ILR International Livestock Research Institute

Research Report 25



The Impacts of the Arid Lands Resource Management Project (ALRMPII) on Livelihoods and Vulnerability in the Arid and Semi-Arid Lands of Kenya The Impacts of the Arid Lands Resource Management Project (ALRMPII) on Livelihoods and Vulnerability in the Arid and Semi-Arid Lands of Kenya

Nancy Johnson¹ and Ayago Wambile² (editors)

Nancy Johnson, ILRI (International Livestock Research Institute), Nairobi, Kenya
Ayago Wambile, ILRI, Nairobi, Kenya



International Livestock Research Institute

ILRI works with partners worldwide to help poor people keep their farm animals alive and productive, increase and sustain their livestock and farm productivity, and find profitable markets for their animal products. ILRI's headquarters are in Nairobi, Kenya; we have a second principal campus in Addis Ababa, Ethiopia, and 14 offices in other regions of Africa and Asia. ILRI is part of the Consultative Group on International Agricultural Research (www.cgiar.org), which works to reduce hunger, poverty and environmental degradation in developing countries by generating and sharing relevant agricultural knowledge, technologies and policies.

© 2011 International Livestock Research Institute (ILRI)



This publication is copyrighted by the International Livestock Research Institute (ILRI). It is licensed for use under the Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported

License. To view this license, visit http://creativecommons.org/licenses/by-nc-sa/3.0/. Unless otherwise noted, you are free to copy, duplicate, or reproduce, and distribute, display, or transmit any part of this publication or portions thereof without permission, and to make translations, adaptations, or other derivative works under the following conditions:



ATTRIBUTION. The work must be attributed, but not in any way that suggests endorsement by ILRI or the author(s).

NON-COMMERCIAL. This work may not be used for commercial purposes.

SHARE ALIKE. If this work is altered, transformed, or built upon, the resulting work must be distributed only under the same or similar license to this one. NOTICE:

For any reuse or distribution, the license terms of this work must be made clear to others. Any of the above conditions can be waived if permission is obtained from the copyright holder. Nothing in this license impairs or restricts the author's moral rights.

Fair dealing and other rights are in no way affected by the above.

The parts used must not misrepresent the meaning of the publication. ILRI would appreciate being sent a copy of any materials in which text, photos etc. have been used.

Cover painting—Maasai herding by Kahare Miano.

Design and layout—ILRI Editorial and Publishing Services, Addis Ababa, Ethiopia.

ISBN 92-9146-257-8

Citation: Johnson, N. and Wambile, A. (eds). 2011. The Impacts of the Arid Lands Resource Management Project (ALRMPII) on Livelihoods and Vulnerability in the Arid and Semi-Arid Lands of Kenya. ILRI Research Report 25. Nairobi, Kenya, ILRI.

International Livestock Research Institute

P O Box 30709, Nairobi 00100, Kenya Phone + 254 20 422 3000 Email ILRI-Kenya@cgiar.org P O Box 5689, Addis Ababa, Ethiopia Phone + 251 11 617 2000 Email ILRI-Ethiopia@cgiar.org

www.ilri.org

Table of Contents

List of Tables v				
List of Figures v				
Ał	obrev	iations and acronyms	ix	
A	cknov	vledgements	x	
Ex	ecuti	ve summary	1	
1	I Introduction			
	1.1	Development challenges in the Arid and Semi-Arid Lands	4	
	1.2	Origin and structure of ALRMPII	5	
	1.3	Indicators and conceptual framework	9	
	1.4	Site selection and data	10	
2	Imp	acts of ALRMPII on the vulnerability of ASAL populations to drought (KPI1)	13	
	2.1	Introduction	13	
	2.2	Data and methods	15	
	2.3	Results of analysis of determinants of percent of population needing food aid	18	
	2.4	Community perceptions of trends in vulnerability to drought and food aid needs	18	
	2.5	Summary and conclusions	22	
3	Imp	act of ALRMPII on emergency responses to drought (KPI2)	23	
	3.1	Introduction	23	
	3.2	Data and methods	24	
	3.3	Characteristics of response organizations	24	
	3.4	Sources of information that organizations use in their response decisions	27	
	3.5	Impacts of the ALRMP Bulletin on organizations' responses to drought, including changes in response time	28	
	3.6	Impacts of ALRMPII beyond response time	31	
	3.7	Summary and conclusions	32	
4	Imp	acts of ALRMPII on child nutritional status	34	
	4.1	Introduction	34	
	4.2	Data and methods	34	
	4.3	Evaluating the impact of ALRMP II on child nutrition using difference in difference regressions	38	

	4.4	Assessing the impact of ALRMPII using stochastic dominance analysis	41
	4.5	Summary and conclusions	50
5	Imp	acts of ALRMPII on access to social services in ASAL communities (KPI4)	51
	5.1	Introduction	51
	5.2	Data and methods	52
	5.3	Changes in household access to services	55
	5.4	Community perception of changes in service quality in ALRMPII communities	57
	5.5	Changes in relationships between communities and service providers	59
	5.6	Contributions of ALRMP to changes in service provision and providers	62
	5.7	Impacts of ALRMP service provision projects on communities	65
	5.8	Summary and conclusions	69
6	Insti and	tutionalizing the impacts of ALRMPII by empowering communities influencing policy (KPI5)	71
	6.1	Introduction	71
	6.2	Data and methods	72
	6.3	Impact of ALRMPII on community empowerment	73
	6.4	ALRMPII influence on national-level policies	77
	6.5	Summary and conclusions	86
7	Con	clusions and Recommendations	87
	7.1	Summary and implications	87
	7.2	Some general recommendations	92
Re	ferer	nces	94

List of Tables

Table 1. ALRMPII Districts, by financial year in which they entered the project	6
Table 2. ALRMPII Program expenditures per capita (KES), by district and time period	16
Table 3. Summary statistics for variables used the regression analysis	17
Table 4. Determinants of % of population assessed as needing food aid	19
Table 5. Responses to droughts by drought, type and information source	29
Table 6. Mean response time by type of response, drought and use of ALRMP information	30
Table 7. Determinants of change in response time (n=62)	31
Table 8. Sample size by financial year (July–June) and district	36
Table 9. Median MUAC Z-score by financial year (July–June) and district	36
Table 10. Median MUAC Z-score by financial year (July–June) and district—Intervention Sites	36
Table 11. Median MUAC Z-score by year and district—Control Sites	36
Table 12. 10th percentile MUAC Z-score—whole sample	37
Table 13. 25th percentile MUAC Z-score—whole sample	37
Table 14. MUAC Summary Statistics for 2005/06–2008/09—Sublocation panel data	38
Table 15. Impact of ALRMP on individual MUAC z-scores, by type of control-intervention categorization2005/06–2008/09 Diff-in-diff Regression—Dependent Variable: individual MUAC Z-score	39
Table 16. Impact of ALRMP on individual MUAC z-score, by length of spellDiff-in-diff Regression—Dependent Variable: individual MUAC Z-score	40
Table 17. Summary table of Stochastic Dominance Results	44
Table 18. Mean values of selected characteristics of households, by year, agro-ecological zone, and treatment category	52
Table 19. Summary of changes in service indicators related to water	53
Table 20. Changes in indicators of access to human health services	54
Table 21. Changes in indicators of access to animal health services	54
Table 22. Changes in indicators of access to education and security services	55
Table 23. Changes in indicators of access to agricultural and veterinary extension	55
Table 24. Community indicators for quality of social services, by type	57
Table 25. Average quality of services on a scale of 0 to 10, before and after ALRMP	58
Table 26. Average community in degree before and after ALRMP II by district	61

Table 27. Changes in ALRMP out-degree, by district	62
Table 28. ALRMP betweenness centrality before and after ALRMP II across all sites	63
Table 29. ALRMPII projects identified by communities for impact diagramming analysis	66
Table 30. Contributions of ALRMPII to the National Policy on Peace Building and Conflict Management	79
Table 31. ALRMPII contribution to the National Disaster Policy	80
Table 32. ALRMPII contribution to the ASAL policy	82
Table 33. ALRMPII contribution to the FSN policy	84
Table 34. ALRMPII contribution to the livestock policy, by source of information	85

List of Figures

Figure 1. I	Districts selected for the ALMPII evaluation	7
Figure 2. I	Percentage of people assessed as requiring food assisstance in Kenya,	
ł	by year	13
Figure 3. I	Percent of household needing food aid, by district and assessment period	14
Figure 4. 1	Trends in NDVI by district	17
Figure 5. /	Average scores for severity of harvest loss, severity of livestock loss, and proportion of community members requiring food aid, all sites	20
Figure 6. /	Average scores for severity of livestock loss and proportion of community members requiring food aid, arid sites	21
Figure 7. /	Average scores for severity of harvest and proportion of community members requiring food aid, semi-arid sites	22
Figure 8. I	Distribution of survey responses by district (N=95)	25
Figure 9. 7	Types of organizations that responded to the survey, by ecological zone (N=95)	25
Figure 10.	. Scale of operation of survey respondents, by ecological zone (n=93)	26
Figure 11.	. Stresses to which organizations respond, by ecological zone (n=270*)	26
Figure 12.	. Source of information for planning and implementing response activities (n=110)	27
Figure 13.	. Indicators of interest by source of information (N=244)	28
Figure 14.	. Type of indicators sought in ALRMP bulletin, by ecological zone (n=148)	28
Figure 15.	. Perceived usefulness of information for planning, by source (N=131)	29
Figure 16.	. Contribution of ALRMPII to Drought Management	32
Figure 17.	. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. Median MUAC of observations < 0. Categorization by Investment	46
Figure 18.	. First Order Stochastic Dominance—Difference Intervention vs. Difference Control Sublocations. 25th percentile of MUAC distribution Categorization by Investment	47
Figure 19.	. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. 10th percentile of MUAC distribution Categorization by Investment	48
Figure 20.	. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. Median MUAC of observations < -1. Categorization by Investment	49

Figure 21. First Order Stochastic Dominance—Different Intervention vs. Different Control Sublocations. Median MUAC of observations < -2. Categorization by Investment	nce 49
Figure 22. Changes in community perceptions of the quality of social services, agro-ecological zone	by 58
Figure 23. Changes in community perceptions of the quality of social services, service type and agro-ecological zone	by 59
Figure 24. Map of actors in Eor Ewaso Community (Narok) in 2004 and 2009	60
Figure 25. Social network of Tharaka (Kanyange) 2009	64
Figure 26. Social network of Mandera (Bella) 2009	65
Figure 27. Impact Diagram for water drawn by women in Gathiuru	67
Figure 28. Impact Diagram for dam drawn by community in Oljabet	67
Figure 29. Impact Diagram for borehole drawn by Women in Kulan	68
Figure 30. Impact Diagram for borehole drawn by Men in Kulan	68
Figure 31. Framework for analysing policy influence (Source ODI)	73
Figure 32. Average community out degree before and after ALRMPII	74
Figure 33. Community node betweenness centrality, 2004 and 2009	75
Figure 34. Impacts of ALRMPII on communities, according to DSG members (n	=65) 76
Figure 35. Impacts of ALRMPII Policy Advocacy work on communities, accordi to DSG members (N=38)	ng 77

Abbreviations and acronyms

ALIN	Arid Lands Information Network
ALRMPII	Arid Lands Resource Management Project, Phase 2
ASAL	Arid and Semi-arid Lands
AU-IBAR	African Union /Inter-African Bureau for Animal Resources
DFID	Department for International Development
DCTF	Drought Contingency Trust Fund
DFID	Department for International Development
DMA	Drought Management Authority
DMI	Drought Management Initiative
DSGs	District Steering Groups
ECHO	European Community Humanitarian Aid
EDRP	Emergency Drought Recovery Project
EMO/PRRO	Emergency Operation/Protracted Relief and Recovery Operations
EWS	Early Warning System
FAO	Food and Agriculture Organization of the United Nations
FEWS	Famine Early Warning System
GoK	Government of Kenya
ICRAF	World Agro-forestry Centre
ILRI	International Livestock Research Institute
IP-ERS	Investment Program for the Economic Recovery Strategy
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KFSM	Kenya Food Security Meeting
KFSSG	Kenya Food Security Steering Group
КМС	Kenya Meat Commission
KPIs	Key Performance Indicators
LINKS	Livestock Information Network and Knowledge System
MUAC	Mid-upper Arm Circumference
NCCK	National Council of Churches of Kenya
NDVI	Normalized Difference Vegetation Index
NGOs	Non Governmental Organization
PRSP	Poverty Reduction Strategy Paper
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNICEF	United Nations Children's Fund
USAID	United States Aid for International Development
WFP	World Food Programme

Acknowledgements

This report is based on the results of an evaluation commissioned by the Arid Lands Resource Management Project. We would like to acknowledge the support of the ALRMPII project management unit, especially Fatuma Abdikadir, Charles Wanjigi, James Odour, Abdirahman Abass, Mohammed Halakhe and Saadia Mohamed, for making available project data and documentation, facilitating contacts, and providing thoughtful feedback throughout the evaluation process.

We are especially grateful to the drought management officers (DMOs) of the 10 study districts—Joseph Langat of Narok, John Mwangi of Nyeri, Julius Muriuki of Laikipia, Francis Koma of Mwingi, Adan Mohamed of Mandera, George Otieno of Kajiado, A. M. Farah of Garissa, J. Muthaura of Tharaka, Geoffrey E. Kaituko of Turkana, and Godana Doyo of Marsabit. The DMOs and their staffs provided logistical support for the household and community data collection and the dissemination of the response agent survey. In addition they compiled information to document the component outcome indicators in their districts.

The following people provided useful information on the status of the different policies related to ASAL areas: Abbas Mohammed of the Kenya Livestock Marketing Council, James Tendwa of the ASAL-Based Livestock and Rural Livelihoods Support Project, Gordon Otieno Muga of the Department of Disaster Reduction at the Ministry of Special Programmes, Paul Obunde of the Ministry of State for the Development of Northern Kenya and other Arid Lands, John Omiti of the Kenya Institute for Public Policy Research and Analysis, Samuel K. Maina of the National Steering Committee on Peace Building and Conflict Management at the Office of the President, and Orre Sunya of the Ministry of Environment and Natural Resources.

Njeri Muhia, Maren Radeny, and the rest of the team of facilitators and enumerators worked hard under challenging conditions to gather the qualitative and quantitative data on which much of the analysis is based. Equally challenging was the creation and management of the data bases, and we are grateful to Kennedy Karani of ALRMPII, Oscar Naibei and Nicholas Ndiwa in ILRI, and Claire Cheng at Cornell University for their efforts to make sure that the data were available for analysis. Abisalom Opio made the maps. We are grateful to Joyce Wanderi for administrative and editorial support.

Members of several World Bank missions to Nairobi provided useful feedback on previous versions of the evaluation. Jane Poole advised the evaluation team on statistical analysis. Two external reviewers provided useful comments.

A final word of thanks goes to the participants in the surveys, focus group discussions, and key informant interviews who shared their time, information, and opinions with us in the hope that it would help to improve the impact of investments in ASAL regions. We hope that the results of this evaluation will contribute to that end. Any errors or omissions remain the responsibility of the authors alone.

Executive summary

There is an urgent need for new approaches and effective models for managing risk and promoting sustainable development in arid and semi-arid lands (ASALs), especially in the face of climate change and increasing frequency of drought in many areas. This study assesses the impacts of the Arid Lands Resource Management Project (ALRMPII), a community-based drought management initiative implemented in 28 arid and semi-arid districts in Kenya from 2003 to 2010. The project sought to improve the effectiveness of emergency drought response while at the same time reducing vulnerability, empowering local communities, and raising the profile of ASALs in national policies and institutions.

In this evaluation, multiple data sources and analytical methods were used to assess impacts on the project's five key performance indicators (KPIs). The evaluation focused on 10 randomly selected districts. Data sources included a household panel data set (505 households), anthropometric measurements (>600,000 observations), 21 focus group discussions in project intervention communities, a survey of 95 response agencies, and key informant interviews. Though the project was not implemented according to an experimental framework, where appropriate difference-in-difference analysis was used to assess impact on indicators.

Some of the major results by KPI are:

The analysis of the proportion of people in each ASAL district assessed as needing free food aid, normalised by severity of drought (KPI1) found a small but negative and statistically significant correlation between cumulative ALRMPII expenditure and the percent of people needing food aid in the arid districts, controlling for other factors such as drought. Qualitative analysis also found evidence of reduced vulnerability to drought in arid districts, though food aid needs continued to grow. In semi-arid districts, there was no significant relationship between percentage of people needing food aid and ALRMPII expenditure, and qualitative analysis found a positive relationship between vulnerability to drought and need for food aid.

According to their own estimates, the time that agencies took between becoming aware of an emergency and responding (KPI2) dropped by 1.5 weeks (16%) during the time that ALRMPII was operational. A variety of factors influence agency response time. Regression analysis revealed a negative and significant relationship between change in response time and use of ALRMPII Bulletin to design and implement interventions.

Child malnutrition remains pervasive in the ten districts, however the results of this analysis comparing intervention and control sublocations over time provide some mild evidence that

ALRMP II has been positively associated with improvements in child nutrition, as measured by mid-upper arm circumference (MUAC) (KPI3).

Access to social services (defined as water, human and animal health, education, security and agriculture (KPI4) generally improved in both intervention and control communities, according to household survey data. Qualitative analysis also found that service quality and availability had, on average, increased in the intervention sites, as had the number of service providers active in the communities.

According to the perceptions of communities, response agencies, and individuals involved in policy processes at national level, ALRMPII has contributed to strengthening the voice of people from project districts in local and national development (KPI5) by building capacity in communities, by facilitating participation of key stakeholders from the ASALs in policy processes, and by contributing evidence and experience to several policies of relevance to ASAL regions.

Some more general recommendations based on the findings of this evaluation and on the lessons learned in undertaking it are:

ALRMPII appears to have played an important coordination role in the districts. The project may want to consider making this an explicit objective in the future, and include a KPI to measure the impact. Similarly, the main indicator of community-level impact was service provision, however if the objective of participation in community-level projects—whether for infrastructure, service provision, natural resource management, or income-generation— also includes building capacity and demonstrating alternative models of working with communities, then an alternative specification of the indicator that captures changes in community capacity and empowerment would be appropriate.

There were no KPIs around environmental impacts in ALRMPII, however there are several reasons why it might be useful to put more effort into documenting these in the future. First, changes in the quality and availability of natural resources could be important causal mechanisms through which project interventions impact on poverty and vulnerability. Second, environmental indicators would also be a necessary part of understanding the impacts of climate change and the potential impacts of interventions around adaptation or mitigation, issues which are likely to be important in the ASAL regions in the future.

In terms of evaluation methodology, the project had substantial baseline data available which facilitated the evaluation, however there are several ways in which the evaluation framework could be strengthened. More attention to specifying impact pathways would improve understanding of the causal mechanisms by which project interventions may have influenced

observed outcomes. In addition, the ability to attribute observed changes to project activities would be improved through the development of a clear framework for site selection and classification that can guide project implementation as well as evaluation.

1 Introduction¹

Nancy Johnson (ILRI) and Ayago Wambile (ILRI)

In many parts of the developing world, arid and semi-arid lands (ASALs) are regarded as marginal due to their harsh environments and small populations. As a result, they receive little attention from national governments whose investment strategies tend to favour high potential and high population areas. In the past, some of the efforts that were made to develop ASAL regions had the opposite effect, undermining traditional ways of life and increasing poverty and environmental degradation. Currently, significant resources are being spent by governments and the international community in response to droughts and other emergencies in ASALs. While effective in saving lives and averting humanitarian crises, such efforts can foster dependency and further erode traditional livelihoods and coping strategies.

There is an urgent need for new approaches and for effective models for managing risk and promoting sustainable development in ASALs, especially in the face of climate change and increasing frequency of drought in many areas. This study assesses the impacts of the Arid Lands Resource Management Project (ALRMPII), a community-based drought management initiative implemented in 28 arid and semi-arid districts in Kenya from 2003 to 2010. The project sought to improve the effectiveness of emergency drought response while at the same time reducing vulnerability, empowering local communities, and raising the profile of ASALs in national policies and institutions.

The report is organized as follows: Section 1 describes the challenges of the Kenyan ASALS and discusses the history and structure of the ALRMPII and explains the evaluation objectives, approach, and data sources. Sections 2–6 present the results of the analysis of each of the project's five key performance indicators. Section 7 concludes with a summary of findings and their implications for the ALRMP and for future development policy and practice in the ASALs.

1.1 Development challenges in the Arid and Semi-Arid Lands²

Arid and semi-arid lands cover about 467,200 km² or 88 per cent of the Kenya's total landmass. Annual rainfall ranges between 125 and 500 mm in the arid districts, and between 400 and 1250 mm in the semi-arid project districts. The economic mainstay of ASAL areas is livestock production. In 2008, the national livestock population was estimated at 9 million

^{1.} This evaluation was conducted by a team from ILRI and Cornell University, led and coordinated by Nancy Johnson of ILRI. The authors of the analyses of the individual KPIs are presented in those sections.

