Reversing Environmental Degradation and Rural Poverty through Adaptation to Climate Change in Drought Stricken Areas in Southern India: A Hydrological Unit Pilot Project Approach

Final Project Review

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About this report

This report was the result of the Final Project Review of the project '*Reversing Environmental Degradation and Rural Poverty through Adaptation to Climate Change in Drought Stricken Areas in Southern India: A Hydrological Unit Pilot Project Approach*', also referred to as *Strategic Pilot on Adaptation to Climate Chan*ge [*SPACC*]), designed to increase the knowledge and capacity of communities to adapt to climate variability and change in seven drought-prone districts of Andhra Pradesh and Telangana states in southern India.

In accordance with the project document, a mid-term review (MTR) was to be undertaken at the beginning of the second year of project implementation. However, MTR was stalled by the Food and Agricultural Organisation of the United Nations (FAO) as the project life is short (3 years) and it took about six months before actual grounding of project activities could take place. Alternatively, it was felt that a final project evaluation would be more appropriate. However, in light of the limited resources available for a full evaluation, and based on consultation with the FAO Office of Evaluation, it was decided that instead, a Final Project Review consisting of a more limited exercise would be carried out after 3 years of project implementation. The project completed on 30th June 2014 and this review is for the entire Project tenure.

Given the experimental nature of the project intervention, it was expected that there could be a number of learnings from it for the national and state level stakeholders, mainly the government agencies. The final review was to document the project experiences, especially the good practices emerging out of the project experience, considering that it is likely that the information is useful to the stakeholders viz., Government of India (GoI), FAO and the Global Environment Facility (GEF), apart from Governments of Andhra Pradesh (GoAP) and Telangana (GoT), who may wish to incorporate or mainstream the project experiences in their regular programs.

The final project review was to determine progress made towards achievement of outcomes, and to assess the effectiveness and efficiency of the institutional arrangements on project implementation and the net benefit or negative impact of this on the recipients. The review was to, inter alia:

- Inform the stakeholders (GEF, FAO, the Ministry of Environment and Forests, Government of India [MoEF], GoAP, GoT, partner non-governmental organisations [PNGOs], and community based organisations [CBOs]) about outcome of the project intervention and the lessons that could be learned thereof;
- Reflect on the possibility of mainstreaming the ideas emerging out of the project in regular government programs; and
- Examine feasibility of up-scaling the project model in other GEF and/or FAO programs, elsewhere in the country/globe.

Key aspects to be reviewed were:

- Relevance of the project concept – the basic premise that the farmer with their practices aiming towards sustainable groundwater management have proved their

technical and managerial capability and are capable of engaging themselves in the pursuit of community based climate change adaptation intervention;

- Relevance of the project design – the results framework;
- Overall effectiveness – of the project actual and potential contribution of the project to the normative and knowledge function of FAO;
- Outcomes – the expected or unexpected outcomes produced in terms of quantity, quality and timeliness;
- Outputs – the expected or unexpected outputs produced in terms of quantity, quality and timeliness;
- Implementation process – Efficiency and effectiveness of project implementation process will be assessed in the evaluation including the assessment of: i) the project management; ii) institutional set-up; and iii) financial resource management;
- Analysis of the application of the United Nations (UN) common country programming principles, cross-cutting themes, and of the Humanitarian Principles; and
- Partnerships and Alliances – including: i) how they were planned in the project design and developed through implementation; ii) their focus and strength; and iii) their effect on project results and sustainability.

Annex I of this evaluation report contains the evaluation Terms of Reference.

The Final Project Review took place in June 2014; the review benefited from attending a project dissemination workshop held in Hyderabad on 24 June 2014.

Acknowledgments

The Review Team would like to thank the staff of the project and all its collaborating partners for the efficiency with which they made arrangements for the mission, in terms of meetings with essential stakeholders and visits to project sites and the openness with which they responded to all enquiries. Thanks are extended to the community members, government staff as well as all counterparts met during the mission who gave time to answer our questions and queries with unfailing openness and courtesy.

The review was carried out between 2 June 2014 and 30 June 2014 and the following tools were used: review of existing documents (reports, strategy papers, annual work plans and budgets, etc.); semi-structured interviews and focus group discussions with key informants, stakeholders and participants (meetings with Project personnel at the Project office in Hyderabad, and interactions with CBO members, partner NGO personnel, government functionaries) and, direct observation during field visits to 7 hydrological units (HUs) – of the 9 taken up for implementation in two states – Andhra Pradesh (Kurnool, Kadapa and Prakasam Districts) and Telangana (Nalgonda and Mahabubnagar Districts), as well as participation in a one-day dissemination workshop. While the review of the extensive project documentation allowed for some direct impressions of project activities, the discussions at Hyderabad and during the field visits offered an opportunity to gain some first-hand experience from project stakeholders. It must be borne in mind that this document is not the output of a full evaluation exercise. Rather, as mentioned in the Terms of Reference, it is the product of a more limited review exercise. However, we hope that this document provides a reasonable idea of the project's achievements, constraints and lessons.

Composition of the Evaluation Team

Evaluation team

Kalyani Kandula: Independent Consultant[1]

Sunder Subramanian: Independent Consultant [2]

[1] Kalyani is an Independent Consultant based at Hyderabad. As a consultant in environmental management, she has worked over the past 7 years with a range of clients including The World Bank, GIZ, FAO and SIDBI. Prior to consultancy, Kalyani has worked as Senior Programme Coordinator with the Centre for Environment Education (CEE) for 11 years.

