

## Final Report

## BMZ Small Grants

### General Information

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<b>Reporting period</b>	Jan 1 2018 – March 30, 2020
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### Basic data

1. The IARC applicant	ICARDA
2. Project title	Reversing land degradation in Africa through scaling-up Evergreen Agriculture- Component 1 Economics of Land Degradation (EGA/ELD)
3. Funding type, GIZ Project Number and Contract Number	GIZ Project number: 17.2010.1-005.00 Contract number: 81220167
4. Reporting Period	From 01/01/2018 to 30/03/2020
5. Project Coordinator and Project Scientist	<b>Richard Thomas (ELD scientific coordinator)</b> c/o ICARDA, 2512 Clayborne Place, Oakville, Ontario L6M 4C3, Canada Phone number: +1 289-888-1400 e-mail address: <a href="mailto:drjthomas@gmail.com">drjthomas@gmail.com</a>
6. Partners	ELD consortium partners; Professor Robert Costanza and Dr Ida Kubiszewski, Australian National University, Professor Lyndsay. Stringer, University of Leeds, UK, Dr Emmanuelle. Quillerou, University Institute of Technology of Quimper, France, Dr Stacey Noel and Philip Osano, Stockholm Environment Institute, Kenya, Simone Quatrini, UNCCD-Global Mechanism, Dr Pushpam Pumar, UNE, Dr Anne Juepner, UNDP, and 2 Kenyan national teams led by

Jomo Kenyatta University of Agriculture and Technology and University of Nairobi, respectively.

## 7. State of Project Implementation, assessment and contribution to development outcomes

The aim of this grant was to collaborate with the ELD secretariat/initiative in its current implementation phase that aims to facilitate the engagement of ELD consortium in research/policy dialogue/capacity development activities in 8 partner countries in Africa (Kenya, Ethiopia, Ghana, Mali, Niger, Rwanda, Senegal and Somalia). Specifically this grant supported the overall scientific coordination and the Kenyan case study in particular. The activities were financed from an agreement with the European Commission (EC DEVCO) which is valid for 35 months. The contract reported on here ran from 01.01.2018 to 31.03.2020. As detailed below all activities were completed.

The Kenyan project teams now represent a cadre of trained personnel that can interact as a science-multi-sectoral policy interface and comprise representatives from local and national government, academia, NGOs, research institutions, donors and in a few cases, the private sector. This is an important successful outcome of the project and fills a gap between the scientific and policy arenas where sustainable land management options can now be expressed in terms of their financial (in terms of direct land users) and economic benefits (in terms of society). This strengthens the negotiating power of all stakeholders but especially the direct land users in discussions on land use planning including restoration planning.

There were no major deviations from the workplan with the main limitation being the lack of personnel with economic backgrounds in the project teams. Additional requests for training and case study development however, arose during the implementation of the project from India and Iceland. These were funded from separate resources but are recorded here as they relate to items c), f), h), i) and j) of the consultant's project activities as described below.

Achievements of project implementation are listed under each activity of the grant agreement below:

- a. Provide scientific guidance to the ELD Initiative and assistance to the ELD working group leaders and consultants in the context of national ELD case studies and capacity development activities of the partner institutions within the eight target countries of the joint EC/GIZ/ICRAF project. Assist in literature research, provide backstopping and review services and contribute to the finalisation and editorial review of all eight country studies and eventually a summary report.

Completed via guidance provided throughout the project period via 3 training events, 4 steering group meetings, review of country case studies and other documents sent by ELD secretariat including the text for the ELD campus.

- b. Provide direct research, study and report writing inputs (including in-country research) to the ELD case in Kenya.

Completed via co-writing of the scoping study for Kenya (Annex I), the two Kenyan case studies (Annex II and III) and a synthesis document (Annex IV).

- c. Assist and advise additional national research activities, for example related to ICRAF's agroforestry component, as they are developed.

Completed by providing direction to the two Kenyan case studies.

- d. Organise ELD scientific working group meetings at least twice yearly and report on working group meeting's outcomes. The meetings will be a mix of physical and/or virtual meetings.

Completed by attending and co-organizing agendas for 4 steering group meetings.

- e. Provide information on events of interest to the ELD to the ELD Secretariat. Participate in and contribute to relevant ELD meetings as Scientific Coordinator and promote the ELD initiative at national and international meetings and events.