^{2.} For more information, see http://www.aridland.go.ke/index.php.

beef cattle, 3.5 million dairy cattle, 11 million goats, 8 million sheep, 0.85 million camels, and 30 million chickens, of which 60% of beef cattle, 70% of the sheep and 80% of goats were in ASALs (KMC 2009).

Over 60% of the ASAL population lives below the poverty line. Pastoral areas of Kenya have the highest incidences of poverty and the lowest level of access to basic services. Infant mortality rates are high, in some districts more than double the national average, and school enrollment rates are low, especially for girls. Outbreaks of human and animal diseases are frequent.

Drought is a major factor contributing to poverty in ASAL areas. On average, ASAL households lost 40 per cent of cattle and 20 per cent of sheep and goats to the 2000 drought, and two other severe droughts were experienced during the project implementation period, one in 2005/6 and another in 2008/9. Dependency on food aid is increasing. Insecurity has become a major concern in many ASAL districts, further undermining delivery of essential services such as medical care and education, and constraining livestock production and marketing.

1.2 Origin and structure of ALRMPII

The Emergency Drought Recovery Project (EDRP) was implemented by the Government of Kenya with the support of World Bank from 1991–1996 in Mandera, Marsabit, Tana River, Turkana and Wajir districts. Two main lessons emerged from this experience. The first was that project interventions need to be consistent with local livelihoods strategies, including mobile pastoralism, and responsive to local priorities in order to reduce vulnerability and build resilience to shocks. The second lesson was that projects need to have a long implementation period in order to have a meaningful impact on the lives of the population in these areas.

These lessons informed the design of the Arid Lands Resource Management Project (ALRMP), a community-based drought management initiative of the GoK, jointly financed by GoK and the World Bank. In the first phase (1996–2003), ALRMPI was implemented in ten arid districts.³ The total budget for Phase I was USD 25.1m and the major activities included drought management (USD 10.9m), marketing and infrastructure (USD 3.4m), community development (USD 5.9m), and project implementation support (USD 4.9m).

^{3.} The ten arid districts covered in Phase I include; Mandera, Marsabit, Tana River, Turkana, Samburu, Isiolo, Baringo, Garissa, Moyale and Wajir.

Though never the subject of a rigorous impact assessment, the ALRMP I was widely regarded as successful (World Bank 2005; ALRMP 2008; Mude et al. 2009). Some of the major achievements include: (1) publication of 822 district and national EWS bulletins with reported reduced response times and increased response capacity during the 1999/2001 droughts, (2) implementation of more than 1200 micro-projects benefiting an estimated 180,000 people, (3) enabling grazing reserves for pastoralists in 24 areas and supporting initiatives to reduce land degradation around boreholes, and 4) implementation of 53 livestock infrastructure projects.

In the second phase (2003–2010), the geographical area was expanded to include semi-arid districts (Table 1 and Figure 1). ALRMP II was designed to build upon successes of ALRMP I and to foster economic growth and reduce poverty within the framework of Kenya's Poverty Reduction Strategy Paper (PRSP). Its development objective was to enhance food security, increase access to basic services, and reduce livelihood vulnerability in 28 drought-prone arid and semi-arid land districts of Kenya.

Semi-Arid Districts	Arid Districts
Ijara	Baringo
Kajiado	Garissa
Kilifi	Isiolo
Kitui	Mandera
Kwale	Marsabit
Laikipia	Moyale
Lamu	Samburu
Makueni	Tana River
Malindi	Turkana
Mbeere	Wajir
Meru North	
Mwingi	
Narok	
Nyeri	
Taita Taveta	
Tharaka	
Transmara	
West Pokot	

Table 1. ALRMPII Districts, by financial year in which they entered the project



Figure 1. Districts selected for the ALMPII evaluation.

ALRMP II supported three complementary channels of interventions, to address the complex problem of vulnerability and enable communities in the project areas to move beyond survival and subsistence to sustainable development. These were:

- Strengthening and institutionalizing natural resources and drought management to reduce the impact of natural shocks by reinforcing preparedness and mitigation activities, and by improving the effectiveness of response interventions;
- Empowering communities so that they can successfully identify, implement and sustain their development priorities
- Fostering a conducive, enabling environment for development in the arid lands through policy support, advocacy and improvement in the delivery of essential services, complementing existing sector programs.

ALRMP II is structured in four components:

- Drought Management (DM) aimed at developing an effective drought cycle management system that would minimize the need for emergency interventions and enhance response mechanisms for improved actions during drought emergencies through establishment of (1) credible system(s) for timely provision of early warning and food security information (2) multi-sectoral contingency plans and (3) coordination structures and sectoral activities to enhance preparedness, mitigation, emergency response and recovery.
- *Natural Resource Management (NRM)* aimed to establish and strengthen initiatives to reduce the vulnerability of pastoral and agro-pastoral communities to the effects of drought, and enhance rural livelihoods through sustainable use and management of natural resources.
- Community Driven Development (CDD) sought to empower communities to successfully identify, implement and sustain their development priorities. Its aim was to give community organizations authority and control over decisions and resources that affect their lives.
- Support to Local Development (SLD) aimed at fostering an enabling environment in the arid lands to allow the population to break out of the prevalent survival-relief cycle into a positive development agenda leading to economic growth and reduced dependence on outside intervention through (1) improving the delivery of essential services to enable communities diversify their economic activities, (2) developing sustainable diversification strategies, and (3) promoting the interests of the arid lands at the national level to ensure that adequate consideration is given to arid lands development.

All four components were implemented in the arid districts while only the drought and natural resource management components were implemented in the semi-arid districts. The total program budget was USD 142.85 million with contributions from the IDA (USD 120 million), Government of Kenya (USD 17.8 million), and communities (USD 5.05 million).

ALRMPI was implemented under the Office of the President. Responsibility for implementation of ALRMPII passed from the Ministry of Special Programs, Office of the President to the newly-created Ministry of State for the Development of Northern Kenya and Other Arid Lands in the Office of the Prime Minister in 2008.

1.3 Indicators and conceptual framework

According to project documents, there are five key performance indicators (KPIs) against which impact of ALRMPII can be assessed. These indicators, which cover different aspects of the project's activities, are:

KPI1—Decreased proportion of people in each ASAL district assessed as needing free food aid, normalised by severity of drought.

KPI2—Reduced time lapse between reported stress and response

KPI3—Improved child nutritional status over time (Anthropometric indicators for children <age 60 months), normalised by severity of drought

KPI4—Increased number of people with access to social services (defined as water, human and animal health, education, security and agriculture)

KPI5—Strengthening voice of people from project districts in local and national development as shown through reflection of arid lands concern in the Investment Program for the Economic Recovery Strategy for Wealth and Employment Creation (IP-ERS) and in National level policies

This report focuses primarily on the empirical analysis of the indicators as specified in the project documentation, however the precise definition of indicators and the interpretation of results was informed by recent thinking on poverty dynamics and poverty traps (see, for example, Carter and Barrett 2006). Poverty traps theory links poverty dynamics to changes in household asset levels over time in the face of risks and shocks. As long as households can maintain sufficient levels of key assets, they can cope with shocks and continually improve

their welfare over time. In the absence of credit markets, households that fall below critical asset levels, either due to low initial levels or to shock-induced asset loss, will not be able to generate sufficient returns to accumulate or replace assets. Without assistance, these households are likely to remain in chronic poverty.

By improving the timeliness and effectiveness of emergency responses to drought, ALRMPII activities can save lives and reduce the incidence of destructive coping strategies such as reduction of food consumption or distress sale of livestock and other assets. At the same time, better access to services, more diversified livelihoods, and more sustainable management of natural resources can reduce vulnerability to drought when it strikes. Empowering communities and ensuring that ASAL concerns are reflected in policy will help to institutionalize project advances and create a more favourable context for ASAL development beyond the project sites and project implementation period.

1.4 Site selection and data

With the exception of some aspects of KPI 5, all KPIs are assessed based on a sample of 10 districts, randomly selected from among the 21 districts in which baseline data were collected in 2004/5.⁴ The selected districts include six semi-arids (Nyeri, Tharaka, Narok, Kajiado, Mwingi, Laikipia) and four arids (Marsabit, Turkana, Mandera and Garissa) (Figure 1).

Because of the diversity of indicators, multiple methods and data sources were used in the evaluation. Detailed descriptions of the metrics and methods used to assess each indicator are described in the following sections. The main data sources used in the evaluation are discussed below.

Household and community surveys—A baseline survey was conducted by the Central Bureau of Statistics on behalf of ALRMPII in 21 of the 28 ASAL districts in 2004/5, covering over 4000 randomly-selected households. In pastoral areas, there is often a concern that mobile households will not be captured in surveys. In the baseline survey, households were selected from locally maintained population rosters, which should serve to minimize this risk. Further, in these areas mobility generally takes the form of some households members migrating seasonally with parts of the herd while other household members remain at a permanent location, where they can be more easily located. Between June and August 2009, a subset of these households was re-surveyed using a similar questionnaire to gather data on income, assets, access to services, and other variables.

^{4.} Transmara, West Pokot, Narok, Nyeri, Kajiado, Tharaka, Makueni, Kitui, Mwingi, Mbeere, Laikipia, Mandera, Baringo, Tana River, Marsabit, Isiolo, Samburu, Garissa, Turkana, Wajir, and Moyale.

ALRMPII interventions were not implemented according to an experimental design; however the project did not work in all sites in the baseline. This permitted the construction of sample containing 'intervention' and 'control' communities. For the household survey, intervention communities were identified as those that had activities from at least two of the four ALRMPII components. Initial categorization was done using ALRMPII investment data, and was subsequently confirmed with district staff. Econometric techniques are used in the analysis to control for any underlying differences between the treatment and control samples.

After categorization by treatment category, sites (sublocations) were categorized by livelihood zone,⁵ and comparable intervention and control sites were identified. The baseline survey included 15 households per site, so in order to obtain the targeted 500 households for the 2009 survey, two intervention and two control sites per district were selected to allow for the possibility of attrition, i.e. that some households from the 2004 survey would not be available in 2009. Where possible, the selection of sites was random; however in most cases there were few choices to be made given the limited number of appropriate sites in the baseline data set. The final data set includes 505 households, 56% in treatment communities.

Qualitative information was gathered through focus group discussions in 21 of the 24 treatment communities in which the household survey was conducted. In each community, a one-day focus group discussion was held in which community perceptions of changes in their vulnerability to drought, the impacts of ALRMPII interventions, and the role and impact of ALRMPII and other organizations in their communities were analysed using a variety of participatory tools.

Anthropometric data—Child nutritional status is measured by mid upper arm circumference (MUAC), an indicator for which data were collected as part of the ALRMPII monitoring system since the project began. According to the protocol, these data, which form part of the early warning system (EWS), were to be collected monthly from a sample of 30 households per sublocation, or 10 households per sentinel⁶ site. Each year the households participating in the data collection are changed. In reality, the number of households per sublocation and the number of sublocations per district varied dramatically⁷ (Table 8). The data set used in this evaluation includes over 600,000 observations from 128 sublocations in the 10 districts from 2005–2009.⁸

^{5.} Livelihood zones are based on FEWSNET and include pastoral, agro-pastoral, marginal mixed farming, mixed farming, and irrigated farming.

^{6.} Unlike project intervention sites, sentinel sites were selected based on specific guidelines.

^{7.} In some districts sites were added when they were deemed to be undergoing unforeseen stress that might not be captured using data from the existing sites only. The requests are made by the district staff to the national headquarters. The monitors on the ground might have added new households as they are required to report many children at the sentinel site for the purposes of quick assessments of imminent stresses.

^{8.} Of the 128 sublocations, only 9 overlap with the household data.

As was done for the household data, the 128 sublocations were classified as either intervention or control. Intervention and control locations were identified using two separate methods. First, district program managers were asked to use their personal judgment as to whether a sublocation received sufficient ALRMPII investment to achieve an impact. To guide this subjective assessment, we suggested to the district managers that a sublocation could be considered 'intervention' if it had received investment in at least two out of the four ALRMPII components or received a large investment in just one component. We obtained this classification information for all study districts except Narok and Marsabit. Having no data for these two districts resulted in the exclusion of 127,946 observations out of the total of 602,672 MUAC measures.

Second, we classified sublocations by the amount of cumulative ALRMPII sublocation specific investment between 2005 and 2009. Sublocation specific investment does not include the sublocation's share of division or district level expenditure. The distribution of the data suggest a natural cut off for categorization: sublocations without any sublocation specific investment are defined as control locations; sublocations with some sublocation specific investment are the intervention locations. This investment data is available for all but 116 out of the total of 602,672 observations.

There is overlap between the two different methods of identifying treatment locations, however, the correlation is far from perfect. Only in 68% of cases do the two methods of categorization agree. Given these discrepancies between the two methods of categorizing intervention and control sublocations, as a robustness check we use both types of categorization in our analysis as well as run the analysis on the subset of observations for which the district staff and the investment categorization match.

Other sources of data

In addition to the data described above, we implemented a survey of relief organizations and other agencies involved in emergency interventions in the study districts and conducted key informant interviews with individuals involved in policy processes in Nairobi. Secondary data such as Normalized Difference Vegetation Index (NDVI), food aid needs assessments, and policy documents were also used. More details are provided about these sources in subsequent sections.

2 Impacts of ALRMPII on the vulnerability of ASAL populations to drought (KPI1)

Ayago Wambile (ILRI), Nancy Johnson (ILRI), and Juliet Kariuki (ILRI)

2.1 Introduction

Kenya has experienced persistent drought over the past decade leading to sharp increases in food aid requirements (Figures 2 and 3). It is projected that 3.8 million people will require aid in 2010 (KFSSG 2009). In response, the government and aid organizations have implemented a range of interventions including free food aid, food for work, food for assets, and cash transfers, among other emergency interventions in the water, animal and human health, and livestock sectors, to reach the affected populations. By far, the main response has been emergency free food distribution, implemented both through the Government of Kenya and World Food Program (WFP).



Figure 2. Percentage of people assessed as requiring food assistance in Kenya, by year.





Figure 3. Percent of household needing food aid, by district and assessment period.

Since 2004, Kenya has experienced ten phases of Emergency Operation/Protracted Relief and Recovery Operations (EMOP/PRRO) focusing on food aid distribution targeted to ASALs.⁹ Arid districts have received more food aid that the semi-arid districts. For example, while Mandera, Turkana and Marsabit were considered in almost all ten phases of the EMOP/ PRRO, Narok, Tharaka and Nyeri participated in only half of the phases, and only specific divisions per district were targeted. The 2009 drought has seen almost all districts considered for food aid.

Through its work to empower communities, increase access to basic services, diversify livelihoods, and sustain the resource base, the ALRMP II sought to improve the resilience of households and communities and reduce their vulnerability to drought and other risks. Resilient households and communities are better able to cope with drought shocks and less likely to require emergency aid when a drought-related crisis occurs.

The effectiveness of ALRMP II in achieving its objectives of increasing resilience is assessed using the key performance indicator decreased proportion of people in each ASAL district assessed as needing free food aid,¹⁰ normalized by severity of drought (KPI1). This indicator was assessed quantitatively by looking at the relationship between the percentage of people assessed as needing food aid and ALRMP II program expenditure at the district

^{9.} In May 2009 EMOP was phased out, and PRRO was initiated in June. PRRO runs in phases of 3 years, compared to 6 months for EMOP.

^{10.} Free food aid' is the relief food provided freely to the needy members of communities particularly during emergencies. It doesn't include cash aid or food for work.

level. We normalized for drought using the normalized difference vegetation index (NDVI). The quantitative results are complemented by community-level perceptions of changes in household vulnerability in areas where ALRMP II worked.

2.2 Data and methods

Both quantitative and qualitative data and methods are used to assess this indicator. Three types of quantitative data are used; needs assessments, ALRMP II program expenditure, and environmental conditions. The period covered in the analysis is July 2004 to June 2009. Since food aid needs are assessed at district level and since ALRMP II worked in all ASAL districts, we can only look at relationships among these variables over time, not between ALRMP II districts and similar 'control' locations.

Needs assessments. The data on percentage of households needing food aid was obtained from the needs assessments conducted semi-annually by the Kenya Food Security Steering Group (KFSSG).¹¹ The KFSSG's needs assessment tool was preferred because it is based on a standard, agreed-upon, process and uses a common methodological framework across the districts of interest. It employs a multi-sectoral livelihood based approach for food security analysis *(KFSSG 2006)*.

The assessments correspond to the two rainy seasons: short rains (October–December), and long rains (March–June). The needs assessments reports are released in January and July of each year based on the outcome of the previous rainy season and assessment of the drought related needs for the ensuing dry season. Figure 3 shows trends in food aid requirements for the study districts. In general, the arid districts had a higher percent of people needing food aid, particularly Mandera, Turkana and Marsabit.

ALRMP II program expenditure. To measure the contribution of the ALRMP II, we used district-level program expenditure data. ALRMP has two types of funding, program and contingency. We chose to focus on program expenditure since this includes the development-oriented activities that are designed to reduce vulnerability. Contingency funds are for emergency responses to droughts that are already occurring, and while these undoubtedly save lives in the short run they are not generally considered to be a tool for building resilience. This has important implications for the empirical analysis because we would expect to see an inverse relationship between ALRMPII program spending and percent needing food aid, while contingency spending and percent needing food aid move in the same direction.

^{11.} http://www.kenyafoodsecurity.org/.

In order to make the expenditure data comparable to the needs assessment data, we divided annual expenditure into two periods: July–December (1st and 2nd quarters of the GoK fiscal year) and January–June (3rd and 4th quarters of the GoK fiscal year). Expenditure was then divided by population to give per capita expenditure per district (Table 2). Arid district have higher project expenditure per capita compared to semi-arid districts, reflecting the fact that only two of the four components were implemented in semi-arids and all four in arids.

	Marsa- bit	Man- dera	Ka- jiado	Laikip- ia	Mwin- gi	Narok	Nyeri	Thara- ka	Tur- kana	Gar- issa
2004/05 (1st)	65.96	58.61	12.16	14.74	7.36	8.11	4.53	18.60	17.22	39.54
2004/05 (2nd)	325.92	168.70	37.44	18.20	28.45	21.03	10.44	57.43	90.59	144.71
2005/06	122.26	35.45	9 91	7 09	14 10	10 55	2 32	8 56	35.09	45 70
2005/06	02 77	90.11	22.61	20.06	41.22	20.11	10 6 0	99.06	25.65	70.90
(2110) 2006/07	92.77	09.11	32.01	20.96	41.25	30.11	10.00	54.00	25.59	79.00
(1st) 2006/07	74.51	75.50	12.94	10.26	19.84	11.11	5.32	54.88	32.71	54.63
(2nd) 2007/08	106.99	83.09	15.32	5.93	22.65	25.25	19.48	56.33	30.22	72.64
(1st) 2007/08	109.31	84.11	14.48	18.10	19.17	21.62	14.91	45.06	41.51	32.10
(2nd)	106.93	103.78	17.09	21.41	19.17	9.14	8.89	46.02	25.22	45.48
(1st)	139.56	74.57	8.25	13.66	27.09	32.57	7.38	8.53	47.39	32.14
(2008/09 (2nd)	187.54	125.55	26.82	52.25	59.73	31.73	37.46	139.80	55.28	101.54

Table 2. ALRMPII Program expenditures per capita (KES),¹² by district and time period

Drought severity. NDVI is used to control for the severity of drought. We use a district average NDVI measured as deviation from the long-term mean for each month to obtain a semiannual estimator.13 Generally an NDVI measure of 0.5 and above indicates high greenness or vegetation cover. The mean NDVI experienced across the study districts was 0.32 while the lowest and highest observations were 0.12 (Marsabit) and 0.6 (Nyeri)14 (Figure 4).

^{12.} KES (Kenya shilling). (KES 80.20 = USD 1 at 30 November 2010).

^{13.} The Normalized Difference Vegetation Index (NDVI) data is obtained from the ILRI data library link http://iridl.ldeo.columbia.edu/expert/SOURCES/.USGS/.ADDS/.NDVI/.NDVIrg/.dekadal/.maximum/lon/lat/NDVI%5Bx/y%5Dweaver:/X/-20/55/0.1/RANGEEDGESTEP/Y-40/40/0.1/RANGEEDGESTEP/false/setweave/:weaver/X/%2836.40%29VALUE/Y/%280.49%29VALUE/.

^{14.} ALRMP II activities in Nyeri focused on the semi-arid region of Kieni, so the average NDVI used is only from Kieni.



Figure 4. Trends in NDVI by district.

