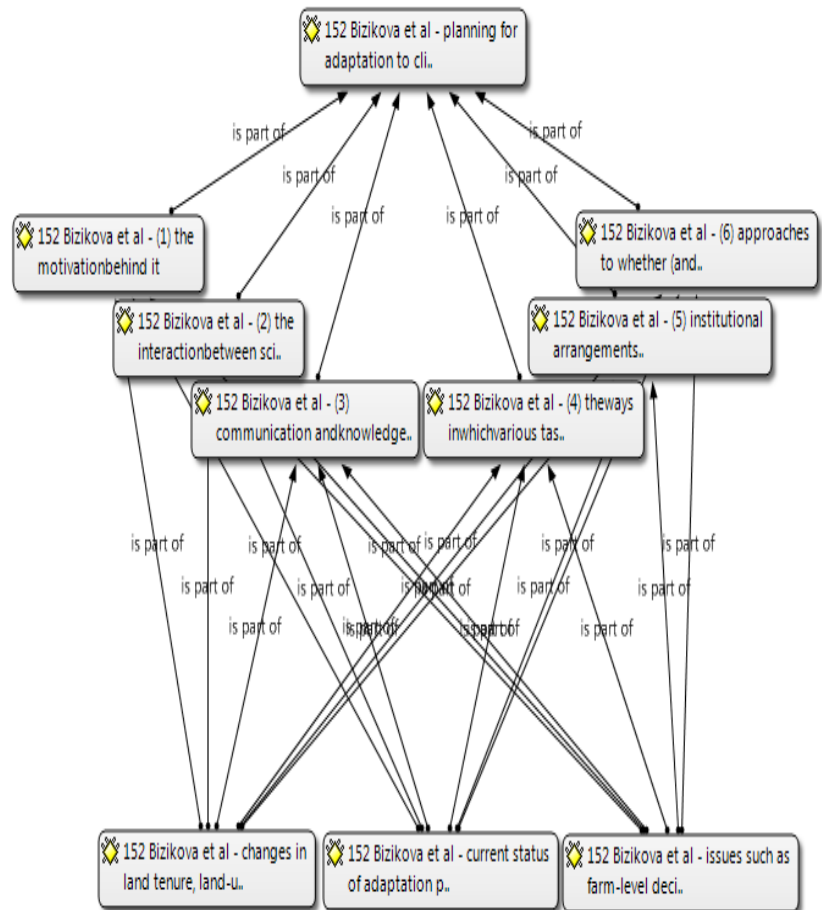
²⁴ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Bizikova et al 2015

Structured summary of construct operationalization	
Construct:	planning for adaptation to climate change
Research Question:	“The paper pursues three main research questions: first, how the transformation that occurred in the agricultural sectors in transition countries influence the planning for adaptation to climate change? Second, to what extent approaches to adaptation planning applied in advanced economies are relevant for the needs and conditions in transition countries? Third, what are the key processes, collaborations and capacity needs necessary for the development of adaptation strategies in agriculture in transition countries?”
Article reference:	Bizikova, L., M. Nijnik and A. Nijnik. A role of institutions and collaboration in adaptation planning to climate change in agriculture in transition countries [Internet]. 10 Nov 2015 [cited 10 Nov 2015].
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“Adaptation to climate change is defined as an “adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, in order to reduce harm or take advantage of opportunities” (IPCC 2007, p. 869). Adaptation strategies encompass specific, targeted measures (Eriksen et al. 2011) as well as steps to build adaptive capacity through actions such as institutional strengthening, establishment of policies, and mainstreaming adaptation considerations into national and sectorial strategies (IPCC 2012; European Commission [EC] 2013).”
Data collection methods	“In order to gain insights into transition processes in CEE and CIS, we focus on 24 transition countries to review specific aspects of the transformation in the agricultural sectors including changes in land tenure, land-use and policies and strategies to monitor land ownership and guide land markets. We also reviewed the current status of adaptation policy-making, key types of priority adaptation actions, and measures and processes recommended for their implementation. Our research builds on knowledge from relevant literature and from international, regional and national policy documents. We then conducted a series of in-depth interviews in Slovakia, Ukraine and Tajikistan” [...] “We used snowball sampling (Atkinson and Flint 2001) to identify respondents based on an initial set of stakeholders involved in the development of reviewed policy documents who then referred us on to other candidate interviewees. This process developed a network of stakeholders directly involved in agricultural and/or planning processes. Key consideration for the sampling strategy we focused on two major groups of stakeholders’ involved in agricultural policy and strategy development and second group of stakeholders’ engaged in agricultural production. Within the first group we focused on policy-makers active at the international, national and subnational level with experiences over 5 years in the area. For the producers we focus on those that are engaged in plant production on

	<p>land over 5 ha with 5 years and longer years of operations. This approach to stakeholders' identification enabled us to explore key processes, challenges and lessons learned on implementing agricultural strategies and potential adaptations. The semi-structured interviews addressed issues such as farm-level decision making, especially the role of national policy, land tenure structures, experiences with vertical and horizontal collaboration (at both national and sub-national levels), and interviewees' experiences of accessing information and linking scientific knowledge to policy and stakeholder engagement"</p> <p>[...]</p> <p>"We conducted 78 interviews in Slovakia (2008–2009), 38 in Ukraine (2010) and 43 in Tajikistan (2008). These included both long-distance interviews (by phone and Internet) and face-to-face interviews conducted primarily by the authors, which lasted from 60 to 90 min. During the interviews, notes were taken, and afterwards, a report outlining the findings was provided to all interviewees for review."</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>"we focus on 24 transition countries to review specific aspects of the transformation in the agricultural sectors including changes in land tenure, land-use and policies and strategies to monitor land ownership and guide land markets. We also reviewed the current status of adaptation policy-making, key types of priority adaptation actions, and measures and processes recommended for their implementation"</p> <p>[...]</p> <p>"The semi-structured interviews addressed issues such as farm-level decision making, especially the role of national policy, land tenure structures, experiences with vertical and horizontal collaboration (at both national and sub-national levels), and interviewees' experiences of accessing information and linking scientific knowledge to policy and stakeholder engagement."</p>

Sub-constructs linking governance construct to indicators (unless directly operationalized²⁵)



Data analysis methods

“We then conducted a series of in-depth interviews in Slovakia, Ukraine and Tajikistan, and associated the results of the reviews with the outcomes from analyzing the interviews to identify key approaches to adaptation planning in agriculture in these countries. We chose these three countries as they have strong agrarian economies, representing different stages of the transition processes, and having well documented records of their land tenure and agricultural transformation dynamics.”
 [...]
 “Interview data were sorted using a simple coding system reflecting the framework categories and key themes within the research questions (Coffey and Atkinson 1996). QSR International’s NVivo software was used to process the coded interviews. In total 96 categories were identified across the three countries which then were grouped into 15 major themes approximately two to three themes per each stage of the adaptation planning process. Basic statistics were included as well error margin for the key major

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	<p>themes and categories were calculated using the binomial confidence interval approximation method (Brown et al. 2001). The identified themes and categories are elaborated in the next section to identify key trends in the agricultural sectors and overall experiences with collaboration and participation to guide adaptation planning in CEE and CIS.”</p>
Justification of inference from results to conclusions	<p>“A series of common observations can be identified from our findings to help guide future adaptation planning and implementation in transition countries”</p>
Discussion of limitations	

Brownhill & Hickey 2012

Structured summary of construct operationalization	
Construct:	food security policy barriers
Research Question:	“Our research presents key informant interviews that provide a ‘multiperspective’ lens through which we can examine Kenya’s food security policy barriers”
Article reference:	Brownhill L, Hickey GM. Using interview triads to understand the barriers to effective food security policy in Kenya: a case study application. Food Secur. 2012;4: 369–380. doi:10.1007/s12571-012-0183-2
Operationalization:	
Item	Quoted text
Construct definition	<p>“This study was conducted within the framework of grounded theory (Glaser and Strauss 1967). Grounded theory relies on inductive principles where data are often collected in the absence of hypotheses. Babbie (2001) outlined the grounded theory approach as follows: 1) Initial data are used to determine the key variables; 2) Hypotheses or propositions are then derived from the collected data; 3) Continuing data collection provides a sharpened understanding of the issues; and 4) Sharpened understanding leads to a sharpened focus for data collection. We recognize that the process by which interview questions are devised and asked and responses are interpreted involves the imposition of researchers’ assumptions, starting points and interests. Nevertheless, the observations and analysis presented here are derived from the problems and issues identified by the interviewees themselves.”</p> <p>[...]</p> <p>“We sought first to situate the policy-making process in its ‘real-life’ institutional context. We identified interlinked institutions at government, research and farm levels. Given our interest in the information pathways linking institutions most centrally concerned with food policy, we needed to include those from “the top” to “the bottom” (see Timms 2011).”</p>
Data collection methods	<p>“We interviewed a range of actors concerned with the process and outcomes of food policy-making in Wote, Makeni County, including extension staff and women’s groups in 2010–11. From this larger sample of 27,1 we recognized the relative centrality of three particular informants’ perspectives”</p> <p>[...]</p> <p>“1</p> <p>Interviewees included 22 farmers (18 women; four men), two researchers (two men (one at HQ; one at Kambiya Mawe), and three policy-makers/bureaucrats (one man (National); two women (District))”</p>
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to	DIRECTLY OPERATIONALIZED

indicators (unless directly operationalized ²⁶)	
Data analysis methods	<p>“We explored the overlaps and divergences in these interviews, as above, and sought a means to analyse their content, further than presenting their words unexpurgated. To do so, we borrowed from health sciences the interview triad approach (Kendall et al. 2010). The interview triad involves analysing the words and perspectives of three individuals who are variously placed to view a given problem from their own distinct experiential standpoint. In reporting on the use of this method, Kendall et al. suggest that “Interview dyads or triads, where two or three participants are interviewed as a set or case study, can explore complex complementary as well as contradictory perspectives”(Kendall et al. 2010:196).”</p>
Justification of inference from results to conclusions	<p>“Grounded theory relies on inductive principles where data are often collected in the absence of hypotheses. Babbie (2001) outlined the grounded theory approach as follows: 1) Initial data are used to determine the key variables; 2) Hypotheses or propositions are then derived from the collected data; 3) Continuing data collection provides a sharpened understanding of the issues; and 4) Sharpened understanding leads to a sharpened focus for data collection” [...]</p> <p>“Wote is a semi-arid agro-pastoral area experiencing erratic and unpredictable weather. Incidence of poverty is high (74%) and drought conditions prevail on an increasingly frequent basis (Ngugi and Nyariki 2006; Rocheleau et al. 1995; Kenya Food Security Steering Group n.d.). Though focused on Wote, the issues covered in this case study speak more generally to food security policy challenges across much of Kenya” [...]</p> <p>“Many researchers examining agricultural sustainability in Kenya have noted the centrality of community, research and policy institutions to the study of food policy (Kristjanson et al. 2009; Magunda et al. 2010; Qureish et al. 2009). This work highlights the importance of “spanning boundaries between communities, scientists and policy-makers, all the while colearning and cocreating a hybrid of traditional/local and scientific/universal knowledge” (Kristjanson et al. 2009:5049). In their examination of land issues in pastoral communities in Kenya, Kristjanson et al. concluded that by blurring the boundaries between researchers, policy makers and communities, they brought into focus “the probability that the information generated would not only be useful, but used” in policy-making and its implementation (2009:5049). For ‘information’ to result in improved policies requires pathways along which different</p>

²⁶ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>parties' knowledge can be mobilized.</p> <p>The process of mobilizing this knowledge results in new syntheses of information, new forms of knowledge. It is to this synthesis that we look for promising direction for more effective food security policy. If policy is derived from processes that integrate farmers' (and other concerned constituents') expressed concerns and active participation, that policy is likely to more closely 'fit' the farmers' needs and its implementation more readily undertaken.</p> <p>This process of knowledge integration and its use in policy processes echoes Mutshewa's conception of 'informational power,' which he describes as the result of a pattern of information use, including "extracting, collating, summarising, translating, collecting or gathering information, verifying information and disseminating information" (Mutshewa 2010:220). Mutshewa focuses on environmental planners using this power "to counter the power bases of other stakeholders" (ibid), and thus to drive and influence the planning process. However, informational power could become part of a cooperative rather than competitive process of knowledge integration in pursuit of a common goal that key stakeholders share despite their differences, in this case, effectively addressing food insecurity.</p> <p>In our view, there is power in the sharing of information, and the intentional syntheses which arise from this sharing (Raymond et al. 2010; Sanginga et al. 2007). Much innovation has arisen socially, economically and environmentally through the cocreation of knowledge. It is widely recognized that knowledge mobilization contributes to the making of effective policy (Mutshewa 2010). We also learned from those we interviewed that the central question of putting such knowledge to practical use is likewise a central concern among on-the-ground farmers, agricultural researchers and policy-makers in Kenya.</p> <p>Because our interest was to examine links between institutional actors, rather than to generalize about the experiences of any one set of actors, our approach diverged from that of a large sample or survey of policy-makers, researchers and farmers. Instead we selected prominent leading individuals within three linked institutions and addressed questions of the efficacy of their own food security initiatives and any constraints they faced in advancing their own objectives, especially with regard to information flows between and among institutions. This produced an analytical 'snapshot' meant to be illustrative of the diversity and the overlaps in the perspectives of key informants in three institutions concerned with food policy."</p>
Discussion of limitations	<p>"Much of this interrogation speaks to the question of the trustworthiness of the individual voice as a form of evidence (Thompson 2000; Lummis 1981). Lummis (1981) addressed the trustworthiness of oral evidence in a manner that is pertinent to our</p>

	<p>use of individual interviews. He divides the issue into two main areas: “the degree to which any individual interview yields reliable information on the historical experience, and the degree to which that individual experience is typical of its time and place” (Lummis 1981: 109).</p> <p>As to the first concern, because our interviewees were speaking of current and ongoing experiences, rather than historical ones, the reliability of memory and accuracy of recall is less of an issue. What is pertinent for our ‘interview triad’ approach is the question of accuracy of details. Lummis posits that “the validity of an interview can be assessed for its general accuracy by the degree to which it corresponds to checkable details... . In other words, the normal process of maximum triangulation with other sources can go a long way toward establishing the general reliability of the interview” (Lummis 1981: 110).</p> <p>The second concern also provides insight into the use of interviews as evidence in scientific studies. How representative of their wider social groups are the views and opinions expressed by our interviewees? With oral histories, the researcher can compare key features of interviewees’ life histories with such published data as census results to estimate the degree to which interviews are typical of wider groups’ experiences. In addition to this ‘fact-checking’ task, we add a further qualification to the ‘generalizability’ of our particular interview triad. As leaders, our interviewees’ opinions ‘matter’ insofar as they are capable of directing the actions and opinions of others, and sometimes the funds and decision-making directions of whole organizations, which in turn can have wide-ranging impacts beyond the individuals.</p> <p>In this regard we have found it most helpful to bring in the views of some of the other interviewees we spoke to in 2010. For this purpose, not only were taped interviews useful, but author field notes supplied details of other farmers’, researchers’ and policy-makers’ views and perspectives that helped validate our key informants’ interviews. For example, in an interview with the District Agricultural Office (DAO), the Minister’s views on the need for better information flows were corroborated by this local-level policy implementer. She stated, on the question of who in Wote is working on questions of food security, that “the government is encouraging the integration of our [Ministry of Agriculture] services with the NGOs and businesses in the area. We are forming a stakeholders’ forum to meet quarterly” (Brownhill 2010). Interviews with farming women’s group members’ contextualized and validated the views of our woman farmer. For instance, women reported the same general problems and similar solutions, including use of organic manures, compost and pesticides; focus on household food self-sufficiency and the need for better information flows amongst farmers. And an interview with a senior researcher at KARI corroborated the perspectives of the Wote KARI field researcher.</p>
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	<p>These local voices elaborate the settings in which the three interviewees operate and help distinguish why we chose the particular three key informants from the larger sample.</p> <p>Further examination of this concern about the trustworthiness of oral evidence in the form of individual interviews is merited. Bertaux and Kohli, for instance, suggest that one important dimension of the methodological challenge of oral history “is the sheer number of life stories: Some research projects are based on several hundred, others rely on a single one, and the majority fall somewhere in between. The number depends on whether empirically grounded generalization is being sought or whether one is using a case study approach, where only generalizations based on theoretical plausibility, not statistical induction, are possible” (1984: 218, emphasis added).</p> <p>Another critical issue concerns whether the researcher seeks an analysis of the subjective circumstances and experiences of the interviewee, or sets the interview the task of illuminating larger social relations and processes. “While the sociological community usually associates life story research with an orientation toward subjectivity, many contemporary sociologists use this approach to investigate some set of social relationships ... sociologists with a more subjectivist orientation have to acknowledge the existence of social frames ... and those with a more objectivist orientation have to take into account the fact that social structures are the result of sociohistorical processes in which action, and therefore subjectivity, is playing its part. Consequently, advocates of both positions must not only coexist but communicate” (Bertaux and Kohli 1984: 218–219).</p> <p>In our case study application of the interview triad, the emphasis was on social relations, especially regarding the dynamics of communication and action among the three institutions (farm, research institute and ministry). These are not ‘life story’ interviews; yet they do allow for some insight into a subjective analysis. Because of the singular nature of each interviewee’s narration, the data are reflective of them as ‘subjects’ within their institutions. The views expressed are ‘partial,’ or subjective; but they also reflect a certain overlap between the individual and institutional experience, or between the interviewees’ subjectivity and the institutional and wider social relations within which they are embedded.</p> <p>Furthermore, what Bertaux and Kohli emphasize as the need for ‘coexistence and communication’ between researchers adopting different approaches to their work, is a principle that is much more widely applicable and indeed constitutes a recurrent theme in this research. When applied to the area of food security policy, for instance, ‘coexistence’ lends itself to the growing prevalence of crossdisciplinary research design in the academy and research institutes; and, at the state level, inter-ministerial cooperation. Our case study embraces this notion of coexistence and communication,</p>
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	and seeks to better understand 'inter-institutional' divides that exist between farmer, researcher and policy-maker so that these divides might be bridged"
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Candel et al 2015

Structured summary of construct operationalization	
Construct:	capabilities to deal with wicked problems
Research Question:	<p>“Against this background, this article aims to elucidate the presence (and absence) of capabilities that enable the Commission – which we approach as an internally differentiated arena or governance system (Cram 1993; Hooghe 2001; Kassim and Dimitrakopoulos 2007) – to deal with wicked problems”</p> <p>[...]</p> <p>“Our research question interrogates the extent to which the European Commission possesses the capabilities required to deal with wicked problems, and how these capabilities are deployed to resolve such problems”</p>
Article reference:	Candel, Jeroen J. L., Gerard E. Breeman, and Catrien J. A. M. Termeer. 2015. “The European Commission’s Ability to Deal with Wicked Problems: An in-Depth Case Study of the Governance of Food Security.” <i>Journal of European Public Policy</i> 0 (0): 1–25. doi:10.1080/13501763.2015.1068836.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>“Capabilities are defined as ‘the ability of policy makers to observe wicked problems and to act accordingly, and the ability of the governance system to enable such observing and acting’ (Termeer et al. 2013: 4). We focus particularly on the last dimension: the presence of conditions that enable or constrain the Commission’s overall ability to deal with wicked problems.”</p>
Data collection methods	<p>“To obtain a better understanding of the Commission’s use of the five capabilities, we asked Commission officials about their experiences with the wickedness of food security and whether and how they felt enabled to cope with this wickedness. We thus used an interpretive approach, i.e., one that seeks to understand the governance context by focusing on understandings and experiences of people working in that context (Yanow 2000). The advantage of such an approach is that it provides the opportunity to obtain an in-depth understanding of conditions that influence everyday work practice.</p> <p>We conducted an interview round at the Commission in spring 2014, in which we talked to a total of 20 Commission officials who worked in the various services in which food security concerns played a role. Interviews were semi-structured and lasted one hour on average. Most interviews were with individual respondents, but two interviews were with two or more people. Respondents were selected on the basis of the services and units in which they worked, their function or alleged experience with food-security-related issues, whereby we aimed for as much diversity as possible (for an overview, see Supplementary Material SM II). Although many respondents agreed to participate when first approached, availability and willingness were constraints in the case of Commissioners’ cabinet members. Therefore, we asked high-positioned Commission officials, including a former cabinet member, about dynamics at cabinet level.</p>

	<p>We first asked respondents about their function and to what extent and how food security concerns played a role in their work and domain. The second part of the interviews was structured along the five governance challenges, whereby we asked respondents to what extent and how they experienced these challenges (observations), how they dealt with them (strategies), and whether and how they felt enabled or constrained to act (enabling and constraining conditions) (Supplementary Material SM III). For this part of the interview, we referred to the observations, strategies and conditions in Table 1, which we translated to the respondents' frames of reference by using concrete examples. Respondents were given the opportunity to complement enabling conditions with additional conditions specific to the EU context"</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>"We first asked respondents about their function and to what extent and how food security concerns played a role in their work and domain. The second part of the interviews was structured along the five governance challenges, whereby we asked respondents to what extent and how they experienced these challenges (observations), how they dealt with them (strategies), and whether and how they felt enabled or constrained to act (enabling and constraining conditions) (Supplementary Material SM III). For this part of the interview, we referred to the observations, strategies and conditions in Table 1, which we translated to the respondents' frames of reference by using concrete examples. Respondents were given the opportunity to complement enabling conditions with additional conditions specific to the EU context"</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized²⁷)</p>	
<p>Data analysis methods</p>	<p>"The interviews were transcribed and coded. Subsequently, these codes were interpreted and compared, resulting in the categories of conditions reported in the results section (cf. Charmaz 2006). Enabling conditions were interpreted by comparing these categories</p>

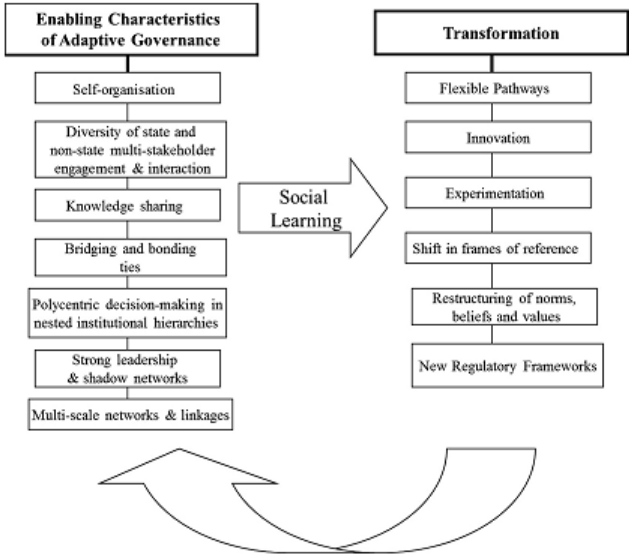
²⁷ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>to Table 1 and the associated capabilities framework, although some categories were found to be specific to the EU context and therefore described in new terms. Constraints were all studied and interpreted inductively, whereby we synthesized similar observations into overarching categories. It is important to point out that respondents may have experienced the governance challenges and presence of capabilities and enabling conditions or constraints in different ways. We describe the dominant views and experiences, but also elaborate on any significant differences between respondents”</p>
<p>Justification of inference from results to conclusions</p>	<p>“Because the enabling conditions and constraints we identified were not specific to food security but to the functioning of the Commission in general, we believe that our findings could well be extended to the way in which the Commission deals with other wicked problems.”</p> <p>[...]</p> <p>“In spite of relatively well-developed capabilities, the Commission seems to lack a meta-capability that would enable a continuous monitoring and adjustment of these capabilities. We would argue that this meta-capability requires at least a deliberate reflection on the system’s ability to cope with a wicked problem in all its facets. We did not find such a mechanism in the case of food security. Instead, actors reflected on, and dealt with, specific elements of the wicked problem. By doing so, they can and do reshape the governance system in a way that could further enable coping with specific governance challenges, but the compartmentalization of these efforts runs the risk of keeping particular challenges unmonitored and unanticipated.”</p>
<p>Discussion of limitations</p>	<p>“Because the enabling conditions and constraints we identified were not specific to food security but to the functioning of the Commission in general, we believe that our findings could well be extended to the way in which the Commission deals with other wicked problems. Nevertheless, some case-specific characteristics should be pointed out. First, although we applied a holistic view of food security, it is a policy problem that has traditionally been dealt with mainly in the EU domain of development co-operation. This is a domain in which the Commission has relatively limited jurisdiction and resources vis-a`-vis the member states, and this makes it more difficult to respond proactively.</p> <p>Second, it is an issue that is widely recognized as a problem in urgent need of attention, as opposed to slumbering or unattended wicked problems. This implies that capabilities have had some time to develop. Third, and conversely, although food security has received policy-makers’ attention for decades, it only came centre stage after the 2007–8 and 2010 food price crises, because of which responses and developments are still very much in progress.</p> <p>Regarding the analysis, our interpretive approach by definition involves a double hermeneutic (Giddens 2007). Both the researcher</p>

	<p>and respondents are subject to bias, which we have aimed to: (i) limit by preparing each interview with a desk study and by comparing respondents' experiences with each other; and (ii) make transparent by presenting the interpretive scheme and using illustrative quotations throughout the results section. Throughout the results section, references to the interview transcripts are made, so that it is clear to the reader which findings can be traced back to the interviews directly."</p>
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Cooper & Wheeler 2015

