

# **Agriculture and Climate Change** Learning from Experience and Early Interventions

Case Study Compilation



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## Introduction

The following suite of case studies were developed for an agriculture and climate change workshop supported by the Climate and Development Knowledge Network (CDKN) and convened and facilitated by Meridian Institute.

The objective of this initiative was to convene a diverse cross-section of key stakeholders involved with supporting and implementing agriculture and climate change activities at different scales. Participants included policymakers, science experts, donors, and civil society engaged with supporting or implementing multinational programs, national-level strategies, and sub-national projects.

Recognizing that most initiatives are diligently focused on their own activities, the case studies, presentations and workshop discussions aimed to facilitate exchange and learning across these different institutional, national, and regional scales in order to share the benefits of learning from their respective challenges and successes.

To facilitate comparable exchange across such a diverse set of initiatives, presenters were asked to share their experience along a number of key topics:

- Initiative objectives (context, timeline, actors involved);
- Funding (both short- and long-term support);
- Capacity Building and Community Involvement
- Defining Success (how the effort defines and measures success); and
- Outcomes and Lessons Learned (changes in strategy, sharing of lessons learned).

This suite of case studies and workshop resources are being shared more broadly in order to allow others to learn from this exchange. For additional resources including a graphical summary of the workshop, video of panel presentations, PowerPoint slides, and case studies online please visit: <http://www.climate-agriculture.org/LEEI.aspx>

## Overview of Climate Resilient Green Economy Strategy of Ethiopia

**Presenter:** Selam Kidane Abebe, Environmental Protection Authority, Ethiopia

### General Information

Ethiopia is experiencing the effects of climate change. Besides the direct effects such as an increase in average temperature or a change in rainfall patterns, climate change also presents the necessity and opportunity to change to a new, sustainable development model. The Government of the Federal Democratic Republic of Ethiopia through the Environmental Protection Authority initiated a Climate-Resilient Green Economy Strategy (CRGE) initiative to protect the country from the adverse effects of climate change and to build a green economy. The Strategy was officially launched at COP 17 in Durban, South Africa.

Despite the challenges of being one of the world's poorest countries, Ethiopia has good prospects for growth. The International Monetary Fund forecasts for Ethiopia a real gross domestic product (GDP) growth of more than 8% p.a. over the next five years where as the government of Ethiopia is even more optimistic and it projects a growth rate of 11%.

The strategy aims in building a Climate Resilient Green Economy by the year 2025. In doing these, the strategy has identified six sectors for green economy (under mitigation) and adaptation. Agriculture is one of the sectors identified both under mitigation and adaptation efforts.

During the process of designing the CRGE Strategy, the government of Ethiopia used three different bodies. The Inter-Ministerial Committee (IMC) as a governing and decision making body while the Technical Committee of CRGE (TC) to give technical guidance and support and Sub-technical Committee (STC) composed of experts from different ministers/sectors that are currently working on the ground, feeding information and technical expertise for the above mentioned bodies to help implement CRGE in both national and regional level.

### Objectives

If Ethiopia were to pursue the conventional economic development path to achieve its ambitious targets, the resulting negative environmental impacts would follow the patterns observed all around the globe. Under current practices, greenhouse gas (GHG) emissions would more than double from 150 Mt CO<sub>2</sub>e in 2010 to 400 Mt CO<sub>2</sub>e in 2030. Its development path could also face resource constraints: for example, it could reach the carrying capacity for cattle. Furthermore, it could lock its economy into outdated technologies. A conventional development path could also be financially challenging. For example, a significant share of GDP might need to be spent on fuel imports, putting pressure on foreign currency reserves.

The Climate-Resilient Green Economy (CRGE) initiative follows a sectoral approach and has so far identified and prioritized more than 60 initiatives, which could help the country achieve its development goals while limiting GHG emissions to around today's 150 Mt

CO<sub>2</sub>e – around 250 Mt CO<sub>2</sub>e less than estimated under a conventional development path.

The green economy plan is based on four pillars:

- Improving crop and livestock production practices for higher food security and farmer income while reducing emissions
- Protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks
- Expanding electricity generation from renewable sources of energy for domestic and regional markets
- Leapfrogging to modern and energy-efficient technologies in transport, industrial sectors, and buildings.

### Agriculture Under Green Economy Strategy

Ethiopia is among the most vulnerable countries in the world. The recurrent deep-rooted droughts have caused serious food insecurity problems in the country. Agriculture which is the mainstay of Ethiopia's economy (employing more than 84% of the population and contributes approximately 50% of GDP of the country and also the major revenue-deriving sector accounting for more than 90% of the country's exports) and this source of food is susceptible to the frequent climate extremes.

The Inter-governmental Panel on Climate Change regional review on the impacts of climate change identified the three most vulnerable sectors – as food security, energy resources and health in Ethiopia. Food security is said to suffer due to the rain-fed agriculture which is affected by the amount and temporal distribution of rainfall. Greater total or more intense rainfall across Ethiopia will increase soil erosion and the incidences of crop damage.

Livestock yields are being and will be impacted directly through temperature effects on annual growth, milk and wool production and reproduction; and indirectly by changes in the quantity and quality of pasture, forage, grass and disease and increases in parasites. Pastoralist communities may be particularly negatively impacted by climate change.

On the other hand, GHG emissions are attributable to livestock and crops in that order. The current cattle population is more than 50 million and other livestock nearly 100 million. Livestock generate greenhouse gases mainly in the form of methane emissions arising from digestion processes and nitrous oxide emissions arising from excretions. Livestock emissions are estimated to amount to 65 Mt CO<sub>2</sub>e in 2010 –more than 40% of total emissions today. The cultivation of crops contributes to the concentration of greenhouse gases mainly by requiring the use of fertiliser (~10 Mt CO<sub>2</sub>e) as well as by emitting N<sub>2</sub>O from crop residues reintroduced into the ground (~3 Mt CO<sub>2</sub>e).

Well into the foreseeable future, agriculture will remain the core sector of the economy and provide employment for the vast majority of. Sustained high growth rates of the agricultural sector – the GTP projects more than 8% over the next five years – are needed not only to increase household income of most families, but also to provide food security for a growing

population and support the growth of direct exports of agricultural products and/or the establishment of more light manufacturing, which often requires agricultural input.

The traditional economic development path could deliver the required growth, but at the cost of significant agriculture land expansion (inducing pursuing and accelerating deforestation), soil erosion, and higher emissions as well as at the risk of reaching the limits to further development, e.g., by exceeding the carrying capacity for cattle of Ethiopia.

Building a green economy will require an increase the productivity of farmland and livestock rather than increasing the land area cultivated or cattle headcount. In order to offer a viable alternative to the conventional development path without foregoing growth in the short term and significant advantages thereafter, a set of initiatives has been identified that can provide the required increase in agricultural productivity and resource efficiency.

The CRGE initiative has prioritised the following initiatives to limit the soil-based emissions from agriculture and limit the pressure on forests from the expansion of land under cultivation:

- Intensify agriculture through usage of improved inputs and better residue management resulting in a decreased requirement for additional agricultural land that would primarily be taken from forests,
- Create new agricultural land in degraded areas through small-, medium-, and large-scale irrigation to reduce the pressure on forests if expansion of the cultivated area becomes necessary,
- Introduce lower-emission agricultural techniques, ranging from the use of carbon and nitrogen-efficient crop cultivars to the promotion of organic fertilizers. These measures would reduce emissions from already cultivated areas.

Also, to increase the productivity and resource efficiency of the Livestock sector, the following initiatives have been prioritised:

- Increase animal value chain efficiency to improve productivity, i.e., output per head of cattle via higher production per animal and an increased off-take rate, led by better health and marketing,
- Support consumption of lower-emitting sources of protein, e.g., poultry. An increase of the share of meat consumption from poultry to up to 30% appears realistic and will help to reduce emissions from domestic animals,
- Mechanise draft power, i.e., introduce mechanical equipment for ploughing/tillage that could substitute around 50% of animal draft power, which – despite burning fuels – results in a net reduction of GHG emissions.
- Manage rangeland to increase its carbon content and improve the productivity of the land.

These initiatives offer the combined benefit of supporting economic growth, increasing farmers'/ pastoralists' income and limiting GHG emissions.