To test for the impact on the percent of people needing food aid, we estimated the following model:

$$Y_{i} = a_{i}^{0} + a_{i}^{1} (\Pr oj Exp_{i}) + a_{i}^{2} (NDVI_{i}) + q_{i}^{1} d_{i} + q_{i}^{2} y + e_{i}$$

where Y_i is the percentage of people needing food aid in district *i* at time *t*, ProjExp is ALRMPII project expenditure in district *i* and time *t*, and NDVI is the mean deviation from long term trend in district *i* and time *t*, *d* are district dummy variables which control for unmeasureable spatial variation, and *y* is a vector of yearly dummies to capture economic or policy related effects that change annually. Table 3 provides descriptive statistics of the data used in the regression analysis.

Table 3. Summary statistics for variables used the regression analysis¹⁵

,	0	,	
Variable	Obs*	Mean	Std. Dev.
% needing food aid	100	24.868	19.622
NDVI	100	0.321	0.128
Total expenditure per capita (KES)	100	47.705	48.806
Expenditure on SLD per capita (KES)	40	15.131	10.918
Expenditure on DM per capita (KES)	100	23.170	23.405
Expenditure on CDD per capita (KES)	40	29.509	3.154
Expenditure on NRM per capita (KES)	100	4.644	8.364
District Population	100	376,833	164,020

* 10 districts x 5 years x 2 periods per year (Jan–Jun; Jul–Dec) =100 observations. SLD and CDD have 40 observations as they were only operational in arid districts.

^{15.} The data covers project expenditures for financial years 2004/05, 2005/06, 2006/07, 2007/08, 2008/09 starting July through June of each year and excludes the district or national project administration.

2.3 Results of analysis of determinants of percent of population needing food aid

For the full sample, ALRMPII cumulative expenditure¹⁶ is negatively associated with the percent of people needing food aid, however the relationship isn't statistically significant (Table 4). As expected, NDVI is negatively and significantly associated with the percent of people needing food aid, meaning that food aid needs increase as NDVI decreases. Compared with the reference district of Turkana, nearly all districts had relatively fewer people needing food aid. Food aid needs were relatively higher in 2009 as compared to the two previous years.

When we look just at the arid districts, ALRMPII expenditure is negatively and significantly associated with the percent of people needing food aid. NDVI is still negative but is no longer significant in this model. Food aid needs in Garissa were relatively lower than in the other arid districts, while food aid needs in Marsabit were relatively higher. 2007 and 2008 had relatively lower food aid needs as compared to 2009.

ALRMPII expenditure is not significant when only the semi-arid districts are included. NDVI is highly negatively correlated with food aid needs in semi-arid districts. Food aid needs in the semi-arid districts were relatively higher in 2009 than in the previous three years.

2.4 Community perceptions of trends in vulnerability to drought and food aid needs

To understand better how ALRMPII may have contributed to reduced vulnerability to drought in communities, we conducted qualitative research in 21 communities in which ALRMPII implemented interventions. Using different participatory methodologies, communities reconstructed a timeline of droughts over the past 20 years and assessed trends in drought severity using community-identified indicators. Participants in the focus group discussions were also asked how they perceived trends in food aid requirements.

^{16.} ALRMPII current expenditure may be endogenous in the sense that the ability of the program to implement activities, and therefore to spend money, is reduced during severe droughts. Attempts to model current expenditure as a function of NDVI gave poor results, however, and are not presented here.

Variable	Pooled sample	Arid districts	Semi-arid districts
Proj Expenditure+	-0.01	-0.03*	0.06
	(0.01)	(0.02)	(0.03)
NDVI	-50.76**	-1.31	-55.19**
	(24.39)	(76.10)	(25.26)
Mandera	9.15	12.06	
	(6.04)	(8.87)	
Marsabit	11.65	24.66**	
	(7.53)	(11.07)	
Garissa	-11.47**	-10.02*	
	(5.28)	(6.42)	
Nyeri	-22.16**		11.76
	(9.77)		(8.27)
Laikipia	-21.96***		9.34
	(6.51)		(7.39)
Mwingi	-10.16**		18.25**
	(5.52)		(7.18)
Tharaka	-20.44***		
	(7.18)		
Narok	-20.13**		10.10
	(7.80)		(6.65)
Kajiado	-20.11***		8.85
	(5.17)		(8.23)
Yr05	0.99	11.76	-4.86
	(4.46)	(8.13)	(5.36)
Yr06	3.00	19.29**	-9.66*
	(4.77)	(9.65)	(5.92)
Yr07	-2.22	10.59	-14.24**
	(5.44)	(12.02)	(7.16)
Yr08	-3.25	14.30	-18.45**
	(5.83)	(13.59)	(7.93)
Yr09	11.67*	31.19*	-6.84
	(7.00)	(16.39)	(9.99)
Constant	53.10***	33.73**	29.005
	(6.60)	(16.24)	(12.4)
#of obs	100	40	60
Adj R-squared	0.68	0.38	0.47

Table 4. Determinants of % of population assessed as needing food aid

Note: Standard Error in parenthesis; * α < 0.10 ** α < 0.05 *** α < 0.01. + measured as cumulative expenditure per capita.

Communities used a combination of environmental, socio-economic, and market-based indicators to identify droughts and assess their severity. In terms of drought severity, the most common indicators were related to impact on agricultural production: 'loss of harvests' and 'loss of livestock'. In each community, participants scored the severity of crop or livestock loss on a scale of 1 (low) to 10 (high). It is important to note that these indicators do not reflect the actual severity of the drought, as measured, for example, by NDVI or rainfall, but rather how communities perceive the severity. As such, they can be considered as indicators of vulnerability to drought rather than drought severity *per se*.

Since the late 1990s, community perceptions of the trends in the two drought vulnerability indicators mirror each other closely (Figure 5). Both are increasing over time, though at a slower rate than the trend in food aid.



Score for severity

Figure 5. Average scores for severity of harvest loss, severity of livestock loss, and proportion of community members requiring food aid, all sites.

This divergence in drought indicators and food aid needs is even more apparent when we divide the sample into arid and semi-arid districts. In the arid zones visited, most communities were livestock-dependant. Usually, women and young children would remain at the homestead with weak animals, while men would mainly be responsible for mobility with the remaining livestock. FGD participants in the high aridity sites identified that it would be difficult to abandon pastoralism because no other livelihood would be suitable given the terrain. In the semi-arid districts visited, communities were mostly settled, with many households owning livestock herds consisting of either small or large stock or both. Mixed crop livestock production systems characterized most of the semi-arid sites, and the agro pastoralists here were more likely to have a diversified livelihood portfolio than the pastoralists in the arid districts. The increasing use of the kitchen garden approach (irrigated gardens) gives an indication of the communities' reliance on agriculture in these areas, while the growing cash economy can afford some agro pastoralists the opportunity to hire labour to herd their livestock.

Using livestock losses as a measure of vulnerability to drought in arid districts and crop losses in semi-arid districts, we see that communities in arid districts (Figure 6) perceive little correlation between trends in livestock losses and food aid needs in recent years. Trends in livestock losses have generally declined over time in these communities, while food aid needs have increased. In the semi-arid districts, communities perceive the relationship between food aid and crop loss to be very close, with both growing over time (Figure 7). In semi-arid districts, the community perception that droughts were more severe in recent years was often attributed to the increased intensity and duration of droughts. In some sites, the loss of important water sources—vital in crop agriculture after a failed rainy season— increased the perceived severity of droughts. Prolonged dry seasons, poor access to water and failed crop harvests were therefore among the reasons for increased demand in food aid. Other factors mentioned which contributed to the perceiption of increased need for food aid today was an increase in resource-based conflict.



Figure 6. Average scores for severity of livestock loss and proportion of community members requiring food aid, arid sites.



Figure 7. Average scores for severity of harvest and proportion of community members requiring food aid, semiarid sites.

2.5 Summary and conclusions

The analysis of KPI 1 (Decreased proportion of people in each ASAL district assessed as needing free food aid, normalised by severity of drought) found a small but negative and statistically significant correlation between cumulative ALRMPII expenditure and the percent of people needing food aid in the arid districts. As ALRMPII expenditure increased, percent of people needing food aid declined. The correlation between ALRMPII expenditure and percent of people needing food aid was not significant in semi-arid districts, a result which is not surprising given the relatively lower levels of expenditure by ALRMPII in these districts, especially in activities oriented towards reducing vulnerability.

According to community perceptions, both food aid needs and drought vulnerability have grown over time, but food aid needs have grown faster. Analysis by agro-ecological zone showed that according to community indicators, drought vulnerability has actually declined in arid districts, though food aid needs have continued to rise, perhaps as a result of conflict or of people having lost their animals and left pastoralism without finding alternative livelihoods. In semi-arid districts, drought vulnerability and the need for food aid are closely related, especially in recent years.

3 Impact of ALRMPII on emergency responses to drought (KPI2)

Zahra Sharif (ILRI), Nancy Johnson (ILRI), Juliet Kariuki (ILRI), and Jemimah Njuki (ILRI)

3.1 Introduction

The Government of Kenya (GoK) is increasingly focusing resources on drought management in order to reduce the negative impacts of droughts. The objective is to create a more effective drought cycle management system that can minimize the need for emergency intervention and enhance response mechanisms for better action in acute drought emergencies. The drought management system includes a drought early warning system, and drought preparedness, mitigation, relief and recovery, together with coordination structures.¹⁷

The drought management structure at the national level includes the Kenya Food Security Meeting (KFSM) which is an advisory group on all issues pertaining drought and food security, and the Kenya Food Security Steering Group (KFSSG) which is a subcommittee of the KFSM and acts as a technical advisory body. District Steering Groups (DSGs) are key components of coordination of drought and early warning information, as well as other development initiatives, at the district level.¹⁸

The main stakeholders involved in drought management in Kenya include GoK line ministries, the UN, various development partners, and relevant NGOs. In addition to the KFSSG and KFSM, there are several other complementary activities funded by European Community Humanitarian Aid (ECHO), international NGOs, the UN and other donors.

Some of the major constraints to a timely and appropriate response to drought are lack of information about the emergency and ready funds to implement interventions. The drought management component of ALRMPII addressed these constraints simultaneously through the establishment of an early warning system based on monthly data gathered from communities, and a series of structures at district and national level to better coordinate the flow of information and funds once they are triggered.

The effectiveness of the drought management system is measured in the key performance indicator reduced time lapse between reported stress and response (KPI2). While the ALRMPII drought management system works at the national, district, and community level,

^{17.} In the pipeline is the establishment of the Drought Management Authority (DMA) and the Drought Contingency Trust Fund (DCTF) that is expected to enhance the effectiveness of emergency drought response.

^{18.} Most of the drought management structures at the district and national level are facilitated by ALRMP and the Drought Management Initiative (DMI) an EU funded project implemented through the ALRMP that focuses in drought management and response in districts where ALRMP II is operational.

to assess this indicator we focused on the district and community levels—the drought early warning systems, the ALRMPII monthly bulletin, and the district steering group (DSG). The reason is that aid agencies implement emergency response interventions at the district and community levels, which means that changes in their response times can most effectively be measured at this level. Issues related to ALRMPII's influence at national level are covered in KPI 5.

3.2 Data and methods

An early warning system (EWS) is a system of data collection to monitor people's access to food in order to provide timely notice when a food crisis threatens and thus to elicit an appropriate response (Davies et al. 1991). Whether it succeeds in its goal depends on how key decision-makers use the EWS information (Buchanan-Smith 1999). This indicator focuses on identifying key users, understanding their needs for and use of EWS information, and assessing the impact of information use on their response activities, including but not limited to changes in response time.

The data for analysis of this KPI come from a survey of District Steering Group (DSG) members in the 10 study districts. The DSG is made up of all the relevant actors that influence or are directly involved with emergencies within the District. They include line ministries, non-governmental organisations, community-based organisations, and donors. The district commissioner is the chairman, and ALRMPII acts as the secretariat. The meetings are held monthly and are coordinated and minuted by the Drought Management Officer (DMO) at ALRMPII. The technical committees of DSG responsible for different sectors, e.g. health or livestock, may meet more frequently, especially in times of crisis.

Both hard and soft copies of the survey were sent to ALRMPII Office in each of the ten districts. The DMO disseminated them to members of the DSG and any other actors within the district who could provide feedback on the early warning information produced by the project. Respondents were offered the option to return the surveys directly to evaluation team in hard or soft copy, but nearly all elected to send them via the DMO. Therefore, we cannot guarantee that results were anonymous.

3.3 Characteristics of response organizations

In total, 95 responses were received from eight districts (Figure 8). Just over half the responses (55%) were from semi-arid districts.


Figure 8. Distribution of survey responses by district (N=95).

The majority of respondents (63.2%) were from government departments and ministries (Figure 9). Non-governmental organizations (NGOs) constituted 26.3% of respondents, followed by 10.5% from the private sector. Private sector organizations were more common in the semi-arid districts. Examples of organizations that identified themselves as private sector include Thirigitu, Mt Kenya Environmental, Kirira Child Welfare Organisation, and Ilamaiyo.



Figure 9. Types of organizations that responded to the survey, by ecological zone (N=95).

The majority (72%) of the respondents operate at the district level (Figure 10). International organizations (those working regionally or globally) are more common in arid districts.



Figure 10. Scale of operation of survey respondents, by ecological zone (n=93).

Respondents report that their organizations deal with a wide range of drought-related stresses (Figure 11). Food shortages are the most common, however they account for only 18% of total responses and are more common in semi-arid than arid districts. In arid districts, human health emergencies are the most common type of emergency to which organizations respond.



* Multiple responses per organization possible

Figure 11. Stresses to which organizations respond, by ecological zone (n=270*).

3.4 Sources of information that organizations use in their response decisions

ALRMPII Bulletin was by far the most commonly mentioned source of information for planning and implementing response activities in both arid and semi-arid zones (Figure 12). Over half of all respondents mentioned using it. Other common sources were Famine Early Warning System (FEWS) (13%) and Livestock Information Network and Knowledge System (LINKS) (13%). The DSG is mentioned as an information source separate from the ALRMPII Bulletin, especially in semi-arid districts, though this is in fact a instrument that was largely created by the project for service delivery and coordination.



Number of respondents

Respondents were asked what type of information they obtained from the sources they used. Information was divided into five categories of indicators: environmental, food security, livestock disease, human health, and other. The results show that the ALRMPII Bulletin was the most common source for all types of information (Figure 13). The type of information respondents sought in the ALRMPII bulletin differed slightly by agro-ecological zone (Figure 14). In Arid districts, environmental indicators were most common while in semi-arid districts users sought food security information more frequently.

Respondents were asked to assess the usefulness¹⁹ of the different sources of information for planning response. Consistent with its high levels of use, ALRMPII information was perceived by respondents to be more useful than the information from other sources (Figure 15). Only for the ALRMPII bulletin did the majority of users find the information 'very useful'.

Note: FEWSNET- Famine Early Warning System, ALRMP = Bulletin, ALIN-Arid Lands Information Network, LINKS- Livestock Information Network and Knowledge System, DSG- District Steering Group. **Figure 12.** *Source of information for planning and implementing response activities (n=110).*

^{19.} Usefulness was defined by the respondents but is expected to cover aspects such as accuracy, relevance and timeliness.

Number of respondents



■ Environmental ■ Food Security ■ Livestock Disease ■ Human health ■ Other

Figure 13. Indicators of interest by source of information (N=244).



ALRMP indicators of Interest by Ecological Zone

Figure 14. Type of indicators sought in ALRMP bulletin, by ecological zone (n=148).

3.5 Impacts of the ALRMP Bulletin on organizations' responses to drought, including changes in response time

To assess the impacts of the ALRMP's drought early warning system on agency response time, survey respondents were asked about their responses to the last 3 major droughts (2000, 2005 and 2009).²⁰ They were asked what specific responses they implemented, what information sources they used in implementing their responses, and how much time passed between becoming aware of the drought and implementing the response.

^{20.} The actual year in which the drought occurred varied somewhat by district.



■ Not Useful ■ Generally Useful ■ Mostly Useful ■ Very Useful

Figure 15. Perceived usefulness of information for planning, by source (N=131).

A range of types of responses were implemented, and the composition changed over time (Table 5). As might be expected 'emergency' (e.g. food aid) was among the most common response types in each of the droughts, though its importance declined over time as livestock, water, and health responses became more common.

	20	000	2005		2009	
Response type	(%) of responses (n=38)	% using ALRMP Bulletin	#% of responses (n=64)	% Using ALRMP bulletin	% of re- sponses (n=80)	% Using ALRMP Bulletin
Health	5	0	14	78	12	40
Capacity build- ing/ Community development	16	0	14	78	13	82
Livestock	13	40	22	86	19	94
Water	13	20	14	56	17	87
NRM	5	0	5	33	3	33
Agriculture	8	33	6	25	7	100
Emergency	29	55	17	82	19	81
Other	11	50	8	80	10	67
Total	100	32	100	72	100	78

 Table 5. Responses to droughts by drought, type and information source*

*2000 is before the ALRMPII began, however it is include here as a baseline against which progress can be measured and impact assessed.

The total number of responses increased over time from 38 in 2000 to 80 in 2009. The percent of responses in which ALRMPII information was used increased from 32% in

2000 to 78% in 2009. In 2009, health and NRM responses were least likely to have been informed by ALRMP information, while agriculture and livestock responses were most likely to been based on information from the project.

Average response time declined over the period, however the average response time varied by type of response, by year, and by whether or not ALRMPII information was used in the response (Table 6). Mean response times were lower for users of ALRMPII than for non-users. Health responses tended to have the shortest response times. Response times for emergency responses were not lower than for other types. Response times declined slightly faster in semi-arid districts, especially between 2000 and 2005.

	2000		2005		2009	
Response type	Users of ALRMP Bulletin (weeks)	Non-users of ALRMP Bulletin (weeks)	Users of AL- RMP Bulletin (weeks)	Non-users of ALRMP Bulletin (weeks)	Users of ALRMP Bulletin (weeks)	Non-users of ALRMP Bulletin (weeks)
Health	1.5	NA	5.2	0.1	2.8	1.2
Capacity build- ing/ Community development	17.3	3	5.7	30	4.0	12.1
Livestock	3	4	4.6	24	5.1	2.0
Water	9	9	7.1	7	2.1	3.5
NRM	NA	12	4.0	12.0	2.0	11.5
Agriculture	4	3.3	4.0	4.8	4.5	NA
Emergency	6.7	4.5	2.2	8.0	3.2	7.0
Other	5	27.3	3.5	2.5	2.7	2.0
Total	7.6	10.2	4.4	10.8	3.5	5.2

Table 6. Mear	n response time	by type of	of response,	drought and	use of ALRMP	o information
		/ //		0		

Reduction in response time is our indicator of interest; however the ultimate effectiveness of an emergency response is influenced not only by its timeliness but also by its appropriateness. Since different types of interventions have different response times, there could be trade offs between timeliness and appropriateness. If an agency changes its type of response to one that is more appropriate, the overall impact of the response could increase even if the response time stays the same or even increases. To avoid confounding timeliness and appropriateness, we constructed a set of paired observations in which the same organization implemented the same type of response in two different droughts. This allowed us to look at changes in response time controlling for the effects of the type of response and the specific characteristics of the implementing agency. Sixty-three pairs of responses were obtained, 28 for the period 2000–2005 and 35 for 2005 to 2009. For each pair, the change in response time was calculated between the two periods. On average, the response time declined by 1.6 weeks, 1 week between 2000 and 2005, and 2 weeks between 2005 and 2009.

Many factors, from expansion in quality and coverage of ICTs to improvement in humanitarian practice by aid agencies to changes in funding mechanisms, influence response time. To assess the contribution of ALRMPII, we used multivariate regression analysis. The results show that use of the ALRMPII Bulletin is significantly and negatively associated with change in response time (Table 7). Responses in which the Bulletin was used as an information source had greater reductions in response time than responses in which it was not used. Responses implemented by the government had smaller reductions than those implemented by other types of organizations. Response times in arid areas declined more than in semi-arid districts, though the difference is not statistically at conventional levels. Reductions in response time between 2005 and 2009 were slightly larger than between 2000 and 2005, but the difference is not significant.

	Coefficient
(Constant)	-1.279
	(1.270)
Type of organization (1=government)	2.091**
	(0.953)
Use of ALRMPII Bulletin (1=yes)	-1.975**
	(0.853)
Agro-ecological zone (1=arid)	-1.345
	(0.83)
Time period between droughts	-0.821
(1=2005-2009)	(0.841)
Response type (1=emergency)	0.774
	(0.995)

 Table 7. Determinants of change in response time (n=62)

Note: Standard Error in parenthesis; ** α < 0.05. Adj. R2=.15

3.6 Impacts of ALRMPII beyond response time

To get a sense of the broader impacts of the ALRMPII's drought management activities on emergency response in the districts, respondents were asked to assess qualitatively the extent to which the ALRMP drought management systems contributed to four possible impacts:

- Reduced lag time between stress and response,
- Increased appropriateness of the response,
- Improved coordination between organisations,
- Reduced impact of drought on households.