Completed by presenting ELD at major international conferences; i) Land & poverty conference World Bank, Washington, March 2018, ii) Consultation on adapting agriculture in semi-arid India to a global temperature rise of 1.5 C, June 2019, iii) A community of ecosystem services (ACES), Washington Dec 2018, iv) Soil Erosion Symposium FAO, Italy May 2019, and v) UNCCD COP-14 India Sept, 2019.

- f. In close cooperation with the ELD Secretariat help identify further funding opportunities for the project and for the ELD Initiative. Contribute to discussions on relevance of research proposals to the ELD initiative when extra funding becomes available.

Completed by co-developing a concept notes for additional study in Kenya, India and Iceland and with WOCAT under a GEF proposal.

- g. Review and update the database and classification of the ELD collection of existing case studies and estimate their relevance and their helpfulness for the respective national contexts. When appropriate add descriptions of existing case studies relevant to the initiative to the existing database for publication on the ELD website.

Completed by reviewing an ELD case study in Georgia, a review of an ELD-commissioned study on reversing land degradation in Africa: synthesis of existing studies and economic meta-analysis of farmer managed natural regeneration and a report on evaluating the impact of natural resource management interventions on land, water and pastoral livelihoods in the Afar region of Ethiopia.

- h. Ensure that ELD interests and results from the ELD national activities are inserted into on-going policy processes at the international level such as: the UNCCD Land Degradation Neutral World, land-related issues in the SDG process, and Global Soil Partnership, as well as a scoping study for land degradation under the IPBES.

Completed by presentations and discussions at the World Bank's Land & Poverty conference March 2018, discussions with the Natural Capital Coalition Dec 2018, the Global Soil Partnership symposium on the economics of soil erosion May 2019, the dissemination meeting of the Kenyan case studies March 2020 and by representing ELD at the UNCCD COP-14 in India Sept 2019.

- i. Provide support to the ELD Initiative's capacity-building which includes online content contribution, editorial oversight of the course script assignment assessments and eventually facilitating in-country training courses.

Completed by undertaking training in Kenya July 2018. In addition reviewed and added voice over to the ELD campus modules (more details under training below).

- j. ICARDA will further work to ensure that the results from national ELD studies and research activities will be included in national and sub-regional policies and decision-making processes, facilitating in parallel the development of necessary capacities of decision makers.

Completed as under sections h and i above. A chronology of events attended is provided in Annexe V.

## 8. Major research findings

### Kenya case studies

In Nyandarau county a cost-benefit analysis of a range of 12 SLM interventions and ecosystem services was completed. The interventions were combinations of interventions already being tested by farmers and were categorized as follows: i) agroforestry and crop rotation , ii) agroforestry and vegetative strips, iii) terracing and agroforestry, iv) agroforestry and cover crops, v) vegetative strips, vi) agroforestry and mixed farming, vii) terracing and other practices, viii) cover crop and organic farming, ix) crop rotation, x) agroforestry and organic farming, xi) terracing and other combinations without agroforestry, and, xii) mixed cropping and other practices.

Results indicated that in the business as usual scenario (assuming 8% interest rates and costs and benefits of different land management practices discounted over a period of 20 years), agroforestry and crop rotation present the highest net present value (NPV) followed by vegetative strips while, mixed cropping combined with other practices has the lowest net present value. The benefit cost ratio (BCR) under the same scenario indicated that vegetative strips, cover crops and organic crops, and terracing in that order presented the highest BCRs. The worse case scenario, which assumed a 15% discount rate and discounted future values heavily, the resulting values were relatively lower indicating low returns. The best case scenario assumed a social discount rate of 3% for all future benefits and costs. The BCR from this scenario shows that, vegetative strips still gave the highest rate of returns followed by cover crops and organic farming, while agroforestry combined with organic farming present the lowest ratios. It is concluded that of the range of SLM practices, vegetative strips, agroforestry and crop rotation, cover crops and organic farming, present the most viable SLM options for farmers. Mixed cropping presents the least viable option.