## Agriculture Under Climate Resilient Strategy

1. Short-term Climate Variability (now and the next 5 – 10 years) – focused on current and emerging trends - capacity, “no and low regrets” actions to address.
  - Setting baseline for mapping agro-climate zones
  - 14 agro- ecological zones are used for adaptation planning zones
  - Regional adaptation plans
2. Building climate resilience into existing growth and sector development plans in medium term
  - Sectoral strategies over next 5 to 15 years that expand capacity to cope with trends in climatic risks
  - Medium term investment
  - Information and knowledge base
  - Coordination and institutional capacity
  - Vulnerability analysis – climate hazardous vs. vulnerable groups
3. Medium to Long-term climate resilience (2025 and beyond) – identifying the major long-term climate change threats and identifying areas for early action.
  - Review of existing climate change scenarios for Ethiopia
  - Illustrative climate and socio-economic scenarios for the 2050s
  - Interpretation of existing climate change impacts studies for agriculture
  - Food chain analysis of climate impacts and resilience
  - Macro-economic analysis of climate change risks to the Green Economy strategies
  - Synthesis of climate-resilient development pathways
4. Complementing bottom-up with macro-economics of climate resilience and green growth – focused on the key links between growth policy;
  - High quality infrastructure,
  - Macro-economic stability,
  - Sound institutional frameworks,
  - Sustainable management of natural resources,
  - Openness to trade,
  - Access to credit bank risk capital,
  - Competitive markets and
  - High resource efficiency/productivity

## Funding CRGE Strategy

One of the important initiatives under the CRGE Strategy is CRGE Facility. The Facility will be a national institution, working with all stakeholders to support Ethiopia’s climate change response. It will be closely linked to the Environmental Protection Authority (EPA), the Prime Minister’s Office and the Ministry of Finance and Economic Development (MoFED).



The core purpose of the CRGE Facility will be to channel finance to the activities prioritized in the CRGE Strategy and later, the CRGE Plan. CRGE Facility was officially launched on September 2012.

The CRGE Facility will be responsible for attracting, allocating and channeling international climate finance. The Facility will look to leverage both public and private finance, from both multilateral and bilateral sources. Ideally, climate finance will complement other forms of investment to bolster Ethiopia's core climate-compatible development activities (in areas such as food security, energy, infrastructure development and natural resources management). The government is also looking at possibility of having a results-based / performance-based mechanism for allocating finance.

### **Outcomes and Lessons Learned**

During the designing process of this Strategy different types of capacity building programs were carried out. The government of Ethiopia partnered with different institutions conducted training for the technical experts working on CRGE, among the trainings GHG inventories, baseline assessment, methodology for adaptation and mitigation.

Furthermore, the strategy results in a better coordination between different offices working on climate change office. All Ministers have a coordinate for climate change, the different office now have a CRGE coordinate unit that report back to the Environmental Protection Authority of Ethiopia (EPA) the mandated institution for following all climate change related activities in the country.

## Case Study: Climate Smart Agriculture: Capturing Synergies and Managing Trade-offs Among Food Security, Adaptation and Mitigation

**Presenters:** Wendy Mann, Food and Agriculture Administration (FAO) of the United Nations; Pham Si Sen, Vietnam Ministry of Agriculture, Austin Tibu, Malawi Ministry of Agriculture

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### General Information

#### *Geographic focus*

The project partners with two African countries, Malawi and Zambia, and one Asian country, Vietnam. Malawi and Zambia are classified by the UN as Least Developed Countries, while the World Bank classifies Vietnam and Zambia as “lower middle income” countries and Malawi as a low income country.

#### **Malawi**

The project has a national focus in developing an evidence-base, and will then identify sub-national activities for the development of climate-smart investment proposals. Malawi is a small, landlocked and densely populated country with one of the lowest levels of per capita income in the world and rapid population growth. Over the past ten years, Malawi’s poverty levels (above 50% of the population) have improved only slightly as Malawi’s economic growth slowed from a peak of 9.7% in 2008 to 3% projected for 2012. Agriculture contributes 28% of GDP, but services, which account for 33% are linked the agriculture sector. Maize is the main staple. Fertilizer subsidies for maize led to bumper crops but the financial sustainability of this measure and the efficiency of fertilizer use would benefit from further study.

High population density and poverty have led to significant pressure on the environment and degradation of Malawi’s natural resource base, notably land and forests, in some areas (e.g. Shire Basin).. Malawi is prone to natural disasters, primarily related to climate variability and change. Over the past two decades, drought and flood events have increased in frequency, intensity, and magnitude with negative consequences for food and water security, as well as the sustainable livelihoods of rural communities.

#### **Vietnam**

The geographic focus of the project in Vietnam will be the Northern Mountain Region where poverty and ethnic minorities are prevalent and cultivation takes place on deforested, sloping areas. Following the harvest of annual crops (particularly maize), the sloping areas are prone to erosion and landslides. However, Vietnam has had one of the best-performing economies in the world over the last decade.

GDP grew by an average of 7.5% per year over the period 1995-2005, 5.3% for 2009 and 6.8% for 2010; although poverty reduction has been slow among the country’s ethnic minorities. Rice production plays a particularly important role for the country in terms of food security

(staple) rural employment (two-thirds of the rural labor force) and foreign exchange (Vietnam is the world's second-largest rice exporter). Vietnam also recently overtook Brazil to become the world's largest exporter of *robusta* coffee, which is grown mainly in the central highland area, where coffee cultivation has displaced forest. Agriculture, forestry, and fishing contribute 21% of GDP and employ over 47% of the country's labor force.

Vietnam's long coastline, geographic location, and diverse topography and climates contribute to its being one of the most hazard-prone countries of the Asia-Pacific region, with storms and flooding responsible for economic and human losses. A high proportion of the country's population and economic assets (including irrigated agriculture) are located in coastal lowlands and deltas. Vietnam has been ranked among the five countries most likely to be affected by climate change, particularly sea level rise.

Vietnam is now looking to diversify out of rice, to build more sustainable production systems and add higher value to the products it produces, while safeguarding food security, poverty reduction gains and economic growth under climate change. The project may focus on the unsustainable maize systems, expanding tea, coffee (Arabica), agroforestry systems within the context of land management of uplands in the North.

## **Zambia**

The project has a national focus with an aim to develop sub-national activities for the preparation of climate-smart investment proposals. The definitive sub-national geographic focus for investment proposals is likely to include areas where agriculture is a main driver of deforestation and might include dry and humid areas under conservation agriculture, with and without agroforestry and livestock. Despite rapid growth (about 5.7% during the last decade), poverty remains high (42% of the population) and is concentrated in rural areas, particularly among small-scale farmers. Despite vast potential for diversification, based on Zambia's rich endowment of natural resources that include abundant land, water and forests, the mining sector continues to dominate the economy. Only a small portion of arable land is cultivated and irrigated. Agriculture employs 65% of the population and is largely rain-fed. Maize is the main staple.

Zambia's climate is highly variable, with frequent droughts, seasonal and flash floods, extreme temperatures and dry spells. Mean annual temperature has increased by 1.3°C since 1960. Mean annual rainfall over Zambia has decreased by an average rate of 1.9mm per month (2.3%) per decade since 1960. The frequency of floods and droughts has increased over the past three decades, reducing gains from economic growth. These trends are expected to intensify in the future.

### *Project Timeline*

The project began 1 January 2012 and will last for 3 years. The project is currently completing its inception phase, wherein tailoring to county-specific contexts has been discussed with stakeholders, culminating in a stakeholder consultation.

### *Who is involved?*

The first tier of partners includes the EC and the three project partner countries. Consultation with countries began in some case two years prior to the formal start of the project. A second country level tier, includes government (Ministries of Agriculture, Environment and Finance) and national stakeholder coordination mechanisms, universities and research institutes, farmer unions and farmers are key partners. At sub-national level, the role of local institutions (extension, traditional chief, land tenure systems will be analyzed with a view of strengthening their support to farmers. Bilateral donors, UN agencies and NGOs (e.g. Oxfam, Care, TNT and SEARICE) having ongoing in-country programs of relevance to the project were also consulted to avoid duplication, build on work already undertaken and exchange views on project design.

International organizations with which the project will partner include CCAFS, which shares a common focus and approach to food security, climate change and agriculture. A number of universities outside project partner countries will also cooperate on specific issues.

## Objectives

The objective of the Project is strengthened capacity of farmers, their organizations and policy-makers to make evidence-informed investment decisions to achieve scaled-up (1) context-specific agricultural practices, as well as (2) supportive policies, institutions, and strategies that promote sustainable agricultural development and food security under climate change, including those that help to overcome adoption barriers and manage risk.

To accomplish this objective the project will deliver the following outputs:

- (a) an **evidence base** drawn from socio-economic, land use, climate data, as well as institutional, policy and project/program mapping. The evidence base will underpin the identification of promising practices, adoption barriers, risk profiles, policies, strategies, investment options, as well as synergies and tradeoffs between adaptation, food security and mitigation. The Project will also identify the current situation, the baseline or business-as-usual agricultural development path, and alternative or CSA development paths that includes adaptation and lower emissions against the baseline, which could help in measuring additional adaptation and mitigation costs and benefits.
- (b) **Country-owned strategic frameworks** for implementation of climate-smart agricultural activities
- (c) **investment proposals** for implementation, including possible sources of financing, particularly climate financing, assessing additional CC costs and benefits
- (d) **capacity building** for evidence-based planning, implementing and financing.