Three options were given for each type of impact: 'contributed greatly', 'contributed slightly', or 'did not contribute'. The majority of respondents felt that the drought management work contributed greatly to all four impacts (Figure 16). Improved coordination was the most mentioned impact while reduced impact of drought on households was the least mentioned.



ALRMP contribution to:

Figure 16. Contribution of ALRMPII to Drought Management.

3.7 Summary and conclusions

According to the results of the survey, ALRMPII Bulletins and contingency plans are the main information sources that DSG members and other response agencies use in planning and implementing responses to drought. For all types of drought-related information, the ALRMPII Bulletin is more useful and more used than any other EWS or information source.

Response agencies implement many different types of interventions in response to drought. Standard 'emergency' responses, e.g. food aid, accounted for fewer than 20% of responses during the last two major droughts, down from 29% in 2000. Responses in areas such as livestock, water, and human health increased over the period. The ALRMPII Bulletin was used as an information source in 78% of responses to the 2009 drought, up from 32% in 2000, before the start of ALRMPII.

On average, response time decreased by 1.6 weeks since 2000, though this varied by type of response. Controlling for other factors affecting change in response time for which data were available, the use of ALRMPII bulletin was found to be significantly and negatively associated with change in response time, meaning that agencies that used the bulletin had larger reductions in response time. In addition to reduced time lags, agencies reported that their responses were better coordinated and more appropriate, due in part to the activities of ALRMPII.

As mentioned earlier, there was the potential for respondent bias in this survey due to lack of anonymity, however the findings that ALRMPII information is widely used and that coordination among agencies has improved are generally consistent with the conclusions of other assessments of drought response in Kenya (e.g. ILRI, 2010). The studies also concur that there is still substantial room for improvement, and survey respondents provided many suggestions to that end.²¹

^{21.} See section 7.1 for more detail on suggestions.

4 Impacts of ALRMPII on child nutritional status

Felix Naschold (Cornell University), Chris Barrett (Cornell University), Nancy Johnson (ILRI)

4.1 Introduction

Child malnutrition in Kenya remains high; 30% of children under-five suffer from chronic malnutrition (stunted), 6% are severely malnourished (wasted), and 20% are underweight (Macharia et al. 2005). Nutrition studies show that children in ASALs and generally among pastoralist populations present higher levels of wasting (measured by weight for height) and lower levels of stunting (measured by height for age) than agrarian populations in the same countries and region (Sandler et al. 2009). In Kenyan ASALs, malnutrition levels are generally declining but are still above emergency threshold levels, worsened by recurrent droughts, high poverty rates, and HIV/AIDS (UNICEF 2008). North Eastern Province, for example, reports 23.2 per cent of under-five children suffering from acute malnutrition, and with reported increase in infant and under-five mortality rates (ibid). A range of factors such as limited household access to food, high levels of infectious disease, and inadequate breastfeeding and complementary feeding practices contribute to nutritional deficiencies of children under five in ASAL areas.

Child nutritional status is an outcome that captures the direct effects of nutritional interventions as well as the indirect impacts of interventions that focus on intermediate outcomes such as improving household income, agricultural production, access to services, or natural resource management. For these reasons, child nutritional status is an appropriate measure of the overall impact of the ALRMPII, capturing the combined impact of activities to reduce vulnerability to food insecurity and activities to improve the emergency response to drought when it strikes.

Improved child nutritional status over time, normalized by severity of drought (KPI 3) is measured using anthropometric data from the ALRMP II Early Warning System (EWS). We compare patterns in monthly average mid-upper arm circumference (MUAC) over time and between locations where ALRMPII implemented interventions and those where it did not. Mid-upper Arm Circumference (MUAC) is a standard reliable indicator of child nutrition status, and considered the most appropriate measure for children in pastoral areas (Sandler et al. 2009).

4.2 Data and methods

The dataset for this analysis contains over 602,000 individual child MUAC measurements, from 128 sublocations in 10 arid and semi-arid ALRMP II districts taken between June

2005 and August 2009 (Table 8). While the protocol for data collection is the same, there is significant variation in coverage across districts. Turkana accounts for around a quarter of all observations, while there are only 27,000 observations for Mandera, including none for fiscal year 2007/08.²²

Tables 9, 10 and 11 provide the median MUAC Z-score²³ by district for the whole sample, the intervention sites, and the control sites,²⁴ respectively. The arid districts tend to have a lower median MUAC Z-scores, indicating higher malnutrition. There is no clear pattern between intervention and control sites. For some districts the median MUAC is higher in control sites while for others it is higher in intervention sites. Tables 12 and 13 show the 10th and 25th percentile MUAC Z-scores for each district and year. Overall, these tables show a high degree of childhood malnutrition that does not change perceptibly over time. Table 12 shows that in almost all districts (with the exception of Nyeri and possibly Laikipia), 10 percent of children have a MUAC of less than –2 standard deviations indicating severe malnutrition. Even the 25th percentile figures from Table 13 are closer to the –2 cut-off point than the –1 standard deviation level that indicates mild malnutrition.

To evaluate the impact of ALRMP II activities on child nutrition outcomes in the form of MUAC Z-scores we use two complementary approaches. First, we use differences-indifferences regressions to compare changes in MUAC summary statistics between the treatment and the control sublocations. Then, we use stochastic dominance analysis to look at changes in the entre distribution of MUAC statistics, over time and between treatment and control locations.

$$Z(MUAC_{ijt}) = \frac{MUAC_{ijt} - \overline{MUAC(reference \ population)}}{s_{MUAC(reference \ population)}}$$

where MUACit is child i's MUAC at time t in location j from which we subtract the MUAC of the reference population, which is then divided by the standard deviation of the MUAC in the reference population. Individual child Z-scores were created using the WHO/NCHS normalized reference values for MUAC-for-age (6-59 months) given in Appendix A. These child-level z-scores are used in the analysis below.

24. The categorization of project (i.e. control and Intervention) was based on project activities and expenditures. See appendix X for a list of sublocations by control category.

^{22.} Data are organized by Government of Kenya fiscal year which runs from July to June.

^{23.} For our evaluation of the ALRMP II program we use MUAC Z-scores rather than MUAC measures. Z-scores are superior to MUAC measures in centimetres as they allow a direct comparison across age and gender of children. Z-scores, such as weight-for-age or height-for-age, are typically used in to measure child nutrition status. For some reason, perhaps inertia from when MUAC Z-scores were difficult to calculate, many recent studies still use raw MUAC measures in centimetre, despite clear evidence that Z-scores are the preferable measure. In order to use all children from 0-59 months old in the same analysis we will convert the raw MUAC data into z-scores Z(MUAC_{iii})

Table 8. Sa	mple size b	y tinancial y	/ear (July–Ju	ne) and dist	trict						
Year	Garissa	Kajiado	Laikipia	Mandera	Marsabit	Nyeri	Mwing	Narok	Tharaka	Turkana	Total
2004/05	0	0	556	2,769	795	1,429	0	876	664	3,236	10,325
2005/06	16,517	9,974	15,243	17,437	10,921	14,805	19,165	4,837	18,607	36,626	164,132
2006/07	17,147	9,832	11,956	3,816	11,627	15,092	22,780	7,580	14,697	34,489	149,016
2007/08	14,753	14,370	10,725	0	12,820	15,564	23,267	10,818	14,074	37,578	153,969
2008/09	4,623	13,541	8,184	3,042	8,079	15,044	11,091	10,880	7,767	42,979	125,230
Total	53,040	47,717	46,664	27,064	44,242	61,934	76,303	34,991	55,809	154,908	602,672
Table 9. <i>M</i> e	edian MUA	C Z-score b	y financial y	ear (July–Jur	וe) and distו	rict					
Year	Garissa	Kajiado	Laikipi	a Mande	era Marsa	abit Mv	wingi	Narok	Nyeri	Tharaka	Turkana
2004/05			-0.54	-1.4	-1.17			-1.18	-0.65	-1.12	-1.28
2005/06	-1.51	-1.06	-0.66	-1.53	-1.32	Ī	.23	-1.4	-0.66	-0.97	-1.34
2006/07	-1.38	-1.06	-0.71	-1.74	-1.25	Ξ.	.26	-1.23	-0.54	-0.91	-1.29
2007/08	-1.01	, T	-0.73		-1.21	Γ,	.04	-1.14	-0.52	-0.85	-1.24
2008/09	-0.76	-1.21	-0.76	-1.17	-1.22	-1	.04	-1.18	-0.66	-0.77	-1.36
Table 10. A	Aedian MU,	AC Z-score l	by financial	year (July–Ju	une) and dis	strict — Inte	ervention 2	Sites			
Year	Garissa	Kajiado	Laikipi	a Mande	era Marsa	abit Mv	wingi	Narok	Nyeri	Tharaka	Turkana
2004/05			-1.16	-1.395	5 -1.11	2		-1.12	-0.52	-1.14	-1.31
2005/06	-1.5	-1.03	-0.78	-1.49	-1.23	Ī	.2	-1.73	-0.61	-1.08	-1.4
2006/07	-1.4	Ť	-0.93	-1.68	-1.15	Ī	.12	-1.33	-0.59	-0.98	-1.45
2007/08	-1.12	-0.91	-0.98		-1.08	9	.84	-1.21	-0.59	-0.86	-1.35
2008/09	-0.815	-1.18	-0.89	-1.15	-1.13	1	.01	-1.27	-0.71	-0.73	-1.4
Table 11. A	1edian MU	AC Z-score l	bv vear and	district – Cc	ontrol Sites						
Year	Garissa	Kaiiado	Laikini	a Mande	era Marsa	abit M	wingi	Narok	Nveri	Tharaka	Turkana
2004/05			-0.335	-1.54	-1.44	5	þ	-1.21	-0.69	-1.1	-1.23
2005/06	-1.52	-1.14	-0.61	-1.68	-1.47	1	.27	-1.22	-0.74	-0.91	-1.3
2006/07	-1.34	-1.37	-0.58	-1.93	-1.5	<u> </u>	4.	-1.17	-0.45	-0.89	-1.12
2007/08	-0.8	-1.35	-0.57		-1.6	Ĺ,	.22	-1.11	-0.4	-0.85	-1.1
2008/09	-0.73	-1.35	-0.65	-1.21	-1.54		.07	-1.12	-0.61	-0.8	-1.32

Year	Garissa	Kajiado	Laikipia	Mandera	Marsabit	Mwingi	Narok	Nyeri Tharaka	Turkana
2004/05			-1.99	-2.41	-2.16		-2.07	-1.69 -2.05	-2.28
2005/06	-2.4	-2.14	-1.75	-2.65	-2.33	-2.36	-2.55	-1.67 -1.87	-2.26
2006/07	-2.33	-2.09	-1.87	-2.72	-2.24	-2.41	-2.36	-1.62 -1.795	-2.18
2007/08	-1.94	-2.07	-1.94		-2.29	-2.24	-2.42	-1.53 -1.73	-2.14
2008/09	-1.88	-2.22	-2.1	-2.13	-2.29	-2.14	-2.35	-1.54 -1.74	-2.25

 Table 12. 10th percentile MUAC Z-score—whole sample

 Table 13. 25th percentile MUAC Z-score—whole sample

Year	Garissa	Kajiado	Laikipia	Mandera	Marsabit	Mwingi	Narok	Nyeri	Tharaka	Turkana
2004/05			-1.21	-1.87	-1.68		-1.65	-1.17	-1.63	-1.86
2005/06	-1.97	-1.67	-1.16	-2.06	-1.79	-1.84	-1.96	-1.2	-1.45	-1.85
2006/07	-1.87	-1.64	-1.21	-2.25	-1.78	-1.9	-1.76	-1.13	-1.37	-1.77
2007/08	-1.5	-1.55	-1.31		-1.78	-1.66	-1.74	-1.06	-1.3	-1.76
2008/09	-1.45	-1.76	-1.4	-1.69	-1.69	-1.68	-1.76	-1.15	-1.28	-1.86

To measure changes over time and compare them between intervention and control sublocations, we need to construct a panel data set. The child-level data are unsuitable for this for three reasons. First, individual child identifiers (the id number assigned to each child) are not consistent across time in the data set. Second, MUAC data are not available for all children in all months. And third, the sample of children will necessarily change over time. A large proportion of MUAC observations are lost over the four-year period from 2005 to 2009 as most children observed in the early years will have exited the 6–59 month age group towards the end of the period. Similarly, new children were added to the sample in each successive year.

Therefore, we constructed a two period (2005 and 2009) panel at the sublocation level by summarizing the child-level MUAC z-scores in sublocation summary statistics. One such statistic is the mean MUAC for children in the community

$$Z\left(MUAC_{jt}\right) = \frac{1}{N_{j}} \sum_{i=1}^{N_{j}} Z\left(MUAC_{ijt}\right)$$

Because interest is focused primarily on malnourished children, our analysis relies on statistics that focus on that subpopulation, for example the mean Z-score for children with nutrition levels below the international reference population (Z(MUACijt)<0), or the cumulative frequency of children with Z(MUACijt)<-1 or <-2, focusing on standard cut-off levels to capture the prevalence of mild or severe malnutrition.

The panel consists of 118 sublocations with MUAC summary statistics for each financial year between 2005/06 and 2008/09.²⁵ The data set contains annual means of 14 monthly sublocation-specific MUAC Z-score summary statistics (Table 14).

^{25.} Note: There are a few MUAC observations for June 2004 which come from the financial year 2004/05. As this is the only month with MUAC data of this financial year, these observations are not used in the subsequent analysis.

Variable	Obs	Mean	Std. Dev.
Median MUAC Z score	449	-1.093188	0.5022725
10th percentile MUAC Z score	449	-1.930555	0.539924
25th percentile MUAC Z score	449	-1.538514	0.5153495
Mean MUAC Z score	449	-1.067947	0.4927434
Median MUAC Z-score for children with Z-score<0	449	-1.210719	0.4032496
Median MUAC Z-score for children with Z-score<-1	448	-1.573112	0.2451168
Median MUAC Z-score for children with Z-score<-2	431	-2.34046	0.1581729
% of children <0 MUAC Z score	449	0.8857954	0.1258737
% of children <-1 MUAC Z score	448	0.5433122	0.2300705
% of children <-2 MUAC Z score	431	0.1470618	0.1392561
Z score gap of children <-1 MUAC Z score	449	-0.3895501	0.2742031
Z score gap of children <-2 MUAC Z score	449	-0.0324579	0.0441983
Squared Z score gap of children <-1 MUAC Z score	449	0.4443037	0.4315114
Squared Z score gap of children <-2 MUAC Z score	449	0.0143911	0.0236099

Table 14. MUAC Summary Statistics for 2005/06–2008/09–Sublocation panel data

4.3 Evaluating the impact of ALRMP II on child nutrition using difference in difference regressions

We examined trends and ALRMP impacts by looking at changes in MUAC statistics over time using difference-in-difference (DD) regression. DD is standard practice in program evaluation, comparing the change (before and after) in the outcome variable, in this case MUAC, between intervention and control sites.

Two types of DD regression specifications can be used to compare changes in MUAC between the intervention and the non-intervention locations. The first DD specification does not require panel data. The advantage of this specification is that we can use the large sample repeated cross-sectional individual level MUAC data. The drawback is that without panel data we cannot control for any unobserved characteristics of each child that may affect its MUAC measure.

The non-panel data specification is estimated as:

$Z(MUAC_{ijt}) = \beta_{0} + \beta_{1}T_{t} + \beta_{2}D_{j} + \beta_{3}T_{t} * D_{j} + \beta_{4}NDVI_{jt} + \varepsilon_{ijt}$

Where T_t is a time dummy equal to zero in the first period and one in the last period and D_j is a sublocation dummy equal to zero for control sublocations and one for intervention sites. β_1 represents the changes in MUAC over time for both intervention and control sublocations and β_2 shows the difference in MUAC between intervention and control sublocations that exist in both periods. β_2 is the DD coefficient that displays any potential impact from ALRMP on child nutrition. It picks up the variation between intervention and control sites over time that is not explained by β_1 and β_2 . External factors such as drought²⁶ have different impacts on child nutrition across regions. Therefore, to control for drought conditions we add NDVI²⁷ as a control variable.

The results for this type of DD regression are summarized in Tables 15 and 16. Table 15 presents results using the three different categorization variables for control and intervention sites.²⁸ The coefficients on the treatment category variable are positive in all equations, and in equation 2 (subjective categorization by district personnel) the coefficient is positive and significant, indicating a positive impact of ALRMPII on MUAC z-scores.

	(1)	(2)	(3)
VARIABLES	Categorization by Investment	Categorization by District Staff	Categorization by Both
Time dummy for 05/06 to 08/09 DiD regression	0.0785	-0.0310	-0.0687
	(0.290)	(0.686)	(0.437)
Control-intervention by investment	-0.0576		
	(0.425)		
Diff in diff	0.0245		
	(0.782)		
Normalized Difference Vegetation Index	1.029***	1.019***	1.322***
	(6.25e-07)	(5.13e-06)	(5.06e-07)
Control—intervention by district staff		-0.197**	
		(0.0318)	
Diff in diff		0.177*	
		(0.0801)	
Control—intervention if inv and staff agree			-0.171
			(0.112)
Diff in diff			0.162
			(0.133)
Constant	-1.391***	-1.266***	-1.360***
	(0)	(0)	(0)
Observations	271061	230115	158287
R-squared	0.033	0.041	0.052

Table 15. Impact of ALRMP on individual MUAC z-scores, by type of control-intervention categorization 2005/06–2008/09 Diff-in-diff Regression — Dependent Variable: individual MUAC Z-score

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

^{26.} Another external factor that may explain changes in MUAC statistics is major outbreaks of communicable diseases. Since disease outbreaks may be endogenous to location-level nutritional conditions due to bidirectional causality, information on disease outbreaks will not serve as an appropriate control.

^{27.} See Section 4.2 for details of NDVI.

^{28.} The three methods are by expenditure, by subjective classification, and both (see Section 3.2 for more detail).

	(1)	(2)	(3)
VARIABLES	1 year lag–by Investment	2 year lag-by Investment	3 year lag–by Investment
Time dummy for 05/06 to 06/07 DiD regression	0.0288		
	(0.599)		
Control-intervention by investment	-0.0626	-0.0568	-0.0576
	(0.387)	(0.431)	(0.425)
Diff in diff	-0.0204		
	(0.767)		
Normalized Difference Vegetation Index	0.901***	1.049***	1.029***
	(2.46e-06)	(1.80e-07)	(6.25e-07)
Time dummy for 05/06 to 07/08 DiD regression		0.103	
		(0.110)	
Diff in diff		0.0518	
		(0.528)	
Time dummy for 05/06 to 08/09 DiD regression			0.0785
			(0.290)
Diff in diff			0.0245
			(0.782)
Constant	-1.356***	-1.397***	-1.391***
	(0)	(0)	(0)
Observations	291287	294781	271061
R-squared	0.031	0.041	0.033

Table 16. Impact of ALRMP on individual MUAC z-score, by length of spell

 Diff-in-diff Regression—Dependent Variable: individual MUAC Z-score

Robust p-values in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

Different types of ALRMP expenditures can take different amounts of time to result in improved child nutrition. We, therefore, also explore the impact of ALRMPII over varying time periods from the shortest 1-year intervals to the longest 3-year intervals (from 2005/06 to 2008/09). Investments made two and three years ago are positively but not significantly associated with increases in MUAC z-scores, (Table 16).²⁹

The control-intervention dummy is negative in all regressions regardless of time lag or whether we categorize investment and control locations by investment data or district staff assessment. The negative coefficient on the control-intervention dummy indicates that MUAC Z-scores in intervention locations are lower than in the control locations, which is consistent with targeting of ALRMPII investments to worse-off locations.

^{29.} We only present the results using the district staff categorization. As expected based on the results presented in Table 15, no significant relationships between investment and MUAC are found when using the expenditure categorization.

Across all regressions, NDVI has a positive impact on MUAC Z-scores. Better agro-climatic conditions result in less malnutrition. The small R-squared in these regression is not a concern as our objective is not to explain what drives the level and changes in MUAC Z-score statistics, but only to ascertain whether ALRMP II activities have had an impact on child nutrition levels.

The second type of DD regression compares changes in outcome variables rather than the level of the variables, between intervention and control sublocations. Since we need to construct differenced variables for this regression specification, we can only use the sublocation panel data for this analysis. Compared to the first, non-panel DD specification, our sample size is much smaller as the unit of observation is now the MUAC Z-scores of the sublocation and not of the individual child. The advantage is that we can account for unobservable differences across sublocations over time. The, panel-data DD regression is estimated as:

$$\Delta MUAC_{SS_j} = \gamma_0 + \gamma_1 D_j + \gamma_2 NDVI_j + \gamma_3 NDVI_j^2 + \sum_{l=2}^{L} \delta_l L_l + \varepsilon_j$$

where $\Delta MUAC_{SS}_{jt}$ is the change in a MUAC summary statistic for sublocation *j* and *L*_j are district dummy variables to capture regional variation.