Structured summary of construct operationalization	
Construct:	adaptive governance mechanisms
Research Question:	“Therefore, the principal aim of this paper is to evaluate the potential of adaptive governance mechanisms to contribute to the resilience of livelihoods to climate risk and to produce recommendations for more effective adaptation policy”
Article reference:	Cooper, Sarah J., and Tim Wheeler. 2015. “Adaptive Governance: Livelihood Innovation for Climate Resilience in Uganda.” <i>Geoforum</i> 65 (October): 96–107. doi:10.1016/j.geoforum.2015.07.015.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	<p>“Fieldwork took place over seven months between January and August 2010 in Mbarara District located in south-western Uganda.”</p> <p>[...]</p> <p>“Two study sites were selected for the presence of active institutional governmental and non-governmental extension and development projects, and their proximity to a weather station in Mbarara Town. Nyanja Parish in Bukiro Sub-County is located 40 km from Mbarara Town and 6 km from the nearest sealed road and town: Bwizibwera. Rukindo Parish in Nyakayojo Sub-County is located just 15 km from Mbarara Town with the major road connecting Kampala with Rwanda running centrally through the parish and the nearest town Ruti (2 km). As a result, farmers here were better connected, with more options for livelihood diversification and market access. A mixed methods research design was used to achieve a balance between quantitative robustness and the qualitative exploration of process and dynamics (Cresswell, 1994; Yin, 2003; Bryman, 2008).</p> <p>Prior to questioning on social learning, farmers had provided details of their livelihood responses to drought, rainfall variability and extreme rainfall events. The learning of these responses, e.g. digging drainage channels, asset accumulation, and selling livestock, etc., was used to frame the questions on social learning. Importantly, many farmers perceived temporal changes in rainfall and temperature which framed their responses. Semi-structured questionnaires (SSI) were used for structure but also to give respondents flexibility to express opinions and ask questions. 160 farmers (80 in each parish) were randomly sampled and asked questions concerning socio-economic characteristics, e.g. farmer groups, perception of climate risk, response to climate risk, adaptive capacity and social learning. All interviews were conducted in the local language, ‘Runyankole’, with translation provided by a recent graduate from a local university. Case study interviews (n = 62) complimented the by providing in-depth, contextual information to processes underpinning success of livelihood innovation.”</p>
Indicators/questions used in data	“Prior to questioning on social learning, farmers had provided details

<p>collection instruments?</p>	<p>of their livelihood responses to drought, rainfall variability and extreme rainfall events. The learning of these responses, e.g. digging drainage channels, asset accumulation, and selling livestock, etc., was used to frame the questions on social learning. Importantly, many farmers perceived temporal changes in rainfall and temperature which framed their responses. Semi-structured questionnaires (SSI) were used for structure but also to give respondents flexibility to express opinions and ask questions. 160 farmers (80 in each parish) were randomly sampled and asked questions concerning socio-economic characteristics, e.g. farmer groups, perception of climate risk, response to climate risk, adaptive capacity and social learning.”</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized²⁸)</p>	 <p style="text-align: center;">Fig. 1. Learning outcomes for transformation and the enabling characteristics of adaptive governance.</p>
<p>Data analysis methods</p>	<p>“Due to the large sample size of the case study interviews, both quantitative and qualitative interpretation of the data was used.” [...] “Individual actor-linkage analysis (n = 62) determined frequency of contact with institutional actors most important for learning. This exercise was triangulated with focus group discussions incorporating participatory actor and institutional analyses (n = 4). Exploration of scalar dynamics was through key informant interviews (n = 35) (actors in NAADS being the primary focus) at each scale: snowball sampling was used to interview ten actors at national scale; twelve at district scale; four at sub-county scale; four at parish scale and five at village scale. A guided and unstructured questionnaire was used to encourage freedom of expression and ease of flexibility for adapting</p>

²⁸ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	to each scale. Data from all scales were then compared to interpret the vertical dynamics of the system. The findings in the following section initially focus on adaptive governance at the lower scales and then progress to vertical-scale integration. Finally, the livelihood outcomes are discussed”
Justification of inference from results to conclusions	
Discussion of limitations	

Donovan et al 2010

Structured summary of construct operationalization	
Construct:	REDD+ Enablers
Research Question:	<p>"The objective of this report is: "...to verify the content of Guyana's reports stating its performance according to the enabling activities under the Guyana-Norway partnership on REDD+, hereunder an assessment of whether the enabling activities have been conducted as described in the Joint Concept Note (JCN)".</p> <p>1 Important activities in the verification process include the following (as per Enabling Indicator 7):</p> <ul style="list-style-type: none"> ☑ Overall verification of whether or not the REDD+ enablers have been met, as described in the six Enabling Indicators"
Article reference:	Donovan, Richard Z., Gary Clarke, and Christian Sloth. 2010. "Verification of Progress Related to Enabling Activities for the Guyana-Norway REDD+ Agreement." USA: Rainforest Alliance.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>"In Section 2 of the JCN, six Enabling Indicators for the fulfilment of the enabling activities have been described. In terms of this independent verification the six Enabling Indicators has been used as a framework for our verification work, titled as follows:</p> <ul style="list-style-type: none"> ☑ Enabling Indicator 1: Strategic framework ☑ Enabling Indicator 2: Continuous multi-stakeholder consultation process ☑ Enabling Indicator 3: Governance ☑ Enabling Indicator 4: Financial mechanism ☑ Enabling Indicator 5: Monitor, report and verify (MRV) ☑ Enabling Indicator 6: The rights of indigenous peoples and other local forest communities as regards REDD+ <p>RA has used the Enabling Indicators as our starting point, and we have added "Verification Indicators" and "Evidence" to use for verifying the Enabling Indicators. In the report there is some overlap of the issues treated in each Enabling Indicator, as some subject areas are crosscutting and thus relevant under two or more of the six Verification Indicators."</p>
Data collection methods	<p>"The verification audit that is described in this report included a number of activities aimed at assessing the contents of the Progress Report of Enabling Activities. These activities included:</p> <ul style="list-style-type: none"> ☑ Individual interviews with stakeholders and other interested parties, ☑ Review of official government documents and databases, ☑ Review of documentation of meetings and stakeholder consultation

carried out by the GOG as part of the activities carried out to implement the Low Carbon Development Strategy (LCDS); and,

☑ Review of other observations or verifications of LCDS activities on the Internet, reports, etc.

The verification team contacted and communicated with a broad range of non-government organizations (NGOs), associations, community representatives, industry organizations as well as individuals in order to evaluate the different viewpoints of the LCDS and REDD+ processes and activities in Guyana. The verification team capitalized on reaching interested parties through the networks of individuals and organizations on the MSSC, as well as capitalizing on prior Guyana-specific experience and networks of Mr. Donovan and Dr. Clarke, and individual or organizational contacts provided by the GON and the GOG. The verification team was not able to contact each and every recommended individual or organization, but attempts at communication were made. It was sought to meet and talk to as many stakeholders as possible within the timeframe of the audit. Inputs from stakeholders and other interested parties was sought soon after the granting of the contract to RA and continue to be welcomed by Rainforest Alliance throughout the process, including up until delivery of a final report to the GON and GOG. Comments received after the submission of final report will be maintained on electronic files by Rainforest Alliance for potential use in any future related verification work, should it happen. The team has sought to collect and note all comments and inputs from stakeholders and use these as inputs in the verification, while keeping the objective of the assignment in focus.”

Indicators/questions used in data collection instruments?	Evidence	
	Documentation of mechanisms (i.e. systems) to disperse funds is available	
	Evidence that the financial planning system is implemented and used.	
	A process for regular reporting is in place and followed	
	Evidence of strategic collaboration between sectors and between varying approaches through interviews with stakeholders.	
	Financial reporting results are distributed publicly and/or to critical stakeholder representatives on a timely basis, or consistently available upon request on a timely basis.	
	An overview of all funding directed to activities relevant to REDD-plus/LCDS efforts is available	
	The overview of funding directed to REDD+ and LCDS is updated on the LCDS website on a regular basis	
	By design, systems and procedures build on and foster coordination between LCDS, REDD+ and other related activities.	
	Written records or interviews demonstrate coordination between the above parties.	
	REDD+ is clearly integrated into the LCDS	
	Written procedures describing mechanisms for incorporating feedback from ongoing monitoring exist	
	Records of inputs to the strategy are kept.	
	Evidence of how this input is used is available (documented or through interviews)	
An internal monitoring system exists.		
Information from the monitoring system is used to improve the strategic framework		
A written stakeholder consultation methodology exists.		

	The methodology is available.		
	The methodology is followed.		
	The methodology allows for independent input.		
	The methodology is perceived as equitable to interested parties, irrespective of geo group.		
	The policy is available (see Developing a Framework for an "Opt in" Mechanism for Concept Paper, March 2010)		
	FPIC is followed with respect to other interest groups.		
	Actions demonstrate adherence to the cited Articles.		
	Procedures exist (see 1.7)		
	Feedback is consistently documented		
	Evidence exists that adaptation is considered and where appropriate occurs based on		
	Records of meetings and other inputs from indigenous and forest dependent people		
	Evidence demonstrating how the above input has been incorporated into the consult		
	Records of meetings and other actions demonstrate participation of women.		
	Evidence demonstrating how women's perspectives are considered in the consultati		
	Awareness Session with Women's Organisations – July 21, 2009 and Report on disc		
	convened by Rural Women's Network).		
	Procedural elements of the cited Conceptual Framework are implemented.		
	RGDP is developed.		
	RGDP requirements are clear.		
	RGDP has clear timelines for implementation		
Records document steps taken to establish IFM.			
Selection criteria emphasize credibility and independence			
Formal dialogue with EU has occurred with the intent of joining FLEGT process and			
Records of meetings and actions taken.			
Formal dialogue with EITI has occurred or an alternative mechanism furthering the			
Records of meetings and actions taken			
Sub-constructs linking governance construct to indicators (unless directly operationalized ²⁹)	Table: Governance-related REDD+ Enablers		
	Enabling Indicator	Criteria	Evidence
	Enabling Indicator 1: Strategic framework	1.1 Financial planning mechanisms to disperse funds shall be in place.	Documentation of disperse funds is
		1.2 Financial planning systems shall be implemented.	Evidence that the implemented an
		1.3 Financial reporting and systems shall be consistent.	A process for res followed
		1.4 Strategic collaboration between different sectors involved with varying approaches shall be implemented.	Evidence of stra sectors and betw documented or stakeholders.
		1.5 Transparency of activities	Financial reporti and/or to critica regular basis, or request on a tim
		An overview of a relevant to REDD publicly available	
		The overview of	

²⁹ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

			LCDS is updated and timely basis
		1.6 Systems and procedures institutionalized and implemented to coordinate between activities such as those related to the LCDS, UN REDD+ and FCPF.	By design, systems foster coordination FCPF. Written records coordination between REDD+ is clearly
		1.7 Procedures to ensure "adaptivity" of strategy to incorporate findings from stakeholder consultation and internal monitoring into the strategic framework.	Written procedures incorporating feedback and monitoring Records of input Evidence of how (documented or An internal monitoring Information from improve the strategic
	Enabling Indicator 2: Continuous multi-stakeholder consultation process	2.1 Stakeholder consultation methodology and management shall be developed (institutionalization, transparency, independence, equitability)	A written stakeholder exists The methodology The methodology The methodology interested parties location, interests
		2.2 Free, prior and informed consent has been adopted as a policy by the Government of Guyana in this process.	The policy is available Framework for a Amerindian Communities (2010) FPIC is followed groups.
		2.3 The following key Principles and Articles enshrined in the Guyana Constitution (2003) serve as the overarching framework which anchors the national stakeholder process for the LCDS review and are adhered to in a consistent and effective manner: [] Article 13: Democracy and Decision Making [] Article 149 G: Indigenous Peoples Rights [] Article 149 J: The Environment [] Article 154 A: Protection of Human Rights	Actions demonstrate Articles.
		2.4 Procedures and systems including feedback and adaptation systems shall be implemented	Procedures exist Feedback is consistent Evidence exists where appropriate received.
		2.5 Specific attention to indigenous groups and forest dependent communities shall be incorporated.	Records of meetings indigenous and forest Evidence demonstrate been incorporated Records of meetings demonstrate participation Evidence demonstrate

			perspectives are process (e.g. Re Women's Organ Report on discuss Rural Women's I
		2.6 The use of multi-stakeholder consultation and special attention to indigenous groups will be verified according to the Government of Guyana's "Conceptual Framework on Process for the MultiStakeholder Consultations on Guyana's Low Carbon Development Strategy"	Procedural elem Framework are i
	Enabling Indicator 3: Governance	3.1 A REDD+ governance development plan (RGDP), which includes the issues listed in "Table 1 Contents of REDD+ Governance Plan" of the JCN shall be developed. The plan should have clear requirements and timelines for its implementation.	RGDP is develop RGDP requireme RGDP has clear
		3.2 Steps shall have been taken to establish independent forest monitoring (IFM) by a credible, independent entity.	Records docume Selection criteria independence
		3.3 Activities shall be undertaken to initiate a formal dialogue with the European Union, with the intent of joining the Forest Law Enforcement, Governance and Trade (FLEGT) processes towards a Voluntary Partnership Agreement (VPA).	Formal dialogue intent of joining towards a VPA. Records of meet
		3.4 Activities shall be initiated to engage in a formal dialogue with the Extractive Industries Transparency Initiative (EITI) or an alternative mechanism agreed by the Participants to further the same aim as EITI.	Formal dialogue alternative mech agreed to Records of meet
Data analysis methods			
Justification of inference from results to conclusions			
Discussion of limitations			

Douxchamps et al 2015

Structured summary of construct operationalization	
Construct:	adoption of agricultural adaptation strategies
Research Question:	“Our hypothesis was that adoption of agricultural adaptation strategies makes a significant contribution to household-level food security for all farm households, although we expect differences between farm households on the type of strategies adopted”
Article reference:	Douxchamps, Sabine, Mark T. Van Wijk, Silvia Silvestri, Abdoulaye S. Moussa, Carlos Quiros, Ndèye Yacine B. Ndour, Saaka Buah, et al. 2015. “Linking Agricultural Adaptation Strategies, Food Security and Vulnerability: Evidence from West Africa.” <i>Regional Environmental Change</i> , September, 1–13. doi:10.1007/s10113-015-0838-6.
Operationalization:	
Item	Quoted text
Construct definition	
Data collection methods	“Sampling strategy and survey implementation For this study, we surveyed 600 households (200 per site) using a stratified sampling strategy and IMPACTlite’ survey methodology described in detail in Rufino et al. (2012). The data are available online at https://thedata.harvard.edu/dvn/dv/CCAFSbaseline/ (Silvestri et al. 2014). The first layer of the sampling strategy consisted in identifying key agricultural production systems within each of the CCAFS sites. High-resolution satellite images, transect drives and interviews with local experts and key informants were used to identify these production systems. Within each of the identified production systems, representative villages were randomly selected up to a total of 20 villages per site. In each village, ten households were randomly selected from a list of all households. All households were interviewed using a questionnaire that included information on: detailed household composition and structure, crop and livestock production and management, household economy (assets, incomes and expenses) and food consumption”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ³⁰)	
Data analysis methods	“The relationships between household characteristics and adaptation strategies were explored using various univariate and multivariate techniques. Generalized linear models were fitted for food security and farm characteristics for all sites.

³⁰ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>The best model structure was selected by model averaging and the Akaike information criterion, using the package AICcmodavg in R (R development Core Team 2007). Then, based on the key explanatory variables for food security and adoption of adaptation strategies, a household typology was developed (details below in 'Typology of households practicing adaptation strategies' section) and tested by performing a canonical analysis on principal coordinates, using the CAP programme (Anderson 2004)"</p>
<p>Justification of inference from results to conclusions</p>	<p>"Assets are a key indicator of the degree of poverty (Carter and Barrett 2006); households with more assets are more likely to adopt new agricultural practices (Wood et al. 2014)" [...] "Off-farm income from sources such as artisanal work, commerce, gold mining, wage employment and remittances contributes to buffer production risks associated with climate variability and to stabilize cash flows and food consumption (Brown et al. 1994)" [...] "Smallholder farm households are typically characterized by a strong reliance on labour for production and income generation, and this variable is therefore an important driver of household-level food security (Brown et al. 1994)" [...] "Increased market orientation can have two opposing effects on food security: through increased diversification, it improves both the level of food consumption in normal times and the ability to cope during bad times, but if it is accompanied by a big fall in subsistence production, it can have a deleterious effect on food security (IFAD 2014)." [...] "if markets are working well, the circulation of cash increases in rural areas and gives households broader opportunities to construct pathways out of poverty (Ellis and Freeman 2004)."</p>
<p>Discussion of limitations</p>	

Duncan & Barling 2012

Structured summary of construct operationalization	
Construct:	participation in the Committee on World Food Security
Research Question:	“The challenges of setting up, mobilizing and implementing workable procedures for the participation of a range of new constituencies in the CFS in meaningful ways are presented below.”
Article reference:	Duncan J, Barling D. Renewal through Participation in Global Food Security Governance: Implementing the International Food Security and Nutrition Civil Society Mechanism to the Committee on World Food Security. <i>Int J Sociol Agric Food.</i> 2012;19: 143–161.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“To illustrate the shifts in participation outlined above, and to highlight some of the emerging tensions, we turn to the reformed committee on World Food security and the associated but autonomous international civil society Mechanism and review ways in which civil society actors are co-ordinating participation in global food security governance.”
Data collection methods	“This article draws upon interview data and field-work conducted through observation of the United nation committee on World Food security (CFS) and the international civil society Mechanism (CSM) between October 2010 and March 2012”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ³¹)	
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

³¹ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Eakin et al 2011

Structured summary of construct operationalization														
Construct:	Institutional fit between New Public Management and Adaptation Governance													
Research Question:	“We have looked at ways that NPM has affected governance and adaptive capacity and the institutional fit between the objectives of NPM and the requirements for managing evolving climate-change risks”													
Article reference:	Eakin H, Eriksen S, Eikeland P-O, Øyen C. Public sector reform and governance for adaptation: implications of new public management for adaptive capacity in Mexico and Norway. <i>Environ Manage.</i> 2011;47: 338–351.													
Supporting literature	Eakin, Hallie, and Kirsten Appendini. 2008. “Livelihood Change, Farming, and Managing Flood Risk in the Lerma Valley, Mexico.” <i>Agriculture and Human Values</i> 25 (4): 555–66. doi:10.1007/s10460-008-9140-2.													
Operationalization:														
<u>Item</u>	<u>Quoted text</u>													
Construct definition	<p>“By bringing existing concerns and opportunities associated with the implementation of NPM together with insights on adaptive capacity and governance emerging in the theoretical literature, we have identified several thematic areas in which the aims of NPM and adaptive capacity-building intersect, to highlight the difference between the anticipated outcomes of NPM and expectations for adaptive capacity (Table 1). We selected these three thematic areas because of their salience in both the NPM and adaptive-capacity literatures; we do not claim that Table 1 captures either the characteristics of NPM or adaptive capacity comprehensively.”</p> <table border="1"> <thead> <tr> <th colspan="3">Table 1 Key areas of potential influence of NPM reforms on the adaptive capacity of sectors and actors</th> </tr> <tr> <th></th> <th>Potential positive effects on adaptive capacity</th> <th>Potential negative effects on adaptive capacity</th> </tr> </thead> <tbody> <tr> <td>Technical and financial Capacities</td> <td>More efficient allocation of resources to where they are required</td> <td>A hollowing out of public sector regulatory, technical and financial capacity due to shift in objectives from professionalism to economic efficiency and due to a devolution of functions and expertise from government departments to alternative service delivery systems</td> </tr> <tr> <td>Learning,</td> <td>Devolution of</td> <td>Divisions of</td> </tr> </tbody> </table>		Table 1 Key areas of potential influence of NPM reforms on the adaptive capacity of sectors and actors				Potential positive effects on adaptive capacity	Potential negative effects on adaptive capacity	Technical and financial Capacities	More efficient allocation of resources to where they are required	A hollowing out of public sector regulatory, technical and financial capacity due to shift in objectives from professionalism to economic efficiency and due to a devolution of functions and expertise from government departments to alternative service delivery systems	Learning,	Devolution of	Divisions of
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Learning,	Devolution of	Divisions of												

	knowledge, institutional memory	responsibilities, enhancing the representation of local knowledge and increasing the autonomy of subordinate governmental levels in responding to local needs	operational and policy functions in public agencies, leading to policy fragmentation, undermining ability to address complex long-term multisectoral issues, and inhibiting information exchange and responding to local needs
	Participation, empowerment, accountability	Enhanced responsiveness of government to citizens as customers/clients; Decentralized decision making to where problems are experienced	Loss of accountability, potential centralization of power within managerial and commercial actors rather than elected representatives or civil society stakeholders
Data collection methods	<p>“The study was carried out as a qualitative case study in the pre-fab housing industry of Norway, coupled with an analysis based on a theoretical study of publications focused on climate change, NPM and building processes in Norway. The study involved 36 interviews, carried out in 2005–2007, incorporating public officials in municipal offices from six municipalities, active in planning and building services, property administration, urban development and environmental administration, and managers and craftsmen from four different manufacturers of prefabricated housing (for further details, see Eriksen and others 2007, 2009). The manufacturers and municipalities were located in different climate zones in Norway (see Fig. 1).”</p> <p>[...]</p> <p>“The findings of a study of flood management of the Upper Lerma Valley (see Fig. 2) carried out in 2004 and 2005 illustrates the potential effects of these reforms for adaptive capacity. The study evaluated the institutional capacity for flood-risk management in the Upper Lerma Valley in an effort to illuminate how policy-making, governance and disaster response interact to influence capacity for adaptation to climate change. The project involved 48 interviews</p>		

	<p>with public officials in federal, state and municipal offices who were active in water, agriculture, civil protection, urban development and environmental administration. (For full details of the approach and methodology of this study, see Eakin and Appendini 2008, Eakin and others 2010)”</p> <p>(Eakin et al 2011)</p> <hr/> <p>“The two case studies presented below involved the collection of qualitative data from semi-structured interviews conducted in July and August of 2004 with rural residents affected by floods, as well as from in-depth interviews with public officials at the municipal, state, and federal level associated with civil protection, agricultural policy, and water management. The household-level interviews were the result of a random sample of 20 households in Emilio Portes Gil and 28 households in San Bartolo de Llano drawn from a list of 104 and 426 households, respectively, who reported flood effects to the state Secretary of Agriculture and Rural Development (SEDAGRO) in 2003. The goal of these semi structured interviews was to explore the range of households’ perceptions of loss in relation to changing livelihood strategies and the influence of public policy in the communities.</p> <p>Farmers were asked to describe what they perceived as a flood, to discuss the frequency of flooding in the community, and to describe the impact of the 2003 flood on their property, crops, consumption, livestock, and livelihoods. They were also requested to explain their own response to their losses as well as their observation of the response of the local, municipal, and state governments. The additional key-informant interviews with local leadership and public officials captured policy and sectoral perspectives on the cause and solution to the problem of flooding.”</p> <p>(Eakin & Appendini 2008)</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>“The goal of these semi structured interviews was to explore the range of households’ perceptions of loss in relation to changing livelihood strategies and the influence of public policy in the communities.</p> <p>Farmers were asked to describe what they perceived as a flood, to discuss the frequency of flooding in the community, and to describe the impact of the 2003 flood on their property, crops, consumption, livestock, and livelihoods. They were also requested to explain their own response to their losses as well as their observation of the response of the local, municipal, and state governments. The additional key-informant interviews with local leadership and public officials captured policy and sectoral perspectives on the cause and solution to the problem of flooding.”</p> <p>(Eakin & Appendini 2008)</p>

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized³²)</p>	
<p>Data analysis methods</p>	<p>The interviews were analyzed using qualitative data analysis software (NVIVO). Parent and child codes are described in the supporting article Eakin, Lerner and Murtinho 2010 “Adaptive capacity in evolving peri-urban spaces” <i>Global Environmental Change</i>. 20: 14-22. (Table 2)</p>
<p>Justification of inference from results to conclusions</p>	<p>“In each case, we first examine the public sector reforms carried out at the national level and ways in which they represent a shift away from governance conditions conducive for adaptation. Next we investigate how key facets of adaptive capacity—of the building sector in Norway and the water sector in Mexico—have been directly or indirectly affected by NPM reforms. Presenting a case of NPM reforms from an emerging economy and new democracy (Mexico) together with a case from a country with a long history of democratic process and political stability (Norway) highlights the commonalities of intent and structure that define NPM reforms in both contexts. Although these two studies initially were neither designed for comparison nor shared a common research approach, identification of similarities through comparative analysis of two diverse geographic contexts is particularly fruitful for eliciting generalizable lessons rather than case-specific results”</p>
<p>Discussion of limitations</p>	<p>“Although these two studies initially were neither designed for comparison nor shared a common research approach, identification of similarities through comparative analysis of two diverse geographic contexts is particularly fruitful for eliciting generalizable lessons rather than case-specific results”</p>

³² By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Structured summary of construct operationalization	
Construct:	Seed governance in Syria
Research Question:	“This paper provides an analysis of seed governance in Syria up to the beginning of 2011, as affected by governance regimes from the international to the local level, from a social science and gender perspective”
Article reference:	Galiè, Alessandra. 2013. “Governance of Seed and Food Security through Participatory Plant Breeding: Empirical Evidence and Gender Analysis from Syria.” <i>Natural Resources Forum</i> 37 (1): 31–42. doi:10.1111/1477-8947.12008.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>“Paavola and Gouldson (2009) argue for an analysis of governance “regimes” that include customs, norms, rules and also governance frameworks that shape how an actor or an activity are governed in a particular context. This paper focuses on seed regimes by analysing the intersections between seed governance frameworks and the informal rules regulating seed management at community and intra-household level.”</p> <p>[...]</p> <p>“Seed governance is defined in this paper as the formal and informal rules and behaviours that affect rights, access to and control of seed at the international, national, local and individual levels”</p>
Data collection methods	<p>“The empirical work involved in-depth fieldwork with a panel of 12 women from ten households in three Syrian villages (see Figure 2), who were selected purposively following a diagnostic study (Galiè, 2013a).”</p> <p>[...]</p> <p>“In addition, in 2009, a male MA student carried out seven semi-structured interviews with 24 men from the three villages in order to explore men’s opinion of the intra-household division of labour in agriculture and their understanding of women’s role in agronomic management (see Figure 2).”</p> <p>[...]</p> <p>“During three stages offieldwork (2007-2008, 2009 and 2010) the following methods were employed in women-only meetings: (a) daily and seasonal calendars (Chambers, 1983) were used to assess men’s and women’s involvement in farming, across changing seasons and sites of production;</p> <p>(b) semi-structured interviews were used in all three fieldwork stages (2007-2008, 2009 and 2010) to explore household management of seed (handling, storing, selecting, selling and buying) and women’s</p>

	<p>access to seed; and</p> <p>(c) women’s perception of household decision-making dynamics related to seed management was assessed through matrix analysis (Miles and Huberman, 1994), matching women’s daily activities and their power to make decisions about their activities.”</p>
Indicators/questions used in data collection instruments?	<p>“the management of seed at household level and its changes consequent to the involvement of the women farmers in the PPB programme”;</p> <p>[...]</p> <p>“men’s and women’s involvement in farming”;</p> <p>[...]</p> <p>“men’s opinion of the intra-household division of labour in agriculture and their understanding of women’s role in agronomic management (see Figure 2)”;</p> <p>[...]</p> <p>“the interaction between the international and national legal frameworks, and customary rules operating at ground level”;</p> <p>[...]</p> <p>“household management of seed (handling, storing, selecting, selling and buying) and women’s access to seed”.</p>
Sub-constructs linking governance construct to indicators (unless directly operationalized ³³)	<p>informal rules regulating seed management at community and intra-household level; seed governance frameworks; rights, access to and control of seed; international, national, local and individual levels; Gender-sensitive seed governance.</p>

³³ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

<p>Data analysis methods</p>	<p>“The empirical analysis of seed management at ground level was based on direct observation and participatory assessment, both of (a) the management of seed at household level and its changes consequent to the involvement of the women farmers in the PPB programme and (b) the interaction between the international and national legal frameworks, and customary rules operating at ground level.” [...] “(c) women’s perception of household decision-making dynamics related to seed management was assessed through matrix analysis (Miles and Huberman, 1994), matching women’s daily activities and their power to make decisions about their activities”</p>
<p>Justification of inference from results to conclusions</p>	<p>“On the basis of these findings, it is possible to interpolate the “proof of principle” 12 into the larger setting, to ask what might be the best options for the government of Syria to support farmers and achieve food security through improved seed governance while enhancing social and gender equity? The options, this paper suggests, would include the following” [...] “12 That is, this research proves that it is possible to enhance women’s food-related rights through PPB in the studied contexts. This understanding can be useful in other contexts where, however, its validity needs to be assessed.”</p>

Discussion of limitations	The study was in-depth and based on a small number of respondents. As a consequence, the findings provide a proof of principle and an understanding of complex processes (such as how international and national seed governance regimes interact with gender norms and customary rules at ground level) that in turn can be helpful to appreciate other situations in broadly similar settings. No generalization is however, possible.
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Gereffi et al 2005

Structured summary of construct operationalization	
Construct:	global value chain governance
Research Question:	"In the following section, we highlight how global value chain governance structures have evolved in four distinct industries: bicycles, apparel, fresh vegetables, and electronics. Some trajectories of change are identified on Table 2, and we refer to these trajectories as we discuss each of the cases"
Article reference:	Gereffi G, Humphrey J, Sturgeon T. The governance of global value chains. <i>Rev Int Polit Econ.</i> 2005;12: 78–104. doi:10.1080/09692290500049805
Supporting literature	Sturgeon, Timothy J. 2002. "Modular Production Networks: A New American Model of Industrial Organization." <i>Industrial and Corporate Change</i> 11 (3): 451–96. doi:10.1093/icc/11.3.451.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>"We acknowledge, as do most other frameworks that seek to explain industry organization – from transactions costs to global commodity chains to organizational theory – that market-based relationships among firms and vertically integrated firms (hierarchies) make up opposite ends of a spectrum of explicit coordination, and that network relationships comprise an intermediate mode of value chain governance. What we add to this conceptualization is an extension of the network category into three distinct types: modular, relational, and captive. Thus, our typology identifies five basic types of value chain governance"</p> <p>[...]</p> <p>"Having laid out this typology, our next step is to develop an operational theory of global value chain governance. Under which conditions would we expect market, modular, relational, captive, or vertically integrated global value chain governance to arise? Building on the work cited above, we will identify and discuss three key determinants of value chain governance patterns: complexity of transactions; codifiability of information; and capability of suppliers."</p>
Data collection methods	<p>"This discussion is based on Galvin and Morkel (2001)"</p> <p>[...]</p> <p>"This discussion is based on Sturgeon (2002)."</p>
Indicators/questions used in data collection instruments?	