The following activities (see figure 1 below) are constructed to deliver these outputs:

- (e) Assessing the situation
- (f) Understanding barriers to adoption of CSA practices
- (g) Managing climate risk
- (h) Defining coherent policies and strategies
- (i) Guiding investment

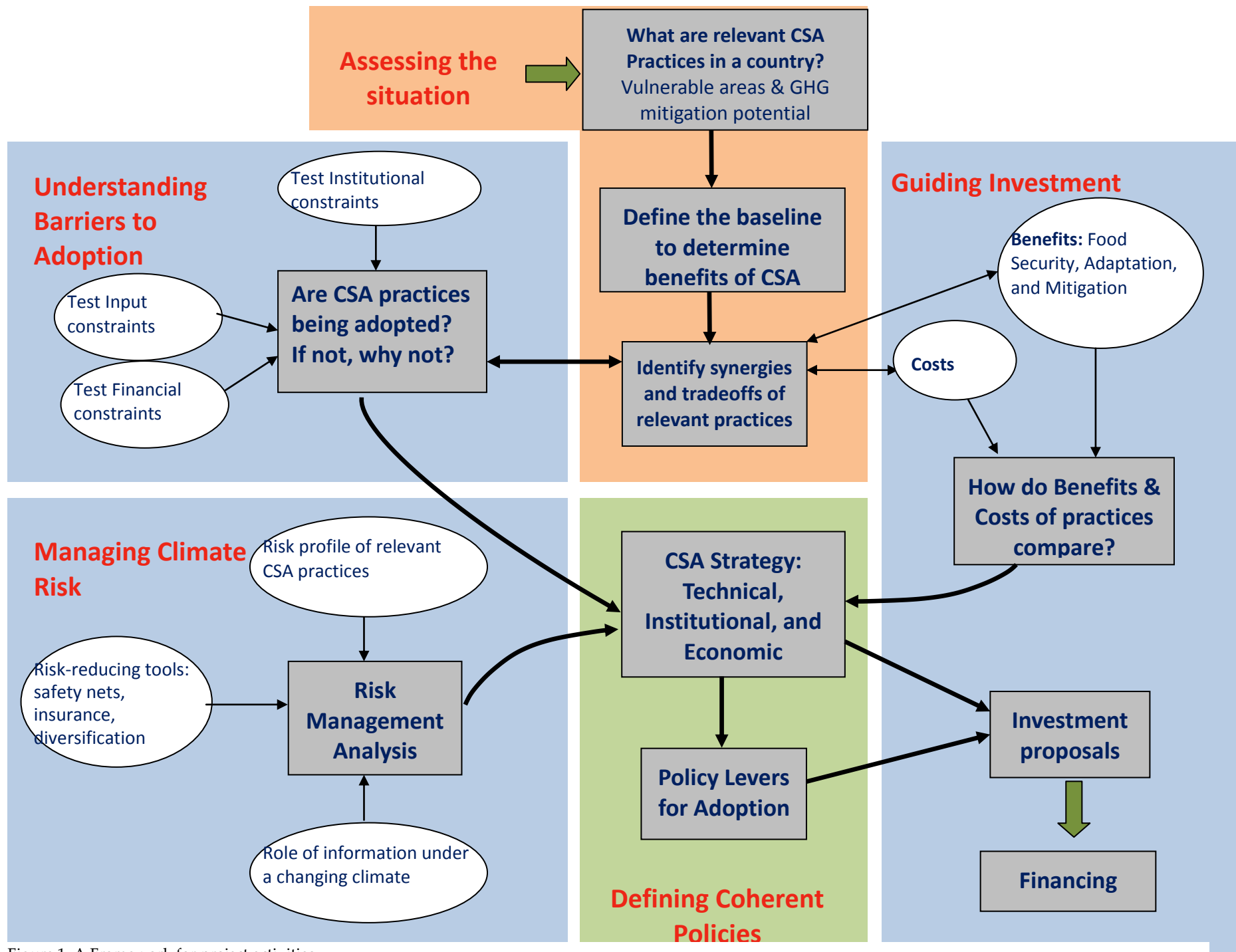


Figure 1: A Framework for project activities

### *Co-benefits*

The project does not take a single-focus approach. It is based on the notion that food security, agricultural development, climate change adaptation and mitigation need to be addressed together, rather than separately, in order to capture potential synergies and manage potential trade-offs across these closely linked areas. This is at the heart of the concept of *climate smart agriculture (CSA)*, used by FAO. For FAO, CSA encompass sustainable agriculture, expanding it to include the imperative for climate change adaptation, the potential for mitigation and the need to consider the technical, policy, institutional and financing implications of such inclusion. Implementation involves integration and coordination across institutions and policy instruments.

It is further recognized that adaptation will clearly be the priority for less-developed countries or low income agriculture-based populations in any country, where agricultural development for food security and poverty reduction is the main policy objective. In this context, mitigation is a secondary benefit, but one which is nonetheless important to consider since mitigation-related activities can be synergistic with sustainable development generally, and adaptation specifically. Actions with mitigation benefits can include those increasing the efficiency of resource use, as well as the restoration and conservation of agro-ecosystems to improve resilience. The potential for financing mitigation actions in developing countries will depend on the costs of accessing such financing, the capacity of countries to secure such financing, and implications for their broader development processes. Over the short-term, smallholders in LDCs are likely to face difficulties in accessing compliance markets. Public funds, including under such mechanisms as the Green Climate Fund, may offer a more viable option.

## **Project Funding**

### *Short and longer-term funding*

The EC has generously provided 3.3 million euros for the Project and FAO is co-financing a further 2 million euros for a total of 5.3 million euros. The Project will develop investment options and identify possible financing (including climate financing) for implementation of the investment options, which could form the basis of a second phase to the project.

## **Capacity Building and Community Involvement**

### *Capacity Building*

Capacity building is part of the objective of the project and is to cut across all its activities in order to strengthen knowledge, tools and institutional structures needed for implementation of climate-smart agriculture approaches. Examples include:

- Collaborative links with leading research institutions and universities and support for MSc and PhD students at agricultural universities carrying out research on topics related to the project.
- Local and national institutional arrangements will be analyzed with a view to strengthening their capacity to support farmer uptake of CSA practices, coherent

policies across agriculture, environment and finance ministries, agricultural planning that integrates climate change adaptation and mitigation, strategies for action and investment

- The project will use participatory scenario building with representatives from Ministries of Agriculture, Environment and Finance to:
  - improve long-term decision-making
  - motivate change
  - generate alternative trajectories for future developments
  - orient thinking about different policy and strategy options, while helping to build a common vision.
- Stakeholder consultation and an interactive web-based platform will be used for both collecting and disseminating knowledge
- The project will support, in close coordination with COMESA in the case of Zambia and Malawi, participation by Ministry of Agriculture staff to attend UNFCCC Talks to strengthen knowledge of international issues where agriculture and climate change intersect, as well as the Ministry's capacity to negotiate and network at intergovernmental meetings.
- Maximum use will be made of existing institutional, policy and strategic frameworks, as the importance of and benefits that accrue from nationally led and owned efforts are fully recognized.

As the Project aims to strengthen capacity to scale up sustainable agriculture under climate change (a sort of readiness project), operational activities at farm/community levels are not envisaged at this stage. Through the development of investment options, the Project will identify more farm/community-focused activities to be implemented in a second phase. However data from household surveys and historical climate data, currently being analyzed by the Project, deal directly with conditions at farm level and farmer decision-making about the management of their farms. The Project is also guided by the recognition that it is ultimately decisions made by farmers, which will change the way farming is pursued under climate change, and that action by other stakeholders must seek to support their decision-making.

## Defining Success

*How would you define success and/or measure progress for this effort?*

The Project follows EC and FAO standards in this regard. It will implement a results-based Monitoring and Evaluation system aimed at assessing whether and how Project goals are being achieved over time. The system will be designed to respond to stakeholders' growing demands for measuring tangible, concrete results. Stakeholder consultations will be held in each of the Project countries to define a set of indicators for M&E purposes, based on the Project log-frame.



### *Methodology for measuring success/progress?*

Within the M&E framework the project aims at identifying CSA effects to the extent possible and where attribution does not represent an issue. At the same time, if and where opportunities will arise in the undertaking of project activities aimed at providing evidence of CSA, impact assessment will be carried out to measure ad hoc effects of specific CSA practices. Yet, it is important to specify that there is an interest in the *development* of metrics for both agricultural adaptation and mitigation. In this regard, FAO has already submitted to VCS a Methodology for Sustainable Grassland Management in the context of another project in Qinghai Province, China.