Again, we use both the district staff and the investment categorization as the interventioncontrol dummy. Results for the panel data difference-in-difference regression for the seven MUAC Z-score statistics and for the seven MUAC Z-score malnutrition indices (% of children below a certain score) show that the ALRMP program effect, as measured by the intervention dummy, is never statistically significant.³⁰ This is quite possibly due to the much smaller sample size of the sublocation panel data (of between 85 and 114 sublocations).

4.4 Assessing the impact of ALRMPII using stochastic dominance analysis

The difference-in-difference regressions examined differences in the changes in mean child nutrition between treatment and control locations. The stochastic dominance analysis expands this analysis from changes in the mean of child nutrition to the changes in the whole distribution. Using stochastic dominance, we can assess not only whether there have been changes, but also see how these changes differ across percentiles of the z-score distribution. For example, we can determine to what extent ALRMP project activities are likely to have

^{30.} Results of these regressions are available upon request.

contributed to improvements in child nutrition for malnourished versus adequately fed children.

The stochastic dominance analysis proceeds in three steps. First, we test for SD for control and intervention sites separately over time. Second, we compare intervention and control sublocations before and after ALRMP II. Third, we test for stochastic dominance between changes in intervention and changes in control sublocations, representing a difference-in-difference method. The complete list of stochastic dominance tests is given in Box 1.

Box 1 Complete list of stochastic dominance (SD) tests

First order SD (FOSD) tests check for differences in distributions of changes between intervention and control sublocations. Second order SD (SOSD) tests assess the extent to which one distribution's changes in MUAC Z-score summary statistics are concentrated at the lower end of the distribution of *changes*. Third order SD (TOSD) tests give additional weight to the changes at the lower end of the distribution. All three types of tests involve comparing two curves and the differences between them.

Intervention and control sublocations separately over time (Data used: Individual and Panel)

Intervention sublocations 2005/06-2008/09

Tests for each MUAC Z-score summary statistic: FOSD, SOSD, and TOSD

Control sublocations 2005/06-2008/09

Tests for each MUAC Z-score summary statistic: FOSD, SOSD, and TOSD

Intervention vs. control sublocations at same point in time (Data used: Individual and Panel)

Intervention vs. control sublocations 2005/06

Tests for each MUAC Z-score summary statistic: FOSD, SOSD, and TOSD

Intervention vs. control sublocations 2008/09

Tests for each MUAC Z-score summary statistic: FOSD, SOSD, and TOSD

Differences in intervention vs. differences in control sublocations (Data used: Panel)

Tests for each MUAC Z-score summary statistic: FOSD and SOSD. TOSD tests are not meaningful here since the lower end of this distribution, that is, the most negative changes in nutritional status, do not (necessarily) represent the most malnourished sublocations.

The analysis was conducted for 14 different MUAC Z-score summary statistics (Box 2). Because the results did not vary much across these indicators and to keep the presentation in this report tractable, the discussion below will focus on two out of those 14 indicators: the median MUAC Z-score of all individuals whose MUAC Z-score was below zero and the proportion of children with MUAC Z-score below –1 standard deviation. Both of these summary statistics are sensible truncations of the MUAC Z-scores distribution if we want to focus on undernourished children. We can ignore level and changes at higher levels of MUAC since we want to focus on malnourished children and high MUAC observations and large positive changes at the upper tail of the distribution are not necessarily desirable or positive.³¹ Unlike income or consumption, in the context of child nutrition more is not always better.

Box 2. The 14 MUAC Z-score summary statistics used for stochastic dominance testing:

Simple summary statistics: median, 10th and 25th percentile, mean

Simple summary statistics below cut off point: median of all below 0, median of all below -1, and median of all below -2

'Poverty index' type summary statistics

'headcount': proportion below < 0, proportion below -1, proportion below -2

'poverty gap': gap of observations below -1, gap of observations below -2

'poverty gap squared': squared gap of observations below -1, squared gap of observations below -2

Selected results from the stochastic dominance analysis are summarized in Table 17.³²

I. MUAC changes in intervention and control sublocations 2005/06–2008/09 (Rows I.1 and I.2)

In both intervention and control sublocations MUAC statistics in 2008/09 dominate those from 2005/06. Child nutritional status as measured by MUAC has improved over the course of the ALRMP II project, something that was not evident from looking just at mean results. These simple comparisons don't provide evidence for an effect of ALRMP's location-level investments on child nutrition. This is true both for the panel data and the individual dataset. The results for the two statistics from the panel data set, the median MUAC of all observations below 0 and the proportion of observations below minus 1 standard deviation, tend not to be statistically significant due to sample size of just over 100. The results for the individual MUAC Z-scores dominance tests are all significant due to a sample size of several hundred thousand.

^{31.} This latter point only applied to the individual MUAC Z-scores. The panel data is naturally truncated below zero we don't have any locations which have MUAC Z-score summary statistics that are greater than zero anyway.

^{32.} Full set of results are available upon request

II. MUAC differences between intervention and control in at one point in time (Rows II.1 and II.2)

	Sublocation panel						In	Individual data		
	Median MU/	AC of obs	< 0	% below	–1 SD		MUAC Z-Score			
	Dominance	Which*	Signif.	Domi- nance	Which**	Signif.	Domi- nance	Which*	Signif.	
I.1 Interventio	n 05/06–08/09)								
FOSD	Y	08/09	NS	Almost	08/09	NS	Y	08/09	S	
SOSD	Y	08/09	S	Y	08/09	NS	Y	08/09	S	
TOSD	Y	08/09	S	Y	08/09	NS	Y	08/09	S	
I.2 Control 05	/06–08/09									
FOSD	Y	08/09	NS	Y	08/09	NS	Y	08/09	S	
SOSD	Y	08/09	NS	Y	08/09	NS	Y	08/09	S	
TOSD	Y	08/09	NS	Y	08/09	NS	Y	08/09	S	
II.1 Intervention	on vs. Control (05/06								
FOSD	Y (almost)	Control	NS	Almost	#	NS	Y	Control	S	
SOSD	Y	Control	NS	Y	Control	NS	Y	Control	S	
TOSD	Y	Control	NS	Y	Control	NS	Y	Control	S	
II.2 Interventio	on vs. Control	08/09								
FOSD	Ν	_	NS	Ν	Control	NS	Y	Control	S	
SOSD	Unclear	-	NS	Y	Control	NS	Y	Control	S	
TOSD	Unclear	_	NS	Y	Control	NS	Y	Control	S	
III. Diff Interve	ention vs. Diff.	Control								
FOSD	Ν	-	NS	Ν	-	NS				
SOSD	Y?	-	NS	Y	Interven- tion	NS				

Table 17. Summary table of Stochastic Dominance Results

* Lower curves to the right are dominant for these indicators for which a greater number indicates 'better'.

** For parts I. and II. higher curves to the left dominate for the proportion of observations below –1SD, as lower proportions are 'better'. In contrast, for changes from 2005/06–2008/09 in part III, larger positive changes are better, so lower curves to the right dominate.

Control sites dominate up to MUAC Z-score of -0.1. Intervention sites dominate for MUAC Z-score > 0.

For the panel data set in 2005/06 both MUAC indicators are better in the control than in the intervention locations, though none of these results is statistically significant. The MUAC Z-scores from the individual data are statistically significant. Control locations dominate first order only up to a MUAC Z-score of -0.1. CDFs cross at around a level of 0. Control locations started out better at the beginning of ALRMP II.

If anything the gap between control and intervention had narrowed slightly by 2008/09. As both intervention and control groups showed improvements in MUAC statistics over the three year period this suggest that the intervention sites improved perhaps a bit more.

The comparisons of changes over time within locations and differences between intervention and control sites at each point in time are at best indicative. The best evidence comes from the following difference-in-difference stochastic dominance analysis.

III Differences-in-differences Stochastic Dominance 2005/06–2008/09 (Rows III)

Discussion. For the stochastic dominance analysis comparing changes in intervention sites to changes in control sites, we cannot use the individual-level data and have to use the sublocation panel and its sublocation-specific MUAC Z-score summary statistics. Methodologically, changes in these MUAC Z-score summary statistics are analogous to changes in incomes. Hence, we can draw on the literature on economic mobility. However, in this literature the term 'economic mobility' is implicitly or explicitly defined in at least six different ways (Fields 2001; Fields 2007). The mobility definition that is most appropriate for analysing MUAC changes is that of directional (income/MUAC) movement,³³ as we want to capture both the magnitude and the direction of MUAC changes over time, and capture them in absolute, not relative terms, that is, irrespective of what happened to other changes in MUAC of other locations.

There is no meaningful range of 'poverty lines' expressed in terms of changes in MUAC Z-scores that make sense. Therefore, we test for stochastic dominance over the entire domain rather than the typical right-truncated domain used in consumption or income poverty analysis. The stochastic dominance analysis in the previous two subsections was based on levels. We could, therefore, test up to third stochastic dominance. In this subsection we test for stochastic dominance between differences. This only allows meaningful stochastic dominance analysis up to second order. This limitation is rooted in moving from differences in MUAC Z-score summary statistics to the distribution of these differences in the panel of location specific MUAC Z-score statistics.

Stochastic dominance compares the cumulative distributions of a particular variable. That is, the variable of interest is ordered along the horizontal axis. If this variable is the difference in, rather than the level of, sublocation-specific MUAC values then the smallest changes in MUAC will appear at the lower end of the domain regardless of the level of malnutrition in the sublocation. As a result, running stochastic dominance tests no longer focuses on the

^{33.} Other economic mobility concepts relate to movements in ranks, in shares, and in symmetric income. For our MUAC analysis we are not concerned with these.

higher malnutrition locations³⁴ and the reasoning and definitions of equality preference and transfer sensitivity no longer apply in the same way as for the stochastic analysis of MUAC level.

Results. For the median MUAC of all MUAC observations below zero there is no full first order dominance between changes in intervention and changes in control locations. However, as shown in Figure 17 intervention sites have had fewer sites that experienced negative changes. The intervention CDF dominates the control CDF up to around a median MUAC of zero. This suggests that ALRMP intervention sites were more effective in preventing worsening nutritional status, though in terms of absolute levels intervention sites still lag behind control sites. Above the level of around zero MUAC median, the two CDFs are fairly close and intersect repeatedly indicating that treatment and control sites had roughly equal proportions of sites that experienced equal improvements child nutritional levels over time.



FOSD difference intervention vs. difference control median MUAC of obs<0. categorization by investment

Figure 17. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. Median MUAC of observations < 0. Categorization by Investment.

^{34.} Effectively, this would apply the Focus Axiom of poverty measurement technically, but not in spirit as we are not focusing on the poorest and worst nourished, but on those that have had the most negative changes in MUAC.

Again, these results are based on the smaller panel dataset and are thus not statistically significant. However, for all of the other stochastic dominance tests above where we could use the individual data as well as the panel data, the results of the two data sets always matched with the latter always statistically significant. Intuitively, this lets one put a bit more confidence in the current result.

Figures 18 and 19 show the difference-in-difference stochastic dominance results for the changes in MUAC Z-scores for the 25th and 10th percentile, respectively. They complement the findings of the median (or 50th percentile) in Figure 17. As we move to smaller and smaller percentiles (from the median to the 25th to the 10th percentile), the analysis concentrates increasingly on the worst-off kids. And the more we concentrate on these kids, the more the intervention sites seem to have succeeded in preventing negative changes in MUAC Z-scores relative to the control sites. For the 25th percentile there were fewer negative changes for the intervention sites than for the control sites. For example, for the 10th percentile in Figure 19 around 15% of intervention sublocations had a negative change in MUAC Z-scores of –0.1, whereas around 25% of control sublocations had the same negative change. In addition, at the 10th percentile there were also fewer smaller positive changes. Again, though, these results are not statistically significant, likely a result of the small sample size of the sublocation panel dataset.





% of sublocations

Figure 18. First Order Stochastic Dominance—Difference Intervention vs. Difference Control Sublocations. 25th percentile of MUAC distribution. Categorization by Investment.



FOSD Difference Intervention vs. Difference Control

Figure 19. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. 10th percentile of MUAC distribution. Categorization by Investment.

The malnutrition 'poverty' indices, that is, the proportion of children with MUAC measures below minus 1 and minus 2 standard deviations in Figures 20 and 21 appear to show a different pattern. Control locations seem to have been more successful in preventing the number of children below –1 and –2 SD to rise. However, this result is consistent with Figures 17–19 as –1 SD is above the median, and even –2SD is above the 10th percentile (see Table 12) and close to the 25th percentile (see Table 13). Moreover, the result of control locations faring better in terms of the malnutrition index is stronger in Figure 20 for –1SD than in Figure 21 for –2 SD.



Figure 20. First Order Stochastic Dominance—Difference in Intervention vs. Difference in Control Sublocations. Median MUAC of observations < -1. Categorization by Investment.

FOSD Difference Intervention vs. Difference Control % of MUAC Z-score<-2. Categorization by Investment



Figure 21. First Order Stochastic Dominance—Different Intervention vs. Difference Control Sublocations. Median MUAC of observations < -2. Categorization by Investment.

4.5 Summary and conclusions

Child malnutrition remains pervasive in the ten districts; however the results of this analysis provide some mild evidence that ALRMP II has had a positive impact on child nutrition. The difference-in-difference regressions using panel data did not show a statistically significant ALRMP program impact, though do suggest that ALRMPII interventions were targeted at the worst-off sublocations.

The stochastic dominance analysis revealed that nutritional status had improved over time in the districts. It also found fewer negative changes in the median MUAC of those sublocations that had a median MUAC Z-score lower than 0 as well as in the MUAC of the 25th and 10th percentile. This suggests that ALRMP prevented nutritional status from worsening for the worst-off children. ALRMP, thus, may have functioned as a nutritional safety net.

There are two potential ways in which the results in this evaluation may be an understatement of the actual ALRMP program effect on child nutrition. First, control sublocations also benefited from ALRMPII activity at the district and national levels. Second, the above results may be influenced by the extent to which ALRMP has displaced other agencies that focus on child well-being and nutrition. If, say, an NGO had moved out of an ALRMP intervention sublocation and into a control sublocation due to the presence of ALRMP itself then the program impact of ALRMP would not be fully captured by this evaluation. A similar effect would be achieved through attempts at the district level to coordinate where projects work in order to maximize the number of communities that receive interventions.

Finally, there may have been likely some spill-over effects of certain ALRMP investments. For instance, people in neighbouring control sublocations may also benefit from investments in infrastructure, services or trainings in intervention sublocations, though the same might be true of interventions from other agencies in non-ALRMP sublocations.

5 Impacts of ALRMPII on access to social services in ASAL communities (KPI4)

Ayago Wambile (ILRI), Juliet Kariuki (ILRI), Nancy Johnson (ILRI), Kristian Jakobsen (UNEP Risoe Centre on Energy, Climate and Sustainable Development), and Jemimah Njuki (ILRI)

5.1 Introduction

Decades of economic and political marginalization have resulted in the ASALs being the most underdeveloped areas of Kenya. Basic services like health and education are underprovided and in most cases, are not adapted to the mobile nature of the pastoral population. Persistent insecurity in some ASAL areas continues to limit access to services and hinder development efforts. As a result, these populations have poorer health and lower levels of education than people in the rest of the country.

Better and more appropriate service provisions is expected to have a significant impact on poverty reduction in pastoral and agro-pastoral areas (Oxfam 2006; GoK 2007). Efforts to improve service provisions in ASALs are undermined by a variety of factors including frequent droughts and floods, low population density, low primary productivity, degradation of natural resources, conflict in managing common resources such water points and rangelands, and weak links to national economy (ILRI 2008).

ALRMP II sought to increase the availability and quality of social services in ASAL communities in four ways. First, the project implemented interventions that directly expanded the availability of services such as water, sanitation, adult education, human health, and animal health. Second, through its role in the DSG, the project helped coordinate interventions by other actors, including service providers. Third, the project worked to empower communities to articulate their needs to service providers and to influence allocation of local resources such as constituency development funds (CDFs). Finally, ALRMP sought to influence national policy in ways that recognize the importance of and expand the funding allocations to agencies that provide services in ASAL communities, for example the National Policy for the Sustainable Development of Arid and Semi-arid Lands of Kenya or the Policy Framework for Nomadic Education in Kenya.

The key performance indicator 'Increased number of people with access to social services (defined as water, human and animal health, education, security and agriculture)' captures the combined impacts of all four pathways. To assess the ALRMPII impact on this KPI, we first looked at quantitative measures of service access using household survey data. We then use qualitative methods to further explore changes in service availability and quality in ALRMP intervention communities, and the contribution of the project to changes observed.

5.2 Data and methods

The impact of ALRMP II on the availability and quality of basic services is analysed quantitatively using the household panel data set.³⁵ Selected characteristics of the sample households are presented in Table 18.

Table 18. Mean values of selected characteristics of households,	, by year, agro-ecological zone, and
treatment category	

		Pooled		Arid districts		Semi-arid districts	
		Mean 2004	Mean 2009	Mean 2004	Mean 2009	Mean 2004	Mean 2009
Household Size	Control	5.6	7.5	5.3	7.9	5.9	7.2
	Interven- tion	5.5	7.7	5.8	8.4	5.4	7.1
Age of household	Control	46.5	50.2	46.6	48.9	46.5	50.9
head	Interven- tion	45.2	50.7	42.9	47.4	46.5	52.9
% of households	Control	31.5	61.7	32.5	50.7	30.8	69.8
are children (<18 years)	Interven- tion	30.0	60.6	30.6	58.6	29.6	62.3
% of households	Control	18.3	22.6	14.9	21.79	21.7	23.08
that are female headed	Interven- tion	20.1	21.56	20.8	22.77	24.7	20.83
Level of highest educated house- hold member	Control	Primary school (grade 7)	Primary school (grade 8)	Primary school (grade 6)	Primary school (grade 7)	Primary school (grade 8)	High school (grade 8)
	Interven- tion	Primary school (grade 8)	High school (Form 1)	Primary school (grade 7)	Primary school (grade 8)	Primary school (grade 8)	High school (Form 1)
Distance to the nearest major town in km	Control	70.86	27.64	129.65	57.66	32.62	9.58
	Interven- tion	70.57	37.44	129.8	95.34	35.67	5.42
Annual income	Control	6077.48	5569.82	4019	4540.12	7426.39	6278.79
per capita (KES)	Interven- tion	8889.48	5276.78	6223	3466.86	11040	6802.29
Non-farm income	Control	0.77	0.61	0.69	0.56	0.81	0.65
as a share of total income	Interven- tion	0.80	0.67	0.75	0.68	0.84	0.66
TLU holdings per	Control	1	0.7	1.54	0.87	0.57	0.49
capita	Interven- tion	1	1.7	1.53	1.6	2.25	2.84

Household size increased over the period, as did educational achievement measured as the highest level attained by any household member. Incomes decreased in arid and semi-arid

^{35.} See Section 1.3 for detailed description of the data set.

sites, with the decline especially high for intervention communities in arid districts. The share of non-agricultural income fell over the period. TLU per capita fell slightly in control communities and increased slightly in intervention communities.

Changes from 2004 to 2009 were significant within intervention sites for most services, however when changes are compared between intervention and control locations, none is statistically significant.³⁶

Our selection of variables to measure availability of services was limited to those that were available in the baseline data set (Tables 19–23).

		Mean 2004	Mean 2009	Difference
Average time to water during dry season	Control	58.3	62.9	4.6
(minutes) (n=462)	Intervention	56.84	58	1.16
Average time to water during wet season	Control	28.77	32.48	3.71
(minutes) (n=463)	Intervention	28.45	27.96	-0.49
'Quality of source' index, dry season***	Control	0.43	0.55	0.12
(n=442)	Intervention	0.58	0.62	0.04***
'Quality of source' index, wet season (n=443)	Control	0.50	0.70	0.21
	Intervention	0.63	0.77	0.13***
Spending on domestic water in dry seasons	Control	206.39	147.51	-58.88
(KES) (n=110)	Intervention	307.24	145.98	-161.26***
Spending on domestic water in wet seasons	Control	258.93	47.74	-211.19
(KES) (n=71)	Intervention	203.17	59.3	-143.87***
Spending on water for Livestock in dry season	Control	27.05	425.32	398.27
(KES) (n=95)	Intervention	116.20	180.09	63.90
Spending on water for Livestock in wet sea-	Control	150	187.92	37.92
son (KES) (n=17)	Intervention	218.1	34.29	-183.8***

Table 19. Summary of changes in service indicators related to water

*** p<0.01, ** p<0.05, * p<0.1 Note: asterisks on difference column indicate within-treatment changes over time while asterisks on variable name indicated difference in difference; n= number of observations for diff in diff analysis

For each variable, we calculated the mean values in 2004 and 2009, and the difference between them, for each treatment category. Because the original assignment of treatment and control sites was not done randomly, we had to control for underlying differences between the two types of sites that could influence how they responded to ALRMP program interventions. Therefore, we estimated the OLS regression:

$$\Delta y_i = \mathbf{a} + \mathbf{q} D_i + \mathbf{b} X_i + \mathbf{e}_i$$

^{36.} Results of the difference in difference regressions available upon request.

where i is the treatment category (treatment or control), Δy is the change in the variable between the two periods, D is a treatment dummy, X is a vector of household and community level control variables. A significant coefficient on D would indicate an effect of the program.