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized³⁴)</p>	
<p>Data analysis methods</p>	
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	

³⁴ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Gupta et al 2010

Structured summary of construct operationalization	
Construct:	inherent characteristics of institutions facilitating adaptive capacity
Research Question:	“How can the inherent characteristics of institutions to stimulate the adaptive capacity of society from local through to national level be assessed?”
Article reference:	Gupta, Joyeeta, Catrien Termeer, Judith Klostermann, Sander Meijerink, Margo van den Brink, Pieter Jong, Sibout Nootboom, and Emmy Bergsma. 2010. “The Adaptive Capacity Wheel: A Method to Assess the Inherent Characteristics of Institutions to Enable the Adaptive Capacity of Society.” <i>Environmental Science & Policy</i> 13 (6): 459–71. doi:10.1016/j.envsci.2010.05.006.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“The fundamental storyline is that institutions that promote adaptive capacity are those institutions that (1) encourage the involvement of a variety of perspectives, actors and solutions; (2) enable social actors to continuously learn and improve their institutions; (3) allow and motivate social actors to adjust their behaviour; (4) can mobilize leadership qualities; (5) can mobilize resources for implementing adaptation measures; and (6) support principles of fair governance.”
Data collection methods	<p>“The fundamental storyline is that institutions that promote adaptive capacity are those institutions that (1) encourage the involvement of a variety of perspectives, actors and solutions; (2) enable social actors to continuously learn and improve their institutions; (3) allow and motivate social actors to adjust their behaviour; (4) can mobilize leadership qualities; (5) can mobilize resources for implementing adaptation measures; and (6) support principles of fair governance.”</p> <p>[...]</p> <p>“The Adaptive Capacity Wheel can be applied in different ways. This section highlights how the Adaptive Capacity Wheel can be applied both qualitatively and semi-quantitatively. Both applications have specific implications for ‘scoring’ adaptive capacity.”</p> <p>[...]</p> <p>“Data was collected through in-depth interviews with nineteen stakeholders involved in the municipalities’ local water management”</p> <p>[...]</p> <p>“In data collection, we collected data on each criterion by reading all the policy documents and conducting a content analysis.”</p>
Indicators/questions used in data collection instruments?	<p>“Developing a list of questions can help secure information regarding the criteria. In the case of interviews, we argue that there are essentially six groups of questions – one on each dimension – following a warm-up question and a concluding question.</p> <p>1</p> <p>The questions should be open, with possible follow-up questions to</p>

	<p>elucidate the specific nature of the answer especially in relation to the definitions of criteria provided in Table 1. The questions should, as far as possible, not use technical language: i.e. they should not say: is directional leadership a strong point of the local institution; but rather: how would you characterise the nature of the leadership shown or stimulated by the existing rule? The warm-up and concluding questions should try and ascertain if some important element has been missed out in the discussions and if there are reinforcing or contradictory ideas and forces within the institutional system in a specific context. For observations a similar technique could be used, with the difference that the researcher should see if the dimensions cover every relevant aspect. In the case of a document analysis, a more comprehensive list of questions (for example, one on each criterion) could be useful, however, those should be well defined and delineated to keep a clear focus while studying the texts. The stakeholder answers, the observations and/or the document analysis must be registered in a formal background document without any additional interpretation”</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized³⁵)</p>	
<p>Data analysis methods</p>	<p>“The third step consists of analyzing the data collected to score each criterion of adaptive capacity (see table under Fig. 1). It is necessary to have different researchers independently score the background data and then discuss the difference of opinion, if any, on a specific criterion. This helps to ensure transparency as well as robust results. All researchers should keep a record of the arguments why a particular criterion has been scored in a particular way. There are some optional further steps: if needed, it is possible to generate aggregated scores for adaptive capacity as a whole, by adding the scores of each criterion and then dividing by the number of criterion per dimension, and then adding the scores for each dimension and then dividing by 6 (the number of dimensions). These steps are only useful if the researcher wishes to compare a large number of different</p>

³⁵ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>institutions (see, for example, Table 2); but such an aggregation method needs to be used with caution since not all criteria are additive”</p> <p>[...]</p> <p>“The Adaptive Capacity Wheel can be applied in different ways. This section highlights how the Adaptive Capacity Wheel can be applied both qualitatively and semi-quantitatively. Both applications have specific implications for ‘scoring’ adaptive capacity.”</p> <p>[...]</p> <p>“In the data analysis process, we used the scoring system, assigned scores to criteria based on the interviews (see Fig. 2) and clarified the underlying arguments.”</p> <p>[...]</p> <p>“In the data analysis, we undertook the steps mentioned in Section 3 and, since a content analysis can often lie in the eye of the beholder, the content analysis was double checked in three rounds by three different researchers, individually and then jointly. We kept a record of why we scored a criterion in a particular way in order to make the arguments transparent. Quantitative scores were assigned to the different criteria, which were then tallied to get a single value for each institution”</p>
<p>Justification of inference from results to conclusions</p>	<p>“The fourth step is to translate the information collected into a story – a story that communicates the strengths and weaknesses of a specific institution or institutional context in terms of adaptive capacity. In this step, the scores are interpreted to give them meaning in their context. For example, what does a ‘-1’ score on learning capacity mean for the institution that is being researched; and what can be done to improve this dimension of adaptive capacity? Data interpretation also includes explaining (inter)dependencies between criteria and/or dimensions; and tensions between criteria and/or dimensions; which criterion appears to be in conflict with another criterion in a specific situation and why? Finally the researcher needs to draw conclusions on what the interpretations imply about the ability of a specific institution to promote the adaptive capacity of society; and what can be done to improve the adaptive capacity of the institution”</p> <p>[...]</p> <p>“In the data interpretation process, we interpreted the scores on criteria in the context of both municipalities. For example, it appeared that in both regions, indistinct accountability procedures for causing and solving water problems imply that residents often do not act in accordance to the roles assigned to them in the law. This behaviour can be explained by the fact that municipalities are urbanized and that residents often have no information on, or interest in, ground water flows. The complex structure of cities calls for a centralized management of responsibilities and accountability. However, such a top-down management approach of governmental</p>

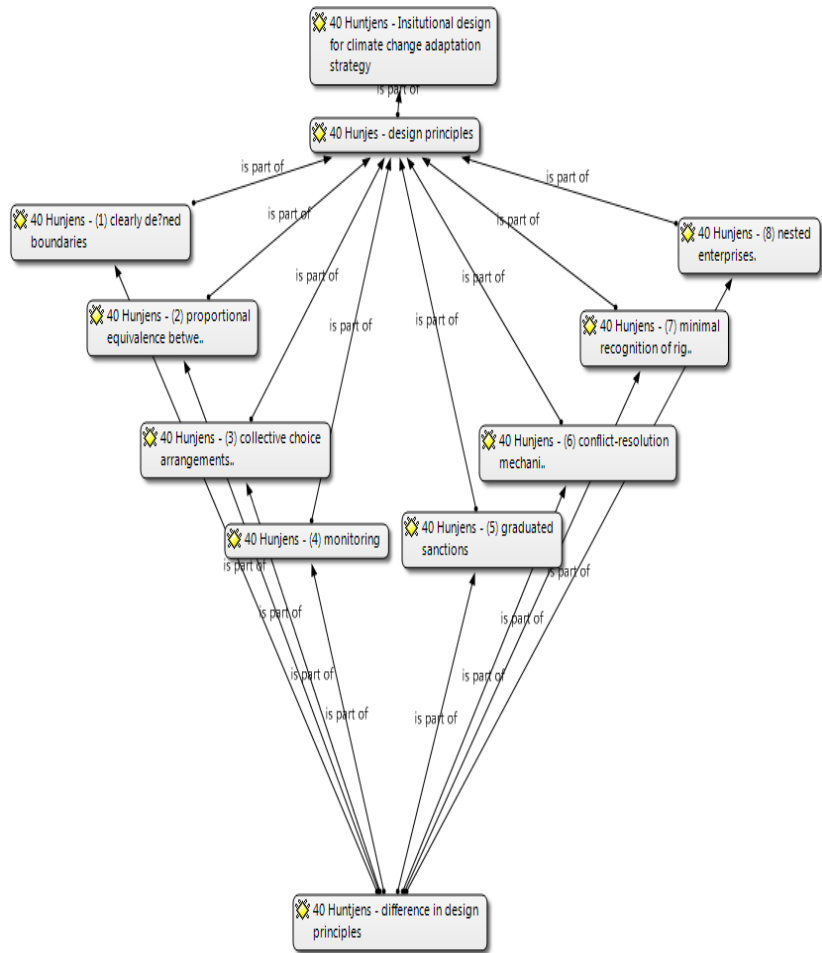
	<p>bodies hampers variety, learning capacity and the room for autonomous change in some ways.</p> <p>This analysis shows that in cities, there might be a tension between regulating responsibilities between actors and adopting a multi-level, collaborative management approach”</p>
Discussion of limitations	<p>“The Adaptive Capacity Wheel can also be applied to assess policies and regulations. Where one is comparing many institutions, it may seem more relevant to undertake an additional step and aggregate the information into single quantitative scores. We have argued that the criteria are not additive and, hence, this step should be undertaken with caution. This implies that in addition to the steps taken in the previous case study, the optional fifth step under analyzing the data should be undertaken (under Section 3.3). One can aggregate the information on the different criteria into one value and again aggregate the data on the six dimensions into one score on a specific institutions’ ability to promote the adaptive capacity of societies; however, with increasing aggregation, detail is lost. It is thus recommended to never use the aggregate tool without the separate Adaptive Capacity Wheels backing such an aggregation.” [...]</p> <p>“The Adaptive Capacity Wheel also has some interesting paradoxes: for example, we hinted before at the paradox between variety and leadership: strong leadership may automatically lead to less variety and weak leadership may have the advantage that a lot of variety is developed in society.</p> <p>Such paradoxes in the Wheel reflect paradoxes in social reality itself. Understanding adaptive capacity may call for expert judgements regarding how to deal with the overlaps and contradictions between criteria.</p> <p>Other key questions include: How objective is the evaluation? Are equal shares for each dimension and criterion in the Wheel reflective of equal weights? In response to the first question, a comprehensive coding system allows for enhanced transparency of the evaluation; even though there will always be a subjective element in it. In response to the second question, we have assigned equal weights to the dimensions and criteria in our applications. However, in a specific context, one dimension or criterion might be more important than another, and explaining these kinds of contextual varieties is an important step in applying the wheel. This does not stop future applications of the wheel from experimenting with assigning weights in specific contexts, and comparing how adaptive capacity improves or changes over time”</p>

Huntjens et al 2012

Structured summary of construct operationalization	
Construct:	Institutional design for climate change adaptation strategy
Research Question:	"The overall objective of this paper is to develop institutional design propositions for climate change adaptation based on comparative analysis of strategy development"
Article reference:	Huntjens, Patrick, Louis Lebel, Claudia Pahl-Wostl, Jeff Camkin, Roland Schulze, and Nicole Kranz. 2012. "Institutional Design Propositions for the Governance of Adaptation to Climate Change in the Water Sector." <i>Global Environmental Change</i> 22 (1): 67–81. doi:10.1016/j.gloenvcha.2011.09.015.
Supporting literature:	Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Zsuzsanna Flacher, Susana Neto, Romana Koskova, Maja Schlueter, Issah NabideKiti, and Chris Dickens. 2008. "The Role of Adaptive and Integrated Water Management (AIWM) in Developing Climate Change Adaptation Strategies for Dealing with Floods and Droughts – a Formal Comparative Analysis of Eight Water Management Regimes in Europe, Asia, and Africa." Deliverable 1.7.9b of NeWater project. Germany: Institute of Environmental Systems Research, University of Osnabruck.
	Huntjens, Patrick, Claudia Pahl-Wostl, Benoit Rihoux, Maja Schlueter, Zsuzsanna Flachner, Susana Neto, Romana Koskova, Chris Dickens, and Isah Nabide Kiti. 2011. "Adaptive Water Management and Policy Learning in a Changing Climate: A Formal Comparative Analysis of Eight Water Management Regimes in Europe, Africa and Asia." <i>Environmental Policy and Governance</i> 21 (3): 145–63. doi:10.1002/eet.571.
	Huntjens, Patrick, Claudia Pahl-Wostl, and John Grin. 2007. "Formal Comparative Analysis of Adaptive Capacity of Water Management Regimes in Four European Sub Basins." Deliverable 1.7.9. NeWater Project. Osnabruck: Institute of Environmental Systems Research, University of Osnabruck.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	<p>"The primary data sources were documents about the process events, water policies and other project plans, and interviews with participants or conveners involved in their preparation, implementation and follow-up. In all three cases the authors were involved as experts during the adaptation process, although the cases were compiled post hoc. For each case study we undertook 10 extensive interviews with experts representing ministries, water authorities, planners, academic institutions and civil society. The interviewees in each case study were selected because they had been closely involved in the process of developing the selected strategy. An effort was made to select a mixture of experts to provide a fair representation of the perspectives on the processes being analyzed."</p> <p>(Huntjens et al 2012)</p> <hr/> <p>"A calibrated approach, using a standardized questionnaire for the elements of AIWM (see table 3), and a questionnaire for determining key characteristics of adaptation strategies (see table 5), expert judgment for both questionnaires, and reinterpretation of outcomes by means of relevant literature) was used to compare the water management regimes in the selected case-studies. A complete outlay of the questionnaires being used for data collection can be</p>

	<p>found in NeWater Deliverable 1.7.9a (Huntjens et al., 2007).”</p> <p>(Huntjens et al 2008)</p> <hr/> <p>“A calibrated approach, using a standardized questionnaire for the characteristics of a water management regime, and a questionnaire for determining key characteristics of adaptation strategies (see Table 5), expert judgement for both questionnaires and reinterpretation of outcomes by means of relevant literature was used to compare the water management regimes in the selected case studies. A complete outlay of the questionnaires being used for data collection can be found in Huntjens et al. (2007).”</p> <p>(Huntjens et al 2011a)</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>“During the interviews we discussed for each design principle the extent to which that specific aspect was similar or different when talking about (the processes of) climate change adaptation in the countries under consideration using a standardized set of questions (see Annex 1). We used the original design principles of Ostrom (1990) as point of departure for our analyses”</p> <p>(Huntjens et al 2012)</p> <hr/> <p>[Full template of questionnaires in Huntjens et al 2007]</p>

Sub-constructs linking governance construct to indicators (unless directly operationalized³⁶)



Data analysis methods

“Our selection of strategies being analyzed is based on earlier work on the comparison of water governance regimes, their adaptation strategies and levels of policy learning (see Huntjens et al., 2008, 2011a,b). With only three cases it is not expected that major generalizations will suddenly emerge but that the contrasts will help to refine the analyses.”

[...]

“In the following section we will summarize the key observations in each case study; a more detailed description of analyses of individual design propositions in each case study is provided in Huntjens et al. (2011a)”

(Huntjens et al 2012)

“By using standardized questionnaires, or using these questionnaires for standardized interviews, qualitative data was being collected in

³⁶ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>such a way that it was possible to compare weighted averages on each separate indicator. The weighted average has been calculated by multiplying each individual score by the weight which respondents assigned to it; the total sum of all respondents in one case-study was then divided by the total assigned weight (by adding up all weights assigned to this specific indicator). Furthermore, the level of inconsistency (standard deviation) for each variable has been calculated, next to 'Independent Samples T Tests', in order to test for significant differences between the case-studies.</p> <p>The reason for developing standardized answering options in the questionnaire is that it supports a formal comparative analysis of the results. Furthermore, the questionnaire allows for assigning weights to each indicator. In this way it is possible to aggregate multiple indicators, resulting in a score for one variable, or for aggregated variables, resulting in a score for one meta-variable (e.g. category of variables)."</p> <p>(Huntjens et al 2008)</p> <hr/> <p>"A calibrated approach, using a standardized questionnaire for the characteristics of a water management regime, and a questionnaire for determining key characteristics of adaptation strategies (see Table 5), expert judgement for both questionnaires and reinterpretation of outcomes by means of relevant literature was used to compare the water management regimes in the selected case studies. A complete outlay of the questionnaires being used for data collection can be found in Huntjens et al. (2007)."</p> <p>(Huntjens et al 2011a)</p>
Justification of inference from results to conclusions	<p>"Our selection of strategies being analyzed is based on earlier work on the comparison of water governance regimes, their adaptation strategies and levels of policy learning (see Huntjens et al., 2008, 2011a,b)"</p>
Discussion of limitations	<p>"With only three cases it is not expected that major generalizations will suddenly emerge but that the contrasts will help to refine the analyses."</p> <p>[...]</p> <p>"Our comparative study had several important limitations. Only three cases were examined. The cases were compiled post hoc. For simplicity we selected as units of analysis one or a tight cluster of closely related events as a focus of our analysis of the processes. In practice all of these 'cases' were part of a much larger and less coherent collection of activities, meetings and networking that might constitute a process for strategy development. A more historical, long-term, analysis of individual cases was beyond the scope of this analysis but undoubtedly would reveal further insights about the building of trust and dynamics of relations, and changing understanding of actors involved. Another important limitation was</p>

	<p>that effectiveness was not systematically assessed. In other words, to what extent the design propositions contribute to climate change adaptation is not entirely clear yet, since the outcomes of the adaptation strategies being studied are largely unknown at present. Most of these strategies have only recently been introduced and there has not been enough time to test their long-term appropriateness and effectiveness in relation to their institutional arrangements. It does not mean however that there are no tangible outputs for the governance systems being studied. For a governance regime to deal with the current and anticipated impacts of climate change it first needs to have a policy or strategy in place, either for flood protection or drought resilience, or for both. From this perspective, the output of a governance system is not only defined by its physical interventions, but also by means of its management interventions. The three case-studies are selected because they all have climate change adaptation strategies in place, being defined as outputs of extensive policy processes”</p>
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Jacobi et al 2015 a

Structured summary of construct operationalization	
Construct:	self-organization and learning capacities (for agroecosystem resilience)
Research Question:	“Taking stock of how the different cocoa growing systems (monoculture and different forms of agroforestry) coexist in Alto Beni, this study aimed to: (a) assess how cocoa farmers perceive climate change, and build a set of indicators of agroecosystem resilience based on a transdisciplinary approach; (b) determine resilience—mainly of the agroecosystem (aspects of buffer capacity)—under the different cocoa cultivation systems; and (c) explore to what degree self-organization and learning capacities enhance agroecosystem resilience in cocoa cultivation or, more specifically, what role organic cooperatives and organic certification play in building resilience to climate change”
Article reference:	Jacobi, Johanna, Monika Schneider, Patrick Bottazzi, Maria Pillco, Patricia Calizaya, and Stephan Rist. 2015. “Agroecosystem Resilience and Farmers’ Perceptions of Climate Change Impacts on Cocoa Farms in Alto Beni, Bolivia.” <i>Renewable Agriculture and Food Systems</i> 30 (02): 170–83. doi:10.1017/S174217051300029X.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“In order to gather information on socio-economic aspects of resilience (self-organization and adaptive capacity), we asked farmers about their affiliation and interaction with cocoa cooperatives, participation in courses on cocoa cultivation and motivations”
Data collection methods	“These methods include focus group discussions and key informant interviews with different stakeholders. In the present study, we adopted this methodology to capture farmers’ perceptions of climate change impacts. In a first phase, we defined critical external influences on cocoa production based on five expert interviews and three focus group discussions with cocoa producers. Climate change impacts and adaptation strategies from the cocoa producers’ perspective were further assessed in a final workshop with 30 cocoa producers from Alto Beni. The workshop followed an interactive methodology for the participatory evaluation of risks and adaptation possibilities suggested by the Livelihood and Forestry Programme Nepal”
Indicators/questions used in data collection instruments?	affiliation and interaction with cocoa cooperatives; participation in courses on cocoa cultivation; motivations behind their affiliation to a cocoa cooperative

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized³⁷)</p>	<pre> graph BT A["42 - self-organization and learning.."] B["42: affiliation and interaction wit.."] C["42: motivations behind their aff?li.."] D["42: participation in courses on co.."] B -- "is part of" --> A C -- "is part of" --> A D -- "is part of" --> A </pre>
<p>Data analysis methods</p>	
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	

³⁷ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Jacobi et al 2015 b

Structured summary of construct operationalization	
Construct:	social–ecological resilience
Research Question:	“This study analyzes the social–ecological resilience of organic and nonorganic cocoa farms with a view to adapting cocoa production to the rapidly changing socioeconomic and climatic conditions. We further address the question of how these two strategies—certified organic cocoa production and non-certified production—are related to the farm-specific compositions of livelihood assets and how they enhance or reduce a cocoa farming system’s resilience.”
Article reference:	Jacobi, Johanna, Monika Schneider, Maria Pillco Mariscal, Stephanie Huber, Simon Weidmann, Patrick Bottazzi, and Stephan Rist. 2015. “Farm Resilience in Organic and Nonorganic Cocoa Farming Systems in Alto Beni, Bolivia.” <i>Agroecology and Sustainable Food Systems</i> 39 (7): 798–823. doi:10.1080/21683565.2015.1039158.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“Milestad and Darnhofer’s concept of farm resilience is based on the work of Carpenter et al. (2001), from which it adopts the three components of buffer capacity, self-organization, and adaptive capacity”
Data collection methods	<p>“We interviewed cocoa farmers with and without organic certification in and around the four communities of Simay (22), San Antonio (13), Delicias (12), and Santa Ana (5) in the Alto Beni valley. Selection was based on the availability of households where cocoa was a mayor income source, and the readiness of an adult family member to participate in the interview. We conducted 52 semistructured interviews with cocoa farmers on 30 organic and 22 nonorganic farms”</p> <p>[...]</p> <p>“Further, we conducted a more in-depth participant observation following Martin (2004) in 15 families (8 organic, 7 nonorganic) from among the 52 households interviewed. We also conducted five expert interviews with representatives and agricultural consultants of local farmers’ organizations in order to complement the information from the interviews as proposed by Martin (2004).”</p> <p>[...]</p> <p>“We determined resilience indicators based on the results of a prestudy with three focus group discussions and a participatory workshop of one day with 30 cocoa producers (Jacobi et al. 2013). The workshop followed an interactive methodology for the evaluation of risks and exploration of adaptation options by the Livelihood and Forestry Programme Nepal ([LFP] 2010). We did not discuss resilience as such, but how cocoa farms could persist and adapt to risks and stress factors. Together with the whole group, we assessed the farmers’ perceptions of risks and stress factors for cocoa production including climate change impacts, as well as suggested and already implemented adaptation strategies and goals for sustainable and adaptive farming systems. Then the</p>

participants ranked the risks and stress factors according to their importance, and the adaptation options according to feasibility and sustainability”
 [...]

 “We complemented quantitative data of the resilience indicators with qualitative information for better contextualization by means of participant observation (Martin 2004). The first author shared daily work with the respective farming family during one to three days, consisting mostly of cocoa harvesting and post-harvest activities, such as fermentation and drying of the beans. Activities were analyzed together with the family in order to capture family-specific social capital (in terms of social connectedness and capacity building). Qualitative aspects of connectedness were addressed by inquiring the meaning of being part of a local farmers’ organization such as a cooperative, and changes in the community due to the emergence of such organizations and organic certification. We also discussed the farmers’ experiences with agroforestry and their interest in it.”

