



Water Related Indicators for Sustainable Crop- Livestock Intensification Planning in Ethiopia

Report from an 'early win' project

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The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.



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Purpose, objectives, planned outputs

The objective of this proposal was to review, test and provide a package of outputs that together will better define areas of priority where gains in crop and livestock productivity to reduce poverty could be brought about. Testing and identification of increased water use efficiency, greater/better use of water storage structures and opportunities and constraints for interventions will ultimately support and promote sustainable development goals within Ethiopia where this research is proposed.

The outputs from the project were planned to be: a) a review document detailing the opportunities for developing indicators of water use, water constrained agriculture and water vulnerable agricultural and b) a series maps showing where particular regions have specific opportunities or constraints from water use and management in relation to reducing poverty through better targeting of agricultural practices. Together these would provide a proof of concept identifying the opportunities and constraints for better targeting of agricultural water planning and targeting and further development in the full Africa RISING program.

The activities to generate these outputs were proposed to consist of a review of previous and existing work on water indicators from a mixture of biophysical and a poverty/socio-economic stand points. Further analysis of existing mapped and GIS products would be used within Ethiopia to generate a series of indicators. Finally, to test and validate the indicators and maps a series of discussions and interviews with experts and different stakeholders would be undertaken.

Partners

This work was undertaken by a consortium of researchers drawn from centers of agricultural water expertise in Ethiopia and internationally. Namely the contributors are IWMI, East Africa and Nile Office based in Addis Ababa, ILRI, Bahir Dar and Arba Minch universities.

The specific responsibilities of these partners were: IWMI led the project and undertook research coordination, inputs to the literature review, trajectory development, data collation, leading report writing and financial management. ILRI led much of the spatial analysis and co-partnered the research development and contributed to the literature review and report writing. Bahir Dar and Arba Minch universities attended 2 days introduction and training on the use of the GIS toolbox. Subsequently they set up, ran and wrote reports from testing of the toolbox/GIS with a range of stakeholders in the north and south of the country respectively. They also attended the national workshop meeting.

Achievements

The research undertook a literature review of policies, initiatives and policies promoting agricultural intensification. From this review as well as regional and national consultations, eight trajectories of change, which combine a number of practices to achieve different objectives were identified and developed. These trajectories recognize a number of local spatially variable potential opportunities, limitations, existing livelihood and social conditions. To assess the suitability of these trajectories a number of indicators have been applied to evaluate the suitability of a practice, combinations of practices, and the likelihood of their adoption by farmers. For each trajectory a number of spatially explicit indicators (1 to a maximum of 5) were selected. The final product from this development and analysis is a set of maps of suitability.

Collectively these elements provide a toolbox for targeting and prioritizing future land use interventions to reduce poverty and improve livelihoods at a landscape scale.

To test the proof of concept of the approach we tested the toolbox through two pilot workshops with Ethiopian university researchers and regional policy staff in which the work was described and participants engaged in practical use of the toolbox to test it. From these, comments on the use and applicability of the approach were gathered. These comments will help focus the work if there is a subsequent call for development and incorporation into the wider second phase of Africa RISING.

Locations/sites where activities took place

The GIS tool, maps and trajectory tool box are available, together with all of the project materials, from the Africa RISING wiki: <http://africa-rising.wikispaces.com/Quick+water>

Support of Africa RISING

The research provides a transparent and objective approach to evaluating different options for agricultural intensification. The approach can be utilized by a range of end users and stakeholders without extensive training. The approach is flexible enough to allow further trajectories to be built and evaluated according to user defined indicators. It will therefore allow further analysis and evaluation of differing intensification and implementation of possible future policy options.

Scalability

The research was conducted as a proof of concept covering the whole of Ethiopia. There are options to both scale this up to smaller areas of Ethiopia or to scale-out or scale up to other parts of sub Saharan Africa. The structure of the approach should not need to be fundamentally changed, perhaps some adjustment. As such the proof of concept is robust. The principal constraint will be the scale and availability of the necessary data required to run the approach.

Lessons learned

Based on our experience of undertaking the research and from testing the work with stakeholders a number of recommendations are suggested to improve the utility of the toolbox.

In summary, these are:

During all of the consultation meetings the most active topic of discussion was the selection of trajectories, their corresponding indicators and thresholds. A wealth of information and input was provided by participants on the definition of trajectories and locally prioritized development. A number of new potential trajectories were suggested by regional agencies who also requested a more focused development of the toolbox two allow them to test localized development. They also agreed to provide detailed local data for indicators in order to make this possible. This would assist in developing ownership with the national research system and policy advisors/implementation authorities. There was significant interest in the tool and its future use from all of the stakeholders.

Future development of the trajectories and tool will need to:

1. Allow users to define their own trajectories (potentially from a menu of predefined practices) or sub-trajectories. If the toolbox was 'set-up' for regions this may be one approach to simplify the complications of different zonal statics.
2. Incorporate more indicators – these could also be locally specific.
3. It may be necessary to collect some primary data for indicators depending on prioritized trajectories and availability of local data. For example improving the spatial data sets on existing and future irrigation sites. This is an important activity in general as without good quality spatial data sets it will be difficult to prioritize in a systematic and equitable manner areas in which interventions could be targeted in an objective and transparent manner.
4. In terms of national level developments, further evaluation and refinement or establishment of trajectories and indicators against existing and developing government agricultural policy. For instance the government is currently embarking on a drive to establish A Cleaner, Resilient Green Economy (CRGE) with input from a number of donors.
5. Closer collaboration with regional authorities and planners to incorporate local development priorities.
6. Acquire and improve better spatial data sets to define trajectories and appropriate indicators.