## **Outcomes and Lessons Learned**

### *Outcomes or changes to date*

The project only began in January 2012, so it is premature to see major outcomes or changes at this time. Progress can be summarized as follows:

Two staff from Ministries of Agriculture in all three project partner countries attended the Bonn Climate Talks in May/June 2012, where agriculture was discussed in the SBSTA. A staff member of the Ministry of Agriculture and Food Security in Malawi also attended the Global Conference on Agriculture, Food Security and Climate Change in Hanoi in September 2012. Increased awareness of international issues related to climate smart agricultural approaches and the negotiating process has been evident. The Bonn meeting also gave project-sponsored participants the opportunity to discuss agriculture in the context of climate change with colleagues from Environment Ministries and laid the ground for future collaboration.

An initial inception period is being used for discussion with stakeholders on tailoring the project to country specificities and putting in place administrative and management mechanisms. In Malawi, the Inception Workshop with Stakeholders was held in July, attended by the Minister of Agriculture and a broad range of stakeholders. Discussion was lively and useful. The need to include farmers, in addition to farmer unions, was raised. Similar workshops are under preparation for Vietnam and Zambia.

In terms of research, Masters and PhD students have been selected in Malawi. Household survey data from Zambia and Malawi data are being overlaid with climate data using GIS. Some very preliminary analyses of adoption and dis-adoption of conservation agriculture in Zambia show low adoption (and high “dis-adoption”) and indicate rainfall and extension as most important determinants of adoption, as well as possible trade-offs between livestock and CA. Preliminary mapping of the onset of rainy season (showing an historical trend of later starts in most parts of the country) will be further explored in conjunction with CSA practices. The data sources for Vietnam have been identified and officially requested by the MARD for the project.

An outline for a mapping of local/national institutional arrangements, policy instruments and projects/programs in Project partner countries has been made. CCAFS and FAO will



cooperate on participatory scenario building in partner countries as a means to discuss policy options and decision-making across multiple ministries.

*What lessons have you learned thus far that might be useful or applicable to others?*

The magnitude of the need for adaptation (impacts of extreme weather events are already affecting national and international food prices) and the potential for mitigation in agricultural development has major implications for successful agricultural development planning to support food security and poverty reduction.

- (i) Dialogue with stakeholders from the outset to the end of project is essential to capture existing knowledge and build buy-in. Use of tools to help structure this dialogue – such as participatory scenario building - may be helpful in order to convey relatively complex and inter-disciplinary concepts that the project utilizes.
- (ii) In formulating national CSA strategies, a wide range of activity options, cutting across different stakeholders, will need to be evaluated and prioritized. International enabling mechanisms for adaptation and mitigation need to accommodate the specificities of agriculture and national experience should help shape their design.
- (iii) Building change within existing institutional and policy frameworks can heighten buy-in from policymakers (e.g. CAADP Investment Plans and ASWAP in the African context and Action Plan on CC response of AG and RD sector in Vietnam).
- (iv) There is no optimal CSA technology package for all countries or all agro-ecological regions within countries. The diversity of national contexts and agricultural systems needs to be accommodated in national and international enabling mechanisms.
- (v) Sequencing of transition is important. Farmers must first see that they will benefit from the adoption of new practices or crops in terms of greater productivity or resilience, reduced labor requirements or costs – all of which can affect their income. Poor and food insecure farmers will need to realize these benefits immediately. If returns to agriculture investment (or returns to adoption of these practices) are initially low or negative (even though there will be benefits over the longer-term), incentives may be needed to encourage adoption or avoid “disadoption”. Adoption of CSA practice options may therefore require increased investments at the farm level.
- (vi) Linking farmers to new sources of information on climate change will be important, but ‘translating’ the risks and potential margin of error that exist, in ways that farmers can understand and use it in making decisions, is equally important.
- (vii) While the three project countries have different biophysical, economic, social and cultural attributes, there are opportunities to learn from each other. For example, Vietnam has been extremely successful in expanding agricultural production within a short timeframe. Their development pathway may hold lessons for Malawi and Zambia. On the other hand, Vietnam’s household data collection on agriculture and its extension systems could benefit from the experiences of

Malawi and Zambia (lead farmer system, household surveys have richer data on agriculture).

*What are some of the barriers or challenges? How are you overcoming those?*

The project is unlike other projects that partner countries have experienced in terms of its complexity (food security, agricultural development, climate adaptation and mitigation) and the interlinkages across multiple project components (e.g. research-institutions-practice-policy-strategy-investment). This has made the project difficult to grasp by stakeholders. Even more dialogue with stakeholders (than has been the case so far or programmed) will be necessary to explain the project, what it seeks to accomplish and options for how this might be done. As mentioned above, use of tools to structure the dialogue is essential. One potential tool is participatory scenario building which has been successfully used by the CCAFS project to facilitate dialogue about strategies to address climate change amongst a range of stakeholders. In our project inception workshop in Malawi, we had stakeholders participate in developing the country-specific log frame for the project activities and this too was an effective way to promote dialogue.

*Are you currently sharing information with internal and/or external partners? If so, how?*

At present the project is communicating through presentations at relevant meetings inside and outside FAO, through press releases in the partner countries and those issued by FAO and through the project website. The Project Document foresees that the Project will develop a communications strategy to reach Project partners, as well as local, national and international audiences. Communication activities will focus on the outputs and impact of the Project. The strategy is under construction and will include making use of the in-country Project Core Group and Steering Committee, as well as an interdepartmental mechanism at FAO Headquarters to which the EC would also be invited. The project currently uses the EPIC website to reach partners. (<http://www.fao.org/climatechange/epic/en/>)

*Are there components of the project that could be scaled up (nationally; regionally; etc.)? What would be the challenges in doing so? How is this being done?*

As has been mentioned above, the project aims to build readiness for up-scaling and involves the development of investment proposals that link climate finance to agricultural development strategies at a sub-national or national scale. One of the envisioned activities is to establish a baseline agricultural growth path, against which current, alternative, including “climate smart” development paths can be compared, ultimately creating a basis for crediting mitigation and adaptation activities. Challenges are defining and getting consensus on baseline trajectories.

## Case Study: Climate Smart Smallholder Agriculture

**Presenters:** Elwyn Grainger-Jones, International Fund for Agriculture Development

The International Fund for Agriculture Development (IFAD) shared their recent Occasional Paper, “Climate-smart smallholder agriculture: What’s different?” which is available for download at: <http://www.ifad.org/pub/op/3.pdf>. The paper outlines major challenges for ‘climate-smart’ agriculture for smallholder farmers and approaches IFAD is taking to address them according to local needs and circumstances.

## Case Study: Reinforcing the resilience of the rural poor through on-farm conservation of local agrobiodiversity

**Presenter:** Stefano Padulosi, Bioversity International

### General Information

*Please provide some information on the geographic context (i.e., location, type of agriculture involved; significance in the local, regional, and national economy, investment in agriculture, etc.)*

This IFAD-supported Project (IFAD NUS3) is being implemented in a number of sites across Nepal, India and Bolivia and deals with traditional crops (neglected and underutilized species/NUS), on farm conservation and climate change (see <http://bit.ly/UazEv8>). Agrobiodiversity is the most strategic ally of farmers in their quest for more resilient production systems and its conservation is thus fundamental to sustainable agriculture and ultimately to ensuring the world's food security. Unfortunately R&D efforts insofar have been directed mainly towards major crops and the 1750 ex situ gene banks conserve currently a very modest representation of traditional crops whose resistance to biotic and abiotic stresses is widely acknowledged by farmers. Agrobiodiversity today is thus maintained by and large by farmers who hold also invaluable indigenous knowledge associated to their cultivation and use. This project addresses ways to strengthen farmers' ability to conserve agrobiodiversity for reinforcing their capacities to cope with climate change. Its ultimate goal is to facilitate more effective use, management and conservation of local agrobiodiversity by communities and stakeholders, in the context of food security, nutrition and income generating potential and adaptation to climate change. The project explores how to support the work of custodian farmers and develop opportunities to enhance competitiveness of local crops as incentives to their conservation. Novel methods for the community-based documentation and monitoring of agrobiodiversity are also being tested out.

*What is the timeline?*

2011-2014

*Who is involved?*

Global coordination is carried out by Bioversity whereas national coordination is done by the M.S. Swaminathan Research Foundation – MSSRF in India, the Local Initiative for Biodiversity, Research and Development -LIBIRD in Nepal and the Fundación Promoción e Investigación de Productos Andinos -PROINPA in Bolivia. Other national research Agencies and NGOs/CBOS are also involved.