Indicators/questions used in data collection instruments?

TABLE 1 Indicators for the resilience of cocoa farming systems

Concept	Resilience component	Goal	Indicator	Source
Resilient farming systems	Buffer capacity	High agrobiodiversity Risk spreading Access to livelihood assets	Tree diversity Crop diversity Cocoa yield Income sources	Cocoa farmers Cocoa farmers Cocoa farmers Literature
	Self-organization	Connectedness Self-sufficiency Profitable farms	Affiliation to farmers' organizations Subsistence level Annual family income	Literature Literature Cocoa farmers
	Adaptive capacity	Capacity building Feedback mechanisms	Participation in courses Information sources	Cocoa farmers Literature

“We assessed both tree species diversity and crop diversity in the interviews by asking which trees were planted in the cocoa plots and which crops were cultivated, sold, and consumed. Cocoa yields were captured as reported by the farmers for the previous year (Philpott et al. 2007). Further, a number of different income sources may function as an insurance against potential loss of income from cocoa (Anim-Kwapong and Frimpong 2006). We defined the following categories of income sources: crops, livestock, timber and non-timber forest products, hunting and fishing, and off-farm activities”
 [...]

“Connectedness was assessed by asking how many farmers’ organizations family members were affiliated to; this included non-governmental or other organizations engaged in agriculture. In order to better understand self-organization in our sample, we complemented this quantitative assessment with a qualitative analysis of connectedness and the common rules and norms of farmers’ organizations (Ostrom 1990). To this end, we analyzed farmers’ understanding of organic agriculture, the meaning they ascribed to being part of a cooperative, and their perceptions of

	<p>what had changed in their community due to the emergence of the cooperative to which they were affiliated” [...]</p> <p>“We evaluated the families’ subsistence level, represented by the share of food consumed that was produced on-farm” [...]</p> <p>“To capture part of the profitability of the farming strategies evaluated, we assessed family income using the following equation proposed by Eyzaguirre (2005):</p> $I_t = R + L + O,$ <p>where:</p> <p>I is the family income generated over a certain period of time t (in our case, one year);</p> <p>R is the net revenue from production and consists of the value generated from plants, livestock, handcraft, fishing, hunting, timber, and collection (generated value is calculated based on gross production and market price) minus the costs of production (which consist of expenditures for labor force, inputs such as fertilizer, seeds, and fuel, and the rent for land and equipment);</p> <p>L is income from (off-farm) wage labor; and</p> <p>O is additional income from off-farm sources, such as transport services</p> <p>(Eyzaguirre 2005).” [...]</p> <p>“We assessed the learning capacity related to agricultural knowledge for each household based on the number of courses on cocoa cultivation family members had participated in.” [...]</p> <p>“As an indicator of feedback mechanisms, we recorded the number of information sources that a farming family used for organizing productive cycles. The categories were: newspaper, radio, television, markets, phone, agricultural projects, government programs, extension services, religious institutions, community assemblies, and others.” [...]</p>
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Sub-constructs linking governance construct to indicators (unless directly operationalized³⁸)

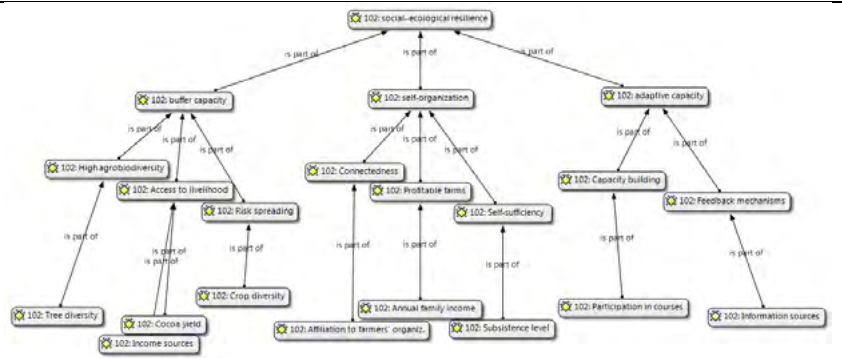


TABLE 1 Indicators for the resilience of cocoa farming systems

Concept	Resilience component	Goal	Indicator	Source
Resilient farming systems	Buffer capacity	High agrobiodiversity	Tree diversity	Cocoa farmers
		Risk spreading	Crop diversity	Cocoa farmers
		Access to livelihood assets	Cocoa yield Income sources	Cocoa farmers Literature
	Self-organization	Connectedness	Affiliation to farmers' organizations	Literature
		Self-sufficiency	Subsistence level	Literature
		Profitable farms	Annual family income	Cocoa farmers
	Adaptive capacity	Capacity building	Participation in courses	Cocoa farmers
		Feedback mechanisms	Information sources	Literature

Data analysis methods

“Quantitative data were statistically tested for significant differences using one-way analysis of variance (ANOVA), with organic certification or noncertification as the explanatory variable and the resilience indicators as the response variables. We checked model assumptions (residuals normally distributed with equal variance) visually (normal Q–Q, Tukey–Anscombe and jitter plots). If they were not fulfilled, non-parametric Kruskal–Wallis rank sum tests were performed. Statistical tests were calculated using version 2.14 of the R open source statistics program”

Justification of inference from results to conclusions

Discussion of limitations

³⁸ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Jawtuschk et al 2013

Structured summary of construct operationalization	
Construct:	sustainability performances of food enterprises
Research Question:	<p>“In compliance with these Guidelines, the Research Institute of Organic Agriculture (FiBL) has developed a tool for a Sustainability Monitoring and Assessment Routine (“SMART”) and has tested its applicability, in order to answer the following research questions:</p> <p>1. How can the SAFA Guidelines be successfully operationalized for a comparative analysis of sustainability performances of food enterprises? 2. To what extent does the SMART tool meet the needs of the enterprise?”</p>
Article reference:	Jawtuschk, Julia, Christian Schader, Matthias Stolze, Lukas Baumgart, and Urs Niggli. 2013. “Sustainability Monitoring and Assessment Routine: Results from Pilot Applications of the FAO SAFA Guidelines.” In <i>Symposium International Sur L’Agriculture Biologique Méditerranéenne et Les Signes Distinctifs de Qualité Liée à l’Origine</i> , 2-4 Décembre 2013, Agadir, Morocco. http://orgprints.org/29547/ .
Supporting literature	FAO. 2014. “SAFA: Sustainability Assessment of Food and Agriculture Systems - Guidelines Version 3.0.” Rome: FAO.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ³⁹)	“FAO developed the SAFA Guidelines which define 20 themes and about 60 subthemes, with corresponding sustainability objectives and guidance, for sustainability assessment procedures (FAO, 2012).”

³⁹ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<pre> graph TD A["318: sustainability performances of."] B["318: Economic resilience"] C["318: Good governance"] D["318: Social well-being"] E["318: Environmental integrity"] F["318: G1. Corporate Ethics"] G["318: G2. Accountability"] H["318: G3. Participation"] I["318: G4. Rule of Law"] J["318: G5. Holistic Management"] B -- "is part of" --> A C -- "is part of" --> A D -- "is part of" --> A E -- "is part of" --> A F -- "is part of" --> C G -- "is part of" --> C H -- "is part of" --> C I -- "is part of" --> C J -- "is part of" --> C </pre>
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

Juhola & Westerhoff 2011

Structured summary of construct operationalization	
Construct:	adaptation governance
Research Question:	“Through an analysis of planned adaptation in two European countries, this paper explores adaptation governance and the modes through which adaptation decision-making is taking place. Here, “planned adaptations” are considered as conscious policy choices or response strategies that deliberately seek to address changing conditions posed by climate change (IPCC, 2007). Drawing on the literature related to governance, complex systems, and networks, the paper focuses particularly on the role of networks in adaptation governance, and the relationship between such networks and formal institutions.”
Article reference:	Juhola, Sirkku, and Lisa Westerhoff. 2011. “Challenges of Adaptation to Climate Change across Multiple Scales: A Case Study of Network Governance in Two European Countries.” <i>Environmental Science & Policy</i> 14 (3): 239–47. doi:10.1016/j.envsci.2010.12.006.
Supporting literature	Juhola, Sirkku. 2010. “Mainstreaming Climate Change Adaptation: The Case of Multi-Level Governance in Finland.” In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskitalo, 149–87. Springer Netherlands. http://link.springer.com/chapter/10.1007/978-90-481-9325-7_4 .
	Westerhoff, Lisa. 2010. “‘Planning for Today’: The Nature and Emergence of Adaptation Measures in Italy.” In <i>Developing Adaptation Policy and Practice in Europe: Multi-Level Governance of Climate Change</i> , edited by E. Carina H. Keskitalo, 233–70. Springer Netherlands. http://link.springer.com.proxy.bnl.lu/chapter/10.1007/978-90-481-9325-7_6 .
Operationalization:	
Item	Quoted text
Construct definition	“Here, “planned adaptations” are considered as conscious policy choices or response strategies that deliberately seek to address changing conditions posed by climate change (IPCC, 2007).”
Data collection methods	“A total of 47 interviews with political and administrative bodies, research organisations and NGOs were conducted in both countries. All interview material was transcribed and translated into English”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴⁰)	Changing conditions posed by climate change; policy choices or response strategies (<- Formal institutions; informal institution; networks in governance; formal institutions and informal networks interact across different scales)

⁴⁰ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<pre> graph BT A[P86:43 - adaptation governance] B[P86:43 - changing conditions posed by c..] C[P86:43 - policy choices or response str..] D[P86:43 - Formal institutions] E[P86:43 - formal institutions and inform..] F[P86:43 - informal institution] G[P86:43 - networks in governance] B -- is part of --> A C -- is part of --> A D -- is part of --> C E -- is part of --> C F -- is part of --> C G -- is part of --> C </pre>
Data analysis methods	<p>“5 For more detailed analyses of how policy-making styles and systems have affected the emergence of adaptation in both case study countries, see (Westerhoff, 2010) for Italy and (Juhola, 2010) for Finland.”</p>
Justification of inference from results to conclusions	
Discussion of limitations	

Kabubo-Mariara 2007

Structured summary of construct operationalization	
Construct:	Property rights in land
Research Question:	We explore the link between property rights in land, population density and adoption of land conservation practices and thus test the applicability of Boserup's hypothesis (see Section 2) in this Kenyan context.
Article reference:	Kabubo-Mariara, Jane. 2007. "Land Conservation and Tenure Security in Kenya: Boserup's Hypothesis Revisited." <i>Ecological Economics</i> 64 (1): 25–35. doi:10.1016/j.ecolecon.2007.06.007.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	<p>"The study uses both primary and secondary panel data. The primary data were collected from a cross-section of households in 1999 and 2000 in three phases. The first phase corresponded with the long rains (March–May 1999), the second phase with the short rains (October–December 1999) and the third phase with the long rains (March–May 2000).</p> <p>Primary data were collected from a self weighting probability sample totaling 1600 observations using a detailed questionnaire. The questionnaire was designed to collect information regarding economic and demographic characteristics of sampled households, land conservation practices and land use rights, among other covariates of interest. To these data we appended data on population density at the cluster level from the population census.</p> <p>Secondary data on village level biomass for the study were obtained from the Department of Resource Surveys and Remote Sensing (DRSRS), Ministry of Natural Resources, Environment and Wildlife and are based on satellite images and vegetation indices collected by the National Oceanic and Atmospheric Administration (NOAA), and translated into kilograms per acre by the DRSRS."</p>
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴¹)	Expected land rights. Adoption of a given conservation technology; land rights with no conservation technology; specific land rights held by individuals.

⁴¹ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Data analysis methods	<p>“To test Boserup's hypothesis, we carry out sample mean tests for differences in population densities by adoption of land conservation practices”</p>
Justification of inference from results to conclusions	
Discussion of limitations	<p>“The author however acknowledges a number of shortcomings of this paper, owing mostly to constraints associated with the available data. These include inability to explore the determinants of the level of land conservation; inability to analyse conservation decisions at the plot level; inability to extend measurement of land rights to perceptions/continuum such as mode of acquisition; inability to take into account the cost of land conservation measures; and inability to take into account the underlying soil conditions/quality prior to adoption of land conservation practices. Another shortcoming of the study is the limitation of the short period of the panel used in this study. In spite of the limitations of the short period of the panel used in this study, this paper makes an important contribution in understanding the interplay of land rights, population density and decisions to invest in land conservation. A longer panel would be more appropriate for assessing the long-term relationship between population density, tenure security and conservation on one hand and evolution of land rights on the other. We recommend future research in this direction.”</p>

Kay 2002

Structured summary of construct operationalization	
Construct:	State policy
Research Question:	“to what extent are differences in agrarian structure, landlord–peasant relations, and state policy significant factors in explaining variations in the development performance between the two regions?”
Article reference:	Kay, Cristóbal. 2002. “Why East Asia Overtook Latin America: Agrarian Reform, Industrialisation and Development.” <i>Third World Quarterly</i> 23 (6): 1073–1102. doi:10.1080/0143659022000036649.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴²)	Agrarian reforms
Data analysis methods	“The comparative analysis focuses on three key issues: state capacity and policies, agrarian structure and class relations, and the significance of certain forms of intersectoral resource flows in development”
Justification of inference from results to conclusions	“In this section I am seeking to account for the different development trajectory and performance of the selected Asian cases and Latin America, particularly regarding the role of agriculture. I am less concerned with deriving policy conclusions from the comparative analysis as this is fraught with pitfalls, especially in view of the different historical context (Legler, 1999) and as there is no single path to development (Akyüz, 1998). In many ways South Korea and Taiwan are special cases and their success cannot easily be replicated (WooCumings, 1997; Jenkins, 1991a). But this does not mean that lessons cannot be learned and that these might not have policy relevance (Evans, 1998; Taylor, 1997). My aim, however, is limited to accounting for some key factors that might enlighten our understanding of this spectacular turnaround. There are three main issues that I consider particularly relevant in explaining the differences and which merit further reflection within a comparative perspective. First, the nature and policy-making capability of the state. Second, the

⁴² By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

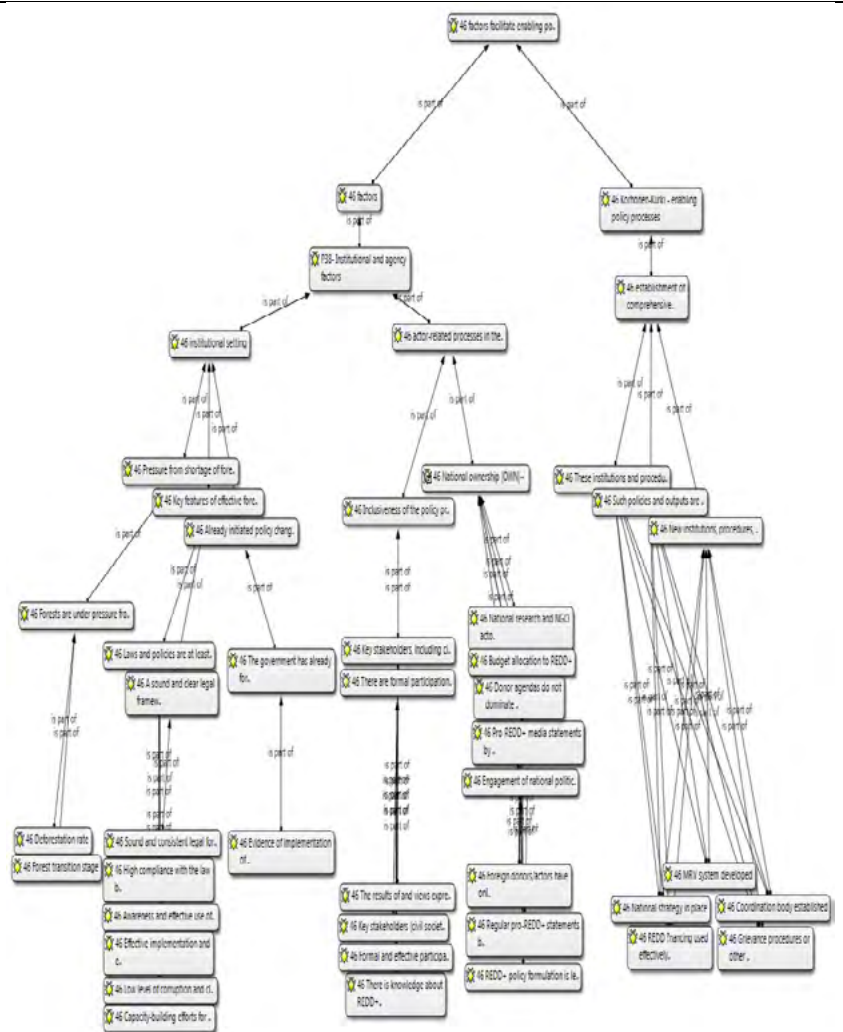
	<p>agrarian land tenure, class configuration and agrarian policy pursued. Third, the particular interactions between the agricultural and industrial sectors in the process of development as well as the state's industrial strategy. I will analyse each of these three interrelated themes in what follows."</p>
<p>Discussion of limitations</p>	<p>"I am less concerned with deriving policy conclusions from the comparative analysis as this is fraught with pitfalls, especially in view of the different historical context (Legler, 1999) and as there is no single path to development (Akyüz, 1998). In many ways South Korea and Taiwan are special cases and their success cannot easily be replicated (WooCumings, 1997; Jenkins, 1991a)." [...] "Discussion of the development successes and failures of countries is far from closed; hopefully comparative studies will continue to enrich development theory and policy"</p>

Korhonen-Kurki et al 2014

Structured summary of construct operationalization	
Construct:	factors facilitate enabling policy processes
Research Question:	“To support the successful development and implementation of REDD+ policies in these countries, it is necessary to understand which preconditions need to be met and which settings and factors facilitate enabling policy processes for a 3E REDD+ .”
Article reference:	Korhonen-Kurki, Kaisa, Jenniver Sehring, Maria Brockhaus, and Monica Di Gregorio. 2014. “Enabling Factors for Establishing REDD+ in a Context of Weak Governance.” <i>Climate Policy</i> 14 (2): 167–86. doi:10.1080/14693062.2014.852022.
Operationalization:	
Item	Quoted text
Construct definition	“Underpinning the present analysis is the theoretical assumption that both institutional and agency factors affect the direction of REDD+ policies (see also Brockhaus, Di Gregorio, & Mardiah, 2013; Corbera & Schroeder, 2011). Therefore, the analysis considers the institutional setting on the one hand and the actor-related processes in the policy arena on the other. Here, ‘institutional setting’ is defined as ‘the formal and informal regulations, rules and norms that are established over time and that are not easily changed or transformed’ (Baumgartner, Jones, & Wilkerson, 2011; North, 1990; Ostrom, 1990; Scharpf, 2000). The other key concept, ‘the policy arena’, is viewed as being framed by institutions but shaped by the actions of the actors, whether individuals, communities, organizations or networks, and characterized by more or less hierarchical or inclusive processes, involving a range of powerful actors, which can foster or prevent certain policies and influence policy formulation (Arts, 2012; Corbera & Schroeder, 2011; Scharpf, 1997).”
Data collection methods	“To prepare for the analysis, data gathered by the country teams during the past two years were summarized. A preliminary list of potentially important factors was compiled during a workshop with participants from several GCS-REDD country teams. This list formed the basis for an online survey completed by project researchers. This survey, although not representative, served to elicit experts’ views on which factors were relevant for cross-country comparison, and why so. Following reviews of the REDD+ country studies, the number of conditions was reduced (overlapping factors were merged, related factors combined into meta-factors, and some factors were excluded based on theoretical expectations or case knowledge). The relevance of the final list of 15 factors was verified once again by the country experts. This process captured the comparable quintessence of two years of intensive case-specific research by almost 50 experts.”
Indicators/questions used in data collection instruments?	{ {Deforestation rate; Forest transition stage}; {Sound and consistent legal forestry framework and policies; Effective implementation and enforcement mechanisms; Capacity-building efforts for implementing agencies; High compliance with the law by citizens and businesses; Awareness and effective use of rights; Low level of

	<p>corruption and clientelistic patterns undermining policy implementation}; {Evidence of implementation of policy strategies in related fields (e.g. one or more of the following: NAMA, PES, deforestation, low-carbon development)} } ;</p> <p>{ {Regular pro-REDD+ statements by government appear in the media; REDD+ policy formulation is led by national political institutions; Foreign donors/actors have only a minor/advisory role and agenda in REDD+ policy formulation}; {Key stakeholders (civil society, private sector, indigenous people) participate or are at least consulted during the REDD+ process; Formal and effective participation mechanisms are developed and present; The results of and views expressed during the consultation process are included in REDD+ policy documents; There is knowledge about REDD+ at the local level.} } ;</p> <p>{ {MRV system developed; Coordination body established; REDD financing used effectively; National strategy in place; Grievance procedures or other mechanisms to enhance accountability in REDD+ systems established} }</p>
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Sub-constructs linking governance construct to indicators (unless directly operationalized⁴³)



Data analysis methods

“For the comparative analysis the list was reduced to eight factors using the same procedure as above, and these were further operationalized by indicators that were established in a consultative process with international experts of REDD+ . To allow cross-checking of results, this final assessment took place in a joint workshop attended by experts from the GCS-REDD country teams. Each country team had at least two group members, who discussed and assessed the indicators and presented the final results in the plenary with all country teams present. The threshold between 0 and 1 assessment for each factor was set through careful examination of the characteristics of the factor, and also drew on substantial contextual knowledge of case countries. As most of the countries share quite similar governance characteristics, thresholds needed to be set in a way that the – sometimes small but decisive – differences

⁴³ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>between the countries could be observed and accentuated so that the specific country features could be revealed. Finally, six factors out of the eight were identified as conditions having a role in determining the success or failure in achieving 3E REDD+ policy outputs, and the remaining two, together with a few important earlier factors that were similar across all countries, formed the joint context. These data formed a reliable and valid starting point for the QCA (Rihoux & De Meur, 2009, p. 48). The analysis was conducted using the software Tosmana (Cronqvist, 2007).”</p>
<p>Justification of inference from results to conclusions</p>	<p>“The aim of QCA is to enable systematic cross-case comparison without neglecting case complexity, thus allowing for modest, medium-range generalization and theorizing.” [...] “In QCA, each case is understood as a specific combination (or ‘configuration’) of factors, called ‘conditions’. QCA is based on the concept of multiple conjunctural causation, meaning that (1) most often, not one factor (called condition) but a combination of factors will lead to the outcome; (2) different combinations of conditions can produce the same outcome (equifinality); and (3) one condition can have different impacts on the outcome, depending on its combination with other factors and the context (Rihoux, 2007, p. 367).” [...] “Whereas the institutional setting provides key conditions for an enabling context, actions by political actors shape the policy arena and the processes that lead to transformational change within that context. Drawing on theoretical considerations, previous studies (Corbera & Schroder, 2011; Di Gregorio et al., 2012; Gupta, 2012; Wong & Surkin, 2008), and the inductive consultation process, three hypothetical proximate conditions on the policy arena, and its impact on REDD+ , were defined in order to find out which of them are necessary to accomplish the outcome-enabling configurations and which combinations provide for a sufficient configuration for REDD+ :”</p>
<p>Discussion of limitations</p>	<p>“This analysis does have some limitations. In addition to the general problem of having a large number of conditions but only a few cases – which the two-step approach was intended to minimize – the small number of cases with outcome 1 considerably constrains the interpretation of results. This limited empirical diversity minimizes the scope for generalizing these results. Only when more cases become available – that is, when more countries make progress with national REDD+ policies – will it be possible to refine our understanding. In particular, it will be interesting to analyse if and how countries with less enabling institutional settings will proceed. For better understanding of the complex realities and the uniqueness of each national context for REDD+ , future analysis should focus on the interdependencies of the identified factors in</p>

successful countries.”

Lebel et al 2006

Structured summary of construct operationalization	
Construct:	Governance
Research Question:	"How do certain attributes of governance function in society to enhance the capacity to manage resilience?"
Article reference:	Lebel, L., J. Anderies, B. Campbell, C. Folke, S. Hatfield-Dodds, T. Hughes, and James Wilson. 2006. "Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems." <i>Ecology and Society</i> , June. http://digitalcommons.library.umaine.edu/sms_facpub/52 .
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	"Governance, the structures and processes by which societies share power, shapes individual and collective actions (Young 1992). Governance includes laws, regulations, discursive debates, negotiation, mediation, conflict resolution, elections, public consultations, protests, and other decisionmaking processes. Governance is not the sole purview of the state through government, but rather emerges from the interactions of many actors, including the private sector and not-for-profit organizations. It can be formally institutionalized or expressed through subtle norms of interaction or even more indirectly by influencing the agendas and shaping the contexts in which actors contest decisions and determine access to resources."
Data collection methods	
Indicators/questions used in data collection instruments?	