		Mean 2004	Mean 2009	Difference
Distance to health facility (kms), (n=6 in	Control	2.0	4.96	2.96
2005, too small for valid comparisons)	Intervention	3.4	6.86	3.46
% of illness for which a health professional	Control	0.63	26.43	25.8
was consulted (n=309)	Intervention	0.55	22.31	21.76***
% of household that had and used bed	Control	53.57	55.30	1.73
nets* (n=313)	Intervention	56	66.85	10.85***
% of children who participated in a com-	Control	67.22	63.31	-3.90
munity nutrition program (n=264)	Intervention	75	60.06	-14.94***
% of children who participated in a	Control	68.61	62.56	-6.05
growth monitoring program (n=264)	Intervention	75.69	59.37	-16.32***
% of children who had diarrhoea in the	Control	68.19	63.17	-5.02
last 4 weeks (n=264)	Intervention	73.61	59.28	-14.33***

 Table 20. Changes in indicators of access to human health services

*** p<0.01, ** p<0.05, * p<0.1; asterisks on difference column indicate within-treatment changes over time while asterisks on variable name indicated difference in difference; n= number of observations for diff in diff analysis.

		Mean	Mean	D://.
		2004	2009	Difference
% of animals that died in last 3	Control	79.65	50.67	-28.97
months (TLU) (n=83)	Intervention	78.45	39.80	-38.65***
% of animals that died in the last	Control	3.59	3.09	-0.5
3 months of disease (by ILU) (n=302)	Intervention	9.4	3.74	-5.66**
Amount spent on drugs and med-	Control	186.54	817.61	631.07
icine and/or vaccines (n=302)	Intervention	347.70	802.64	454.94**
% with vet drugs available in	Control	60	58.92	-1.08
locality (n=161)	Intervention	61.67	76.99	15.32***

Table 21. Changes in indicators of access to animal health services

*** p<0.01, ** p<0.05, * p<0.1; asterisks on difference column indicate within-treatment changes over time while asterisks on variable name indicated difference in difference; n= number of observations for diff in diff analysis.

		Mean 2004	Mean 2009	Difference
Average distances to nearest public	Control	8.96	6.44	-2.52
primary (kms) (n=469)	Intervention	3.90	3.37	-0.53*
Average distances to nearest public	Control	23.48	14.82	-8.67
secondary schools (kms) (n=469)	Intervention	20.29	15.65	-4.65***
% of households that live in localities	Control	21.72	27.94	6.22
with adult education (n=443)	Intervention	22.01	38.25	16.23***
Average distance to nearest police	Control	17.51	16.54	-0.97
station (Kms) (n=462)	Intervention	14.57	15.68	1.11

Table 22. Changes in indicators of access to education and security services

*** p<0.01, ** p<0.05, * p<0.1; asterisks on difference column indicate within-treatment changes over time while asterisks on variable name indicated difference in difference; n= number of observations for diff in diff analysis.

Table 23. Changes in indicators of access to agricultural and veterinary extension

		Mean 2004	Mean 2009	Difference
% seeking agricultural extension	Control	21.58	17.73	-3.85
services in last 12 months (n=284)	Intervention	9.93	12.20	2.27
% of women seeking agricultural	Control		15	
extension services (2009 only)	Intervention		9.05	
% of women seeking veterinary	Control		21.25	
extension services (2009 only)	Intervention		22.86	
% seeking vet extensions services	Control	34.62	43.46	8.84
in last 12 months (n=302)	Intervention	31.30	45.15	13.85***

*** p<0.01, ** p<0.05, * p<0.1; asterisks on difference column indicate within-treatment changes over time while asterisks on variable name indicated difference in difference; n= number of observations for diff in diff analysis.

5.3 Changes in household access to services

The results regarding access to services are presented by type of service.³⁷

Access to water. The quality of water sources that households used increased significantly in both the wet and dry seasons between 2004 and 2009 in ALRMP intervention sites (Table 19). Spending on domestic water declined by half in the dry season and by over 70% in the wet season. Time to the water source increased slightly in both treatment and control sites.

When changes in treatment communities are compared with changes in these same indicators for control communities, however, the differences are not statistically significant,

^{37.} Because of concerns about categorization of intervention and control sites, we did the analysis using the expenditure categorization and a "self-categorization" based on whether survey respondents considered that their community had benefits from ALRMPII. We also did the analysis by arid and semi-arid districts. The results did not differ substantially so only the results from the pooled sample and expenditure categorization are presented.

except in the case of 'quality of water' in the dry season, where improvements in control communities were greater.

Access to human health services. In terms of health service-related indicators, there were significant increases in ALRMP intervention communities in the percent of households consulting health professions and in the use of bed nets, and a significant reduction in child diarrhoea (Table 20). Participation of children in nutrition and growth monitoring programs declined. There were not enough responses in the baseline survey to assess changes in distance to health care facility. Only in the case of bed net use was the improvement in intervention communities significantly better than what was achieved in control communities.

Access to animal health services. Animal health related outcomes improved significantly in the intervention communities, with animal deaths declining by a quarter and deaths from diseases by nearly half (Table 21). Availability of veterinary drugs increased by about 15%, while spending on veterinary medicines more than doubled.³⁸

In general the results with regard to the animal health indicators are better in treatment communities than in control communities; however the differences are not statistically significant according to the regression analysis.

Access to education and security services. Access to education- and security-related services generally improved significantly in the ALRMPII intervention communities between 2004 and 2009 (Table 22). The average distance to the nearest primary school decreased slightly, while the distance to the nearest secondary school decreased by about a quarter. The percentage of households with access to adult education increased by more than 70%. Average distance to a police station increased slightly, though it is not clear whether this represents a decline or an improvement in security levels. There were no significant differences between treatment and control communities in terms of changes in these indicators over the period.

Access to agricultural and veterinary extension. The percent of households seeking agricultural or veterinary extension services increased in treatment communities; however the difference was only significant for veterinary services (Table 23). Treatment communities seemed to perform better in terms of these indicators, but the differences between interventions and controls were not statistically significant.

^{38.} To better understand the relationship between expenditure on veterinary drugs and livestock mortality we would need to control for disease outbreaks. The simple correlation between spending and mortality is positive, which likely indicates that both spending and mortality increase when a disease outbreak occurs.

No gender disaggregated data were collected in the baseline so we cannot look at differences in differences. In 2009, women were less likely to seek agricultural extension and about equally likely to seek veterinary extension in intervention communities compared to control communities.

5.4 Community perception of changes in service quality in ALRMPII communities

Service availability and quality are related but slightly different. For example, distance to a school or water source might decline, indicating greater availability, but if a household is not allowed or cannot afford to use the service then it cannot benefit from the reduced distance. Similarly, the number of schools or water sources might remain the same, however if the quality of teachers or the number of days during which water is available increases, then users can benefit even though there was no change in indicators of availability.

In the focus group discussions, ALRMPII interventions communities identified their own indicators of service quality (Table 24), and shared their perceptions of how quality has changed over time for each type of service. On a scale of 0 (lowest) to 10 (highest), each type of service was given an overall quality score in two time periods, 2004 (pre-ALRMPII) and at the time of the discussion (2009).

Service	Common indicators
Water	Quality , Quantity, Price (cost), Availability, Access, Security/safety, Distance, Variety, Number of users, Protected water
Human Health	Availability of personnel, Availability of medicine, Distance, facilities, Price (Cost), Effectiveness of service, Availability of medical services (in general)
Animal Health	Quality of drugs, Availability of personnel, Availability of drugs, Price (cost), Functionality of services, Relevance of services
Agriculture	variety of agricultural services, availability of agricultural resources, availability of personnel, distance to farms, quality and effectiveness of services, relevance of services, price (cost)
Education	type of schools, Quality of learning, Performance and attendance, Accessibility and distance, Price (cost), School facilities, Availability of bursaries, Availability (number) of teachers
Security	Effectiveness and reliability, Security/police presence, Trust Transport, communication, access and coverage

The average quality score for all types of services was 4.07 before ALRMPII and 5.24 in 2009, a statistically significant difference (Table 25). Average quality scores improved slightly more in arid districts than semi-arids (31% vs. 25% increase), however the distribution of improvements was more equitable in the semi-arids, meaning that a higher proportion of communities experienced improvements (Figure 22). In arid districts, nearly half the communities reported that, on average, the quality of services worsened over the period, which is consistent with a situation of declining resources in some of the ministries responsible for service provision in these areas.

	0 1 1		
	Mean score before	Mean score after	T-values
All sites (n=119)	4.07 (2.33)	5.24 (2.52)	-3.555***
Arid (n=48)	4.48 (2.65)	5.89 (2.78)	-2.290**
Semi- Arid (n=71)	3.80 (2.06)	4.79 (2.24)	-2.780***

 Table 25. Average quality of services on a scale of 0 to 10, before and after ALRMP

Numbers in brackets are standard deviation,

***, ** Significant at the 1% and 5 % level,



Percentage of communities that recorded improvement, worsening and no change in guality of all social services

Figure 22. Changes in community perceptions of the quality of social services, by agro-ecological zone.

In terms of specific services, health and education experienced the greatest increases in quality while animal health and agriculture improved the least (Figure 23).



Percentage of communities reporting improvement, worsening and no change in quality of specific social service

Figure 23. Changes in community perceptions of the quality of social services, by service type and agroecological zone.

5.5 Changes in relationships between communities and service providers

Social network analysis (SNA) was used to analyse the relationships between communities and service providers in order to analyse how observed changes in service provision occurred. SNA seeks to understand the nature of systems as a function of the relationships between different actors (Scott 1988; Carrington, Scott and Wasserman 2005). For this study, we look at the relationships between communities and the organizations that provide services.³⁹

In over 90% of communities visited, there was an increase in the number of organizations providing services. The number of community-based organizations (CBOs), non-governmental organizations (NGOs), and Government institutions (GoK) increased in 70% of the communities visited. Increases in the presence of faith-based organizations (FBOs), parastatals, and private institutions were less pronounced, increasing in fewer than a third of

^{39.} Service provider and organization are used synonymously since all organizations identified in SNA aside from the community itself were providers of social services.

communities. The maps from Narok (Figure 24) provide an example of increases in number of actors and links between actors.



Key: Yellow—NGO; Pink—CBO; Red—Gok.

Figure 24. Map of actors in Eor Ewaso Community (Narok) in 2004 and 2009.
We use several measures to look at changes in relationships between communities and service providers. The first, *in degree*, describes the role of an actor/node as a sink or receiver of information or other services. It is expressed as the sum of the connections to each node—that is, how many other actors send information or provide services to a specific actor of interest. In our case, the actor of interest is the community, and the in-degree measure looks at changes in the number of organizations that provide services to the community. The second measure we use is *closeness* of service providers to the community. Closeness, which relates to the proximity of each organization to the community in the Venn diagram, measures frequency of interaction.

Overall there was a positive change in the community in degree, with a mean in degree of nearly eight before ALRMP II compared to an average in degree of twelve after the project (Table 26). The districts with the largest mean increases were Narok with eleven and Marsabit with ten. There was a positive change in the in degree for 18 of the 21 communities.

District	Site	In degree Before ALRMP II	In degree After ALRMP II
NYERI	Amboni	6	5
	Gathiuru	7	7
KAJIADO	Kisaju	4	8
	Namanga	6	9
NAROK	Siwot	7	20
	Eor Ewaso	2	11
LAIKIPIA	Nturukuma	6	12
	Oljabet	9	11
MWINGI	Ngaani	7	14
	Katwala	8	11
THARAKA	Kathangaceni	7	7
	Kanyange	4	13
GARISSA	Kumahumato	14	9
	Kulan	6	12
MANDERA	Dandu	12	17
	Bella	10	15
	Malkamari/Garba	13	10
MARSABIT	Korr	5	18
	Merille	7	14
TURKANA	Kanamkemer	11	13
	Kainuk	11	16

able 26. Average community in	n degree before and	after ALRMP II by district
-------------------------------	---------------------	----------------------------

When constructing social networks, communities were asked to illustrate the closeness of a relationship with service providers by positioning the cards which represent different actors closer to or further from the community. In 90% (18 of the 20) of communities, the

average closeness of the actors to the community increased (i.e. the distance decreased) with communities placing actors much closer currently than they did before. Improvements were more common in semi-arid districts (83%) compared to arid districts (44%) In 17% of the semi-arid districts people felt that relations with service providers had deteriorated compared to only 11% of communities from arid districts.

5.6 Contributions of ALRMP to changes in service provision and providers

To assess the contribution of ALRMP to the changes in service provision using SNA, we look at two measures: *out degree* and *node betweenness centrality*. The opposite of in degree discussed above, out degree measures the number of links from an actor to other actors. Out degree is usually a measure of how influential an actor is in a network.

Node betweenness centrality indicates the extent to which an actor is an intermediary between other pairs of actors in the network who are not directly linked. Betweenness centrality views an actor as wielding power over interactions between other nodes, to the extent that other actors depend on it to make connections with other people. For each actor, the betweenness centrality routine calculates the proportion of times that they are 'between' other actors (e.g. for sending of information) to arrive at a raw score for actor betweenness centrality. This measure can be normalized by expressing it as a percentage of the maximum possible betweenness that an actor could have had.

ALRMP's out degree increased in all but one site, however the increases were modest (Table 27). When compared to other organizations identified by communities, the out degree of ALRMP II in 2009 is lower. This means that from the perspective of the community, ALRMP is not seen to be directly connected to many organizations.

Region	District	Average out degree before	Average out degree after
Semi-arid	NYERI	0	1.5
Semi-arid	KAJIADO	0	0.5
Semi-arid	NAROK	0	1.5
Semi-arid	LAIKIPIA	0	1
Semi-arid	MWINGI	0	2
Semi-arid	THARAKA	0	2.5
Arid	GARISSA	1.5	2.5
Arid	MARSABIT	1	1
Arid	MANDERA	2	2.3
Arid	TURKANA	4	3.5

Table 27. Changes in ALRMP out-degree, by district

ALRMPII's betweenness centrality also increased between 2004 and 2009 (Table 28). On average, the increase was from 14.11 to 38.18, however there was significant variability across sites. For many of the semi-arid sites, ALRMPII is still not recognized by communities as playing a key linking function. Only in Mwingi and Tharaka was this role of ALRMPII recognized by community members (see for example Figure 25). Even in Garissa and Marsabit where ALRMPII has a longer history, communities perceived that other actors in the network work independently of ALRMP II. In Turkana and Mandera, the role of ALRMPII in linking other actors increased substantially over the period. ALRMPII plays an important linking function in these districts (see for example Figure 26).

Region	District	Average betweeness 2004	Average betweeness 2009
Semi-arid	NYERI	0	0
Semi-arid	KAJIADO	0	0
Semi-arid	NAROK	0	0
Semi-arid	LAIKIPIA	0	0
Semi-arid	MWINGI	0	13.5
Semi-arid	THARAKA	0	15.4
Arid	GARISSA	0	0.3
Arid	MARSABIT	0	0
Arid	MANDERA	7.5	59.3
Arid	TURKANA	38.2	63.5

 Table 28. ALRMP betweenness centrality before and after ALRMP II across all sites



Figure 25. Social network of Tharaka (Kanyange) 2009.



Figure 26. Social network of Mandera (Bella) 2009.

5.7 Impacts of ALRMP service provision projects on communities

In order to explore the impacts of ALRMP interventions in communities, focus group discussion participants were asked to identify the ALRMP interventions that they were aware of in their communities and to select one for analysis using participatory impact mapping (Table 29). Participatory impact mapping is an approach that can be used for community-based rapid assessment (David 2004). The much greater diversity of interventions in arid districts reflects the fact that these districts had CDD and SLD components while the semi-arid districts did not. Water was by far the most common type of service-related intervention.

District	Site	Intervention	Type of intervention
SEMI-ARID			
Nyeri	Gathiuru	ASAL water project	Water
Nyeri	Amboni	Water project	Water
Kajiado	Namanga	Dam	Water
Kajiado	Kisaju	Open water pans	Water
Narok	Siwot	Spring protection	Water
Narok	EorEwaso	Rain-fed tank	Water
Laikipia	Nturukuma	Nturukuma water project	Water
Laikipia	Oljabet	Dam	Water
Mwingi	Ngaani	Loading ramp	Livestock
Mwingi	Kavuti	Rock catchment	Water
Tharaka	Kathangaceni	Seeds	Agriculture
Tharaka	Kanyange	Tank	Water
ARID			
Marsabit	Korr	Sanitation of public toilets	Human health
Marsabit	Korr	Camel restocking	Livestock
Marsabit	Merille	Water supply	Water
Turkana	Kanamkemer	Livestock marketing	Livestock
Turkana	Kanamkemer	Slaughter house	Livestock
Turkana	Kainuk	Pump house	Water
Turkana	Kainuk	Capacity building	Capacity building
Turkana	Kainuk	Business loans	Micro project
Turkana	Kainuk	Honey House	Micro project
Mandera	Garabjig	Water Tank	Water
Mandera	Dandu	Water tank	Water
Mandera	Bella	Engines	Micro project
Mandera	Bella	Installation of clean water	Water
Mandera	Bella	Provision of training (proposal writing)	Capacity building
Garissa	Kumahumato	Borehole pump	Water
Garissa	Kulan	Borehole	Water

Table 29. ALRMPII projects identified by communities for impact diagramming analysis

To better understand the impact of water-interventions on communities and households, we examine the results of the impact diagrams of the water-related projects. Figures 27–30 show the impacts diagrams,⁴⁰ for three interventions selected to illustrate the different types of water-related interventions and their impacts. Figures 29 and 30 are maps of the same intervention, one from the perspective of the women and one from the men.

^{40.} On the right-hand side of the diagrams are the positive impacts that the intervention has generated, starting with the direct benefits and continuing on to the in-direct benefits. The fractions that accompany some of the arrows indicate the relative magnitude of the impact in terms of number of households affected. Letter indicate whether the beneficiaries are men (M), women (Y), or youth (Y). On the left hand side of the diagram are the negative impacts of the intervention, again starting with the most direct impacts.



Figure 27. Impact diagram for water drawn by women in Gathiuru.



Figure 28. Impact diagram for dam drawn by community in Oljabet.



Figure 29. Impact diagram for borehole drawn by women in Kulan.



Figure 30. Impact diagram for borehole drawn by men in Kulan.

Across all the impact maps drawn for water interventions, the main benefit of water provision has been the enhancement of food security through increased agricultural and livestock (milk, eggs, meat) production and consumption. Closer and cleaner water sources also led to improved health and sanitation and more opportunities to tend to other duties as a result of the reduced time taken to fetch water. In some cases, the benefits of water interventions significantly boosted asset values, namely land and livestock, as a result of larger areas of land under irrigation and improved fodder production. Some communities stated that the income generated led to a chain of positive impacts resulting in improved living standards and well being. For example, increases in income led to more children in school and to improved housing conditions. The water interventions also contributed to community unity and empowerment through the formation of water users associations. A small number of communities—Kulan in Garissa, Oljabet in Laikipia and Katwla in Mwingi—attributed more happy families and enhanced livelihoods to the ALRMP water interventions.

Of all the water projects evaluated through impact maps, the most common unintended negative consequence that communities mentioned was increased conflict (domestic, social, and resource-based). Other common negative impacts included high unintended maintenance costs, environmental degradation, and water-related health problems. Perceptions of increased alcoholism and other related impacts were also mentioned. Poor water infrastructure and a lack of technical expertise required to manage water sources reduced benefits in a few communities. In some instances, community members had to wait in long queues to access water and/or walk longer distances to fetch water due to faulty water service provision. Although matters of contaminated water due to unprotected interventions were less frequently mentioned, communities believed more effort from ALRMPII and other service providers could enhance the quality of water services.

5.8 Summary and conclusions

Access to services, as defined by the indicators available in the 2004 baseline survey, generally improved in the communities in which ALRMP undertook interventions. In 2009, intervention communities had better access to quality water sources, to primary, secondary and adult education, and to veterinary medicines than they did in 2004. The percent of households consulting medical professionals, using bed nets, and seeking veterinary extension services also increased significantly over the period. Health related outcomes such as prevalence of child diarrhoea and livestock mortality declined significantly.

When compared to control communities, however, there were almost no significant differences in how these indicators changed over time, which means that in most cases access to services increased in non-ALRMP communities as well. As was the case with in

the previous section (KPI 3—child nutrition as measured by MUAC) it is likely that other organizations are working in ALRMPII control sites. Also, ALRMPII district and national level activities in support of improved service provision in ASALS would benefit both intervention and controls communities.