### Objectives

*What is the primary objective (e.g., increased production; climate change adaptation and/or mitigation; food security)? What are secondary objectives, if any?*

The Project's goal is to facilitate more effective and sustainable use, management and conservation of local agrobiodiversity by communities and stakeholders, in the context of food security, nutrition, income-generation potential and adaptation to climate change.

Its 4 objectives are as follows:

1. Develop and test new methods and tools in close partnership with farmers and value chain actors aimed at enhancing their capacities to sustainably conserve traditional crops and associated knowledge at the farm level;
2. Explore ways of integrating the monitoring of diversity on-farm, along with use-enhancement goals, through inter-disciplinary and multi-sector approaches;
3. Promote a more balanced complementary conservation agenda in national programs, based on the need to combat genetic erosion and to meet the needs of agrobiodiversity users; and
4. Provide useful findings to guide further research related to climate change and its impact on species and varieties deployed in local production systems.

*What, if any, are the anticipated co-benefits (e.g., food security; additional investment in agriculture; capacity building)?*

Enhanced on farm conservation of local crops will strengthen climate change adaptation; Community based documentation and monitoring will help farmers in better management of their resources and guide conservation strategies by countries; enhanced used of local crops will strengthen income generation of community members; technology transfer and training courses will boost capacities of farmers and value chain actors; special focus on women will help contributing towards their own empowerment, greater self-esteem and exit out of marginalization; strengthening the networking among custodian farmers will help sharing of valuable germplasm and IK.

## Funding

*How is this effort funded in the short- and long-term?*

IFAD and European Union main funding sources. National Agencies also supporting implementation in the long term.

## Capacity Building and Community Involvement

*What types of capacity building has this involved and how did you manage those activities?*

There are two main types of interventions: 1) those aiming at reinforcing national partners' capacities in assessing situation and promote best practices and approaches in target communities and 2) those directed specifically to community members and aiming at enhancing their capacities in the sustainable conservation and use on farm of traditional crops. Capacity building of experts is being done through inter-regional and national workshops in which lessons and best practices are shared. Capacity building of community members is carried out through participatory workshops, courses and technology transfer.

## Defining Success

*How would you define success and/or measure progress for this effort?*

Ex ante and ex post impact assessment are being carried out to assess benefits generated by the project in terms of availability of crop species/ varieties, enhanced capacity of value chain actors, women empowerment, conservation of genetic diversity and IK etc.

*Did you develop a methodology? If so, briefly explain the development process and how the methodology is being implemented.*

Methods for participatory documentation and monitoring of agrobiodiversity have been identified during an international workshop held in Germany in June 2011 (see proceedings at <http://bit.ly/OBvmul>). These were then further refined during national stakeholder workshops. Novel methodology for red listing of cultivated species has been developed and presented at the IUCN Congress held last September in Korea <http://bit.ly/TdX9S7>

## Outcomes and Lessons Learned

*Has the project/strategy resulted in any outcomes or changes to date?*

Because of the recent start of the activities, it is too early to see outcomes. Changes are being however emerging in the area of linking ex situ with in situ and in the establishment of networks among custodian farmers (particularly in Bolivia).

*What lessons have you learned thus far that might be useful or applicable to others?*

Surveys insofar have confirmed perceptions of farmers regarding the role of traditional crops in coping with climate change and the different views held by women and men with regard to climate change, its impact and solutions needed.

*What are some of the barriers or challenges? How are you overcoming those?*

The on farm conservation is a highly fragmented community which has also little or no voice at all within international fora. The project is bringing issues relevant to on farm conservation debate in various conferences and meetings around the world (e.g. participation to preparatory Rio+20 meeting in India- Feb 2012; IUCN 2012 Congress in Korea; organization of international Conference for NUS in Cordoba, Spain in Dec 2012; Participation to FAO-EPSO Expert meeting in July 2012; organization of Pan African Conference on NUS in Ghana in 2013; training courses on value chain of NUS in Africa in 2012; etc)

*How are you sharing information with internal and/or external partners?*

Regular emails, Project web site, tweets, blog

*Are there components of the project that could be scaled up (nationally; regionally; etc.)?*

Yes, several components. Negotiating with IFAD opportunities for doing that through their Loans (Agriculture Investment Projects).

## Case Study: Low Carbon Rural Development in India

**Presenters:** Richie Ahuja, Environmental Defense Fund and Jason Funk, Environmental Defense Fund

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### General Information

Four hundred million Indians live below the international poverty line of \$1.25 per day, and these low-income populations will bear the brunt of the problems caused by global warming. With a population that is 70% rural and with agricultural emissions making up 17.6% of its total CO<sub>2</sub> emissions,<sup>1</sup> India needs a program that reduces emissions while also addressing adaptation, alleviating poverty and delivering social, health, and environmental co-benefits.

### Objectives

The Environmental Defense Fund, a US-based non-government organization, and The Fair Climate Network, a consortium of more than 40 non-governmental organizations in India dedicated to sustainable rural development, have joined to create the EDF- FCN partnership. Through a low-carbon development program, this partnership aims to improve existing rural community structures and agricultural practices in South India. The overall objectives of this work are to help farmers adopt a modified set of agricultural and household practices that reduce their greenhouse gas emissions, support development, and to enable them to market these reductions as a new source of income from carbon markets.

### Approach

In 2010, EDF and the Fair Climate Network created a pilot low-carbon development project in three states of South India: Karnataka, Tamil Nadu, and Andhra Pradesh.

Our particular approach is to view rural communities holistically. We consider the interactions between farms, rural households, and rural communities as we design and implement rural mitigation activities. These mitigation activities include:

- changing agricultural practices such as water and soil management,
- reducing tillage and fertilizer,
- promoting multi-cropping and inter cropping,
- installing household and community biogas units,
- substituting conventional wood-burning stoves with more efficient wood-burning cookstoves, and
- providing off-grid solar lighting.

Each of these interventions delivers immediate benefits to the farmer and community. For example, cleaner burning stoves improve indoor air quality. Decreasing the amount of

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<sup>1</sup> [http://moef.nic.in/downloads/public-information/Report\\_INCCA.pdf](http://moef.nic.in/downloads/public-information/Report_INCCA.pdf)



water and fertilizer necessary to grow the same crops, while at least the maintaining yield reduces input costs for farmers. Meanwhile, these same interventions provide emission reductions which are quantified, verified, and sold on voluntary or compliance carbon markets. The revenues from the sale of the emission reduction units provide an additional source of income for the farmers thus rewarding them for adopting sustainable practices.

We initially worked with a coalition of five NGO partners: Social Education and Development Society (SEDS), Accion Fraterna (AF), the Social Animation Centre for Rural Education and Development (SACRED), Bharath Environment Seva Team (BEST), and Palmyrah Workers Development Society (PWDS). Since then, this work has expanded to include a total of 15 NGOs as part of a Pan-Indian coalition. EDF and FCN selected each of these institutions after a rigorous screening process. Selected NGOs have all been working in rural development for at least a decade. Their staff members live in the villages and work directly with farmers and families on development projects. They competently collect and manage data, an activity of prime importance both for decision-making and for quantifying carbon credits.

Our constituents are poor, rural, and vulnerable to climate change. Our local NGO partners have conducted surveys that show that the highest priority for our constituencies is maintaining a stable livelihood. More than 60% of farmers support their families on less than 1 hectare of land, and 30% of the rural populations live on less than \$1.25 per day. For their subsistence and a share of their income, these farmers depend on a few key products such as paddy rice, buffalo milk, cow milk, wheat, and fresh vegetables. These farmers are willing to try new agricultural techniques as long as there is little or no risk of decreasing their yield or profits. Additionally, many of the farmers reported difficulty accessing fertilizers, pesticides and other agricultural inputs due to improper government distribution of subsidies. Credit availability is also a problem.

Once the NGOs have identified farmers and communities to participate, they implement the project through the following steps:

- **Collection of demographic data** – Local NGOs collect detailed baseline data at the household level, including individual demographics, incomes, agricultural practices, cooking practices, availability of land-ownership documents, firewood and kerosene usage, among other relevant information.
- **Delineation of land-holdings and collection of farm data** – Local NGOs survey each farmer's parcel of land and create a record with a hand-held GPS system that can be linked to the demographic data collected. They also collect agricultural and environmental data such as soil type, land gradient, cropping practices, yield, and tree species.
- **Development of baseline emissions data** – Local NGOs provide households with farmer diary templates to track farming, energy, and other emissions-producing activities. The information collected here is verified through regular monitoring and supplemented by random checks. Once adequate data is collected, we compute the baseline emissions for individual households.
- **Identification and application of low-carbon practices** – Farmers and households choose practices that best fit their needs, including micro-irrigation systems, efficient



nutrient management, composting and anaerobic digestion, green manure application, integrated pest management, tree planting, and improved cook stove utilization.