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁴⁴)</p>	
<p>Data analysis methods</p>	<p>“This paper explores the association between attributes of governance and the ability to manage resilience in a set of case studies undertaken by the Resilience Alliance (Table 1).” [...] “We end with comparative observations drawing on additional cases when appropriate and identifying other critical issues.”</p>
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	<p>“These findings are necessarily tentative. The collection of case studies explored in this paper was assembled post hoc, and the individual studies themselves were not designed to address questions about governance. Much of the variation in the association between governance arrangements and the capacity to manage resilience remains unexplained. Our exploration also raised several theoretical and practical issues. First is the problem of measurement. The capacities of individual actors or institutionalized relationships among them are not straightforward to assess. Although there are methods available, most governance attributes have not been systematically assessed in</p>

⁴⁴ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>the same places in which social-ecological relationships are studied. Hence, our understanding of, for example, what makes participation and deliberation effective remains rudimentary (e.g., Rayner 2003, Rowe and Frewer 2004). Second is the problem of experts. Analysis of governance structures and processes sometimes reveals the darker side of conservation in which livelihood needs or the rights of minorities are passed over in the interests of maintaining, say, ecological resilience. Ultimately, these decisions about how to deal with trade-offs and priorities among social and environmental objectives are and should be political, and should not be left to experts and narrowly framed models (Goldman 2004).”</p> <p>[...]</p> <p>“Assessments and other tools for managing the science-policy interface can be particularly helpful in these circumstances (Jasanoff and Wynne 1998, Social Learning Group 2001). Third is the problem of causality. Our explorations here indicate that it is possible that the capacity to manage resilience may influence the form that governance takes and that ecological feedbacks may constrain both governance and this capacity.</p> <p>What is abundantly clear is that, in exploring the sustainability of regional social-ecological systems, we are usually faced with a set of ecosystem goods and service that interact with a collection of users who have different technologies, interests, and levels of power. In this situation, in our roles as analysts, facilitators, change agents, or stakeholders, we must ask not only: the resilience of what, to what? We must also ask: for whom?”</p>
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Leith et al 2012

Structured summary of construct operationalization	
Construct:	“capacity to manage natural resources”
Research Question:	“In this article, we detail pervasive and distinctive local narratives about what constrains and enables capacity to manage natural resources collected through the T13 process across NSW, and we identify commonalities and differences among these localities and the overall patterns of capacity across the state”
Article reference:	<p>Leith, Peat, Brent Jacobs, Peter R. Brown, and Rohan Nelson. 2012. “A Participatory Assessment of NRM Capacity to Inform Policy and Practice: Cross-Scale Evaluation of Enabling and Constraining Factors.” <i>Society & Natural Resources</i> 25 (8): 775–93. doi:10.1080/08941920.2011.637548.</p> <p>Brown, Peter R., Brent Jacobs, and Peat Leith. 2012. “Participatory Monitoring and Evaluation to Aid Investment in Natural Resource Manager Capacity at a Range of Scales.” <i>Environmental Monitoring and Assessment</i> 184 (12): 7207–20. doi:10.1007/s10661-011-2491-y.</p>
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>“Capacity has been the subject of much discussion in the health, development, and extension literatures, yet it remains contested (Beckley et al. 2008). In the context of NRM, recent reviews suggest that capacity can be defined as a function of (1) the resources available to achieve a particular outcome and (2) the capability to utilize those resources to achieve certain ends (Macadam et al. 2004; Thomson and Pepperdine 2004). Resources in this context are anything that an individual or group can muster to address a problem. Capability to utilize such resources can also be understood in terms of assets or attributes of individuals or groups, including catalysts and leadership. Capacity can be legitimately considered across scales, but must be understood in relation to specific objectives, that is, capacity to do what (Beckley et al. 2008)? For example, NRM action within a family might target a particular problem such as soil conservation or weed management, yet it will emerge through the interaction of diverse attributes, relationships, and phenomena, including interests, attitudes, motivation, knowledge, education, enthusiasm, cash flow, and equity. Analysis of capacity thus requires a framework that is flexible enough to include such diverse drivers and constraints of action in the context of outcomes sought”</p> <p>(Leith et al)</p> <p>-----</p> <p>“The capacity of NR managers is defined as the set of resources available to support the adoption of improved NRM practices, and the ability of NR managers to deploy resources effectively in the pursuit of more sustainable natural resource use (Macadam et al.</p>

	<p>2004; Thomson and Pepperdine 2004). The prioritisation of NRM funding programmes has often been top–down with limited understanding of the multiple dimensions of landholder capacity leading to a failure to address the underlying capacity constraints of local communities for NRM (Leith et al. 2012). Without appropriate engagement with local NR managers many NRM programmes have been criticised as lacking legitimacy (e.g. Morrison 2009).”</p> <p>(Brown et al)</p>
Data collection methods	<p>“For T13, local legitimacy and relevance were crucial and a participatory approach using the SLA framework was developed, trialled, and applied across NSW (see Brown et al. 2010 for full methodological details).”</p> <p>[...]</p> <p>“The workshops were structured to provide opportunity for wide-ranging dialogue about matters that substantially constrain and enable NRM. Initially, following brief introductions, a member of the team presented briefly on the rationale for T13 and the policy orientation of the process at regional and state levels of NRM governance. NRM was introduced in terms of the 13 statewide NRM targets, which define NRM for the purpose of this research. We emphasized our interest in the participants’ diverse perspectives on regionally relevant NRM as central to understanding NRM capacity. Groups defined the agro-ecological regions or industries that they felt comfortable to represent. In some workshops, the groups were comprised of land managers from diverse industries or geographical areas, and the group opted to run the process in parallel “breakout sessions.”</p> <p>Most of the 3- to 4-hour period allotted for the workshops was taken up with three overlapping, discursive tasks: facilitated discussion to develop of a set of indicators for each capital, each with a clear statement of the rationale for its selection; evaluation of the degree to which each indicator was currently enabling or constraining capacity within industry=agro-ecological zones; and reflection on the reasons for the value assigned within each region and the important differences between regions. The workshop process was facilitated by one team member, with another recording the information on a computer, and the information was projected onto a screen to enable real-time clarification. It was emphasized that the process was the first drafting stage of reports to policymakers, and participants were encouraged to continually review and edit our notations, clarify points, and highlight differences of opinion within groups.</p> <p>The form of interaction between facilitator, note taker, and participants was critical to the process, and especially to articulating indicators that adequately represented key aspects of an open-ended dialogue. In the early stages of a workshop, wide-ranging discussion was encouraged with a focus on what enabled and</p>

constrained NRM action. The note taker attempted to capture key phrases, ideas, and sentiments, while the facilitator encouraged participants to think in terms of the livelihoods framework by suggesting that a particular statement might relate to a particular capital. Soon participants were also talking in terms of the capitals, and the facilitator directed the discussion to identifying and naming up to five indicators per capital. The group then systematically worked through the capitals, identifying indicators and providing a rationale for each, including how they related to one another.”
[...]

“Numerical ratings assigned to each indicator by the group were averaged by type of capital. In the T13 workshops, assigning of values was achieved through a facilitated discussion that iteratively developed the relative degree to which indicators constrained or enabled NRM capacity at the time of the workshop. Mean ratings for each region were summarized as a series of livelihood pentagons, in which each axis is assigned a capital with a scale of 0 to 5 corresponding to the rating scale used in the workshops. This scale provides a continuum reflecting the degree to which each indicator effects NRM capacity within the area. Zero indicates that it constrains action greatly and 5 indicates that the indicator is strongly enabling. The midpoint, 2.5, suggests that on balance it is currently neither constraining nor enabling action. These ratings provide a point of entry to understanding NRM capacity”

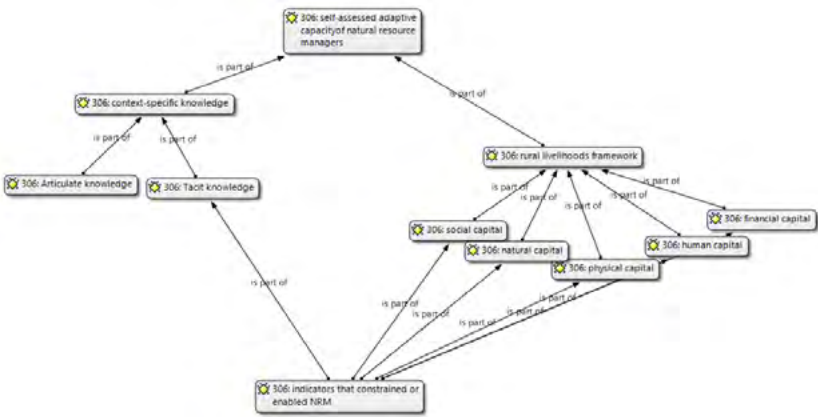
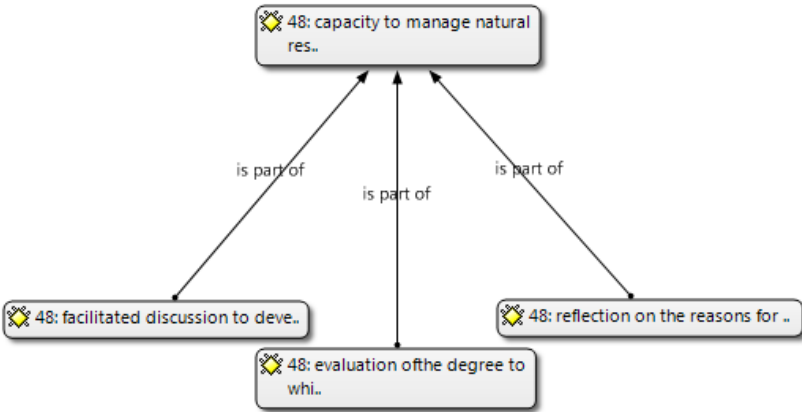
(Leith et al)

“The general process at each workshop with land managers involved a brief introduction to the purpose of the workshop, the livelihoods framework and adaptive capacity, a short discussion about the participants role in NRM and their farming enterprise to establish context, and an outline of the workshop process including selection of indicators, metrics, reason for assigning a particular value to an indicator, and identification of collective actions to improve the indicator.

Full details of the process are in [Brown et al. \(2010\)](#) and [Leith et al. \(2012\)](#).

Twelve workshops were conducted in eight catchments throughout NSW during 2008 (see [Leith et al. 2012](#) for details). In total, 87 land managers and members of local NRM-based communities participated in the workshops, but many of the individuals who participated represented broader constituencies (for example, some participants represented farmer or industry groups). Therefore, actual representation was potentially much higher. The key NR manager groups represented in the workshops included large extensive cropping and grazing enterprises, medium-sized mixed farming enterprises, small-scale farming enterprises, sugarcane,

	<p>dairy, timber production, peri-urban hobby farmers, and irrigated farming systems. Farmers were the principal type of participant, but NRM regional body staff was also involved and actively participated in discussions.</p> <p>There were also representatives of lands protection boards, lifestyle farmers, Landcare, NSW Department of Primary Industries staff, natural resource management (NRM) volunteers, and paid NRM facilitators.</p> <p>Workshop sessions facilitated by the project team then examined each of the five capitals and the information generated was recorded directly into an Excel spreadsheet which was displayed for participants to view throughout the discussion. Participants were asked to identify indicators that constrained or enabled NRM for each capital, provide a rationale supporting the selection of each indicator, and to assign a score (between 0 and 5) to each indicator where '0' implied that the indicator was constraining natural resource management and therefore is a high priority for action and '5' implied that the indicator was effectively supporting NRM and did not need immediate action. Finally the reason for the value assigned to each indicator, and collective actions that if implemented would improve the level of support provided by the indicator for NRM, was discussed. A moderation session ensured agreement among participants and provided an opportunity for sense-making. The information was subsequently summarised into written short reports designed to convey findings to the relevant regional NRM bodies for their input"</p> <p>(Brown et al)</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>"Most of the 3- to 4-hour period allotted for the workshops was taken up with three overlapping, discursive tasks:</p> <p>facilitated discussion to develop of a set of indicators for each capital, each with a clear statement of the rationale for its selection;</p> <p>evaluation of the degree to which each indicator was currently enabling or constraining capacity within industry=agro-ecological zones;</p> <p>[...] reflection on the reasons for the value assigned within each region and the important differences between regions."</p> <p>(Leith et al)</p> <hr/> <p>"Participants were asked to identify indicators that constrained or enabled NRM for each capital, provide a rationale supporting the selection of each indicator, and to assign a score (between 0 and 5)</p>

	<p>to each indicator where ‘0’ implied that the indicator was constraining natural resource management and therefore is a high priority for action and ‘5’ implied that the indicator was effectively supporting NRM and did not need immediate action. Finally the reason for the value assigned to each indicator, and collective actions that if implemented would improve the level of support provided by the indicator for NRM, was discussed.”</p> <p>(Brown et al)</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁴⁵)</p>	 <p>(Brown et al)</p>  <p>(Leith et al)</p>
<p>Data analysis methods</p>	<p>“The frequency of occurrence of indicators across workshops and variation in their ratings facilitates a basic quantitative analysis of</p>

⁴⁵ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>factors constraining and enabling landholders' capacity to manage natural resources at a wider, jurisdictional scale. The analysis also relies on qualitative approaches. Qualitative analysis of recurrent scripts associated with particular farming identities and styles (Vanclay et al. 2007) and argumentative narratives or storylines (Hajer 1995) relating to how capacity is constrained and enabled provides a nuanced description of NRM capacity across NSW"</p> <p>[...]</p> <p>"Analysis of all workshops allows recurrent themes to be identified (Figure 3). Across the workshops, up to six constraints were identified for each of the capitals offset by only two or three enabling factors."</p> <p>(Leith et al)</p> <hr/> <p>"A rudimentary word content analysis was applied to the outputs of the workshops in order to aggregate collective actions and indicators of adaptive capacity. Aggregation was achieved through identification of recurrent phrases and issues relating to collective actions. In some instances, some indicators could not easily be grouped with others and so were placed within an 'others' category. Average values of grouped indicators of the capital (\pm standard errors) were derived from the individual scores elicited through the workshop process. These data and interpretations are largely reported in Leith et al. (2012), but some information is presented here to provide context for the current analysis. The cumulative number of collective actions (n) associated with each indicator was used to provide a measure of the diversity of actions perceived by participants as options to remove constraint to NRM. In order to understand who might be responsible for taking carriage of the collective actions identified through the process, each action was assigned to a broad level of governance: local–community, region–catchment, and state–national. Actions were further categorised into five recurrent activity types being: institutional arrangements (ranging from regional to state and national scale), education and training, practice change, funding and assistance, and research and development. This categorisation allowed the interaction between collective action and temporal, spatial, and governance scales to be explored"</p> <p>(Brown et al)</p>
Justification of inference from results to conclusions	<p>"Rating of indicators provides comparability across a wide region, though it shrouds the local particularity that enables understanding of, and thus more appropriate intervention for, improved NRM within a specific context. Thus, results are most usefully interpreted by shifting focus between the broad regional and statewide patterns</p>

	<p>to the local and particular.”</p> <p>(Leith et al)</p> <hr/> <p>“Our participatory M&E process is grounded within established theories of knowledge creation as described by Nonaka’s SECI model (Loria 2008). This model and adaptations of it have been applied to knowledge transfer in a range of domains including agricultural technology development (Hoffmann et al. 2007), tourism (Xiao and Smith 2007), and business management (Seufert et al. 1999). For M&E of NRM, the process offers a mechanism to transfer tacit knowledge held by local NR managers to explicit knowledge through a workshop process (externalisation). This knowledge is then articulated through formal reporting where it can be combined with knowledge articulated through similar processes at other locations and with biophysical information (combination) for incorporation into management actions for social–ecological systems that cross geographical, governance, and temporal scales (internalisation). The formalised guidance on NR management created through the process can then be adapted by local NR managers and shared among peers (socialisation).</p> <p>The process for assessment of NR manager capacity was developed as part of a state wide MER strategy. In that context, the value of identifying actions to build NRM capacity rather than simply indicators of constraints to NRM is that it aids both ex ante and ex post evaluation of policy and programmes. For regional NRM bodies, the priorities for collective action identified during the workshop process provide insight into what the community sees as capacity building priorities that might also improve agricultural livelihoods. Some of the collective actions fell within the boundaries of regional responsibilities and may contribute to the evaluation of existing policy, programmes, and investments against community needs by:</p> <ul style="list-style-type: none"> & Providing information for the adaptation of existing policy and programmes & Identifying areas of need for community engagement and awareness to improve outcomes of existing NRM interventions & Identifying gaps to be addressed through development of new policy and programmes” <p>(Brown et al)</p>
Discussion of limitations	<p>“Yet the T13 process has methodological limitations, including the consensus approach to rating indicators, the time frame of workshops, and the process more broadly. Also, there is potential for</p>

	<p>bias in the sample, as participants known to regional NRM facilitators may prioritize perspectives of those engaged in NRM. For T13, these issues were necessary trade-offs associated with ensuring inclusion of stakeholders within a tight time frame and budget.</p> <p>Despite these limitations, the T13 process allowed for the development of substantial cross-scale understanding of the key issues that constrain and enable NRM capacity in NSW, and especially the degree to which common themes and local particularities exist across regions. The pervasiveness of common themes across workshops provides some triangulation and indication that the process highlights central concerns of communities about NRM capacity.”</p> <p>(Leith et al)</p>
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Lesnikowski et al 2013

Structured summary of construct operationalization	
Construct:	core aspects of adaptive capacity
Research Question:	“This paper contributes to this body of literature by assessing statistically significant relationships between core aspects of adaptive capacity and systematically measured adaptation occurring in 38 high income countries.”
Article reference:	Lesnikowski AC, Ford JD, Berrang-Ford L, Barrera M, Berry P, Henderson J, et al. National-level factors affecting planned, public adaptation to health impacts of climate change. <i>Glob Environ Change</i> . 2013;23: 1153–1163.
Operationalization:	
Item	Quoted text
Construct definition	<p>“Eight potential factors influencing adaptation were selected for analysis: international treaty participation (Esty et al., 2005), domestic environmental governance (Esty et al., 2005), social expenditures (OECD, 2007), public perceptions on climate change (Pugliese and Ray, 2011), commitment to mitigation (UN Statistics Division, 2010), size of economy (GDP) (World Bank, 2008), population (World Bank, 2008), and perception of corruption (Transparency International, 2009).”</p> <p>[...]</p> <p>“These factors capture total availability of national resources for addressing environmental and health externalities (measured in total GDP), country size (population), institutional capacity (domestic environmental governance), public social commitments (social expenditures), public pressure (public perspectives on personal risks of climate change), commitment to mitigation of future climate change (reductions in carbon emissions), participation in institutions of global governance (international treaty membership), and quality of governance (perception of corruption).”</p>
Data collection methods	<p>“The Environmental Sustainability Index creates a participation score ranging from 0 to 1 and is based on the level of participation in the UNFCCC and Kyoto Protocol, Vienna Convention and the accompanying Montreal Protocol, UN Convention on Biological Diversity, UN Convention to Combat Desertification, CITES, the Basel Convention, and the Ramsar Convention. Points are allocated based on signature, accession, ratification without signature, ratification with signature, acceptance, approval, or succession. Data were available for 36 countries”</p> <p>[...]</p> <p>“The World Economic Forum Survey on environmental governance creates a score (minimum score 27.83, maximum score 59.74) based on pollution regulations, waste regulations, regulatory frameworks, leadership in policy, consistency in regulations and enforcement, and flexibility of regulations. Data were available for 36 countries”</p> <p>[...]</p> <p>“OECD data for 29 countries measures the percentage of GDP spent on social programs related to old age, survivors, incapacity, health, family, active labor, unemployment, and housing”</p>

	<p>[...] “Gallup Poll surveyed 206,193 individuals in 128 countries about perceived personal threats from climate change. Individuals who responded positively that they knew a great deal or something about climate change were asked whether they feel there is a very or somewhat serious personal threat from climate change. Percentages are reported of individuals who answered positively. Nationally representative samples of adult populations age 15 and older were interviewed by phone or in person. Data were used for 26 countries”</p> <p>[...] “Country commitment to mitigation is measured by percentage change in carbon emissions in 1990 to 2007. Data were available for all countries from the UN Statistics Division”</p> <p>[...] “GDP was selected [...] Data were available for all countries from the World Bank World Development Indicators”</p> <p>[...] “Population was tested to determine whether a statistically significant relationship is found between country size and adaptation. This is based on findings in Berrang-Ford et al. (2011), which indicated that large countries are more likely to be high adaptors. Data were available for all countries from the World Bank World Development Indicators”</p> <p>[...] “Data were available from the 2009 Corruption Perceptions Index produced by Transparency International, which measures perceptions of corruption in the public sector. Scores were available for all countries except Liechtenstein and ranged from a high of 9.4 to a low of 1.1”</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>“Eight potential factors influencing adaptation were selected for analysis:”</p> <ul style="list-style-type: none"> international treaty participation; domestic environmental governance; social expenditures; public perceptions on climate change; commitment to mitigation; size of economy (GDP); population; perception of corruption

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁴⁶)</p>	
<p>Data analysis methods</p>	<p>“Pearson correlation coefficients were used to evaluate statistical associations between variables representing adaptation factors and the ARS and HAS. The number of observations (countries) in the dataset provided insufficient statistical power to allow for multivariate regression analysis. The purpose of the analysis was neither to establish causation nor to attempt to quantify causal contributions. Instead, we explore preliminary evidence of correlative trends in factors hypothesized to be potential predictors of adaptation. The results are thus exploratory, contributing to an emerging and critically needed literature on systematic approaches for quantitative assessment of adaptation predictors. The natural log of GDP and population were used. Associations were considered significant at the 95% confidence level. All statistical analyses were conducted in STATA (StataCorp v.11)”</p>
<p>Justification of inference from results to conclusions</p>	<p>“The number of observations (countries) in the dataset provided insufficient statistical power to allow for multivariate regression analysis. The purpose of the analysis was neither to establish causation nor to attempt to quantify causal contributions. Instead, we explore preliminary evidence of correlative trends in factors hypothesized to be potential predictors of adaptation. The results are thus exploratory, contributing to an emerging and critically needed literature on systematic approaches for quantitative assessment of adaptation predictors.”</p> <p>[...]</p> <p>“The results of this analysis provide a foundation to begin identifying national characteristics that differ among high and low adaptors. Here we find that adaptation response scores are significantly related to participation in international environmental treaties and</p>

⁴⁶ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>national environmental governance, as well as population size and GDP. Health areas scores are found to be significantly related to population size and GDP. Several countries are outliers to these trends. Finland received a high ARS and HAS, yet has a population and GDP below median levels. Russia, on the other hand, received a very low ARS and HAS, and yet has one of the largest populations and GDPs of the Annex I group. It is worth noting that in measurements of participation in international treaties and national environmental governance, however, Finland received significantly higher scores than Russia. This indicates that while some theoretical determinants like GDP are highly associated with adaptation action, how they intersect with other contextual factors impacts adaptation outcomes. These results support hypotheses found in the adaptive capacity literature that availability of resources impacts a country's ability to engage in adaptation (Berrang-Ford et al., 2011; Ebi et al., 2006), but also point to other institutional and regulatory factors that affect how fully they result in adaptation actions (Kovats et al., 2003)"</p> <p>[...]</p> <p>"The methodology employed in this study is derived from, and advances in a new direction, approaches used in vulnerability and adaptation scholarship that allow systematic assessments of the complex factors affecting environmental health outcomes (Ford et al., 2013; Hambling et al., 2011; Lesnikowski et al., 2011; BerrangFord et al., 2011; Fu"ssel, 2010b; Tompkins et al., 2010; Brooks et al., 2005). Significant correlations provide a preliminary indication of contextual factors associated with national adaptation outcomes, but cannot be used to infer causality due to the absence of longitudinal data. Furthermore, the current study is limited by the sample size of UNFCCC Annex I countries, which prevents the use of a multivariate analysis and limits statistical power to detect significant associations. Strong associations were nevertheless found between both ARS and HAS and population and GDP, and between ARS and international treaty participation and domestic environmental governance."</p>
Discussion of limitations	<p>"The number of observations (countries) in the dataset provided insufficient statistical power to allow for multivariate regression analysis. The purpose of the analysis was neither to establish causation nor to attempt to quantify causal contributions. Instead, we explore preliminary evidence of correlative trends in factors hypothesized to be potential predictors of adaptation. The results are thus exploratory, contributing to an emerging and critically needed literature on systematic approaches for quantitative assessment of adaptation predictors."</p> <p>[...]</p> <p>"The methodology employed in this study is derived from, and advances in a new direction, approaches used in vulnerability and</p>

	<p>adaptation scholarship that allow systematic assessments of the complex factors affecting environmental health outcomes (Ford et al., 2013; Hambling et al., 2011; Lesnikowski et al., 2011; BerrangFord et al., 2011; Fu"ssel, 2010b; Tompkins et al., 2010; Brooks et al., 2005). Significant correlations provide a preliminary indication of contextual factors associated with national adaptation outcomes, but cannot be used to infer causality due to the absence of longitudinal data. Furthermore, the current study is limited by the sample size of UNFCCC Annex I countries, which prevents the use of a multivariate analysis and limits statistical power to detect significant associations. Strong associations were nevertheless found between both ARS and HAS and population and GDP, and between ARS and international treaty participation and domestic environmental governance."</p>
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Mandemaker et al 2011

Structured summary of construct operationalization	
Construct:	governance characteristics
Research Question:	“To examine whether or not governance characteristics are indeed significant factors determining production increases, and whether these are obtained from yield increase or from area expansion, an empirical analysis of historical tendencies of yield increase and area expansion was performed”
Article reference:	Mandemaker, Menno, Martha Bakker, and Jetse Stoorvogel. 2011. “The Role of Governance in Agricultural Expansion and Intensification: A Global Study of Arable Agriculture.” <i>Ecology and Society</i> 6 (12): 8.
Operationalization:	
Item	Quoted text
Construct definition	
Data collection methods	<p>“Because all indicators had to be measured in a similar manner for all countries in the analysis, we were limited to use global databases such as those of the FAO and the World Bank. Countries for which no consistent data existed because they either merged or split up into separate states during the study period (1975-2007), e.g., former USSR, former Socialist Federal Republic of Yugoslavia, Czech Republic, Slovakia, and Ethiopia, were not included. In total, 173 countries were included in the analysis. Because we are interested in dynamics, most indicators were computed as relative changes between approximately 1975 and 2007”</p> <p>[...]</p> <p>“Annual governance indicator data were available for all six indicators and all 173 countries, during 1996-2008. This period is too short to compute a meaningful relative change, and does not correspond to the period for which other indicators were available (1975-2007). Therefore, averages were calculated over 1996-2008 for all governance indicators, which were included in the regression”</p>
Indicators/questions used in data collection instruments?	Voice and accountability; Government effectiveness; Regulatory quality; Rule of law; Political stability and absence of violence; Control of corruption
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴⁷)	Six World Bank governance indicators.