Documentation of success

Identification of potential development strategies applied to assess suitability and likelihood of adoption for (a) from farm to livelihood zone and (b) multiple development trajectories in Ethiopia

In order to begin the process of assessing where a particular development strategy would be biophysically suitable and also likely to be adopted by farmers (on the basis of socio-economic opportunities and constraints), we identified a number of probable trajectories.

These trajectories of change, aiming towards intensified productivity, include a number of practices combined to achieve different objectives depending on potential local opportunities, limitations and existing livelihood and social conditions.

Having identified an initial range of trajectories we then had to find indicators which could be applied to assess the suitability of a practice, and combinations of practices, and the likelihood of their adoption by farmers.

As the final product is a set of maps of suitability, the indicators must be quantitative and spatially distributed.

The first map below shows the intensification trajectory and priority livelihood area where rainfed livelihoods could be enhanced. The second map shows the distribution of livelihood zones where the number of different intensification trajectories could be targeted and explored in further detail.

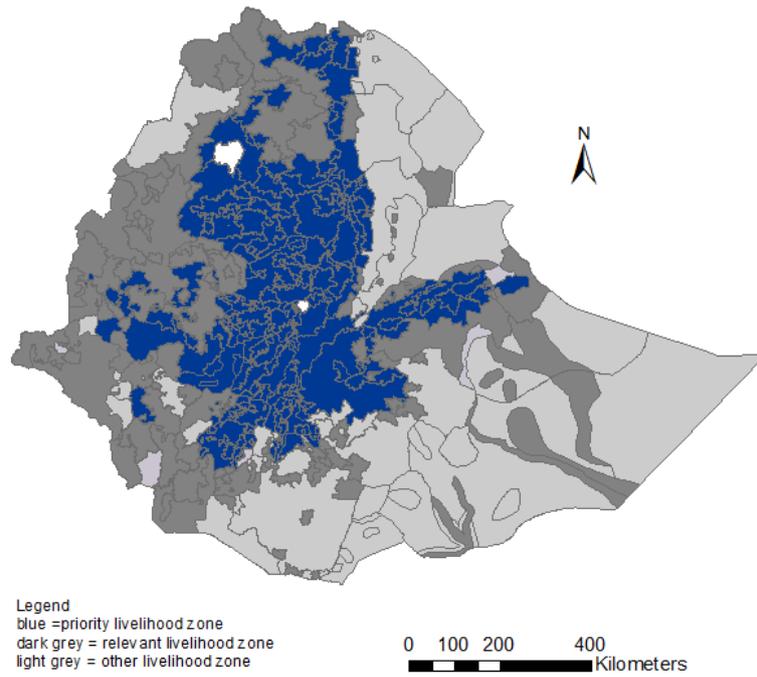


Figure 1: Intensification trajectory and priority livelihood area where rainfed livelihoods could be enhanced

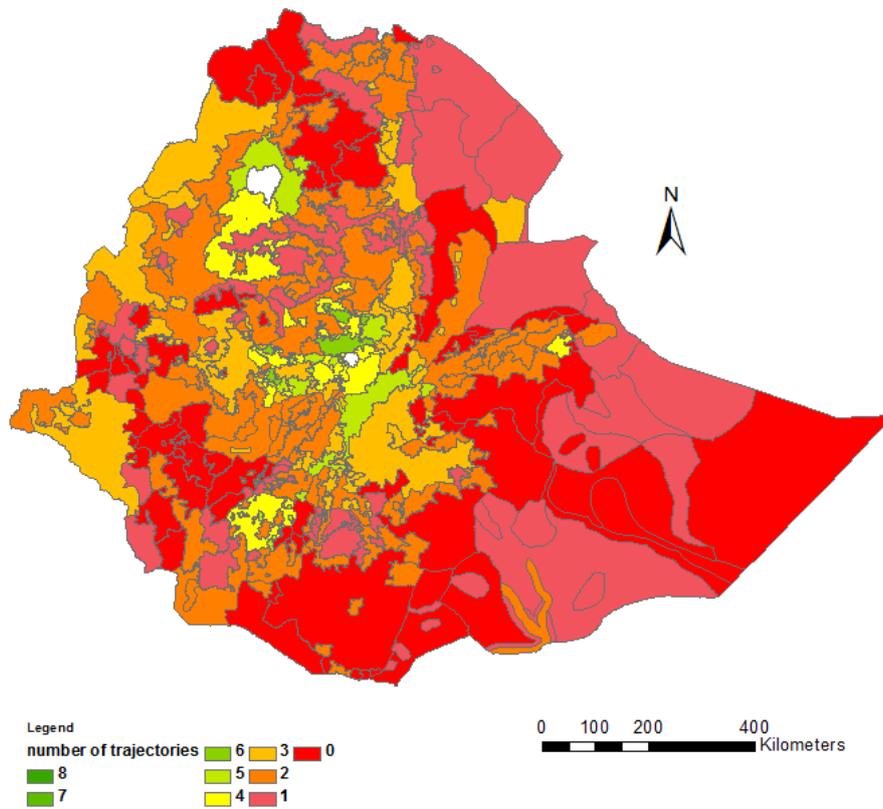


Figure 2: Distribution of livelihood zones where the number of different intensification trajectories could be targeted and explored in further detail