For the management of rangelands in Isiolo county it was concluded that community-based natural resource management (NRM) options including Community Wildlife Conservancies (CWCs) and the traditional Dedha system enhance the sustainable use of rangelands through proper governance of communally owned resources. In addition the broader institutional environment plays a major role in determining the sustainability of the SLM practices especially those aimed at conservation of communally owned resources. The cost of taking action to rehabilitate rangelands is much lower than the cost of inaction over a 30-year period. The results show that the Net Present Value per hectare for Dedha and conservancy was positive irrespective of the discount rate. NPV per hectare for Dedha was KSH22,356, 64,911 and 9,680 using 8%, 3.5% and 12% discount rates respectively while for the conservancy the NPV was KSH38, 597, 78,297 and 23,792 using the 8%, 3.5% and 12% discount rates respectively. (1000 KSH = 95 US\$)

## 9. Assessment of research findings

The recommendations and implications of results for land users, civil society, private sector and policy makers for the two case studies are outlined below;

The mixed cropping systems of the Aberdare Water Towers Project

### For land users

- Establishment of a platform for sharing information between land users that are practicing different SLM options in order to up scale interventions. Farmer focus groups are one promising option.
- Encourage greater soil testing for greater nutrient use efficiency

### For Private sector

- Adopt soil quality indicators and soil nutrient measurement kits for SLM options in order to reduce costs for farmers for soil quality assessments

### For Policy makers

- Promote extension services and create farmer focus groups to increase dissemination of information on crops and nutrient management

- Promote guidelines for SLM practices that reduce and prevent soil erosion and that maintain soil fertility
- Increase monitoring and evaluation for SLM practices and their impact on ecosystem services.

The rangelands of Isiolo county

#### **For Land users - pastoral communities**

Investments in Dedha and conservancy land management practices which address land degradation have significant economic payoffs through improved rangeland productivity. Land improvement and mitigation of land degradation requires behavioural change of pastoralists and following their re-allocation of resources to land improving practices.

To achieve productive and functioning ecosystems an holistic approach that integrates social, economic, physical and biological needs and values is required that results in better governance of natural resources. This involves soil and water conservation, natural resource management and integrated landscape management.

#### **For NGOs and the private sector**

Rangeland rehabilitation and improvement requires an iterative process based on dialogue amongst all stakeholders. The process should enable stakeholders to negotiate and decide on a sustainable form of land use in rural areas as well as initiate and monitor implementation. To support this process there should be targeted policy and institutional support, including the development of incentive mechanisms for SLM adoption and income generation at the local level; land-user-driven and participatory approaches; and multi-level, multi-stakeholder involvement and partnerships amongst land users, technical experts and policy-makers.

Capacity building should be undertaken for communities and their leaders to enable them manage rangelands and their resources effectively. It is equally important that social institutions and regulatory mechanisms are structured in such a way to enable data on ecosystem services and assessments to become the actual basis for decisions and actions with the goal of achieving sustainable social and economic development that promote ecosystem service conservation.

Gender equality and equity is key to rangeland rehabilitation, conservation effectiveness and sustainability. Given gender-differentiated roles and responsibilities in natural resource management, sustainable rangeland management must address the specific needs and opportunities of women and men in order to reduce inequalities, stimulate growth and reverse environmental degradation. The recognition of women's land and resource rights would reinforce their social and economic empowerment resulting in financial security and decision-making power. Women's unique knowledge on natural resources management, their influence on youth and their role in stewarding ecosystems makes them an important stakeholder group in determining and developing sustainable rural economies.

Communities are aware that not only monetary benefits should be considered but additionally that the health of the environment such as biodiversity is also a benefit. Realising the benefits associated with conservancy is entirely dependent on the conservancy members' awareness of conservancy, the conservancy development stage and effectiveness. Therefore, the community should be informed about what conservancy could offer them, the conservancy concept and a general understanding of its associated benefits.

### Policy recommendations

Firstly there is need for the development of a Community Based Natural Resource Management (CBNRM) policy at the national level that would provide guidelines on community participation across all natural resource sectors in Kenya.

- The policy would provide a common definition of CBNRM, its principles, characteristics and clearly outline benefits expected by the communities.
- Whereas the various sectoral policies and laws influencing conservancies outline benefits from community participation in natural resource conservation, there is a need to develop a cost and benefit sharing policy and legislation between the lead actors and community institutions.
- There is need to build the capacity of governments, environmental policy experts and other relevant stakeholders on drafting policies with regards to making sound policy decisions geared towards conservation and improved livelihoods.

Secondly there is need for a guideline for sustainable rangeland use planning at the county level. This will ensure that livelihoods depending on natural resources for their food and their livestock are considered in the planning of county integrated development plans and their implementation.