⁴⁷ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Data analysis methods	<p>“To explore differences between these groups in terms of control and governance indicators, we performed an Analysis Of Variance (ANOVA). Specifically, separate T-tests were performed for all possible pairs of different quadrants and indicators, provided that the number of observations was sufficient. This analysis is referred to as the between groups analysis.”</p> <p>[...]</p> <p>“Next, to test the maximal and marginal explanatory value of governance indicators, we performed linear regressions for all countries together and for the groups individually. Although the between groups analysis distinguished countries based on the sign of dY and dA, the within groups analysis investigates the spatial variability in dY and dA values within groups, taking into account their correlation with governance and control indicators. Multivariate regression analysis was applied to examine relationships between governance indicators and dY and dA.”</p>
Justification of inference from results to conclusions	<p>“From Figure 1 it becomes clear that countries with a yield decline are a minority. Figure 2 shows that total areas of decline and expansion countries are negligible compared with that of growth and/or intensifying countries, and that growth and intensifying countries roughly divide the area in two.”</p> <p>[...]</p> <p>“The results from the two analyses presented here confirm the hypothesis that in countries with lower quality of governance, agricultural production increase is more likely to be achieved by area expansion than by increase in yield. Although governance indicators do not explain vast shares of spatial variability in cultivated area and yield change within groups, a nonzero marginal</p>

	<p>explanatory value considerably increases the likelihood that governance does matter. In reality, the strengths of relationships are likely to be somewhere in between the most strictly (marginal R^2) and loosely held criteria (maximal R^2). Overall, the chosen set of control indicators seems adequate in explaining spatial variability in production indicators other than governance indicators, because of the overall consistency of results.”</p>
<p>Discussion of limitations</p>	<p>“When studying real-world phenomena that are the result of complex processes by means of regression analysis, it is hardly ever possible to isolate the role of the explanatory variable of interest from a wide range of other explanatory variables. In our case, we are interested in how well governance indicators can explain agricultural production indicators, but we cannot escape from the fact that governance is correlated to many other variables that also explain production indicators, e.g., climate, soils, economy, and demography. For this reason, we try to include these other variables as much as possible to account for their potential impact. We will refer to these variables as control indicators. Because of statistical confounding we will not be able to distinguish exactly which part of the explanatory power of the regression can be attributed to each of the two categories, i.e., the governance indicators and the control indicators.”</p> <p>[...]</p> <p>“Because we also include control indicators that are quite closely connected to governance, particularly the economic indicators, we limit our assessment of governance importance to that aspect of governance that is independent from economic performance. Because economic indicators are generally associated with overall quality of governance, the marginal explanatory values of governance are likely to be underestimations.”</p>

Masiero 2015

Structured summary of construct operationalization	
Construct:	e-governance adoption
Research Question:	“This paper, based on an in-depth case study of the Kerala PDS, focuses on how e-governance adoption, rather than just enhancing the effectiveness of existing processes, enables deep anti-leakage transformations in the very nature of the food security system.”
Article reference:	Masiero, Silvia. 2015. “Redesigning the Indian Food Security System through E-Governance: The Case of Kerala.” <i>World Development</i> 67 (March): 126–37. doi:10.1016/j.worlddev.2014.10.014.
Operationalization:	
Item	Quoted text
Construct definition	“At the theoretical level, information and communication technologies (ICTs) are viewed as carriers of efficiency and accountability, so that e-governance has come to be seen as “the digital route to good governance” (Heeks, 2001).”
Data collection methods	“My research consists of a state-level case study, conducted in Kerala over two research visits of three and four months respectively, between November 2011 and September 2012. I have used a primarily qualitative method of data collection and analysis, working directly with the actors involved in computerization of the PDS: overall, 126 in-depth interviews have been conducted, predominantly with actors responsible for the design and use of the digital PDS (software developers, government officials, programme officers) and with final users of the programme (citizens of Kerala availing the system).” [...] “As I followed the case study method (Yin, 2009), I have triangulated interview data with sources consisting of notes from participant observation, statistics on local programmes and their impact, press releases, and government documents regarding the PDS.”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴⁸)	
Data analysis methods	“As I worked with a research question informed by the link between e-governance and development, the focus of my study has been on the processes of change induced by technology: narrative analysis, one of the main tools for process research (Riessman, 2008), has therefore been the main method on which I have relied. As I followed the case study method (Yin, 2009), I have triangulated

⁴⁸ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	interview data with sources consisting of notes from participant observation, statistics on local programmes and their impact, press releases, and government documents regarding the PDS”
Justification of inference from results to conclusions	“. As I worked with a research question informed by the link between e-governance and development, the focus of my study has been on the processes of change induced by technology: narrative analysis, one of the main tools for process research (Riessman, 2008), has therefore been the main method on which I have relied.”
Discussion of limitations	

Minde et al 2008

Structured summary of construct operationalization	
Construct:	fertilizer subsidy programme
Research Question:	<p>“We focus on four salient questions:</p> <p>What are the guiding principles of a “smart” fertilizer subsidy program, and what determines its costs and benefits?</p> <p>What has been the experience of Malawi and Zambia with fertilizer subsidy programs— their achievements and limitations—and what lessons can be drawn for the design of future subsidy programs that would contribute most effectively to national food security and smallholder productivity?</p> <p>What can be learned from Kenya’s experience of rapid smallholder adoption of fertilizer without subsidies?</p> <p>How do the sharply higher world food and fertilizer prices affect the justification for fertilizer subsidies in the region?”</p>
Article reference:	Minde, Isaac J., Thomas Jayne, Eric Crawford, Joshua Ariga, and Govereh Jones. 2008. “Promoting Fertilizer Use in Africa: Current Issues and Empirical Evidence from Malawi, Zambia, and Kenya.” 54501. Food Security International Development Policy Syntheses. Michigan: Michigan State University, Department of Agricultural, Food, and Resource Economics.
Supporting literature	Ariga, Joshua, Thomas S. Jayne, Betty Kibaara, and James K. Nyoro. 2008. “Trends and Patterns in Fertilizer Use in Kenya, 1997- 2007.” 28/2008. Tegemeo Institute of Agricultural Policy and Development Working Paper Series. Nairobi: Tegemeo Institute of Agricultural Policy and Development.
	Ariga, Joshua, Thomas S. Jayne, and James K. Nyoro. 2006. “Factors Driving the Growth in Fertilizer Consumption in Kenya, 1990-2005: Sustaining the Momentum in Kenya and Lessons for Broader Replicability in Sub-Saharan Africa.” 20. Egerton University, Tegemeo Institute of Agricultural Policy and Development Working Paper. Nairobi: Egerton University, Tegemeo Institute. http://purl.umn.edu/55167 .
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“Input subsidy programs may have various objectives, including to increase agricultural productivity, improve food security, or provide income support for poor farmers. National and household food security objectives may be especially urgent in times of crisis, such as the current environment of rapid and major increases in fertilizer and food grain prices. Regardless of their objectives, the design and implementation of input subsidies should be “smart” in the sense that (a) their benefits in terms of agricultural productivity and food security exceed what could be achieved by investing the resources in other areas; and (b) they encourage farmers’ purchases of fertilizer on commercial terms, or at least do not impede it, which could result if government input subsidy programs crowd out commercial transactions or undermine investment in fertilizer distribution by suppliers and agro-dealers. ”
Data collection methods	“Insights from Zambia are based on various analyses carried out by the Food Security Research Project and collaborating partners, using information from nationally representative surveys of smallholder farms conducted annually by the government’s Central Statistical

	<p>Office.” [...] “Findings from Kenya are drawn from an Egerton University/Tegemeo Institute report on trends and patterns in fertilizer use since the initiation of input market liberalization in 1990 (Ariga, Jayne, Nyoro, 2007; Ariga, Jayne, Nyoro, 2008). This study tracks trends in fertilizer use for a nationally representative sample of 1,260 small-scale farm households surveyed by Egerton University’s Tegemeo Institute in 1997, 2000, 2004 and 2007.”</p> <hr/> <p>(Minde et al 2008)</p> <p>“The study’s findings are based on three types of information and analyses:</p> <ol style="list-style-type: none"> 1. Review of secondary data on trends in fertilizer use, prices and other salient indicators for the four main fertilizer delivery system types: (a) integrated sugarcane outgrower arrangements, where fertilizer is supplied on credit to participating farmers, mainly for sugar production but also for other crops; (b) integrated tea input-credit-sale systems; (c) integrated coffee input-credit-sale systems; and (d) independent fertilizer supply chains for crops not involved in coordinated input-sale-cash arrangements, mainly for maize. This information is obtained through the Ministry of Agriculture. 2. Interviews of key informants in the fertilizer industry and with representatives of interlinked fertilizer delivery systems. These interviews were carried out in April and May 2005 to obtain detailed institutional and organizational information on price and supply risks, contract non-compliance risks, potential impacted information problems, and coordination arrangements with buyers and sellers in the vertical supply chain, cost structure, etc. 3. Analysis of small farm household panel survey data to assess fertilizer consumption trends by crop, fertilizer intensity rates by type of delivery system, characteristics of households participating in these fertilizer delivery programs compared to households in the same areas but not participating in these schemes. This information is obtained through descriptive analysis of the Tegemeo/MSU Household Survey Database from the crop years 1995/96, 1996/97, 1999/00, and 2003/04. Analysis is based on survey of 1,364 small-scale farming households consistently surveyed across all four cropping seasons. ” <hr/> <p>(Ariga et al 2006).</p> <p>“Data for this study is from 3 sources: i) Tegemeo rural household survey data from 1997, 2000, 2004, and 2007; ii) interviews with key</p>
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	<p>stakeholders in the fertilizer distribution system; and iii) statistics compiled by the Ministry of Agriculture on fertilizer prices at Mombasa and upcountry (Nakuru)”</p> <p>(Ariga et al 2008)</p>
Indicators/questions used in data collection instruments?	<p>“trends in fertilizer use, prices and other salient indicators for the four main fertilizer delivery system types”</p> <p>[...]</p> <p>“detailed institutional and organizational information on price and supply risks, contract non-compliance risks, potential impacted information problems, and coordination arrangements with buyers and sellers in the vertical supply chain, cost structure”</p> <p>[...]</p> <p>“fertilizer consumption trends by crop, fertilizer intensity rates by type of delivery system, characteristics of households participating in these fertilizer delivery programs compared to households in the same areas but not participating in these schemes.”</p> <p>(Ariga 2006)</p>
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁴⁹)	<p>Cost factors (<- cost of acquiring fertilizer; full economic cost of implementation);</p> <p>benefit factors (<- price of output; Agronomic response rates; increase in total fertilizer use; timely arrival and utilization).</p>
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

⁴⁹ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Nelson & Finan 2009

Structured summary of construct operationalization	
Construct:	policies intended to promote rural development
Research Question:	“Given the importance of drought and climate variability, the research sought to assess the impacts of a recently established climate-forecasting system on the livelihoods of farmers and on the policies intended to promote rural development”
Article reference:	Nelson, Donald R., and Timothy J. Finan. 2009. “Praying for Drought: Persistent Vulnerability and the Politics of Patronage in Ceará, Northeast Brazil.” <i>American Anthropologist</i> 111 (3): 302–16. doi:10.1111/j.1548-1433.2009.01134.x.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	“The research team carried out a household vulnerability survey among 484 farm families in six municípios, each representing different agroecological and climatic zones. The survey data were complemented by systematic interviews with key government agencies, policy makers, farmworker unions, development banks, merchants, and others at both state and local levels. Based on the subsequent results, a subsample of 52 households was revisited during the two following years, which were characterized by a severe El Niño–related drought. The authors thus had a three-year record of household responses to an unfolding drought event.”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵⁰)	
Data analysis methods	“The authors thus had a three-year record of household responses to an unfolding drought event.” [...] “This research phase combined participatory research workshops in local comunidades (communities) in eight municípios with a Participatory Geographic Information System (PGIS) technology to produce vulnerability maps at the município level (Nelson et al. 2009). In follow-up workshops, these maps became central instruments for município planning based on the objective and transparent assessment of community-based vulnerability. This article reflects the accumulated knowledge and insights gained by the authors over an extended (and

⁵⁰ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	ongoing) period of ten years as they have sought to demonstrate the intricate and intimate relationship between vulnerability to environmental stress and governance in rural Cearense society”
Justification of inference from results to conclusions	<p>“The implications of these theoretical nuances are important in several critical ways. When adaptation is situated at the point of dynamic interface between human and ecological systems, human agency assumes a pivotal position as the source of variability that sponsor change in the nature of the human–environment nexus (Brumfiel 1992; Netting 1993). A second theoretical implication is that the teleological imperative of functionalism is abandoned because the dynamic of adaptation does not have an ultimate destiny, especially in the context of exogenous pressure. It is not possible to predict what sociocultural manifestations will emerge as human and ecological systems adjust to stress—of environmental origin or otherwise. This being said, the final theoretical implication of this version of adaptation is that there is an intrinsic resistance to change in the system components and interrelationships. Thus, at the localized site of human–ecological system interaction, the tension between structure and agency plays out as a dialectical process of change and persistence without any intrinsic foreknowledge of what the outcome will be.”</p> <p>[...]</p> <p>“The concept of “social-ecological resilience” resonates well with the comprehensive perspective of vulnerability. Although resilience and vulnerability are conceptually related, they are not mirror versions of each other (Gallopín 2006). Resilience is a characteristic of a system that allows it to absorb disturbances without losing its function and structure while protecting its capacity for change and adjustment (Carpenter et al. 2001; Walker et al. 2004). The capacity for change and adjustment is predicated on maintaining a diversity of responses, which, in the social and political realm, means encouraging and maintaining the participation of diverse actors to increase response options (Berkes 2007). As such, resilience is a defining component of the adaptation process in that it allows a system to adjust to stress while maintaining its essential character. In other words, resilience provides a long-term horizon to system dynamics that are in constant motion (Folke et al. 2002; Walker et al. 2002)”</p> <p>[...]</p> <p>“Based on data from our survey of rural households, we described and classified levels of vulnerability (see Table 1). The categories were created using a combination of extreme poverty (indigence) and poverty thresholds, the climate sensitivity of the household income, and irrigation. This economic metric measures the impact of drought on household production and permits an analysis of relative vulnerability across households.”</p>
Discussion of limitations	“It should only be considered as a proxy to identify vulnerable

	populations based on outcomes. Other than the presence or absence of irrigation, the metric does not consider agricultural production, because, for the most part, all rain-fed systems are similarly vulnerable.”
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Osbahr et al 2010

Structured summary of construct operationalization	
Construct:	informal and formal institutions
Research Question:	"This paper explores the role of individual and collective responses within informal and formal institutions that can lead to successful livelihood adaptive processes to manage the effects of climate change and variability"
Article reference:	Osbahr, Henny, Chasca Twyman, W.Neil Adger, and David S. G. Thomas. 2010. "Evaluating Successful Livelihood Adaptation to Climate Variability and Change in Southern Africa." <i>Ecology and Society</i> 15 (2): 27.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	"We then address dimensions of social resilience based on data derived from four regions in rural southern Africa. First, we assess the ability of, and mechanisms used by, individuals and communities to cope with climate change shocks. In particular, we focus on informal institutions and social networks. Second, we assess those communities' ability to facilitate adaptive capacity, selforganization, and learning by focusing on the role of agency and formal institutions"
Data collection methods	"Study settlements within coherent climate regions were selected in consultation with in-country partners. A cross-section of each community was selected using wealth-proxy records and advice from NGO and agricultural extension officials and local leaders, and using census material. Based on institutional divisions in the communities, 63 focus groups participated in a series of exercises covering response to disturbance, sources of income, support networks, and farming practice. These were followed by 121 household questionnaires, open and closed questions, and in-depth interviews."
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵¹)	<pre> graph BT A[59: Informal and Formal Institutions] B[59: informal institutions and social networks] C[59: agency and formal institutions..] B -- is part of --> A C -- is part of --> A </pre>
Data analysis methods	"Data analysis consisted of mixed qualitative and quantitative techniques to explore patterns in the livelihood data, coded thematic narratives, and interpretations of participatory and ranking

⁵¹ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	exercises.”
Justification of inference from results to conclusions	
Discussion of limitations	

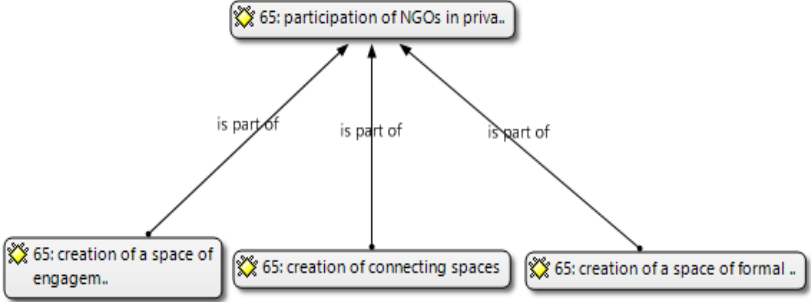
Osbaahr et al 2008

Structured summary of construct operationalization	
Construct:	agricultural policy initiatives
Research Question:	“We seek to understand what engagements are important, and identify the changing pattern of response in the process of reactive coping operating both cross-level and cross-scale. The paper then explores the intersection between these local responses and the role of agricultural policy initiatives to support disaster risk reduction and livelihood renewal, illustrating that density of cross-scale interactions is directly linked to successful livelihood renewal.”
Article reference:	Osbaahr, Henny, Chasca Twyman, W. Neil Adger, and David S. G. Thomas. 2008. “Effective Livelihood Adaptation to Climate Change Disturbance: Scale Dimensions of Practice in Mozambique.” <i>Geoforum</i> , Placing Splintering Urbanism, 39 (6): 1951–64. doi:10.1016/j.geoforum.2008.07.010.
Operationalization	
Item	Quoted text
Construct definition	
Data collection methods	“documents collected from, district, province and national level government, research institutes, traditional authorities and NGOs to analyse national policy response 1” “1 Agencies interviewed and documents collected from: Oxfam GB Pretoria, Save the Children US Maputo, DDADR Extension Service Manjacaze, DDADR Gaza Province in Xai-Xai, SETSAN/Fewsnet and MADER Maputo, Eduardo Mondlane University, Tribal Council Chalala”
Indicators/questions used in data collection instruments?	“to analyse national policy response”
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵²)	Directly operationalized
Data analysis methods	“Analysis consisted of established mixed qualitative and quantitative techniques to explore patterns in the livelihood data, coded thematic narrative and interpretations of participatory and ranking exercises (Philip, 1998; Valsiner, 2000; Demeritt and Dyer, 2002).”
Justification of inference from results to conclusions	
Discussion of limitations	

⁵² By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Pesqueira & Glasbergen 2013

Structured summary of construct operationalization	
Construct:	participation of NGOs in private governance arrangements
Research Question:	"In this article, we discuss the participation of NGOs in private governance arrangements from a political geography vantage point."
Article reference:	Pesqueira, Luli, and Pieter Glasbergen. 2013. "Playing the Politics of Scale: Oxfam's Intervention in the Roundtable on Sustainable Palm Oil." <i>Geoforum</i> , Risky natures, natures of risk, 45 (March): 296–304. doi:10.1016/j.geoforum.2012.11.017.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>"For this purpose, we define a process of interventions which takes place at three different dimensions:</p> <p>The creation of a space of engagement in the sense that the actors involved in the governance arrangement recognize a relationship between the different dimensions of the sustainability problem that each of them is concerned with. From Oxfam's point of view, this implies framing issues from a rights-based perspective and ensuring that social criteria become an integral, conceptual part of the RSPO standard.</p> <p>The creation of connecting spaces which create opportunities for less privileged groups to participate in the networked structure of the arrangement. This implies that Oxfam is able to activate grassroots interests and form alliances that open up opportunities to empower less powerful groups to participate in the RSPO arrangement.</p> <p>The creation of a space of formal interdependence entails that new network relationships become a foundational part of the governance arrangement. This implies that Oxfam secures the institutionalization of mechanisms that protect the rights of less privileged groups, and also enhances the wider accountability and integrity of the RSPO institution as a whole and of the social principles in particular."</p>
Data collection methods	<p>"The research methods utilized include a review of relevant scientific literature, internal (confidential) Oxfam communications, reports produced by Oxfam and other organizations within the international development and palm oil camps, and minutes and official documentation from the RSPO. Additionally, 15 semi-structured in-depth interviews were conducted with the Private Sector Programme coordinator at Oxfam Novib; the Oxfam International representative to the RSPO; the special projects and palm oil coordinator at Oxfam Novib; as well as a number of representatives from UTZ Certified; Unilever; the Body Shop; the Dutch Product Board for Margarine, Fats and Oils; Sawit Watch; SPKS (Serikat Petani Kelapa Sawit – Indonesian Oil Palm Farmers Union); WALHI (Friends of the Earth Indonesia); WWF (World Wildlife Fund) Kalimantan; and community leaders and plantation workers from the province of Sanggau, Indonesia. Some of these interviews were conducted</p>

	during a field visit to palm oil plantations in West Kalimantan and the 8th RSPO annual conference in Jakarta, Indonesia. Lastly, extensive participatory observation in Oxfam Novib (2010–2012) facilitated the elaboration of this study”
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵³)	 <pre> graph BT A[65: participation of NGOs in priva..] B[65: creation of a space of engagem..] C[65: creation of connecting spaces] D[65: creation of a space of formal ..] B -- is part of --> A C -- is part of --> A D -- is part of --> A </pre>
Data analysis methods	
Justification of inference from results to conclusions	<p>“Here, we have developed a politics of scale framework that has permitted us to distinguish three different dimensions at which the impacts of NGO interventions occur; namely, spaces of engagement, connecting spaces, and spaces of formal interdependence. Such dimensions do not unfold naturally and successively. Instead, targeted actions and strategic maneuvers are required to realize change at each dimension. While the creation of a space of engagement always precedes and is a pre-condition for the creation of a space of formal interdependence, our analysis suggests that the creation of connecting spaces sustains the realization of the other two dimensions. This indicates that the institutionalization of rights-based principles in private governance regimes is largely enabled by activating grassroots interests and forming alliances with partners and allies. In the case of Oxfam’s intervention in the RSPO, the opportunities to articulate rights-based principles were mostly determined by the social characteristics of the problem and the ability of Oxfam to combine strategic intent with opportunistic behavior. Other critical factors include Oxfam’s capacity to form and sustain networks and to capture and reorganize resources within the boundaries of the RSPO and beyond.”</p>
Discussion of limitations	

⁵³ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Poeteete & Ostrom 2004

Structured summary of construct operationalization	
Construct:	collective action for sustainable management
Research Question:	“Many natural resource systems, such as forests, fall under collective management or are subject to use by multiple individuals, often for a variety of purposes (Edwards and Steins, 1998; Quiggin, 1993). Failures to overcome collective-action problems contribute to the degradation or loss of natural resources around the world. Sustaining these resources in the face of demographic and economic pressures depends upon successful co-ordination and co-operation. An understanding of the factors influencing prospects for collective action for sustainable management among resource-dependent populations has important policy implications. This article focuses on the debate about the role of group size and heterogeneity”
Article reference:	Poteete, Amy R., and Elinor Ostrom. 2004. “Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management.” <i>Development and Change</i> 35 (3): 435–61. doi:10.1111/j.1467-7660.2004.00360.x.
Operationalization:	
Item	Quoted text
Construct definition	
Data collection methods	<p>“Data collection includes measures of several potential dimensions of heterogeneity, including ethnicity, caste, religion, wealth, occupation, location relative to the forest, reliance on the forest, and patterns of resource use. Teams also collect population data for groups of users with the same rights to and responsibilities for a forest, and for the settlements in which members of these user groups reside.</p> <p>5”</p> <p>[...]</p> <p>“5. ‘User group’ is an analytical category, referring to a set of individuals with a common understanding that they have the same rights and responsibilities to a forest. These individuals need not be organized in any manner, or even know all members of their group. User groups are thus potential units for collective action”</p>
Indicators/questions used in data collection instruments?	

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁵⁴)</p>	<pre> graph BT A["70 - collective action for sustaina."] B["70 - role of group size"] C["70 - role of heterogeneity"] D["70 - interactions and reputations"] E["interactions and monitoring"] F["70 - group similarity"] G["70 - Trust"] H["70 - similar makeup"] B -- "is part of" --> A C -- "is part of" --> A D -- "is part of" --> B E -- "is part of" --> B F -- "is part of" --> C G -- "is part of" --> C H -- "is part of" --> C </pre>
<p>Data analysis methods</p>	<p>“IFRI’s interdisciplinary methodology allows comparisons between actual forest conditions and patterns of use associated with particular institutional arrangements”</p>
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	<p>“The lack of consensus reflects the impossibility of isolating the influence of group size or heterogeneity when these factors are interrelated with several other variables. In addition, conceptual and practical problems exist with the hypothesized links between small size, homogeneity, and collective action”</p>

⁵⁴ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Quinn et al 2011

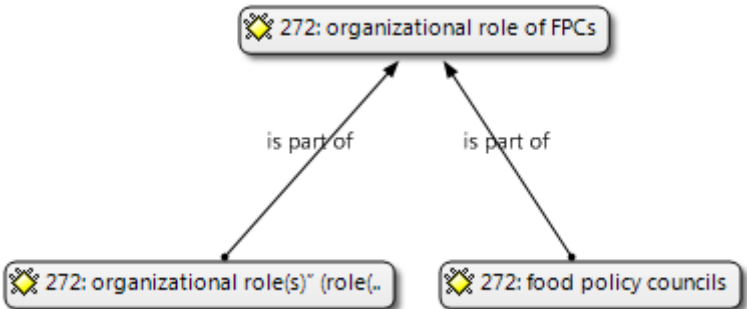
Structured summary of construct operationalization	
Construct:	ability of local institutions to support individual/ household adaptation strategies
Research Question:	“to determine the ability of local institutions to support individual/ household adaptation strategies in the study region”
Article reference:	Quinn, Claire H., Gina Ziervogel, Anna Taylor, Takeshi Takama, and Frank Thomalla. 2011. “Coping with Multiple Stresses in Rural South Africa.” <i>Ecology and Society</i> 16 (3): 2.
Operationalization:	
Item	Quoted text
Construct definition	
Data collection methods	“The third aspect of the method was to assess the capacity of local institutions to help households respond to crises. This was done using semistructured interviews that were carried out with government officials drawn from the Greater Marble Hall and Greater Tubatse municipalities and from Sekhukhune District authorities (n = 9). Interviewees included those involved in local development, community services, primary health care, water services, and environmental matters”
Indicators/questions used in data collection instruments?	“The interviews were focused on identifying the issues that the respondents thought were of most concern at district, municipality, and village level, e.g., water scarcity, unemployment, etc., what activities were underway to address these issues, for example, public works programs, and how the issues might be tackled in the future. Climate, water, and health were highlighted where appropriate”
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵⁵)	Directly Operationalized
Data analysis methods	“The combination of methods used in this study follows the “qual-quant-qual” framework described by Parker and Kozel (2004) for a similar study in India in which they identified this combination as a valuable methodological approach for understanding poverty and vulnerability”
Justification of inference from results to conclusions	“This approach is becoming increasingly common in situations whereby a grounded and contextually detailed understanding of a specific context, and a more general assessment of trends, are both important. Parker and Kozel undertook their qualitative fieldwork to inform the design of the quantitative portion of the research followed by further qualitative interviews to discuss and interpret the results. In the current study, we depart slightly from Parker and Kozel in that we used the second qualitative round to

⁵⁵ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>conduct interviews at the municipal and district scale. Although qualitative and quantitative approaches generate different types of information and are useful for answering different kinds of questions, they can be complementary if used in an integrated way.” [...]</p> <p>“This study has examined the agroecological, individual, and institutional factors that influence household food security in Sekhukhune District in South Africa. By doing so, it is possible to construct a trajectory through the three dimensional space proposed by Fraser (2007) and Fraser et al. (2011; Fig. 4). The evidence from literature, qualitative interviews carried out at local, municipal, and district scales, and quantitative analysis of the stated preference questionnaires suggests that vulnerability is moving toward the bottom far left corner of the cube as the agroecosystem’s capacity to remain productive under changing weather patterns decreases because of a range of drivers, and because individual/household adaptation decisions are limited for multiple stresses, and institutional capacity faces some considerable barriers between the municipal and local scales. This suggests that future environmental stresses may overcome the natural resilience of the agroecosystem or households’ own adaptive capacity, and that although in some ways they are better equipped today than in the past to avert crises, formal institutions are not structured to deal with chronic stresses.”</p>
Discussion of limitations	<p>“The limitations of this research lie in the restricted scale and scope of the case study, which means that the implications of some of the results are speculative at this stage. The ability to scale-up the conclusions to draw general lessons on vulnerability to multiple stresses, considering tradeoffs and time-lags, will require a broader range of in-depth case studies”</p>

Schiff 2008

Structured summary of construct operationalization	
Construct:	organizational role of Food policy councils
Research Question:	“Through an examination of data drawn from interviews with 13 food policy councils in the United States and Canada, this article examines the emerging role of FPCs in the development of sustainable food systems. A grounded theory approach was utilized in collecting and analyzing information related to the organizational role of FPCs.”
Article reference:	Schiff R. The role of food policy councils in developing sustainable food systems. <i>J Hunger Environ Nutr.</i> 2008;3: 206–228.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“This entails an understanding of the objectives and goals of FPCs and of their “organizational role(s)” (role(s) as an organization) in relationship to other individuals, organizations, and institutions. These organizational definitions and roles, which define the purpose and objectives of these organizations, are fundamental to understanding the nature of food policy councils”
Data collection methods	“Two primary data collection methods were employed in this research: (1) objective review of relevant existing documents and (2) semistructured interviews with key informants. The selection of sample participants aimed to include persons representing a variety of FPCs with different administrative arrangements, histories, and social/cultural contexts. FPC coordinators (staff persons or chairpersons) were chosen as representatives for interviews for two primary reasons: (1) they are usually the principal and only contact provided for the FPC in their publications and Web sites or in FPC contact lists provided by other organizations 3–5 (also R. Bourhonesque, e-mail communication, October 19, 2005) and (2) as leaders or administrative centre-points, coordinators are usually required to work daily on FPC issues and therefore hold a significant amount of knowledge about the organization, its members, objectives, history, previous accomplishments, and challenges. In order to gather information about FPCs from several different viewpoints, a request was made by the researcher to speak with another participant such as a FPC member with a great deal of knowledge and history with the organization.”
Indicators/questions used in data collection instruments?	