Qualitative analysis confirmed that on average, quality and availability of services increased in ALRMPII intervention communities. Social network analysis revealed that there are many more actors providing services in 2009 than there were in 2004. In addition, ALRMPII communities feel that their relationships to these organizations are closer and stronger now than they were in 2004. While there were improvements over the period in both indicators, with few exceptions, communities do not perceive ALRMPII as an important direct provider of information or services, nor as a 'connector' or facilitator of relationships. It is important to keep in mind that the social networks represent the communities' perceptions, and communities may not be aware of relationships between other actors. The actors themselves may have different perceptions of their links with ALRMP (see Sections 5 and 8).

According to community perceptions, nearly all of ALRMP's direct interventions in service provision were related to water. Communities identified a range of benefits associated with these interventions. They also suggested ways in which impacts could be increased in future interventions, especially related to conflict management, maintenance costs, and environmental impacts.

6 Institutionalizing the impacts of ALRMPII by empowering communities and influencing policy (KPI5)

Jemimah Njuki (ILRI), Juliet Kariuki (ILRI), and Nancy Johnson (ILRI)

6.1 Introduction

Kenya, like many countries around the world, is attempting to decentralize planning and implementation of government programs, especially in the area of poverty alleviation. The district rather than the national level has become the principle level for many government activities. In 2003, the Constituency Development Funds⁴¹ were created with the goal of increasing transparency and accountability and bringing local spending in line with local priorities. Despite delays and problems with implementation, decentralization clearly offers an opportunity for well-organized communities to shape the local development agenda.

The start of ALRMPII coincided with a dramatic change in the Kenyan political environment, namely the transition from a Kenya Africa National Union Party (KANU) government which had been in place for 24 years to an opposition party government formed by the National Rainbow Coalition (NARC) following the presidential elections of December 2002. The new government opened up the policymaking processes, consulting key stakeholders inside and outside the country and encouraging popular participation. The change in government occurred while the Poverty Reduction Strategy Paper (PRSP) was still being finalized, which gave the new administration the opportunity to broaden and deepen what had previously been a very limited process of consultation. This process resulted in the Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) which replaced the interim PRSP and became the basis for the Investment Program for the Economic Recovery Strategy for Wealth and Employment Creation (IP-ERS) (Swallow 2004; Nyong'o 2005).

The change in government and the trend towards decentralization offered opportunities for ASAL to have more say in local development and to influence policy at the national level. At the community level, ALRMPII sought to empower communities to identify and articulate their development priorities, and to increase the capacity of local government to respond to local needs. At higher levels, ALRMP II worked to strengthen civil society groups and facilitate effective participation of stakeholders from ASALs in national processes.

The impact of this work is measured by the key performance indicator strengthening the voice of people from project districts in local and national development as shown through

^{41.} http://www.cdf.go.ke/.

reflection of arid lands concerns in the Investment Program for the Economic Recovery Strategy for Wealth and Employment Creation (IP-ERS) and in national level policies (KPI5).

6.2 Data and methods

As with KI1, there are no controls for this indicator since all sites are potentially affected by activities to influence policy. The analysis for this indicator is done at community and national levels.

Community Level. At the community level, social network analysis (SNA) is the main methodology used to assess community empowerment. SNA allows us to measure changes in the direction and the strength of relationships as well as in the overall role played by the community in a network made up of many types of actors such as government, NGOs, or CBOs. The SNA results are complemented by information about community activities (e.g. self initiated projects) and by perceptions of other actors (mainly members the DSGs)⁴² of the changes that ALRMPII has made in ASAL communities.

National level. The methodology used for the policy analysis at national level is adapted from the ODI Rapid Outcome assessment (ROA) www.odi.org.uk/Rapid. Two analyses were conducted: 1) episode studies of specific policy changes and 2) case studies to track specific project activities designed to influence policy.

A meeting was held with the ALRMPII project management unit (PMU) to (i) discuss the project's strategy for policy influence (ii) identify policies that the project has influenced; and (iii) identify key activities, episodes, or interactions involving ALRMPII staff that have contributed to influencing each of the specified policies. This was followed by interviews of key stakeholders involved in selected policy development processes to better understand the contributions of ALRMPII. Copies of policies, sessional papers, and other documents were obtained to document the contributions of ALRMPII.

The information obtained was analysed using a policy influence framework (Figure 31). Four main avenues for policy influence are identified:

- Advising: In advising, the organization is part of the policymaking process or within the same department or organizational structure that is in charge of the policy. The organization contributes to the policy and content using evidence from experience or from studies.
- Advocacy: Advocacy involves the use of evidence but in this case the organization is not the originator of the policy. The evidence is presented either through involvement in stakeholder processes; consultancy studies etc to the policy originators. In this case

^{42.} See Section 3 for details of survey of DSG members.

the organization has less influence on the policy compared to the advising role and may sometimes provoke confrontation.

- Lobbying: Policy lobbying does not rely on evidence. It is the use of values, or interests to influence policies, within an organization or system.
- Activism: Activism, similar to lobbying, does not depend on use of evidence. Organizations or individuals try to influence external policies through expressing and pushing for their values and interests. Activism relies on confrontation.



Figure 31. Framework for analysing policy influence (Source ODI).

Using this framework, the contributions of ALRMPII to the formulation process and the content of specific policies are identified, along with the key factors that contributed to success. The project's contributions to each policy are analysed from the perspective of the project staff and from the people / organizations directly involved in each of these policies.

6.3 Impact of ALRMPII on community empowerment

6.3.1 social network analysis

Social network analysis was used to measure changes in community empowerment in two ways. One is through changes in the extent to which communities seek services from service providers rather than simply wait for services to be received. This can be measured using out-degree, which is a measure of the role of an actor/node as a source of information or influence. This is expressed as the sum of the connections from the actor to others (e.g. actor 1 sends information to four others). Out-degree is considered to be a measure of how influential the actor may be. An increase in out degree alone cannot unambiguously be considered an improvement if there need to influence more agents does not lead to more and better services. The results of the analysis of service provision do suggest that the increase in number of actors in communities has resulted in an improvement in service provision.

Another measure of empowerment is *Node Betweenness Centrality*. Betweenness centrality views an actor as wielding power over interactions between other nodes, to the extent that other actors depend on it to make connections with other people. For each actor, the betweenness centrality routine calculates the proportion of times that they are 'between' other actors (e.g. for sending of information) to arrive at a raw score for actor betweenness centrality. This measure can be normalized by expressing it as a percentage of the maximum possible betweenness that an actor could have had.

Across all sites, there was a 54.2% increase in the community out degree between 2004 and 2009 from a mean out degree of 5.9 before ALRMP II to a mean out degree of 9.6 currently. The change was greater in the arid districts as compared to the semi-arids. Mean Out Degree



Figure 32. Average community out degree before and after ALRMPII.

Overall, the average community betweeness centrality value increased from 50 before the project to slightly more than 160 after the project, suggesting that the community has become a more central actor in the network over time. Results vary across sites (Figure 33), though in general increases were greater in arid compared to semi-arid communities.



Figure 33. Community node betweenness centrality, 2004 and 2009.

6.3.2 Community-level changes as observed by DSG members and other response agencies working in ASAL communities

In a survey, DSG members were asked to identify the most significant changes that they had observed at community level as a result of the community development and the policy advocacy activities of the ALRMPII. ALRMPII's community development activities include projects and trainings related to income-generating activities, natural resource management, or service provision. ALRMPII's policy advocacy activities included raising community awareness of relevant policies, prioritization of community needs, and facilitating policy engagement.

Figure 34 shows that changes related to community empowerment were by far the most common impacts that DSG members observed as a result of ALRMPII community development activities.

Community Development- Most significant change observed in the community



Figure 34. Impacts of ALRMPII on communities, according to DSG members (n=65).

Some of the comments that respondents made about empowerment impacts include:

- Communities are able to articulate issues on ASAL development
- Vibrant community willing to participate and add a voice on the districts development agenda
- More awareness on decision-making process within government
- More involvement of community in policymaking
- Communities initiating sustainable projects
- Communities and their local leaders are demanding for services

Information obtained from communities on the number and effectiveness of local committees also suggested that communities are well organized. However, only seven self-organized projects were identified by communities, suggesting that they are still dependent on other external actors for resources and other forms of support for project development and implementation.

The most common change observed by DSG members due to ALRMPII's policy advocacy efforts relate to increased knowledge, followed by increased empowerment, and better access to/use of technology (Figure 35). Some comments made by respondents about impacts of policy advocacy on community knowledge include:

- Increased demand for policy information and participation in public information forums
- More enlightened society on policy issues
- Increased awareness of rights in the communities
- Communities are conversant with related policies, e.g. land, small arms and light weapons

Policy Advocacy-Most significant change observed in the community



Figure 35. Impacts of ALRMPII Policy Advocacy work on communities, according to DSG members (N=38).

6.4 ALRMPII influence on national-level policies

ALRMPII has been involved in the formulation of several draft policies that are relevant to ASALs. These include:

(i) National Policy for the Sustainable Development of Northern Kenya and other Arid lands (formerly called National Policy for the Sustainable development of Arid and Semi-arid Lands of Kenya)

- (ii) National Land Policy
- (iii) National Disaster Policy
- (iv) Policy Framework for Nomadic Education in Kenya
- (v) National Policy on Land Reclamation
- (vi) National Policy on Peace building and Conflict Management
- (vii) National Food Security and Nutrition policy
- (viii) National Livestock Policy
- (ix) National Irrigation and Drainage Policy

In this analysis, we focus on five key policies: Peace Building and Conflict Management, Disaster, Sustainable Development of Arid and Semi-arid Lands of Kenya, Livestock and Food Security and Nutrition. For each policy, we describe the current status, analyse the contribution of ALRMPII to both the process and content using the policy influence matrix, and identify the factors (context, evidence, links and external influences) that contributed to the successful and positive influence on these policies by the project.

6.4.1 The National Policy on Peace Building and Conflict Management Status of the policy

The National Policy on Peace building and Conflict Management aims to establish an institutional framework for peace building and conflict management that fosters strong partnerships between the government, the private sector, the civil society, donors, grass roots communities and regional organizations for sustainable national development. The Peace Building and Conflict Management process followed a very bottom–up approach starting in early 1990s when communities in northeast Kenya started having meetings to promote dialogue amongst the different groups. It was, however, recognized that there needed to be a structure to co-ordinate these processes. The National Peace and Conflict Management Steering Committee (NSE) together with the ALRMPII started having informal interactions with civil society groups in order to kick start the process of coordination. The policy process started in 2004 with national and regional consultations between stakeholders including government and the civil society. In 2005, the first draft of the policy was finished. In 2008, the first draft was refined to include other dimensions of conflict especially after the post election violence. The policy is now awaiting cabinet approval

ALRMPII Contribution to the policy

This is one of the policies to which the project has made major contributions in terms of both participating in the policy processes and influencing the content of the policy (Table 30). The NSC recognized important influences from ALRMPII to both process and content that went beyond what the project itself felt it had contributed.

The role of the project has evolved at different phases of the policy process. The project has played an advisory role by using evidence and experience from the ground especially on the role of community structures and community processes for conflict management and how these can be integrated into a multi-layer framework (community, district and national). This was mainly done in the period between 1996 to 2008 when both the project and the National Steering Committee were housed at the Office of the President. When ALRMPII moved from the Ministry for the Development of Northern Kenya and other Arid Lands in 2008, they continued to advocate for community inclusion and for the use of local structures for peace building and conflict management.

Source of	Contribution to process	Contribution to content
Information		
ALRMPII	Involvement in consultations	Community structures for dispute
	Member of NSC at district and national level	and conflict resolution
National Peace and Conflict	Community mobilization for regional con- sultations and initial peace committees	Community structures for dispute and conflict resolution
management Steering Com- mittee (NSC)	Facilitation of community peace commit- tees and other interest groups to participate	Joint project implementation in line with proposed policy
	Creating dialogue between the government and civil society organizations	National, Provincial, District and Local structures for conflict manage-
	Resource mobilization and financial con- tribution for stakeholder consultations	ment

Table 30. Contributions of ALRMPII to the National Policy on Peace Building and Conflict Management

ALRMPII role in the policy

Factors that encouraged successful and positive influence on the policy

Several factors in the political context, mainly relating to conflict in ASAL regions and tensions between civil society and government, highlighted the need for a policy to address the issues. Because of the experience (mainly peace building committees) and relationships and structures built during ALRMPI (e.g. community level and DSG), the project was able to make contributions to both the content and process. The availability of external funding also helped facilitate the mobilization of actors. Within the region, there were discussions on the management of small arms and the regional conflicts especially in countries surrounding the ASAL areas especially Somalia and these were generating both regional and international interest.

6.4.2 The National Disaster Policy

Status of the policy

This policy aims at addressing the increasing incidences of both slow and quick on-set disasters, which result in serious human distress and suffering, destruction of property and infrastructure, degradation of the environment, and overall reduction in social welfare. The policy document attempts to articulate objectives, strategic guidelines, institutional framework and the supportive legislative instruments for disaster management in the country. The first draft of the policy was finalised in 1998 and reviewed again in 2000. During this review, it was decided that the policy needed to cover a broader range of disasters and

these were added to the policy. In 2006, issues such as climate change and social insurance and protection were added, and a cabinet paper was written for presentation. The National Disaster Management Authority had been proposed as an autonomous body in the 2007 draft but this was in conflict with the functions of the Ministry of Special Programmes. The policy required further review to entrench it within the Ministry of Special Programmes. Due to the elections, the debate on the policy was delayed and the paper was finally submitted in October 2009.

ALRMPII contribution to the process and content

ALRMPII made significant contributions to both process and content, mainly based on its experience with drought management and early warning systems (Table 31).

Key Policies	Contribution to process	Contribution to content
ALRMPII	Consultation meetings	Contributed to drought issues- the need to have a very
	Involvement of ALRMPII in	good EVVS for drought similar to the ALRMPH EVVS
	committees and stakehold-	Contingency planning, assessments
	er meetings	Coordination mechanisms such DSG, KFSG
		Requirement for multi-sectoral assessments
		Provisions for a drought contingency fund
Ministry of	Ministry of Special Pro- grammes Discussions on the policy content at different stages of the policy document Contributed to the Sector working /thematic groups (e.g. Agriculture, Public awareness, Drought, Food security, Shelter/ , Reset- tlement, Health, Water,	Drought management
Special Pro- conter		How to be proactive in disaster risk management
grannes		Early warning systems was borrowed from ALRMPII
		District Level structures incorporated into the policy as they have been proven to work with ALRMPII
		Using the food security group for surveys
		Peace development thematic group
	Hygiene)	

Table 31. ALRMPII contribution to the National Disaster Policy

ALRMPII role in the policy

The initial role of ALRMPII in the disaster policy was one of advising and using evidence especially with respect to the early warning system, drought management, coordination and food security monitoring, and including this in the section of the policy on drought. This was possible as the policy was initiated within the Office of the President where the project was housed. The role then changed to one of advocacy in 2008 when the project moved from the Ministry of Special Programmes to the newly-created Ministry of State for the Development of Northern Kenya and other Arid Lands. The project has continued to interact with the Ministry of Special Programmes to finalize the policy and ensure the structures and systems tested by the project are integrated into the policy. These structures are evident in the current policy document.

Factors that encouraged successful and positive influence on the policy

As with the policy on Peace Building and Conflict Management, the need for a revised policy was made visible due to the increased occurrence of different types of disasters (drought, terrorist attacks, fire etc.) and lack of coordination for risk reduction and management Different actors engaged in disaster management including government departments, international NGOs, UN agencies and hence need for co-ordination mechanism. Increased reliance on external resources was also a source of pressure to get an updated policy in place.

ALRMPII was very well placed to contribute evidence based on the effectiveness of the early warning system for drought management and coordination, including food security monitoring system, with an information system for the collection, dissemination of information at local, district and national level.

There was also some external pressure to get the policy approved because an adaptation of the policy has been adopted and implemented in South Africa and Tanzania. This influenced Kenya because it put pressure to implement it since they initiated it and countries were adapting it before they had even passed it.

6.4.3 National policy for the Sustainable Development of Northern Kenya and Other Arid Lands Status of the policy

The objective of this policy is to improve the standard of living of the ASAL population by appropriately integrating ASALs into the mainstream national economy and society in an environmentally sustainable manner. This policy will provide a framework for a coherent approach to ASAL development and is informed by a new understanding of the different livelihood systems and causes of poverty in these areas. The policy was initiated by the Ministry of Special Programmes in the Office of the President, and spearheaded by the ALRMPII. A draft policy was in place in 2006, however with the development of the Vision 2030, there has been new thinking on the policy, and a process to align the policy with the Vision 2030 was started. By then, the Ministry of State for Development of Northern Kenya and other Arid Lands had been formed and is now spearheading the policy. Subsequently, the name of the policy was changed to National Policy for the Sustainable Development of Northern Kenya and other Arid Lands.

ALRMPII Contribution to the process and content

The key role played by ALRMPII in both the process and content is summarized in Table 32.

	Contribution to process	Contribution to content
ALRMPII	Initiated policy while still under the Of- fice of the President, Special Programmes	The DSGs as a main component of the institutional arrangement for the imple-
	Initiated, facilitated and funded stake- holder consultations	Adaptation of the Kenya Food Security
	Led in the formulation / drafting of the draft policy paper	Meeting (KFSM) into an ASAL develop- ment forum
	Community mobilization for groups to participate in policy forums and discussions	A community based early warning system for risk reduction and disaster prevention including drought
		Commitment to the support of the drought early warning system started by ALRMPII
		A recognition of the current ALRMPII ini- tiatives in drought management and the inclusion of a drought management con- tingency fund to support these activities
		Village peace committees as a mecha- nism for conflict management
		Mobile schools
Ministry of State for Develop-	The Ministry attributes the policy to the project as the key initiators. The project has:	Major initial content on the policy was done by the project based on the evi- dence and experience from the field.
ment of Northern Kenya and other Arid Lands	 Initiated and funded stakeholder con- sultations 	Most contributions are in the areas of drought management, human capital
	 Been hosting and chairing the secre- tariat charged with the development of the policy 	(health and education including adult education), livestock development, and conflict management
	 Continues to provide the institutional memory on activities in the ASAL areas that are shaping the policy 	
	 Continues to participate in consulta- tions to improve the draft policy 	

Table 32. ALRMPII contribution to the ASAL policy

ALRMPII role in the policy

The role of the project in the ASAL policy has mainly been one of an initiator as the project started the policy process while under the Office of the President and the Ministry of Special Programmes. The policy is now under the Ministry for the Development of Northern Kenya and driven more by the Ministry and not specifically by the project. The project still plays an advisory role as a member of the secretariat,

Factors that encouraged successful and positive influence on the policy

The creation of the Ministry of Northern Kenya and Other Arid Lands to cater for the development of Arid and Semiarid areas reinforced the importance of the policy and

demonstrated the government's commitment to the ASALs. ALRMPII's experience on drought management, food security, peace building, and on mobile schools were key pieces of evidence. The project's links with stakeholder such as UN agencies (UNDP, UNICEF, FAO, UNEP), research organizations (ICRAF, ILRI, KARI, KEFRI), NGOs (Oxfam, Plan Kenya, Farm Africa), regions organizations (NCCK), regional programs (AU-IBAR), universities and bilateral donor agencies (USAID, DFID) ensured its participation in the process. Increased donor funding (World Bank, European Union, African Development Bank etc.) for programs in ASALs provided both a carrot and a stick for getting a policy in place.

6.4.4 National Food Security and Nutrition Policy (FSNP) Status of the Policy

The broad objectives of the FSNP are: (i) to achieve good nutrition for optimum health of all Kenyans; (ii) to increase the quantity and quality of food available, accessible and affordable to all Kenyans at all times and (iii) to protect vulnerable populations using innovative and cost-effective safety nets linked to long-term development. The policy recognizes the broad nature of food security and nutrition that goes beyond food production to include linkages with nutrition, health, accessibility of food for the urban and peri-urban poor, and food supply during emergencies. The policy attempts to provide an overarching framework covering all key dimensions of food security and good nutrition, and addresses the synergy that links food security and nutrition with poverty reduction. A draft sessional paper was submitted to Cabinet in 2009.

Contribution of ALRMPII

ALRMPII participated as a stakeholder in the formal process, and its food security monitoring activities have been incorporated explicitly into the policy (Table 33).