- Such a guideline shall contribute significantly to the regeneration of biodiversity, increase the forest cover, provide clean drinking water for people and their livestock and protect the other environmental services provided by an adapted, protected, healthy and diverse environment.
- Sustainable land-use planning at county level and sustainable management of natural resources could significantly contribute positively to the livelihoods of pastoral communities who extensively depend on keeping livestock.
- Devolution has wide-ranging implications for SLM, affecting land use, its management and decisions at county level. Therefore, factoring in the County Integrated Development Plan (CIDP) will ensure that both the Dedha and conservancy land management systems will receive support from the county governments.

Thirdly proper coordination of SLM practices is needed in arid and semiarid counties.

- Counties should form Inter-Ministerial SLM Coordination Committee (IMCC) as proposed in the Kenya Strategic investment Framework on SLM 2017-2027. This body could serve as a platform for high-level consultation between the ministries contributing to the development of a core SLM sector in the counties.
- This will ensure that line ministries complement each other and learn from the projects implemented by other line ministries to ensure successful implementation of SLM practices.
- This will also lead to proper budgeting and support of pastoral communities as well as implementation of the KSIF 2017-2017 in the counties.

The case studies have demonstrated the economic benefits of SLM options, outlining both the costs and benefits of a range of interventions over a planning horizon of 20-30 years and with a range of discount rates. As such the findings fill an important gap in the knowledge on the feasibility of SLM in the real world context of resource poor communities. The studies also show, especially for rangeland management, that successful SLM interventions depend on a systems perspective for restoration of ecosystem services. It is not the introduction of a single new technology, practice or combinations of crops/livestock that leads to success but rather there is usually a number of interacting factors including governance, economic investments, markets, social and biophysical changes, institutional memories and culture that together set a path towards better land management including 're-greening'.

### 10. Know-how transfer

The choice of trainees was designed so that there would be a viable multi-sectoral, multi-institutional team or platform that can undertake further ELD studies within the country and thereby scale up assessments and valuation of ecosystem services beyond the current project.



In addition there is a follow up process on the policy implications of the studies that is being spearheaded by the Stockholm Environment Institute based in Nairobi.

Results of the Kenyan studies were disseminated to an audience of 31 participants including policy makers, NGOs academia and research institutions at a one day meeting March 10, 2020. Group work at this event deliberated on key issues such as gender inequality in the management of natural resources, poor coordination of SLM practices in arid and semi-arid regions, under-evaluation of ecosystem services, lack of incentives for SLM of community owned natural resources, implementation of inappropriate interventions, lack of public extension services and public awareness, the disconnect in initiatives between national and county governments, weak or lack of organized farmer groups, conflicts of policies and strategies leading to sectoral fragmentation of efforts on SLM.

These discussions by a separate group that included the case study teams plus other invitees enriched the overall findings and recommendations and will be incorporated into policy briefs.

## 11. Training

Twenty Kenyans were trained (7 females) from 6 different institutions in July 2018 and 3 concept notes for case studies drafted of which two were funded and studies completed by March 2020 (see Appendix I for lists of trainees and affiliations). One 'ambassador' was nominated by the Kenyan group, Mr Lutta Alphayo Inyende, to represent the ELD in national and international fora. The ambassador took over ownership of the studies, played a key role in coordinating teams within the country and representing the work in international conferences.

A refresher training event for the Kenyan teams took place on August 5-6, 2019 where a detailed coverage of how to conduct the cost-benefit analysis was done using the material from the ELD campus. Progress reports from the 2 teams were also considered.

The work of this project triggered interested in further ELD studies in India and Iceland. In Pune, India, 27 staff from the NGO, Watershed Organization Trust (WOTR) were trained in June 2019 and similarly developed two project proposals that were completed in 2020. Eight villages were studied, four acting as controls and CBAs were done for crops and fodder and water for household purposes. The study also examined rates of migration in the 8 villages. These will be reported separately as they were not funded by this project.

With funds from the Ministry for Environment & Natural Resources, Iceland, 16 participants were trained from local and national government, academia, research institutions and UNESCO-Land Restoration Training Program (formerly United Nations University) and a project proposal was completed and will be implemented 2020/21.