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁵⁶)</p>	 <pre> graph BT A[272: organizational role of FPCs] B[272: organizational role(s)' (role,..'] C[272: food policy councils] B -- is part of --> A C -- is part of --> A </pre>
<p>Data analysis methods</p>	<p>“Since documents and interviews with food policy council representatives were primary sources of data, the findings presented here predominantly derive from these sources with additional and supplementary information derived from the other data collection methods. In examining the themes emerging from responses, quotations from interviews are frequently employed to describe in their own words, the experiences, successes, and challenges of food policy councils.”</p>
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	

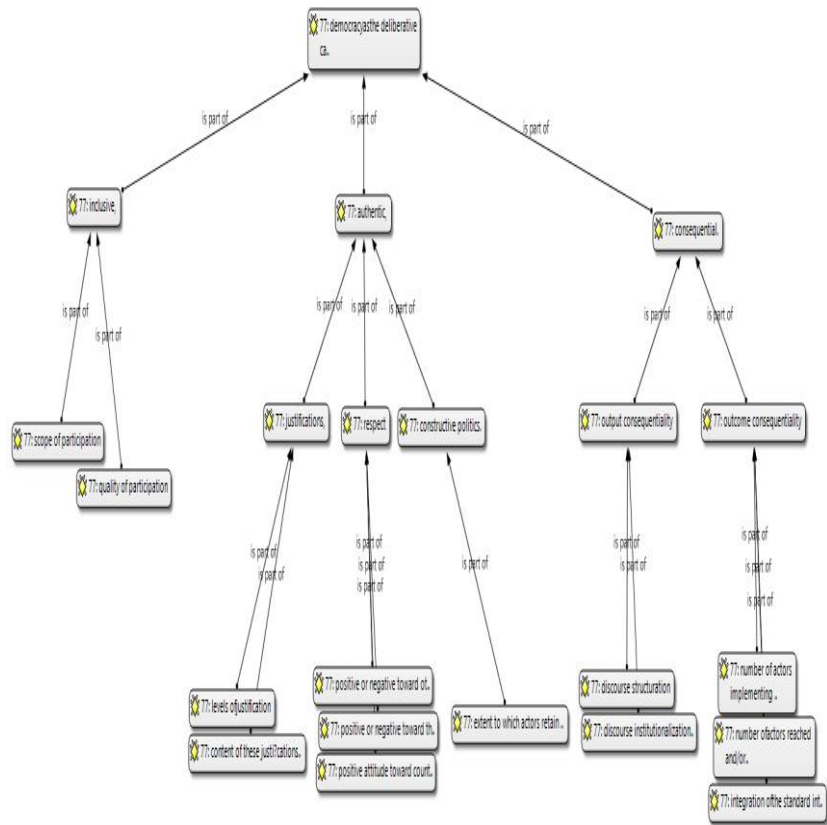
⁵⁶ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Schouten et al 2012

Structured summary of construct operationalization	
Construct:	Democracy as the deliberative capacity
Research Question:	"To analyze democracy as the deliberative capacity of Roundtables, this paper uses the Roundtable on Responsible Soy (RTRS) as an in-depth case study."
Article reference:	Schouten, Greetje, Pieter Leroy, and Pieter Glasbergen. 2012. "On the Deliberative Capacity of Private Multi-Stakeholder Governance: The Roundtables on Responsible Soy and Sustainable Palm Oil." <i>Ecological Economics</i> , Sustainability in Global Product Chains, 83 (November): 42–50. doi:10.1016/j.ecolecon.2012.08.007.
Supporting literature	Schouten, Greetje, and Pieter Glasbergen. 2011. "Creating Legitimacy in Global Private Governance: The Case of the Roundtable on Sustainable Palm Oil." <i>Ecological Economics</i> , Special Section - Earth System Governance: Accountability and Legitimacy, 70 (11): 1891–99. doi:10.1016/j.ecolecon.2011.03.012.
	Schouten, Greetje, and Pieter Glasbergen. 2012. "Private Multi-Stakeholder Governance in the Agricultural Market Place: An Analysis of Legitimization Processes of the Roundtables on Sustainable Palm Oil and Responsible Soy." <i>International Food and Agribusiness Management Review</i> 15 (Special Issue B): 63–88.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	"Dryzek (2009) defines deliberative capacity as the extent to which political systems possess structures to host deliberation that is inclusive, authentic, and consequential."
Data collection methods	<p>"This paper builds on our previous research on the RTRS and RSPO (see: Schouten and Glasbergen, 2011 and Schouten and Glasbergen, forthcoming). The data analyzed in this paper have been collected during the 2008–2011 period. For the RTRS the analyzed data include the minutes of the RTRS Organizing Committee and Executive Board in the 2004–2010 period, newspaper articles and publications of organizations working on soy-related issues. This desk research was complemented by personal observations during two RTRS Executive Board meetings, the fourth Roundtable Conference and the third General Assembly in Campinas, all during May 2009, when most of the debates regarding the expansion of soy cultivation took place. In our control case (the RSPO), the analyzed data include the minutes of the RSPO Organizing Committee, Executive Board and several working groups (2002–2010), newspaper articles and several types of publications (including newsletters) of organizations working on issues related to the sustainable production of palm oil. These data are complemented by five interviews with participants of the New Plantings Working Group, specifically for the analysis of the deliberative authenticity of the communicative processes, as well as observations during the ninth Roundtable Conference on Sustainable Palm Oil and the eighth General Assembly of the RSPO in November 2011 in Kota Kinabalu, Malaysia."</p> <p>(Schouten et al 2011)</p> <hr/> <p>"The article is based on an analysis of RSPO documents and minutes; Documentation of stakeholders; and over 20 semi-structured interviews with RSPO members, RSPO Executive Board members,</p>

	<p>and NGOs working on palm oil issues, including both supporters and critics of the RSPO. A list of interviewees can be found in Appendix A.”</p> <p>(Schouten & Glasbergen 2011)</p> <hr/> <p>“Several data collection methods are combined, including desk research, interviews and observations. Our comparative case study analysis is based on official documents produced by the RSPO and RTRS, minutes of Executive Board meetings, minutes of General Assemblies, and minutes of Working Group meetings. These documents are supplemented by documents on both Roundtables published by individual stakeholders of the Roundtable, and news articles. The desk research is further complemented by over 30 semi-structured in-depth interviews with individual members of both Roundtables (representatives of NGOs and value chain actors) and members of both Executive Boards about the development processes of the arrangements.</p> <p>Furthermore, several employees of NGOs that did not apply for membership of a Roundtable, but are working on palm oil and/or soy issues related to sustainability, were interviewed (a list of interviewees is available in the appendix). Additionally, observations were made during Executive Board meetings of the RTRS, the fourth Roundtable Conference on Responsible Soy and the third General Assembly of the RTRS, all in May 2009 in Campinas, Brazil.</p> <p>Furthermore, observation methods were used during the ninth Roundtable Conference on Sustainable Palm Oil and the eighth General Assembly of the RSPO in November 2011 in Kota Kinabalu, Malaysia”</p> <p>(Schouten & Glasbergen 2012)</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>{scope of participation; quality of participation}</p> <p>{ {levels of justification; content of justifications} ; {positive or negative toward other groups; positive or negative toward the demands of other actors; positive attitude toward counterarguments} ; {extent to which actors retain their original positions or come up with alternative proposals in the course of the deliberative process} }</p> <p>{ {discourse structuration; discourse institutionalization} ; {number of actors reached and/or involved; number of actors implementing new policy; integration of the standard into existing policy} }</p>

Sub-constructs linking governance construct to indicators (unless directly operationalized⁵⁷)



Data analysis methods

“To analyze inclusiveness in terms of discourses, a discourse analysis on the issue of agricultural expansion and sustainable development was conducted. This discourse analysis is not confined to the official discussions within the Roundtable, but also scrutinizes related discourses that take place outside of the Roundtable. Discourses structure the contributions of actors to a discussion, and a discourse analysis illuminates a particular discursive structure in a discussion (Hajer, 2006). Discourse is defined here as an “ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices” (Hajer, 2006, p. 67). The discourse analysis centers mainly on the question: What are the main framings of sustainable development, specifically in relation to agricultural expansion of a specific product? By analyzing official documents and minutes from Roundtables, their member organizations and external organizations referring to the Roundtables, we identified different problem framings and accompanying solutions in the debates regarding the expansion of an agricultural crop. From this data we distilled broader categories of these framings that are similar in their views of sustainability and the

⁵⁷ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>way the relationship is framed between humans, economy and society concerning this specific crop. Furthermore, we linked these discourses to more general discourses on sustainable development” [...]</p> <p>“This paper analyzes the RTRS in an in-depth manner to be able to understand the mechanisms related to the deliberative capacity of this initiative. The RSPO case is used to verify whether the results for the RTRS are applicable to a broader range of Roundtables and is therefore presented in a shorter and less in-depth manner.”</p>
Justification of inference from results to conclusions	
Discussion of limitations	<p>“This paper operationalized the concept of deliberative capacity in order to use it as a tool to empirically assess governance arrangements. Our research suggests that the three elements of deliberative capacity (inclusiveness, authenticity and consequentiality) are not independent from each other, but are connected. A low degree of inclusiveness is likely to go together with a high degree of authenticity in empowered space as well as a high degree of consequentiality. Further research on the relations between the three elements of deliberative capacity is needed in order to methodologically improve the concept.”</p>

Sietz et al 2011

Structured summary of construct operationalization	
Construct:	Barriers to climate mainstreaming
Research Question:	“As several development projects have the potential to integrate climate adaptation into their design, the following sections outline reasons why mainstreaming is restricted and discuss opportunities to overcome these barriers”
Article reference:	Sietz D, Boschütz M, Klein RJ. Mainstreaming climate adaptation into development assistance: rationale, institutional barriers and opportunities in Mozambique. <i>Environ Sci Policy</i> . 2011;14: 493–502.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	<p>“Mainstreaming, however, challenges decision-making for development assistance in five major respects (e.g., Agrawala, 2005; Huq et al., 2006; IDS, 2006; Sperling, 2003). Firstly, donor and national institutions are often not yet set up to encourage mainstreaming. A lack of communication and coordination, poor information dissemination, incoherent mandates and a shortage of funding all impede mainstreaming. Secondly, climate and development concerns are normally tackled on different spatial and temporal scales and respond to different priorities. Over coming these differences is especially important with respect to the long-term effects of current development activities on climate vulnerability and viceversa. In this context, decision-makers face particular uncertainties inherent in the modelling of future changes in climate and socio-economic conditions. Thirdly, the effects of climate come on top of other environmental, gender or health care issues. The potential excess of mainstreaming issues may paralyse development planning and implementation. Fourthly, while attempts are being made to open up developmental decision-making for the newly emerging issue of adverse climate, climate adaptation needs to further broaden its scope by overcoming technology centred approaches. Fifthly, mainstreaming may shift existing funding patterns. There is concern that scarce funds dedicated to climate adaptation could be diverted into more general development activities (Yamin, 2005). But at the same time, funding for climate adaptation could also divert money from ODA intended to address challenges seen as more urgent than climate risks, including sanitation, education and health care (Michaelowa and Michaelowa, 2007).”</p>
Data collection methods	<p>“The results are based on expert consultations held as semi-structured interviews. Experts in Mozambique and Europe were identified by chain referral sampling and by screening the climate relevance of institutional structures in sectors which are involved in the planning and implementing of ODA activities.”</p> <p>[...]</p> <p>“We invited 58 key experts to participate in the interviews in 2006, with a balance between international and national</p>

	<p>experts. 31 of them ultimately participated representing 24 institutions. They involved the positions with the highest institutional responsibilities in key institutions at the donor government interface”</p> <p>[...]</p> <p>“The personnel fluctuations we faced in initiating the interviews may significantly influence institutional continuity and capacities to design and implement activities. Moreover, if personnel in important positions are involved in oversized tasks, their capacities may easily become strained. To deal with some of the uncertainties resulting from this situation, we repeated the consultations with 25 key experts in 2009.”</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>“During the interviews, the experts were asked to indicate the five most important barriers to mainstreaming”</p>
<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁵⁸)</p>	
<p>Data analysis methods</p>	<p>“The experts’ responses range across all three levels of institutional capacity: the individual and organisational level as well as the enabling environment. The level of perception is evaluated according to the number of experts identifying a specific barrier as being most important. A barrier receives the highest perception level (+++) if more than two-thirds of the experts highlighted it as the main barrier, while the medium perception level (++) is given if between one and two-thirds of the experts identified a barrier. Less than one-third of expert identifications result in the low perception level (+). We find that perceptions are fairly consistent among both international and national experts, but differ significantly between the two groups.”</p>

⁵⁸ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

<p>Justification of inference from results to conclusions</p>	<p>“As shown in the previous section, each of the three levels of institutional capacity reveals different mainstreaming barriers. Next, we present specific opportunities identified through the expert consultations and literature review. Planning and implementing climate adaptation for development assistance is not only shaped by bilateral and multilateral donors, but also depends on national development planning. The opportunities focus, therefore, on donors and the Government of Mozambique (GoM). While some barriers can be addressed by either the donors or the GoM, certain opportunities can be seized in partnership. The options for mainstreaming are presented in an actor-oriented way to facilitate the recognition of specific opportunities and collaborative actions”</p>
<p>Discussion of limitations</p>	<p>“The experts interviewed mainly represented the agricultural, water, rural planning and environmental sector. These sectors have been directly impacted by extreme weather conditions, so the experts were convinced that their participation would benefit the inter-institutional networking and related knowledge transfer. In contrast, participation from the health, education and consultancy sector remained limited due to, for example personnel fluctuations, reservations or a lack of interest. Climate-relevant activities in the health and education sector were strongly related to the sectors covered in the expert interviews. Therefore, we assume that perceptions captured reveal the diversity of prevailing opinions. Our experience in the expert interviews already indicates some of the dynamics and barriers inherent in the institutional setting in Mozambique. The personnel fluctuations we faced in initiating the interviews may significantly influence institutional continuity and capacities to design and implement activities. Moreover, if personnel in important positions are involved in oversized tasks, their capacities may easily become strained. To deal with some of the uncertainties resulting from this situation, we repeated the consultations with 25 key experts in 2009.”</p>

Spielman et al 2008

Structured summary of construct operationalization	
Construct:	formal and informal rural governance
Research Question:	“This paper offers a description of both formal and informal rural governance systems in Ethiopia, the role of farmer cooperatives and other membership-based rural producer organizations in these systems, and possible avenues through which rural organizations can play a larger role in improving rural governance”
Article reference:	Spielman, David J., Marc J. Cohen, and Tewodaj Mogues. 2008. “Mobilizing Rural Institutions for Sustainable Livelihoods and Equitable Development: A Case Study of Local Governance and Smallholder Cooperatives in Ethiopia.” Washinton DC: International Food Policy Research Institute.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	
Data collection methods	<p>“The study uses both primary and secondary panel data. The primary data were collected from a cross-section of households in 1999 and 2000 in three phases. The first phase corresponded with the long rains (March–May 1999), the second phase with the short rains (October–December 1999) and the third phase with the long rains (March–May 2000).</p> <p>Primary data were collected from a self weighting probability sample totaling 1600 observations using a detailed questionnaire. The questionnaire was designed to collect information regarding economic and demographic characteristics of sampled households, land conservation practices and land use rights, among other covariates of interest. To these data we appended data on population density at the cluster level from the population census.</p> <p>Secondary data on village level biomass for the study were obtained from the Department of Resource Surveys and Remote Sensing (DRSRS), Ministry of Natural Resources, Environment and Wildlife and are based on satellite images and vegetation indices collected by the National Oceanic and”</p>
Indicators/questions used in data collection instruments?	Iqub (rotating savings and credit associations); Idiir (funeral groups); Other types of credit and savings association; Mahaber (informal farmer associations); Senbete (church associations); Mosque groups; Other
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁵⁹)	Informal governance systems
Data analysis methods	
Justification of inference from results to conclusions	

⁵⁹ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Discussion of limitations	“Note that while these descriptions draw from both the primary and secondary information sources described earlier, the extensive variation in Ethiopia between regions, ethnicities, and communities means that it is impossible to make conclusive, generalizable or nationally representative observations here”
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Stringer et al 2009

Structured summary of construct operationalization	
Construct:	Adaptations
Research Question:	“This paper examines adaptations to three closely linked processes: climate change, desertification and drought. These are considered in three case study countries (Swaziland, Botswana and Malawi) in which we compare national policy strategies to local level adaptations identified through research reported in the literature.”
Article reference:	Stringer LC, Dyer JC, Reed MS, Dougill AJ, Twyman C, Mkwambisi D. Adaptations to climate change, drought and desertification: local insights to enhance policy in southern Africa. <i>Environ Sci Policy</i> . 2009;12: 748–765.
Operationalization:	
Item	Quoted text
Construct definition	Adaptations are defined in the paper as “actions that aim to decrease vulnerability and increase resilience overall, in response to a range of immediate needs, risks and aspirations”
Data collection methods	“The methodology followed for each country is based on a common meta-analytical framework involving first, a literature analysis of the adaptation challenges facing rural agricultural communities (drawing on the authors’ published research and the broader literature). As such, an inductive research approach was taken, as the key drivers of and responses to local adaptations to climate change, desertification and drought in our study countries were identified from the literature.”
Indicators/questions used in data collection instruments?	“the key drivers of and responses to local adaptations to climate change, desertification and drought in our study countries were identified from the literature.”
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁶⁰)	“participation” “policy”
Data analysis methods	“As such, an inductive research approach was taken, as the key drivers of and responses to local adaptations to climate change, desertification and drought in our study countries were identified from the literature. Second, a discourse analysis of each study country’s policy communications to the UNFCCC and UNCCD was undertaken. This involved identifying the patterns of dominant narratives present within each document (Gard, 2005), along with those powerful adaptation strategies afforded most prominence. In doing this, we also attempted to understand the process through which each narrative entered the policy (i.e. whether wholly top-down processes were used in policy development), and assessed

⁶⁰ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

	<p>what this could mean in relation to the more participatory approaches espoused at the international level. Next we used an approach broadly based on grounded theory (Strauss and Corbin, 1990) to draw up key categories in which to place the policy adaptations. These categories emerged from the analysis, and at times shared similarities with the distinctions in typologies such as that developed by Smit and Skinner (2002). Next, we examined the overlaps and differences in the adaptive strategies detailed in policy communications to the UNCCD and the UNFCCC, as well as the similarities and differences between local and policy adaptations. A matrix was then developed to assess these results.”</p>
<p>Justification of inference from results to conclusions</p>	<p>“This section discusses the implications of the contradiction and synergy that has been revealed in our analysis, between climate change and desertification policies, and between the challenges this presents for policy and practice. It considers how policy adaptations may become more mutually supportive if they are embedded within a broader development framework, and argues that adaptation needs to take place synonymously with sustainable development to help reduce vulnerability, in order for it to be successful (as per Schipper, 2007).”</p>
<p>Discussion of limitations</p>	<p>“In evaluating our methodology, we appreciate that there may be other adaptations taking place beyond those documented in the literature we uncovered and that our findings are not exhaustive. Our approach nevertheless permitted the relationship between local and policy adaptations to be explored in a novel and appropriate way to provide new information required to inform both academic research and policy debates. Finally, we also acknowledge that we do not focus on all crops when considering agricultural adaptations in both the policy and local adaptation literature. Instead, we consider only those crops and practices most central to subsistence production. This is because the impacts of climate change, drought and desertification on these crops are likely to have the most profound effect on household wellbeing.”</p>

Termeer et al 2015

Structured summary of construct operationalization																					
Construct:	Four governance capabilities																				
Research Question:	“Using the existing literature, we show how the presence or absence of specific capabilities has produced or prevented progress in dealing with the different problem definitions of sustainable food production under the CAP”																				
Article reference:	Termeer, C. J. A. M., A. Dewulf, G. Breeman, and S. J. Stiller. 2015. “Governance Capabilities for Dealing Wisely With Wicked Problems.” <i>Administration & Society</i> 47 (6): 680–710. doi:10.1177/0095399712469195.																				
Operationalization:																					
<u>Item</u>	<u>Quoted text</u>																				
Construct definition	<p>“We define a governance capability as the ability of policy makers to observe wicked problems and to act accordingly, and the ability of the governance system to enable such observing and acting. Hence, we argue that every capability should include the three aforementioned dimensions of acting, observing, and enabling” [...]</p> <p>“The four capabilities we identify in this article are presented in Table 1. They are derived from four main aspects of wicked problems and based on the characteristics described by Rittel and Webber (1973).”</p> <table border="1"> <thead> <tr> <th colspan="4">Table 1 Four governance capabilities</th> </tr> <tr> <th>Governance capability</th> <th>Definition</th> <th>Aspect of the wicked problem domain to be addressed</th> <th>Effects of deficit</th> </tr> </thead> <tbody> <tr> <td>Reflexivity</td> <td>The capability to appreciate and deal with unstructured problems and multiple realities</td> <td>Unstructured problems Multiple frames and Perspectives</td> <td>Risk of tunnel vision or intractable controversies</td> </tr> <tr> <td>Resilience</td> <td>The capability to flexibly adapt one’s course in response to frequent and uncertain changes without losing identity</td> <td>Interconnected problems Unpredictable consequences of action</td> <td>Risk of failure to keep fulfilling basic functions</td> </tr> <tr> <td>Responsiveness</td> <td>The capability to respond legitimately to</td> <td>No stopping rule Unlimited</td> <td>Risk of overreacting and losing</td> </tr> </tbody> </table>	Table 1 Four governance capabilities				Governance capability	Definition	Aspect of the wicked problem domain to be addressed	Effects of deficit	Reflexivity	The capability to appreciate and deal with unstructured problems and multiple realities	Unstructured problems Multiple frames and Perspectives	Risk of tunnel vision or intractable controversies	Resilience	The capability to flexibly adapt one’s course in response to frequent and uncertain changes without losing identity	Interconnected problems Unpredictable consequences of action	Risk of failure to keep fulfilling basic functions	Responsiveness	The capability to respond legitimately to	No stopping rule Unlimited	Risk of overreacting and losing
Table 1 Four governance capabilities																					
Governance capability	Definition	Aspect of the wicked problem domain to be addressed	Effects of deficit																		
Reflexivity	The capability to appreciate and deal with unstructured problems and multiple realities	Unstructured problems Multiple frames and Perspectives	Risk of tunnel vision or intractable controversies																		
Resilience	The capability to flexibly adapt one’s course in response to frequent and uncertain changes without losing identity	Interconnected problems Unpredictable consequences of action	Risk of failure to keep fulfilling basic functions																		
Responsiveness	The capability to respond legitimately to	No stopping rule Unlimited	Risk of overreacting and losing																		

		unlimited demands and concerns	number of issues and demands Moral responsibilities	citizens' trust and legitimacy
	Revitalizing	The capability to unblock stagnations and reanimate policy processes	Stagnating and unproductive interaction patterns	Risk of more of the same and of regression
Data collection methods	<p>"Using the existing literature, we show how the presence or absence of specific capabilities has produced or prevented progress in dealing with the different problem definitions of sustainable food production under the CAP (Burrell, 2009; Daugbjerg & Swinbank, 2009; De Groot, 1997; Elton, 2010; European Union [EU] Commission, 2010; Feindt, 2010; Fennell, 1997; Grant, 1997; Kay & Ackrill, 2009, 2010; Lynggaard & Nedergaard, 2009; Montpetit, 2003; Termeer & Werkman, 2011; Wiskerke, Bock, Stuiver, & Renting, 2003). We follow the CAP's history by discussing different reforms: The 1984 milk quota reform is used to illustrate the reflexivity capability, the 1992 MacSharry reform serves to discuss the capability of resilience, the 2003 Fischler reform is used to illustrate the capability of responsiveness, and, finally, the Ciolos reform of 2010-2013 is meant to illustrate the capability of revitalization."</p>			
Indicators/questions used in data collection instruments?	<p>"We follow the CAP's history by discussing different reforms: The 1984 milk quota reform is used to illustrate the reflexivity capability, the 1992 MacSharry reform serves to discuss the capability of resilience, the 2003 Fischler reform is used to illustrate the capability of responsiveness, and, finally, the Ciolos reform of 2010-2013 is meant to illustrate the capability of revitalization"</p>			
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁶¹)	Table 1 Four governance capabilities			
	Governance capability	Definition	Aspect of the wicked problem domain to be addressed	Effects of deficit
	Reflexivity	The capability to appreciate	Unstructured problems	Risk of tunnel vision