- **Monitoring farm and household economic data** - One of the objectives of the project is to ensure that farmers and rural households improve their household incomes when adopting low carbon practices. We collect extensive data, both from participating farmers and households and control groups, to monitor changes in income at the farm and household level.
- **Monitoring of emissions** – We built local labs where trained scientists help monitor emissions for both standard and sustainable practices. NGOs collect and measure emission samples from farms on an ongoing basis. This, along with a number of other parameters, forms the basis for estimating the total annual emission reductions.
- **Generation of carbon contracts** – The goal is to sell project-generated emissions reductions as offsets on existing markets. The monitoring process is designed to fit within the strict standards for eligibility within the Clean Development Mechanism (CDM) so that international emissions trading programs may eventually accept credits. EDF and FCN are also developing a new methodology to measure emissions reductions measurement. We aim to have this methodology approved by an international standard setting body such as Verified Carbon Standard (VCS) so that the credits will also be eligible for voluntary trading.

## Funding

The funding needed for this work can be divided into two parts:

1. **Building institutional capacity** – We evaluate partner NGOs and provide training on how to implement programs. Our partners use philanthropic funding to cover the costs of institutional infrastructure.
2. **Cost of the interventions** – Capital costs include the building of biogas units and more efficient cook stoves and the cost of equipment to support new farming practices (eg. a new weeding machine). We cover capital costs through the sale of emission reduction units from the proposed intervention in the carbon market.

There is also the potential for additional types of funding. Developing countries commit significant portions of their budgets to help spur development and improve the quality of life and income of their citizens. Their governments commit budgetary resources to implement energy programs, subsidize fertilizer costs, deliver farm extension services, and provide local infrastructure. Over the long term, these resources could be leveraged to implement low-carbon development activities at a large scale.

## Capacity Building

We work with our partner NGO's to improve management practices, help set up or streamline data collection and management, and determine which interventions should be implemented and at what scale.

One of the key objectives of the Fair Climate Network is to actively promote learning across organizations. The network arranges seminars, conferences and other inter-organizational exchanges between farmers, local elected leaders, NGO field staff and other actors. In this

process, EDF and other network partners also get exposed to new ideas and practices that we incorporate into our program.

We build local capacity by sharing information and supporting farmer exchanges between regions that are already implementing the program and new entrants. Then we use tried and tested models of farmer leadership programs and farmer field schools to help further share this information with the wider local community where the projects are to be implemented.

## Defining Success

By the end of 2012, the network will be working in 180,000 households and will implement low-carbon farming practices on 17,000 acres. We will have built and installed 43,000 new biogas units and delivered over 80,000 efficient woodstoves to 50,000 households. For the program to be considered a success, we need to meet the following criteria:

- Actual and additional emission reductions are achieved;
- There is economic development and poverty alleviation as a direct result of the interventions;
- There is full confidence that the monitoring and verification processes are rigorous, transparent and scalable;
- The program expands to involve over a million households in five states across India by 2014;
- The benefits of the program are documented;
- At least one state takes the initiative to roll out a low carbon rural development program across the entire state; and

Over the long term, nation states adopt national policies that promote low carbon rural development.

## Case Study: Enabling small holders to improve their livelihoods and benefit from the carbon finance

**Presenter:** Dr. Virendra Pal Singh, International Research Center for Agroforestry

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### General Information

*Please provide some information on the geographic context for this project (i.e., type of agriculture involved; significance in the local, regional, and national economy, investment in agriculture, etc.)*

The project, “Enabling small holders to improve their livelihoods and benefit from the carbon finance” is a small holder diversified agriculture systems in four ecological conditions, namely the, humid, semi-arid, arid, and sub-temperate ecologies. It has the significance at local and regional economy and by implications at the national level economy and investment policies.

*Where is this project located? What is the scale (e.g., local, regional, national)?*

This project is located in contiguous land holding grids (grid community, a group of villages) operating 1,984 ha in Orissa (humid), 2,070 ha in Andhra Pradesh (semi-arid), 5,000 ha in Rajasthan (arid) and 2,624 ha in Uttarakhand (sub-temperate). These lands are operated by 1,761 households in Orissa, 689 in Andhra Pradesh, 2,065 in Rajasthan and 1,062 in Uttarakhand, and also involve the landless.

*What is the timeline for the project?*

Three and a half years, June, 2009 to March, 2013, and has been requested for an extension till March, 2014.

*Who is involved in the project? Is it a partnership? What organizations are involved?*

The project is in collaboration with the following five lead national institutions: The institutions are:

- Orissa University of Agriculture and Technology (OUAT), Orissa;
- Central Research Institute for Dryland Agriculture (CRIDA), Andhra Pradesh;
- Maharana Pratap University of Agriculture and Technology (MPUAT), Rajasthan;
- Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Uttarakhand.
- OUTREACH, a national level NGO based in Bangalore, Karnataka.

### Project Objectives

*What is the primary objective of the project (e.g., increased production; climate change adaptation and/or mitigation; food security)?*

The primary objective of the project is the “improved livelihoods and income and food security of the small holder communities, especially in the context of climate change adaptation and mitigation”.

*What are secondary objectives, if any?*

The secondary objectives are the following:

- Validate a SMART- CDM framework in different ecologies,
- Build capacity to deploy framework and tool box for formalizing carbon trading,
- Apply a range of 40 GHG mitigation options at different levels,
- Pilot test small holder carbon trading options, and
- Develop a manual for applying carbon trading options and scaling up approaches.

*What, if any, are the anticipated co-benefits (e.g., food security; additional investment in agriculture; capacity building)*

- Sensitized communities on climate change mitigation benefits, including the carbon finance.
- Enhanced national capacity for mainstreaming small holder farming in CDM carbon platforms.
- Better environment through reduced emissions and increased carbon sequestration.
- Improved farming systems efficiency and farmers livelihoods.
- New avenues for additional farm income, including the revenue from carbon credits.
- Policy briefs to support up-scaling of GHG reducing farming interventions in the national climate change agenda.

## **Project Funding**

*How is this project funded in the short- and long-term?*

The project is funded by the National Agricultural Innovative Project (NAIP) of the Indian Council of Agricultural Research (ICAR), Government of India through a loan from the World Bank. Additional support is also generated from the National Initiative on Climate Resilient Agriculture of the Government of India.

## **Capacity Building and Community Involvement**

*What types of capacity building has the project involved and how did you manage those activities?*

One of the major efforts in this project is the orientation and training of small holder farmers on carbon sequestration and emission reduction approaches and practices and their application at different levels--- house hold, farm, land scape, and community levels. Additionally, developing “business processing units” (a kind of incubators) at the community level by engaging and training the groups of entrepreneurial individuals, who are identified and managed by the community, is another major capacity building activity in

this project. Similarly, training of the Indian scientists on various aspects of carbon finance markets and carbon trading options form another major activity.

The management of these activities involves several steps. First and foremost is organizing villages in the grid in a legal entity, called “Gram Samaj” as a registered body under society’s act of the government. This is followed by mapping of the livelihood / farming systems by households in the grid, doing an ex-ante analysis of potentially smart agricultural practices, and having them vetted by the community and letting the households choose the preferred ones for their application. Next is the training of the small holders, including the women and the landless, and of the incubators on various aspects of the project at the site, and arranging their cross-site visits. Using farmers as the resource persons is a key component in these trainings.

The training of the teams of Indian scientists from each grid involved in this project on various aspects of carbon finance markets and carbon trading options, including the carbon stock assessment used approved methodologies, PDD, verification and validation, market intelligence and negotiations, etc. was done in a sequenced manner. Arrangements were also made for their in-country and overseas visits to expose them on these aspects from other similar projects.

*How have communities or relevant stakeholders been engaged?*

The Indian development machinery structure has villages at the lowest / smallest level, headed by a “Village Panchayat” and the District at the highest level of the administration. In between these two are the community development blocks. A block seems to be too big an entity for a village to access support from and for a block a single village seems to be too small to attend to. Therefore, a new facilitation category was created at each grid called “the Gramya Samaj” with its own office bearers from a couple of villages in the grid. It is a registered legal body under the Indian National / State Societies Act.

These Gram Samajs at each grid constructed their own buildings, called the Gramya Sampada Kendra” which double for as meeting place for the constituents and store house for inputs and supplies, etc. The Gram Samajs identified 4-5 entrepreneuring individuals and composed them in a team called “Business Processing Unit”, some kind of legal special purpose vehicle, or business incubators. These units are from within the community and are managed / supervised and paid by the Gramya Sampada Kendras.