Role of ALRMPII

The role of the project has mainly been advocacy role providing documents and evidence of their experiences specifically on the food monitoring and information systems and the early warning system as well as the use of the KFSM and the KFSSG as a coordination mechanism for both food security monitoring and emergency response

	Contribution to process	Contribution to content
ALRMPII	Participation in stakeholder consultations	Contribute information on food cocurity moni
	Provision of situational analysis information on ASALs	toring
		Contributed to the chapter on Food security and nutrition information
		The policy specifically mentions the EWS and the food security monitoring of ALRMPII as an important source of information. Under the policy, the government would expand this to cover the whole country.
Agriculture Sector Co-	Participation in most of the stakeholder consultations	The project contributed substantially to the chapters:
ordination Unit		Food security and nutrition information
	Contributing content to chap- ters of the policy document	 Cross-sectoral food monitoring
		 Food security and early warning information systems to guide emergency response, prepar- edness and development interventions
		– Use of the KFSM and KFSSG to provide coor- dination of emergency management activities
		 Linking emergency response to development activities especially in ASAL areas
		Institutional and legal framework
		– KFSM as a component of the institutional framework for the implementation of the policy

Table 33. ALRMPII contribution to the FSN policy

Factors that encouraged successful and positive influence on the policy

Several aspects of the political context favoured the development of the policy and the participation of ALRMPII in the process. These include: 1) the recognition of the wider scope of food security beyond agricultural production, 2) the greater focus on food insecurity especially in the ASAL and the role emergency aid and how to link this more with development interventions, and 3) the creation of the Ministry of Special Programs (former home of ALRMPII) with a crucial mandate for emergency operations.

ALRMPII's extensive links with other organizations working on food security and nutrition including UN agencies (WFP, UNICEF), NGOs (Action Aid), the Agriculture Sector Coordination Unit and other ministries especially the Ministry of Health—helped position it to play a role in the policy development process. Previous links between ALRMPII and these actors especially through the KFSSG and the KFSM have been advantageous.

ALRMPII's evidence on the EWS and food security monitoring were important in the development of the emergency-related aspects of the policy.

6.4.5 The Livestock Policy

Status of the policy

The policy addresses the challenges in the livestock subsector in the context of livestock breeding, nutrition and feeding, disease control, value addition and marketing, and research and extension. The main objectives of the policy are to:

- Achieve appropriate livestock management systems for sustainable development of the livestock industry
- Improve and conserve available animal genetic resources effectively
- Achieve effective control of animal diseases and pests in line with the relevant international codes and standards.
- Focus research efforts in the livestock subsector on resolving current and emerging problems
- Ensure quality standards and quality assurance at all levels of production and marketing chain for increased competitiveness of the livestock industry
- Address various cross cutting issues that impact on the livestock subsector including water, environment, infrastructure, insecurity, livestock-wildlife interactions, HIV and other human diseases, gender and capacity building

The sessional paper has been approved by cabinet and the policy is now under implementation.

ALRMPII contribution

ALRMPII participated directly in the process as well as facilitated the participation of others. The project also contributed evidence, though the Ministry of Livestock mainly recognizes the contribution to the process (Table 34).

	Contribution to process	Contribution to content
ALRMPII	Participated in the initial meetings and consul- tations Facilitated consultancies in marketing aspects as well as Animal health aspects	Strengthened the role of community animal health worker for disease control
	Supported the districts livestock marketing Association, the Kenya livestock Marketing Council, Pastoralist Parliamentary Group (PPG) in the policy process	
Ministry of Livestock	Participation in stakeholder consultation meet- ings	
	Support to pastoral groups to participate	

Table 34. ALRMPII contribution to the livestock policy, by source of information

ALRMPII role in the policy

The role of the ALRMPII on the livestock policy has mainly been lobbying for the inclusion of pastoralists issues into the policy as well as supporting other groups with an interest on the policy, including KLMC, to participate in the policy discussions. The project also played an advocacy role with respect to the Surgeons Act by funding some consultancies on animal movements and their impacts on diseases and the role of Community Animal Health Workers (CAHW) on disease management and control especially in the ASAL areas.

Factors that encouraged successful and positive influence on the policy

In terms of policy context, the recent creation of a Ministry of Livestock Development that was separate from Agriculture led to an increased focus on livestock issues. Ability to provide evidence based on experience with livestock interventions in the ASALs and the results of its studies on CAHW enabled it to influence policy content. ALRMPII's links with KLMC and the pastoral groups were also important.

6.5 Summary and conclusions

Social network analysis suggests that ALRMPII communities are exerting more influences on the individual organizations that work in their communities, as well as playing a more influential role in terms of how these organizations relate to each other. DSG members surveyed also claim that ALRMPII activities have contributed to communities being better informed and more empowered.

According to key informants associated with policy processes, ALRMPII has also played an important role in the formulation of several major policies of importance to ASAL regions. Several policies have directly incorporated ALRMPII structures and activities, which provides evidence of the broader institutionalization of project activities.

Both general trends and specific incidents in the Kenyan political context over the lifetime of the project have created opportunities for both community empowerment and for policy influence. Because of its experience and its relationships, the ALRMPII project was able to seize the opportunities to advance its policy agenda.

7 Conclusions and Recommendations

Nancy Johnson (ILRI) and Ayago Wambile (ILRI)

In this evaluation, multiple data sources and analytical methods were used to assess changes in the ALRMPII's five KPIs and explore the contributions of the project to any changes observed. One of the indicators, KPI5, by its very nature could only be evaluated qualitatively. For another (KPI1), qualitative and quantitative methods were appropriate, however the lack of appropriate 'control' or 'without ALRMPII' scenarios limited the analysis to looking for statistical correlation between outcomes and project-related variables over time, without being able to attribute changes to ALRMPII. Only for KPIs 2, 3 and 4 were the available data appropriate for conducting the difference-in-difference analysis that supports claims of attribution of observed impacts to an intervention, although even in these analyses there exist alternative interpretations consistent with data.

The findings for each of the KPIs are summarized below, together with some possible implications for policy or programming. The final part of this section makes some general recommendations based on both the findings of this evaluation and on the challenges encountered in undertaking it.

7.1 Summary and implications

The analysis of KPI 1 (Decreased proportion of people in each ASAL district assessed as needing free food aid, normalised by severity of drought) found a small but negative and statistically significant correlation between cumulative ALRMPII expenditure and the percent of people needing food aid in the arid districts, controlling for other factors such as drought. The correlation between ALRMPII expenditure and percent of people needing food aid was not significant in semi-arid districts, a result which is not surprising given the relatively lower levels of expenditure by ALRMPII in these districts, especially in activities oriented towards reducing vulnerability.

According to community perceptions, both food aid needs and vulnerability to drought have grown over time, but food aid needs have grown faster. Analysis by agro-ecological zone showed that according to community indicators, drought vulnerability has actually declined in arid districts, though food aid needs have continued to rise. In semi-arid districts, drought vulnerability and the need for food aid are closely related, especially in recent years.

Implications: Though it is impossible to attribute observed changes to ALRMPII, the results in the arid districts are consistent with a positive impact of ALRMPII on household vulnerability as defined by '% of households needing food aid'. Unfortunately, given the level of

aggregation, it is difficult to say anything about the causal mechanisms through which such effects might have arisen. Further complicating inference, household survey data showed that incomes were lower and less diversified in 2009 compared to 2004/05, however asset levels have increased slightly. It would be useful to know whether this was the result of, for example, better emergency interventions that prevented loss of assets in low income years, more diversified livelihoods that allowed for accumulation in better years (e.g. 2007 and 2008), or some other mechanisms.

The complexity of the relationship between drought and food aid in the arid areas suggests that an increased focus on interventions that go beyond current drought to address issues such as conflict or dependency that may be functions of the cumulative impacts of repeated shocks on households and communities may be warranted.

According to their own estimates, the time that agencies took between becoming aware of an emergency and responding (KPI2) dropped by 1.5 weeks (16%) during the time that ALRMPII was operational. A variety of factors contributed to the reductions, among them the use by the agency of the ALRMPII Bulletin.

Significant other changes took place over the period that facilitated both ALRMPII activity and more rapid response, including expanded mobile telephone coverage of Kenya's arid and semi-arid lands, increased agency attention to rapid response, and more flexible international funding of emergency response. But when asked about their perceptions of ALRMPII's impacts, survey respondents said that their emergency response activities were not only faster but also better coordinated and more appropriate due in part to the activities of ALRMPII.

Implications: The ALRMPII Bulletin has become the most useful and most used source of early warning information for response agencies. Users appreciate that the information is reliable, community-based, multi-sectoral, and intervention oriented. Users suggest that the bulletin could be improved by ensuring timeliness, broadening the scope of livelihood activities covered, being more participatory in data collection, and including more market-related and environmental variables, and more gender disaggregated information. A more systematic, consistent approach to defining stages in the drought cycle was also recommended.

Currently most users access it through hard copies. Barriers to electronic access should be investigated since this limits distribution. Dissemination via other media (e.g. radio, barazas) was also recommended, as was translation into Kiswahili for greater dissemination within communities.

Some users also raised issues of data quality. While agency users generally consider the data reliable, there is room for improvement. Investment in recruiting, training, and monitoring staff in the districts, and in developing partnerships with other organizations who have expertise in certain types of data collection (e.g. nutrition) are possible options which, given the importance of the EWS to users, would appear to be justified.

Child malnutrition remains pervasive in the ten districts; however the results of this analysis of changes in MUAC over time in intervention and control sublocations provide some mild evidence that ALRMP II has been associated with improvements in child nutrition, as measured by mid-upper arm circumference (MUAC) (KPI3).

Difference-in-difference regressions using panel data did not find a statistically significant ALRMPII program impact, though the results suggested that ALRMPII interventions were targeted to the worst-off areas. Stochastic dominance analysis revealed that nutritional status has improved over time in the districts, on average, and found fewer negative changes among the most malnourished children in the ALRMPII intervention locations as compared to the control locations, although these differences in distributions are not statistically significant. This is consistent with the claim that ALRMPII prevented nutritional status from worsening for the worst-off children, functioning as a nutritional safety net, although the differences among intervention and quasi-control locations and the inability to control for many exogenous factors makes it unclear whether this is in fact the mechanism behind apparent reduction in worst case outcomes.

It is possible that the empirical results underestimate the true impact of ALRMPII on child nutrition in either or both of two ways. Empirical results are based on comparisons between intervention and control sublocations, however, ALRMPII activities related to EWS and policy would benefit all communities whether they had ALRMPII project interventions or not. In addition, the coordination role played by the DSG could also lead to a downward bias in measured impact if it reduced concentration of intervention in certain sites and led to a larger number of communities (including ALRMPII 'control' communities) receiving interventions. Conversely, our results could overstate the effects of ALRMPII on child nutrition if the apparent targeting of worst-off areas naturally led to greater 'catch up' due to regression-tomean effects. Problems in ALRMPII's collection and management of the child-specific MUAC data limit our ability to make stronger inferences about the causal effects of ALRMPII on child nutrition.

Implications: The fact that the child nutritional situation did not get worse in the worst off locations in which ALRMPII intervened is important and encouraging. However, given the severity of the malnutrition problem it would be highly desirable to examine how the program could achieve or increase impact on nutrition levels for all children. More

information on health would be important to understanding the bidirectional mechanisms between malnutrition and health; outbreaks of malaria or other communicable disease cause lower nutrition, but lower nutrition also causes larger outbreaks. To get at these very important causal program impact factors in future would require household survey data that can be matched up to the MUAC measurements and community/geographical level information on the disease environment.

In addition, improvements on the current data (e.g. unique identifier children or more accessible software) would go a long way towards making this valuable data set more useful and more used for program- and policy-relevant analysis.

Access to social services (defined as water, human and animal health, education, security and agriculture (KPI4) generally improved in the communities in which ALRMPII undertook interventions. In 2009, ALRMPII communities had better access to quality water sources, to primary, secondary, and adult education, and to veterinary medicines than they did in 2004. The percent of households consulting medical professionals, using bed nets, and seeking veterinary extension services also increased significantly over the period. Health-related outcomes such as prevalence of child diarrhoea and livestock mortality declined significantly.

When compared to control communities, however, there were almost no significant differences in how these indicators changed over time. As was the case with KPI 3, one possible explanation is that ALRMPII district and national level activities in support of coordination of interventions and improved service provision may have benefited both intervention and control communities. Another possibility is that ALRMPII interventions in particular communities induced other providers to move to 'control' communities. And of course the statistically insignificant differences could equally signal the absence of any effect of ALRMPII on social services access.

Qualitative analysis suggests, however, that on average quality and availability of services increased in ALRMPII intervention communities. ALRMPII communities feel that their relationships to these organizations are closer and stronger now than they were in 2004. While there were improvements over the period in both indicators, with few exceptions, communities do not perceive ALRMPII as an important direct provider of information or services, nor as a 'connector' or facilitator of relationships. DSG members who responded to the survey did see ALRMPII playing the coordinating role however it may not be apparent at the community level.

Implications: These results show that in general where ALRMPII implemented serviceprovision projects, access to services increased. Other organizations are also implementing such projects, however, with similar (generally positive) results. Therefore, we cannot say that, in the absence of ALRMPII, these community-level, project-related impacts would not have happened anyway.

Community-level projects accounted for a significant part of the ALRMPII's expenditure, however they constituted only a part of the total investment in infrastructure and service provision made by government, NGOs, and other actors in ASALs. This raises the question of whether ALRMPII has a comparative advantage in implementing such projects. If the only objective is to expand service coverage, these results suggest that it does not. If, however, the objective of participation in community-level projects –whether for infrastructure, service-provision, natural resource management, or income-generation—also includes building capacity and demonstrating alternative models of working with communities, then such activities may be justified.

If this is the case, then the strategic objectives need to be clearly articulated and reflected in the implementation strategy and evaluation criteria. This evaluation did not look at these aspects of ALRMPII interventions, though anecdotal evidence from other KPIs is consistent with community empowerment impacts. The question then becomes whether it would also be possible to achieve these objectives by partnering with other organizations working in communities. Anecdotal evidence from the field suggests that this is already happening in the sense that ALRMPII often builds on investments made by others.

According to the results of the perceptions of communities, response agencies, and individuals involved in policy processes at national level, ALRMPII has contributed to strengthening the voice of people from project districts in local and national development by building capacity in communities, by facilitating participation of key stakeholders from the ASALs in policy processes, and by contributing evidence and experience to several policies of relevance to ASAL regions.

At the national level, ALRMPII mobilized and facilitated the participation of key ASAL stakeholders such as community committees and pastoral organizations in policy processes. Several policies and draft policies (sessional papers) incorporate objectives, lessons, and in some cases, structures and mechanisms directly from ALRMPII. To date the Disaster Management and Livestock policies have been approved, while Peace Building and Conflict, and Food Security and Nutrition have been submitted to Cabinet. The ASAL policy is due to be submitted in the last quarter of 2010.

Implications: During ALRMPII, opportunities presented themselves to influence national policy and local development agendas, and the project was well-placed to take advantage

of them. While some national-level policies and structures remain to be confirmed, most importantly the ASAL policy, the main challenges towards the future will likely relate to consolidation of gains and implementation of policies. ALMRPII has a role to play here, however the context is likely to be different and new strategies may need to be adapted.

7.2 Some general recommendations

In addition to the KPI-specific implications described above, some more general recommendations have been identified in five main areas:

Coordination. The results of the evaluation suggest that ALRMPII played an important coordination role in the districts. The project may want to consider making this an explicit objective in the future, and include a KPI to measure the impact. As alluded to earlier, this may imply trade-offs in terms of measuring impact between being a coordinator and being an implementer of community level projects, and these need to be thought through carefully.

Capacity building and community empowerment. In this evaluation, the main indicator of community-level impacts was service provision. In retrospect, this indicator may not have captured the project's impacts on community capacity. More analysis is needed to confirm this, however if ALRMPII does indeed have a comparative advantage relative to other service providers in providing models for working with communities, then this could become a focus of work in the future. Working in partnership and focusing on documenting and disseminating lessons could form important components of this work, and are consistent with a scaling out focus.

Environmental impacts. There were no KPIs around this in ALRMPII, however there are several reasons why it might be useful to include them in the future. First, changes in the quality and availability of natural resources could be important causal mechanisms through which project interventions impact on poverty and vulnerability. Second, environmental indicators would also be a necessary part of understanding the impacts of climate change and the potential impacts of interventions around adaptation or mitigation, which are of growing interest in the project region.

Causal mechanisms. Even where the evaluation found significant statistical relationships between outcomes and project-related variables, it was difficult to identify whether there was any causal relationship between ALRMPII interventions and these indicators, much less the mechanisms through which impact might have been achieved. Where multiple causal mechanisms are possible, alternative impact pathways should be specified and indicators developed to differentiate empirically between them. These pathways form the basis for the evaluation framework. More careful articulation of hypothesised causal mechanisms could lead to more targeted data collection, in terms of sites and number of variables collected. Reliable, longitudinal household and individual data will be critical in understanding mechanisms, and more frequent collection from fewer households might be more useful than the current approach. The large and comprehensive baseline data set appears to have done little to inform project interventions, and a relatively small amount of the data collected in the baseline was ultimately used in the evaluation. As mentioned earlier, the ability to link household data to MUAC or other monitoring data would be useful in establishing and understanding causality.

Attribution. It was challenging in this evaluation to identify 'intervention' and 'control' locations for analysis of KPIs 3 and 4. Different methods of *ex-post* categorization gave inconsistent results. Should ALRMP engage in community-level interventions in the future, we strongly recommend that the project develop a clear framework for site selection and classification. Randomization of interventions is desirable for impact assessment, though there are important social, ethical, and practical issues related to randomization of development interventions that need to be considered (see, for example, Barahona 2010). Even if a purposive approach is taken, the important thing is to be clear about the process and criteria by which sites are selected and to keep careful records about which sites are 'interventions' and which are 'controls'.

References

- ALRMP, 2008: Monitoring and Evaluation Framework and Programme Design. Arid Lands Resource Management Project Phase 2: Working Paper 11. October 2008.
- Barahona, C. 2010. Randomised Control Trials for the Impact Evaluation of
- Development Initiatives: A Statistician's Point of View. ILAC Working Paper 13, Rome, Italy:
- Institutional Learning and Change Initiative.
- Buchanan-Smith, Margaret (1999) Role of Early Warning Systems in Decision Making Processes, http:// drought.unl.edu/monitor/ews/ch2_buchanan-smith.pdf.
- Carrington, P. J., Scott, J., and Wasserman, S. (2005). Models and Methods in Social Network Analysis. Cambridge University Press, Cambridge.
- Carter, M and C Barrett, 2006, Economics of poverty traps and persistent poverty: an asset-based approach, *Journal of Development Studies*, 42(2):178–199
- David, S. 2004. Using impact diagrams to evaluate change in people's livelihoods. Centro Internacional de Agricultura Tropical (CIAT). (Highlights: CIAT in Africa no. 13).
- Davies, S., Buchanan-Smith, M. and Lambert, R., 1991: *Early warning in the Sahel and Horn of Africa: The state of the art. A review of the literature.* Volume I. Research Report No. 20, IDS, Sussex, UK.
- Fields, G. S. (2001). *Distribution and Development: a new look at the developing world*. New York, Russell Sage Foundation.
- Kajiado District Strategic Plan 2005–2015
- KFSSG (15th September 2006) Kenya Long Rain Assessment Report.
- Kenya Meat Commission (KMC), 2009. National Livestock Offtake. 2009. Unpublished report.
- Management Project (Credit No. 2797-Ke). The World Bank, Washington, DC, USA.
- ILRI, 2008. Livestock revolution: Exploiting the potential of Kenya's Arid and Semi-arid lands, November 2008. 2nd Kenya National Agricultural Sector Conference November 9–12, 2008.
- ILRI, 2010, An assessment of the response to the 2008–9 drought in Kenya, ILRI working document
- Mude, Andrew, Robert Ouma, Jeannette van de Steeg, Juliet Kariuki, Dennis Opiyo, Annita Tipilda, 2009 "Anticipating, adapting to and coping with climate risks in Kenya: Operational recommendations for Kenya Adaptation to Climate Change in the Arid Lands", ILRI Research Report
- Nyeri District Strategic Plan 2005-2015.
- Nyong'o, Peter Anyang' 2005, "Planning for Policy Making and Implementation in Kenya: Problems and Prospects," F. Etta and L. Elder (eds) *AT THE CROSSROADS ICT Policymaking in East Africa*, East African Educational Publishers/IDRC, 336 pp.
- Office of the President and Special Programs, (2007). National Policy for the Sustainable Development of Arid and Semi-arid Lands of Kenya. Office of the President and Special Programs
- Oxfam International, (2006) Delivering the Agenda: Addressing chronic under-development in Kenya's arid lands
- Republic of Kenya (2002b). Kenya 1999 Population and Housing Census. Analytical Report on Population Projections. Volume 7.
- Scott, J. (1988). Social Network Analysis. Sociology, 22(1), 109-127
- Swallow, Brent, 2004, "Potential for poverty reduction strategies to address community priorities: case study of Kenya, *World Development*, 33(2):301–321
- Tharaka District Strategic Plan 2005–2015.
- World Bank. 2005. Project performance assessment report, Kenya Arid Lands Resource

ISBN 92-9146-257-8