⁶¹ By 'directly operationalized' it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

		and deal with unstructured problems and multiple realities	Multiple frames and Perspectives	or intractable controversies
	Resilience	The capability to flexibly adapt one's course in response to frequent and uncertain changes without losing identity	Interconnected problems Unpredictable consequences of action	Risk of failure to keep fulfilling basic functions
	Responsiveness	The capability to respond legitimately to unlimited demands and concerns	No stopping rule Unlimited number of issues and demands Moral responsibilities	Risk of overreacting and losing citizens' trust and legitimacy
	Revitalizing	The capability to unblock stagnations and reanimate policy processes	Stagnating and unproductive interaction patterns	Risk of more of the same and of regression
Data analysis methods	"Our illustrative case study is necessarily limited to a brief analysis of some moments in the history of the CAP highlighting a single capability perspective per reform."			
Justification of inference from results to conclusions	<p>"The milk quota system was implemented in 1984. In terms of reflexivity, the quota debate meant the weakening of the dominant frame of supporting production increases within the CAP. Under the leadership of Commissioner Delors, the new frame of production constraints became further embedded in the European institutions and finally enabled the introduction of more production ceilings in 1988 (Elton, 2010; Lynggaard & Nedergaard, 2009)."</p> <p>[...]</p> <p>"The MacSharry reform introduced a new CAP regime through which, in the long run, the EU internal market could slowly adjust itself to the international markets. In addition, the MacSharry reform also introduced a new agrienvironmental and afforestation policy scheme. This was introduced as a response to increasing environmental demands from society. It would later develop into an entirely new policy domain of environmental and rural policies,</p>			

	<p>known as the second pillar of the CAP. It enabled easier adjustment to changing preferences concerning environment and rural development (Lynggaard & Nedergaard, 2009). Hence, this second pillar enabled a more resilient institutional basis to adjust to future policy challenges”</p> <p>[...]</p> <p>“The outbreak of animal diseases has taught the Commission to attentively observe new societal concerns and to respond more quickly to changing societal values. As a result, the cross-compliance was introduced to conveniently capture and bundle a set of new issues. This new scheme developed into an enabling condition for responding to all kinds of current and future postmaterialist preferences. In more general terms, the Commission has become more sensitive about changing values, and uses Euro-barometer surveys and general public debates as a means to enable itself to become a more responsive institution.”</p> <p>[...]</p> <p>“In short, a revitalizing process made actors to look at the CAP in a different way: a way in which farmers would integrate farming activities with public goods. However, with declining budgets, there is pressure to maintain traditional ways of thinking, in which income and farmer’s payments are the most important issues on the agenda and in which countries seek to maintain existing shares of CAP spending. Despite many new proposals to reform, the recent proposals for the period 2014-2020 seem to imply a readjustment along the traditional lines of the CAP”</p>
Discussion of limitations	<p>“Our illustrative case study is necessarily limited to a brief analysis of some moments in the history of the CAP highlighting a single capability perspective per reform. It is not meant to show how the four capabilities can be used simultaneously, with varying emphasis. This would have required a different research scheme. We believe that with the chosen structure, we were more capable of spelling out the different details of both the three dimensions and the four capabilities of wicked problem governance. Moreover, the analysis does not provide an in-depth and comprehensive analysis of the CAP in its entirety and does not enter into the technical details of the complex CAP decisions”</p>

Umali-Deininger & Deininger 2001

Structured summary of construct operationalization	
Construct:	food grain policy environment (in India)
Research Question:	“This paper aims to do so by reviewing the food grain policy environment in India, its impact on household food security and the performance of the food grain system”
Article reference:	Umali-Deininger, Dina L., and Klaus W. Deininger. 2001. “Towards Greater Food Security for India’s Poor: Balancing Government Intervention and Private Competition.” <i>Agricultural Economics</i> 25 (2-3): 321–35. doi:10.1111/j.1574-0862.2001.tb00212.x.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“Two main elements characterise the food grain policy environment in India. First, to guarantee a ‘fair’ price to farmers and to ensure the availability of food to the poor who might not be served by the private sector, GOI created a public marketing system which parallels that of the private sector. An extensive regulatory framework is required to support this public system (see Table 1). Second, to maintain national food security in times of ‘crisis’, the GOI, at the state and the central level, has the power to intervene directly in the operation of markets. Not surprisingly, given that different actors tend to have different definitions of what constitutes a ‘crisis’ and in view of the diametrically opposite incentives of states who are net importers and net exporters of food grains, this creates considerable uncertainty, thus reducing the incentives for private sector involvement in general”
Data collection methods	
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁶²)	<pre> graph BT A[83: food grain policy environment] B[83: three pillars of India's food ..] C[83: Public Distribution system] D[83: market regulations.] E[83: Food corporation of India] E -- "is part of" --> C E -- "is part of" --> D E -- "is part of" --> B C -- "is part of" --> B D -- "is part of" --> B B -- "is part of" --> A </pre>
Data analysis methods	

⁶² By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Justification of inference from results to conclusions	
Discussion of limitations	

Von Geibler 2013

Structured summary of construct operationalization	
Construct:	Legitimacy and effectiveness of standard setting
Research Question:	Against this background, this paper discusses the legitimacy and effectiveness of standard setting in the case of palm oil and focuses on the Roundtable of Sustainable Palm Oil (RSPO) as the first global standard setting initiative for palm oil. I
Article reference:	von Geibler, Justus. 2013. "Market-Based Governance for Sustainability in Value Chains: Conditions for Successful Standard Setting in the Palm Oil Sector." <i>Journal of Cleaner Production</i> , Sustainability management beyond corporate boundaries, 56 (October): 39–53. doi:10.1016/j.jclepro.2012.08.027.
Operationalization:	
Item	Quoted text
Construct definition	
Data collection methods	<p>"In this step, the value chain of palm oil is characterised by specifying the key actors and social and environmental concerns emerging due to increased market demand. The description is grounded on an internet search (Google scholar) for literature on palm oil-specific environmental and social assessments and broader literature addressing the sustainability of biofuels as a market with increasing demand.</p> <p>Furthermore, observations have been made at Indonesian palm oil plantations and processing. This step also includes a description of the RSPO in the evolutionary logic of the NSMD approach"</p> <p>[...]</p> <p>"The RSPO is assessed concerning its performance using the criteria developed in step 1. As a result the strengths and weaknesses of the RSPO can be identified. Literature reviews as well as interviews on the RSPO's success were the main information source. For the assessment of conditions for legitimacy and effectiveness in the case study 15 interviews were conducted as the main information source. Interviewees included actors directly involved in the RSPO standard setting process (four steering board members including the chair of the RSPO; two ordinary RSPO members, one associated RSPO member and the general secretary of the RSPO) as well as general experts in the field of certification (four NGO representatives e both RSPO supporting NGOs and RSPO opposing NGOs, and experts from policy, business and science). The interviews were conducted and analysed in the same way as described in step 1"</p> <p>[...]</p> <p>"an interview guideline in order to structure the interview (Meuser and Nagel, 2005)."</p>
Indicators/questions used in data collection instruments?	"an interview guideline in order to structure the interview (Meuser and Nagel, 2005)."

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁶³)</p>	<pre> graph TD A["84: legitimacy and effectiveness of."] B["84: legitimacy"] C["84: effectiveness"] D["84: Non-State Market Driven' (NSMD..)"] E["84: desired effects of sustainabil."] D -- "is part of" --> B E -- "is part of" --> C B -- "is part of" --> A C -- "is part of" --> A </pre>
<p>Data analysis methods</p>	
<p>Justification of inference from results to conclusions</p>	<p>“Using the RSPO standard setting process as an example of nonstate market-driven governance, this paper illustrated why the RSPO as a global sector-specific sustainability initiative is only partly effective. The prospects are good that the certified palm oil plantations will lead to improved sustainability contributions on the certified site. However, indirect effects from increased market demand are not considered sufficiently, which limits the ability of the RSPO to steer value chains towards sustainability. Since knowledge on indirect effects is still emerging, initiatives attempting to provide scientific evidence of the effectiveness of standard setting should receive continuous support. This comprises the development of a scientific consensus on methodical questions and the establishment of according information systems which aim for improvements in data availability and transparency regarding the effectiveness of standard setting (see e.g. the Initiative ‘Defining Good Practice for Measuring the Impacts of Social and Environmental Standards’, ISEAL Alliance, 2008). In this context it will be necessary to bear in mind similarities and differences among existing standards and their target settings. The conditions for success of standard setting processes identified in this paper can be an input to the further discussion of meta-standards.”</p>
<p>Discussion of limitations</p>	

⁶³ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Wambugu et al 2015

Structured summary of construct operationalization	
Construct:	benchmarks on institutional arrangements (for climate-smart agriculture and forestry landscapes)
Research Question:	“to apply benchmarks on institutional arrangements, drawn from the literature, to determine the extent to which they are realizable in practice.”
Article reference:	Wambugu, Susan W., Susan W. Chomba, and Joanes Atela. 2015. “Institutional Arrangements for Climate-Smart Landscapes.” In <i>P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw, and D. Catacutan, Editors. Climate-Smart Landscapes: Multifunctionality in Practice</i> . Nairobi: World Agroforestry Centre (ICRAF).
Supporting literature:	Atela, Joanes O. 2012. “The Politics of Agricultural Carbon Finance: The Case of the Kenya Agricultural Carbon Project.” 49. STEPS Working Paper. Brighton, UK: STEPS Centre.
	Atela, Joanes O. 2013. “Governing REDD+: Global Framings versus Practical Evidence from the Kasigau Corridor REDD+ Project, Kenya.” 55. STEPS Working Paper. Brighton, UK: STEPS Centre. http://steps-centre.org/wp-content/uploads/Governing-REDD+.pdf .
	Atela, Joanes O., Claire H. Quinn, and Peter A. Minang. 2014. “Are REDD Projects pro-Poor in Their Spatial Targeting? Evidence from Kenya.” <i>Applied Geography</i> 52 (August): 14–24. doi:10.1016/j.apgeog.2014.04.009.
	Chomba, S. (In press). Institutional Choices under REDD+ and their implications for local democracy: Lessons from Kasigau project in Kenya.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“Here we present seven benchmarks which are outlined in the literature as crucial in defining climate-smart landscapes. While the benchmarks cut across various landscapes (such as forestry, agricultural, urban, coastal and drylands), the variations between landscapes will determine what criteria are prioritized. Our presentation however does not imply any order of importance or that this list is exhaustive in itself. Rather, they serve as reference points which we can use to analyze institutional arrangements for climate smart landscapes”
Data collection methods	<p>“The cases presented are based on empirical data collected using mixed methods designed under two PhD and one MPA studies conducted in Kenya between 2011 and 2014, (see Wambugu, 2012; Atela, 2012, 2013; Atela et al., 2014; Chomba, in press; Chomba et al., in press). Each individual study entailed different, but related objectives, embedding institutional research, with common findings on multiple and complex institutional arrangements in each of the cases. The authors draw from their primary and secondary data, as well as field experiences to evaluate the cases against the benchmarks”</p> <p>(Wambugu et al 2015)</p> <hr/> <p>“Overall, data were collected from three groups of actors engaged in the project: community members, including participating households and Community Based Organisations (CBO) leaders (45 people plus</p>

	<p>three focus group discussions); project staff (nine people) and government staff including the local chief (four people). Fieldwork and interviews were undertaken in the project sites at two different stages of the project implementation. The first field visit took place after the project had been validated and had received carbon funds but before these funds were distributed. During this first visit, data on project design, narratives, and socio-economic settings of the project area, resource histories and community and state engagements were collected. Specific methods employed include interviews with three project directors, six field staff, 41 community members (differentiated by gender and position in the project community), four representatives of local CBO (Marungu Hills), one local politician (ward representative), and two local chiefs. Focus group discussions were held with three community groups working under the project. Since carbon money had not been shared out during the first visit, it was necessary to make a second visit three months later, allowing adequate time for fund allocations. In the second visit, discussions were held with different committees charged with the distribution of carbon money and the various groups that were expected to implement selected community projects. In-depth interviews were also undertaken with two staff of the Ministry of Forestry in Nairobi. Other participatory approaches such as transect walks and informal discussions were also employed.”</p> <p>(Atela 2013).</p>
<p>Indicators/questions used in data collection instruments?</p>	<p>“data on project design, narratives, and socio-economic settings of the project area, resource histories and community and state engagements were collected.”</p> <p>(Atela 2013)</p> <hr/> <p>“identifying which actors received what kind of benefits; as well any stated policies on tenure and benefit distribution” [...] “Data on contemporary tenure arrangements and benefit distribution by the project were collected” [...] “The questionnaire aimed at providing descriptive data on land ownership and ownership of shares in various forms of companies, and how this conditioned access to project benefits.” [...] “the historical evolution of land tenure, claims, conflicts and dispossessions over time”</p> <p>(Chomba et al 2016)</p>

<p>Sub-constructs linking governance construct to indicators (unless directly operationalized⁶⁴)</p>	
<p>Data analysis methods</p>	<p>“Information was analysed qualitatively using grounded theory approach, excel graphics and flow charts to draw out narratives, actor-networks and interests, and locate these in historical and ongoing intervention processes”</p> <p>(Atela 2012)</p> <hr/> <p>“Data were analysed qualitatively using a grounded theory approach. For instance, narratives about the project by different actors were generated from a perception matrix. The matrix was based on recorded interviews. In these interviews counts of the number of times specific issues were mentioned by various actors were obtained. Counts for global narratives were however obtained from UNFCC Conference of the Parties (COP) and donor documents.”</p> <p>(Atela 2013)</p>
<p>Justification of inference from results to conclusions</p>	
<p>Discussion of limitations</p>	

⁶⁴ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Wilder et al 2010

Structured summary of construct operationalization	
Construct:	capacity to build adaptive organizations within the Arizona–Sonora border region
Research Question:	“Following Pelling et al. (2008), we ask how institutions shape capacity to build adaptive organizations within the Arizona–Sonora border region.”
Article reference:	Wilder M, Scott CA, Pablos NP, Varady RG, Garfin GM, McEvoy J. Adapting across boundaries: climate change, social learning, and resilience in the US–Mexico border region. <i>Ann Assoc Am Geogr.</i> 2010;100: 917–928.
Operationalization:	
<u>Item</u>	<u>Quoted text</u>
Construct definition	“We understand adaptive capacity to be a dynamic process based on social learning between and within institutions, rather than a static condition or set of attributes and outcomes (Pahl-Wostl 2007; Pelling et al. 2008).”
Data collection methods	
Indicators/questions used in data collection instruments?	
Sub-constructs linking governance construct to indicators (unless directly operationalized ⁶⁵)	<pre> graph BT A["302: capacity to build adaptive org.."] B["302: social learning"] C["302: (1) dynamic, structured opport.."] D["302: (2) emergence of formal and in.."] E["302: (3) potential for development .."] C -- "is part of" --> B D -- "is part of" --> B E -- "is part of" --> B B -- "is part of" --> A </pre>
Data analysis methods	
Justification of inference from results to conclusions	
Discussion of limitations	

⁶⁵ By ‘directly operationalized’ it is meant that the data collection instruments contain indicators to directly represent the higher-level governance construct, rather than representing intermediary sub-constructs through conceptual deconstruction of the higher-level governance construct.

Appendix H: Indicator classification and source

Source	Harmonized constructs (original names)	Governance Level	Food System	Indicator-name (1st iteration)	Indicator-name (2nd iteration)
307 Candel et al 2015	reflexivity	Regional	Miscellaneous	reflexivity	reflexivity
	resilience	Regional	Miscellaneous	resilience/robustness	resilience/robustness
	responsiveness	Regional	Miscellaneous	responsiveness	responsiveness
	revitalization	Regional	Miscellaneous	revitalization	revitalization
	rescaling	Regional	Miscellaneous	rescaling	scale-specific responsibilities and competences
152 Bizikova et al 2015	motivation behind (adaptation policy development)	Regional; National; sub-national	Production	Motivation	implementation-supporting conditions
	the interaction between science, policy and research coordination	Regional; National; sub-national	Production	Use of science and research	Use of science and research
	communication and knowledge exchange	Regional; National; sub-national	Production	knowledge sharing	use of knowledge and science
	the ways in which various tasks and responsibilities are distributed between different levels of governance	Regional; National; sub-national; cross scale	Production	distribution of responsibilities across levels	scale-specific responsibilities and competences
	institutional arrangements for incorporating adaptation into sectorial/cross-	Regional; National; sub-national	Production	Institutional mainstreaming	Institutional mainstreaming

	sectorial policies				
	approaches to whether (and how) countries can ensure that their strategies are implemented and reviewed	Regional; National; sub-national	Production	Implementation	implementation-supporting conditions
31 Galiè 2013	informal rules regulating seed management at community and intra-household level	Local	Production	informal rules	informal governance
	seed governance frameworks	Cross-scale	Production	governance framework	governance framework
	rights, access to and control of seed	Local	Production	access to and control of inputs	scale-specific responsibilities and competences
	international, national, local and individual levels;	Cross-scale	Production	cross-scale interaction	cross-scale interaction
	Gender-sensitive seed governance	Local	Production	gender-sensitivity	gender-sensitivity
308 Gupta et al 2010	variety	Universal	Miscellaneous	Variety	scale-specific responsibilities and competences
	learning capacity	Universal	Miscellaneous	Learning	Learning
	room for autonomous change	Universal	Miscellaneous	room for autonomous change	scale-specific responsibilities and competences
	leadership	Universal	Miscellaneous	leadership	leadership
	resources	Universal	Miscellaneous	resources	resources
	fair governance	Universal	Miscellaneous	fairness	fairness
42 Jacobi et al 2015	self-organization and learning	Local; sub-national	Production; Distribution	Non-state self-organising	Non-state self-organising
		Local; sub-	Production;	Learning	Learning

	capacities (for agroecosystem resilience)	national	Distribution		
46 Korhonen-Kurki et al 2014	Pressure from shortage of forest resources (PRES)	NotGov	NotFS		
	Key features of effective forest legislation, policy and governance (EFF)	National	NotFS	Legal Framework	Legal Framework
	Already initiated policy change (CHA)	National	NotFS	Policy change recognising Food Systems	favourable initial policy change
	National ownership (OWN)	National	NotFS	Domestic ownership	scale-specific responsibilities and competences
	Inclusiveness of the policy process (INCL)	National; Local	NotFS	Participation	participation and multi-stakeholder engagement
	establishment of comprehensive policies targeting transformational change in the REDD+ policy domain	National	NotFS	Policy framework	Policy framework
232 Lesnikowski et al 2013	Country size	National	NotFS	Country size	Country size
	public social commitments	National	NotFS	public social commitments	public social commitments
	public pressure	National	NotFS	public pressure	implementation-supporting conditions
	availability of national resources for addressing environmental and health externalities	National	NotFS	Resources	Resources
	institutional capacity	National	NotFS	state capacity	state capacity
	commitment to mitigation	National	NotFS	commitment	outcomes of similar programmes

	of future climate change				
	quality of governance	National	NotFS	corruption	corruption
	participation in institutions of global governance	National	NotFS	involvement in supra-national institutions/agreements	cross-scale interaction
276 Sietz et al 2011	Barriers to climate mainstreaming	Universal	NotFS	Institutional mainstreaming	Institutional mainstreaming
309 Termeer et al 2015	Reflexivity	Regional	Production	reflexivity	reflexivity
	Resilience	Regional	Production	resilience/robustness	resilience/robustness
	Responsiveness	Regional	Production	responsiveness	responsiveness
	Revitalizing	Regional	Production	revitalization	revitalization
52 Mandemaker 2011	Voice and accountability	National	Production	accountability	Electorally democratic
	Government effectiveness	National	Production	public social commitments	public social commitments
	Regulatory quality	National	Production	state capacity	state capacity
	Rule of law	National	Production	Rule of Law	Rule of Law
	Political stability and absence of violence	National	Production	political stability	political stability
	Control of corruption	National	Production	corruption	corruption
60 Osbahr et al 2008	agricultural policy initiatives	National	Production	Policy framework	Policy framework
79 Spielman et al 2008	Informal governance systems	Local	Production	informal rules	informal governance
71 Quinn et al 2011	ability of local institutions to support individual/household adaptation strategies	Local; sub-national	NotFS	support for individual/household action	scale-specific responsibilities and competences
48 Leith et al 2012	self-assessed adaptive capacity of	Local; sub-national	NotFS	adaptive capacity	adaptive capacity

	natural resource managers				
20 Cooper & Wheeler 2015	self-organisation	Local	Production	Non-state self-organising	Non-state self-organising
	diversity of state and non-state multi-stakeholder engagement and interaction	Local	Production	Multi-stakeholder	participation and multi-stakeholder engagement
	knowledge sharing	Local	Production	knowledge sharing	use of knowledge and science
	Bridging and bonding ties	Local	Production	networks	networks
	polycentric decision-making in nested institutional hierarchies	Cross-scale	Production	polycentricity	polycentricity
	stronger leadership & shadow networks	Local	Production	leadership	leadership
	multi-scale networks & linkages	Cross-scale	Production	cross-scale interaction	cross-scale interaction
327 Donovan et al 2010	Strategic framework	National	NotFS	governance framework	governance framework
	Continuous multistakeholder consultation process	National	NotFS	Multi-stakeholder	participation and multi-stakeholder engagement
	REDD+ governance development plan (RGDP)	National	NotFS	Policy change recognising Food Systems	favourable initial policy change
	independent forest monitoring	National	NotFS	Use of science and research	use of knowledge and science
	formal dialogue with the European Union, with the intent of joining the	National	NotFS	involvement in supra-national institutions/agreements	cross-scale interaction

	Forest Law Enforcement, Governance and Trade (FLEGT) processes towards a Voluntary Partnership Agreement (VPA).				
	engage in a formal dialogue with the Extractive Industries Transparency Initiative (EITI)	National	NotFS		
102 Jacobi et al 2015	buffer capacity	NotGov	Production		
	self-organization	Cross-scale	Production	Non-state self-organising	Non-state self-organising
	adaptive capacity	Cross-scale	Production	adaptive capacity	adaptive capacity
Acemoglu et al 2009	Democracy	National	NotFS	Electoral democracy	Electoral democracy
178 Eakin et al 2011	participation, empowerment and accountability	sub-national	NotFS	Participation	participation and multi-stakeholder engagement
	technical and financial capacity	sub-national	NotFS	resources	resources
	learning, institutional memory and knowledge	sub-national	NotFS	Learning	Learning
40 Huntjens et al 2012	Institutional design for climate change adaptation strategy	Universal	Miscellaneous	Common Pool Resource management design	Common Pool Resource management design
55 Minde et al 2008	fertilizer subsidy programme	National	Production	performance of governance programme(s)	outcomes of similar programmes
77 Schouten et al 2012	Democracy as the deliberative	Global	Miscellaneous	Deliberation	Deliberation

	capacity				
135 Wambugu et al 2015	Participatory and collaborative processes	Local	NotFS	Participation	participation and multi-stakeholder engagement
	Secure tenure	Local	NotFS	Legal Framework	Legal Framework
	Equitable benefit-sharing mechanisms	Local	NotFS	fairness	fairness
	Gender consideration	Local	NotFS	gender-sensitivity	gender-sensitivity
	Strategic targeting of investments	Local	NotFS	Institutional mainstreaming	Institutional mainstreaming
	Monitoring and evaluation of impacts	Local	NotFS	Use of science and research	use of knowledge and science
	Explicitly addressing mitigation and adaptation needs	Local	NotFS	Policy framework	Policy framework
187 Gereffi et al 2005	types of value chain governance	Global	Distribution	-	centralisation
	complexity of transactions	NotGov	Distribution	-	
	capability of suppliers	NotGov	Distribution	-	
	codifiability of information	NotGov	Distribution	-	
84 von Geibler	Legitimacy	Global	Production	-	Legitimacy
	Effective	Global	Production	-	Effective
123 Kabubo- Mariara 2007	Property rights in land	National	Production	-	Legal Framework
159 Brownhill & Hickey 2012	food security policy barriers	sub- national	Miscellane ous	-	implementation- supporting conditions
47 Lebel et al 2006	representation	sub- national	Production	-	Electorally democratic
	accountability	sub- national	Production	-	accountability
	multilayered	sub- national	Production	-	scale-specific responsibilities and competences

	polycentric	sub-national	Production	-	polycentricity
	participation	sub-national	Production	-	participation and multi-stakeholder engagement
	social justice	sub-national	Production	-	fairness
	deliberation	sub-national	Production	-	deliberation
	empowerment	sub-national	Production	-	empowerment
	adaptation and learning	sub-national	Production	-	learning
	capacity for self-organizing	sub-national	Production	-	resilience/robustness
59 Osbahr et al 2010	informal and formal institutions	Local	NotFS	-	Informal governance
70 Poteete & Ostrom 2004	collective action for sustainable management	Local	NotFS	-	Common Pool Resource management design
14 Boons & Mendoza 2010	definitions of sustainability	National	Production; Distribution	-	Discursive framing
65 Pesqueira & Glasbergen 2013	creation of a space of engagement	Global	Miscellaneous	-	Discursive framing
	creation of connecting spaces	Global	Miscellaneous	-	participation and multi-stakeholder engagement
	creation of a space of formal interdependence	Global	Miscellaneous	-	networks
302 Wilder et al. 2010	social learning	Regional	NotFS	-	learning
318 Jawtusich et al 2013	Corporate ethics	Local; sub-national	Production	-	fairness
	accountability	Local; sub-national	Production	-	accountability
	participation	Local; sub-national	Production	-	participation and multi-stakeholder engagement
	Rule of Law	Local; sub-national	Production	-	Rule of Law
	Holistic Management	Local; sub-national	Production	-	Holistic

43 Juhola & Westerhoff 2011	formal institutions	Cross-scale	NotFS	-	governance frameworks
	informal institutions	Cross-scale	NotFS	-	Informal governance
	networks in governance	Cross-scale	NotFS	-	networks
	formal institutions and informal networks interact across different scales	Cross-scale	NotFS	-	cross-scale interaction

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