The Business Processing Units were trained under this project on various aspects of agriculture improvement practices, and carbon finance aspects, including the PDD development, CDM protocols and carbon finance markets, etc. They act on behalf of the community in negotiations, provide them assistance on technical aspects of agriculture and in the bulk purchase of inputs & sale of the produce, and customized services on specific needs, e.g. irrigation, mechanical ploughing, etc.

The Gram Samaj or societies have also started a savings account fund from membership fee and income savings called as the “Sustainability Fund” wherefrom the grid members can take soft loan without any collateral.

## Defining Success for the Project

*How would you define success for this project?*

By the end of 2011, over 5000 farming households were adopting a broad range of measures to reduce emissions and sequester carbon. Some of them included measures such as bund plantation of high value trees, horticultural crops and fertilizer trees in the field, populating common lands with fodder trees and shrubs, minimum and zero tillage, row planting, incorporating compost and manures, rotational irrigation, using capacitors in irrigation pumping sets, solar lights for street lighting, replacing Edison bulbs with the CFL bulbs, and using more efficient cooking stoves, etc. The energy saving interventions were on top of the list (more than 90% households applied), followed by the energy efficient cooking stoves (about 50% households) and the field crop agronomy and tree based interventions (about 10% cultivated area).

Initial assessment of these efforts indicates that farmer's productivity and income as well as the employment opportunities, especially for the landless and women are increasing consistently and their input costs decreasing. For example, there is a 50% saving in the firewood use for cooking. They are also able to mechanize some of the crucial field operations through renting or by getting the custom services for those from the "Gramya Sampada Kendras". These parameters along with the expansion of area under such interventions are being monitored.

A prior consideration was submitted and registered at the CDM. As of now the calculated CERs in the respective grids range between 11,544 and 12,988 CERs. It is worth mentioning that some programs and corporate houses have come forward to pay for carbon sequestration by putting upfront resources under their CSR Policy. At Andhra Pradesh grid farmers have been paid for tree planting and taking its care @ Rs. 250 (\$5.00) / tree, through which farmers are getting more income than from their main field crop farming. They have also started to incorporate livestock and animal manure in their farming system as a result of increased fodder supply in the area.

Though the impact of this project is envisaged to be in the long run and its monitoring is in progress, a positive indication of its success is the request by the surrounding villages for enlarging the grid.

*How are you measuring progress on objectives?*

The following are the monitoring indicators for the project.

1. Quantitative baseline data / information on livelihoods / farming systems and practices by households
2. Identification and implementation level of adaptation and mitigation activities by farming households, and of the landless
3. Carbon stock assessment at zero time and after certain time intervals after applying the selected interventions

4. Seasonal productivity levels of the commodities and other enterprises, house hold income and level of expenditure, especially on farm and household inputs, e.g. cooking fuel, lights, etc.
5. Changes in the farming practices, if any, for example introduction of new crops, shifts in the use of input levels, etc.
6. Validation of SMART CDM Protocol and modifications if any needed within the approved methodologies in the CDM frame work
7. Pilot testing of carbon trading options in different available instruments, CDM, Voluntary markets, OTC and CSR,
8. Functioning and engagement of the business processing units
9. Preparation of generic manuals

*Did you develop a methodology for this project? If so, briefly explain the development process and how the methodology is being implemented.*

This project has seven main components. They are the following:

- Innovations
- Identifying and scaling up smart practices for carbon sequestration and emission reduction without substantially altering the livelihood / farming systems
- Carbon assessment.
- Carbon finance.
- Institutions.
- Capacity building.
- Impact.

**Innovations:** Some of the main innovations in this project are the following:

- Developing / assembling a CDM compliant framework ( i.e. SMART-CDM), which simultaneously enables small holders to improve their livelihoods and obtain carbon credits
- Harnessing small holders capacity in community organization and collective decision making in choosing and applying smart practices for carbon sequestration, emission reduction, and improvement in livelihoods
- Achieving reduced emissions and enhanced C sequestration in farming systems, and unifying these two approaches (reduced emissions and enhanced carbon sequestration) in a single project
- Aggregating small farms into grids and treating the grid as a single entity to meet minimum tradable carbon volume
- Organizing grid members in a single legal entity for negotiations, accessing support, economizing costs and proportional benefit sharing while continuing their own livelihood enterprises
- Building business development units, or incubators for representing and functioning on behalf of the community / grid in dealing with business related matters



- Orienting researchers, business incubators, civic societies, and private sector on CDM protocol, C stock assessment and C finance and building their capacity for marketing C through different channels

**Smart Practices:** Apply a number of carbon sequestration and emission reduction interventions for generating/ enhancing multiple streams of livelihoods and better environmental impact for small holder farmers at the community level, through targeting, farmer testing, and up-scaling of the profitable portfolios.

**Carbon Assessment:** Test and apply strategies, tools and methods for measuring and monitoring baseline and carbon sequestration from above and below ground biomass and the emission reduction beginning from the initiation of the project activities on farm and on the landscape.

**Carbon Finance:** Develop carbon financing mechanisms by working with the existing conditional mechanisms for carbon incentives that facilitate, recognize and reward small holders for establishing and managing trees at farm and at the landscape level and for reducing emissions through other practices, based on acceptable standards and voluntary carbon markets.

**Institutions:** Establish a viable Special Purpose Vehicle (business development units, incubators /platform) for small holders to access emerging carbon finance markets through building support linkages with appropriate institutions for managing transactions, negotiations and harmonization of capacities. This body would also be able to provide forward and backward linkages between the community and the markets. The body is operated by professional, but controlled and managed by the community.

**Capacity Building:** Train teams of national scientists, development workers, NGO community, business venture/ corporate house representatives and other stake holders interested in the issue on a range of topics related to livelihood enhancement in conjunction with carbon finance in a variety of markets.

**Impact:** Analysis and dissemination of smart practices, carbon sequestration and emission reduction intervention research and development to support national action plans and policies that will trigger mainstream and up-scaling of the interventions on climate change agenda and livelihoods. This would also be facilitated by the preparation of policy briefs and policy dialogues with the concerned agencies in the country.

## Early Outcomes and Lessons Learned

*Has the project resulted in any outcomes or changes to date?*

Initial assessment of these efforts indicates that farmer's productivity and income as well as the employment opportunities, especially for the landless and women are increasing consistently and their input costs decreasing. For example, there is a 50% saving in the firewood use for cooking. They are also able to mechanize some of the crucial field operations through renting or by getting the custom services for those operations from the



“Gramya Sampada Kendras”. These parameters along with the expansion of area under such interventions are being monitored.

A prior consideration was submitted and registered at the CDM. As of now the calculated CERs in the respective grids range between 11,544 and 12,988 CERs. It is worth mentioning that some programs and corporate houses have come forward to pay for carbon sequestration by putting upfront resources under their CSR Policy. At Andhra Pradesh grid farmers have been paid for tree planting and taking its care @ Rs. 250 (\$5.00) / tree, through which farmers are getting more income than from their main field crop farming. They have also started to incorporate livestock as a result of increased fodder supply, and the use of animal manure in their farming system in the area.

Though the impact of this project is envisaged to be in the long run and its monitoring is in progress, a positive impact indication is the request by the surrounding villages for enlarging the grid and including them in it.

*What lessons have you learned thus far that might be useful or applicable to other projects?*

This project has turned out to be continuous learning ground for such an endeavor and there are a few important lessons that have emerged in the course of this exercise which are enumerated below:

- Enabling small holders to apply smart agricultural practices for improving their livelihoods and benefiting from carbon finance is possible. However, innovative ways are required for achieving a significant impact, and this may include organizing the communities in legal entities and clearly setting their expectations, roles and responsibilities. This also involves enhancing community understanding on aspects of climate change, emission reduction and carbon sequestration interventions, carbon stock assessment, carbon finance, carbon markets, etc. and building its capacity on business component of carbon trading, including the PDD and negotiations in different market instruments.
- Innovations are not a snap shot deal, especially where community involvement is warranted, and thus cannot be prescriptive. One may have to innovate at all steps.
- Usually communities show interest in interventions that provide benefits quickly, both at farm and in the house hold. However, when sufficiently explained they opt for short, medium and long term interventions at the farm and household as well as land scape levels.
- It's extremely important to involve the profile of the community in such projects, including the women, landless, input and service providers.
- It is often useful to assist the community in selecting their preferred interventions from a basket through ex-ante analysis using a set of bio-physical, socioeconomic and cultural criteria.
- Making provisions for input supply locally, e.g. planting materials, etc. enhances the application rates of the chosen interventions.
- The research designs may require adjustments in community participated programs as the communities continue to experiment and evolve their own new ways, however unscientific and non- systematic they may appear to be.