As part of the ELD campus materials, voice over was added to the following modules:

1. ELD initiative
2. Problem dimension – land degradation versus SLM
3. Natural capital and ecosystem services valuation
4. Steps of an ELD study
5. Communication, outreach and policy impact
6. Identification and selection of ecosystem services
7. Valuation of ecosystem services
8. Cost-benefit analysis

## 12. Lessons learned

The major lesson learned was the need to encourage greater interactions and involvement of the agricultural rangeland and forestry agencies with the economic agencies to ensure exchange of information across sectors pertaining to land use and management. The training materials developed by ELD should be inserted into university curricula in the country in order to develop further capacity to assess and value natural capital.

## 13. Future research needs

Responses from trainees in Kenya and other countries of the project indicated a need for further study and training on cost-benefit analyses. The ELD consortium responded to this by developing a self-study module as part of the ELD campus. Follow up will be needed on who uses this and how helpful it is for extending the studies within the target countries of the project and elsewhere.

Tracking of trainees within their institutions and elsewhere will also be a necessary follow up and research activity to assess the on-going impact of the ELD initiative. In particular the implementation of land use changes with the participation of trainees would be useful.

While ELD case studies cover much of Sub-Saharan Africa with limited effort in Central Asia and Latin America, it was clear from the presentation of results at international workshops that there is a widespread



demand for ELD studies. Of particular note is the lack of such studies in the drylands including West Asia and North Africa. These regions will face daunting societal challenges for rural and urban livelihoods and the ELD approach would provide useful information for land use planning.

#### 14. Summary

The training and completion of case studies has achieved the outputs of component 1 of the overall project on “Evergreen Agriculture” in that i) national capacities to assess the costs of land degradation and economic benefits of SLM have been strengthened in Kenya (and India and Iceland although outside this project), ii) there has been communication and dissemination of results within Kenya and iii) Kenya has capacities to conduct holistic economic assessments of ecosystem services and to draw policy recommendations.

The Kenyan ELD case studies can be used to support the scaling out of successful management systems in the rangelands (arid and semi-arid areas) and in the water towers of the Aberdare mountain ranges that are important for water supplies for the capital Nairobi, through the economic assessments of different land management options. It is also expected that the results will be used to inform relevant Kenyan national strategies such as the Integrated National Land Use guidelines, Kenya Strategic Investment Framework, the National Environment Policy and the Kenyan Vision 2030 and Kenya’s reporting for the SDGs, in particular SDG 15.

A cost-benefit analysis of the options in the Aberdare ranges revealed highest Net Present Values (NPV) of crop and livestock production with agroforestry and crop rotations followed by vegetative strips suggesting that the former is economically the best option. When viewed in terms of a Benefit Cost Ratio vegetative strips gave highest NPV followed by cover crops and organic production and then terracing. The overall results suggest that vegetative strips, agroforestry plus crop rotation, cover crops and organic farming present the most viable SLM options estimated over a 20 year period with a range of discount rates. Policy recommendations from this study include measures to improve the enabling environment for accessible and easy to implement land management options, more efforts to control soil erosion control and soil fertility and systems for monitoring and evaluation of SLM options.

In the rangelands of Isiolo county two types of community rangeland management systems were compared after the finding that degradation is mainly caused by poor rangeland governance. The first is a community wildlife conservancy model and the second a traditional management practice known as the Dedha system. Both models improved land governance by providing rules, processes and structures through which decisions are made on the use of land, the manner in which the decisions are implemented and enforced and the way competing interests are handled. These systems employ management practices such as rotational grazing, reseedling of pastures, rehabilitation of gullies, reforestation, removal of invasive plant species, micro-catchment water harvesting and use of terracing. The results showed that the NPV per hectare for wildlife conservancy was KSH 78,297, 38,597, and 23,792 using 3.5, 8, or 12 per cent discount rates respectively (1000KSH=US\$9.5). The corresponding NPV for the Dedha system were KSH 64,911, 22,356, and 9,680 with 3.5, 8 or 12 percent discount rates.

#### 15. Publications, papers and reports

## Annexes

- I. Scoping study for Kenya Training in Kenya July 9-13, 2018
- II. Economics of land use management on ecosystem services: A case study of Aberdare water tower in Nyandarua County.
- III. Costs and benefits of sustainable rangeland management practices in Northern Kenya
- IV. ELD case studies in Kenya – synthesis report
- V. Chronological listing of major events attended 2018-2020.

## Publications (additional to those in the Annexes)

1. Abstract ACES conference, Washington DC Dec 2018
2. Abstract FAO Global Soil Partnership May 2019.