- The impact pathways and scaling –up mechanisms for such projects should be considered as an essential part of the design itself. This becomes handy in monitoring the progress and in impact assessment.
- The horizontal as well as vertical expansion, or the scaling up of certain practices / technologies/ concepts, etc. requires a thorough understanding of certain key considerations, e.g. knowledge systems, institutions, partners, setbacks and challenges, and putting these considerations in the scaling up process could accelerate it in a more systematic and assured way.
- In addition to various other considerations in the scaling up efforts, robustness of the practice/ technology, etc., scientifically delineated application domains of it and a broad based buy in of the stakeholders are essential considerations that will “nail or fail” the effort.

*What are some of the barriers or challenges the project has faced? How are you overcoming those?*

Organizing the community and training them has taken and is taking longer time, much longer than expected. Using trained community members as resource persons in organizing the next community has been effective for this.

Communities, pampered by the government’s subsidy programs often look forward for free gifts even from research programs. Involving them from the very start of the project, clear explanation of the objectives and roles and responsibilities through group interaction and senior leadership of the communities on regular basis has been effective in overcoming some of this.

Keeping certain sections of the society totally out of loop of the project guarantees the destruction. Uprooting of plants and breaking of shoots, grazing of crops, poaching of the harvest, and stealing of fences are common ills in the rural settings. It is therefore, of utmost importance to engage them in certain aspects.

*Are you currently sharing this information with internal and/or external partners? If so, how?*

Quarterly and annual progress and achievement reports are submitted to the donors, which is also shared with the internal partners. Regular monitoring of the project is performed through presentations and stakeholders workshops involving NAIP, partners, other NARES partners, NGOs, donors, etc. We share this through television and radio broadcast, and also publish in peer reviewed journals, book chapters, manuals, policy briefs, etc.

*Are there components of the project that could be scaled up (nationally; regionally; etc.)? What would be the challenges in doing so? How is this being done?*

There are number of out puts and out comes in this project that we intend to scale up. The frame work and methodology of the scaling up process is currently being developed and refined through pilot field testing and a series of workshops, most recent of them was in August, 2012. What we are looking forward is to develop a generic process that takes into account the main drivers, constraints, opportunities, pre-requisites / pre conditions, institutions, partners, etc. so that the methodology can be applicable in varied situations. This is also mentioned in item 9 &10 under question 15 above.

Based on the results obtained so far, it seems that the protocol being developed and tested through this project would have a high degree of applicability and adoption throughout South Asia, particularly in India, especially in terms of improving the small holder livelihoods and employment opportunities for the landless.

As this activity is under a limited scope nationally funded project in India, the validation of scaling up protocol in other situations in the country and other countries of the region (representing ecological variability) is a challenge and restricts the validation process. We are on a constant look out for accessing some bilateral support for this activity.

## Case Study: Climate-smart Agriculture in Sub-Saharan Africa

**Title:** Climate-smart agriculture in sub-Saharan Africa

**Presenter:** Jack Steege, Pricewaterhouse Coopers (PwC) and Climate and Development Knowledge Network (CDKN)

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### Project context

The project has been led by a team from PwC's Sustainability and Climate Change team. Over the course of the project working partnerships were formed with a team from the tropical land use research group from the School of Geosciences at the University of Edinburgh, and Malawian research institutions and project developers. The project was implemented over an 18 month period from May 2011- October 2012.

The project has focused on the development of a set of tools, methodologies, user-guides and supporting analysis that can support smallholder farmers in Malawi (and the wider sub-Saharan African region) measure the mitigation benefits from implementation of conservation agriculture and agro-forestry practices.

In Malawi over 80% of the population derives livelihoods from agriculture. The majority are smallholder farmers reliant on rain-fed cultivation of maize as the key subsistence crop. These farmers are amongst the most vulnerable in the face of climate change. Adoption of conservation agriculture and agro-forestry practices (especially using N-fixing species) are being widely promoted by the Government, donors and civil society organizations, as interventions capable of increasing the productivity and climate resilience of such systems, to achieve food security and green growth objectives. In addition, these practices have the potential to deliver a 'co-benefit' of increased carbon sequestration in trees and soils.

### Objectives

All forms of climate mitigation finance, (including compliance grade carbon markets, PES systems, performance based donor programs, future NAMAs, and 'climate-smart' commodity premiums) require the measurement of mitigation performance (although to varying degrees of accuracy). The inability of smallholder projects and programs to cost effectively measure the mitigation benefits of 'climate-smart' practices has prevented climate finance opportunities from being realized at scale.

The primary objective of this project was to address these challenges, and develop a proof of concept solution to show that measuring the mitigation benefits of smallholder 'climate-smart' agriculture can be simplified and undertaken at low cost. And to explore how such solutions could support access to multiple sources of climate mitigation finance.

### Funding

The Rockefeller Foundation provided grant funding for development of the tools, methodologies, user guides and analysis. Additional funding has been provided by Irish

Aid Malawi and the Royal Norwegian Embassy of Malawi to support in country capacity building in use of the project outputs.

### **Stakeholder engagement, capacity building and community involvement**

Stakeholder engagement, capacity building and community involvement has been critical in designing solutions that meet the needs of organizations working directly with smallholder farmers in adoption of conservation agriculture and agro-forestry practices.

At inception, a project advisory panel was established to provide expert input and critical challenge through-out the project. This was formed of a range of stakeholders from host country governments, research institutions, donors, multilateral development agencies, and NGOs working with smallholder farmers in the region.

To inform the scope, purpose and design of the solutions, background analysis supported by hundreds of interviews and 1-to-1 consultations, was undertaken on a number of issues including:

- CSA practices;
- Agricultural carbon market opportunities in sub-Saharan Africa;
- Market opportunities for 'climate-smart' commodities;
- MRV and data management for CSA mitigation benefits;
- Opportunities and challenges in scaling investment in CSA; and
- Project design processes and needs.

The scope and design was further informed through multi-stakeholder workshops held in Nairobi, Kenya on the 28th October 2011 and in Lilongwe, Malawi on the 2nd November 2011. The workshops brought together over 100 experts and practitioners from the climate, agriculture and development communities and included representatives from: host country governments, donor governments, multilateral institutions, research institutions, NGOs, and the private sector. In addition smallholder visits were made at the Kenyan Agricultural Carbon Project in Western Kenya, and community consultations held at the Anchor Farm project in Mchinji District, Malawi.

During the development phase of the project led by the team from Edinburgh University, further field visits were undertaken and data was collected from a number of project sites and research stations located across Malawi. This data was used to support the GHG flux modeling that underpins the mitigation accounting tools.

In September 2012, capacity building workshops were held in Lilongwe Malawi, in collaboration with the Ministry of Environment and Climate Change, Irish Aid and the Royal Norwegian Embassy. These workshops attended by NGOs, agribusinesses, donors, and farmer representatives, explored how the mitigation accounting tools could be used in development of CSA programs and project ideas.

## Outcomes and future plans

A series of public reports, analysis and project developer user guides have been produced over the course of the project. These can be accessed through the link below.

The proof of concept Small-Holder Agriculture Monitoring and Baseline Assessment (SHAMBA) tool, carbon accounting methodology and user guide, has been submitted for approval under the Plan Vivo system, a payment for ecosystem services (PES) standard. These will be available for download upon completion of their consultation and validation processes.

A joint launch event is planned for the 31<sup>st</sup> October 2012 in London, to share overall project findings and launch a new version of the Plan Vivo Standard.

Interest has been generated to support the further development and application of the tools both in the context of voluntary market PES projects, and donor M&E systems.

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## Conclusion

As evidence by this relatively small sub-group of multilateral, national and sub-national initiatives, there are significant efforts underway to address agriculture in a changing climate by increasing adaptive capacity of farmers and communities, by taking measures to reduce agriculture's contribution to greenhouse gas emissions, and to ensure these efforts include careful consideration of priorities such as increased production and food security.

While many of these initiatives are actively sharing and disseminating information within their partnerships, country, region, or globally, the sheer amount of information available can be overwhelming at times. Therefore, having opportunities to explicitly and purposefully focus on exchange and learning can be a valuable experience to help inform initiatives as they continue to make progress, and where possible, identify areas for greater coordination or collaboration.

As a conclusion of this workshop and the information discussed, Meridian Institute has developed a graphical workshop summary, available with all other workshop resources by visiting: <http://climate-agriculture.org/LEEI.aspx>. For additional news and resources, you can also follow us on Twitter: @meridianccag

The case studies, resources, and workshop would not have been possible without the support and engagement of the Climate and Development Knowledge Network. In order to ensure broad dissemination and learning, especially among least developed and most vulnerable country stakeholders, CDKN has also made these resources available via their online network at <http://cdkn.org/>.