[2] Sunder Subramanian is an Independent Consultant based at Gurgaon, Haryana (part of the National Capital Region). He has worked with a range of clients including FAO, UNDP, UNICEF, The World Bank, World Bank Institute, Water & Sanitation Program South Asia (WSP-SA), ILO, KFW, GIZ, DFID, SDC, NORAD, WaterAid, India-Canada Environment Facility (ICEF), and WASTE, and various others. Originally trained as an engineer, Sunder has over 20 years of diverse experience including with academia, private sector, the non-profit sector, development research and consulting behind him.

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Acronyms

Acronym	Expanded form
ACZ	Agro-Climatic Zone
APCBTMP	Andhra Pradesh Community Based Tank Management Project
APFAMGS	Andhra Pradesh Farmer Managed Groundwater Systems (project)
APWSIP	Andhra Pradesh Water Sector Improvement Project
AWPB	Annual work plan and budget
BIRDS	Bharathi Integrated Rural Development Society
CBO	Community based organisation
CCAC	Climate Change Adaptation Committee
CMSA	Community Managed Sustainable Agriculture
CPP	Country Partnership Program
FAO	Food and Agricultural Organisation of the United Nations
FCS	Farmers Climate School
FWS	Farmer Water Schools
GEF	Global Environment Facility
GEO	Global environmental objective
GoAP	Government of Andhra Pradesh
GoI	Government of India
GoT	Government of Telangana
HPRs	Half-yearly progress reports
HU	Hydrological unit
IPM	Integrated Pest Management
IWMP	Integrated Watershed Management Program
ICFRE	Indian Council for Forest Research and Education
KASP	Knowledge, attitudes, skills, practice
LDCF	Least Developed Countries Fund
MoEF	Ministry of Environment and Forests, Government of India
MPRM	Monthly Plan and Review Meeting
MTR	Min-term review
NAPCC	National Action Plan on Climate Change
NBSAP	National Biodiversity Strategy and Action Plan
NEX	National executed (project)
NFE	Non-formal education
NGO	Non-governmental organisation
NMSA	National Mission on Sustainable Agriculture

Acronym	Expanded form
NMTPF	National Medium Term Priority Framework
NPM	Non-chemical pest management
PCM	Participatory climate monitoring
PCS	Programme Convergence Secretariat
PDO	Project development objective
PMU	Project monitoring unit
PNGO	Partner non-governmental organisation
PPMS	Physical Progress Monitoring System
PR&RD	Panchayati Raj and the Department of Rural Development
PSC	Project Steering Committee
RBM	Results based management
SAPCC	State Action Plan for Climate Change
SBSTA	Subsidiary Body for Scientific and Technological Advice
SC/ST	Scheduled Caste/Scheduled Tribe
SCCF	Special Climate Change Fund
SLEM	The India Sustainable Land and Eco-system Management Country Partnership Program
SLWM	Sustainable land and water management
SPACC	Strategic Pilot on Adaptation to Climate Change
TFO	Technical facilitation organisation
UN	United Nations
UNDP	United Nations Development Programme
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

1. Project overview

ES1 The States of Andhra Pradesh and Telangana experience high climate variability. Some districts are particularly prone to frequent droughts, the negative impacts of which threaten agricultural production and the livelihoods of rural communities in the state. With climate change, rainfall is expected to decrease and become more variable in the drought-prone districts. This will be accompanied by a significant decrease in runoff, water scarcity and a decline in crop yields. The capacity of the communities to cope with the impacts of current climate variability is weak. Limited knowledge and information on local impacts of climate change will hamper the ability of communities to adapt to climate change.

ES2 The development objective of the SPACC project was to increase the knowledge and capacity of communities to adapt to climate variability and change in seven drought-prone districts of Andhra Pradesh and Telangana. The global environmental objective was to contribute to knowledge building and experience in integrating climate change adaptation in sustainable land and water management in drought-prone areas. The project sought to help build the skills and tools for communities to integrate climate adaptation into sustainable land and water management (SLWM) practices.

ES3 The project was designed with key partners at multiple levels. These included the MoEF of the GoI and the Indian Council for Forest Research and Education (ICFRE) at the national level. This project falls under the umbrella of the GEF supported India Sustainable Land and Eco-system Management Country Partnership Program (SLEM-CPP) of the Ministry of Environment and Forests (MoEF). The purpose of the SLEM program is to promote sustainable land management and utilization of biodiversity as well as to maintain the capacity of ecosystems to deliver goods and services while adapting to climate change. Seven projects have been formulated under the SLEM-CPP. These include three projects each being executed by the World Bank and United Nations Development Programme (UNDP) and one project by FAO.

ES4 At the state level, the GoAP through the Principal Secretary Panchayati Raj and the Department of Rural Development (PR&RD), was the key stakeholder. Bharathi Integrated Rural Development Society (BIRDS) was the executing agency responsible for the implementation of project activities, with the support of a Project Management Unit (PMU), consultants and a network of partner NGOs. Other stakeholders, on account of their engagement in similar work were also co-opted. The target beneficiaries of the project were farmers and communities in the seven drought-prone districts of Andhra Pradesh and Telangana: Anantapur, Kadapa, Kurnool, Chittoor (in the Rayalaseema region), Mahbubnagar, Nalgonda (in Telangana region) and Prakasam (in Coastal Andhra region).

ES5 The project has been structured into three main components: (i) information tools for decision making and local institutional capacity development; (ii) pilots on adaptation measures integrated into SLWM practices; and (iii) platform for scaling up climate change adaptation measures suitable for drought prone areas. The main project activities were: baseline study on local and scientific knowledge on climate impacts, participatory climate monitoring (PCM), setting up of CBOs (referred to in the Project as Climate Change Adaptation Committees [CCACs]), Farmer Climate Schools, SLWM pilots, documentation and dissemination.

ES6 The three-year project was financed by GEF and co-financed by the FAO. A network of nine PNGOs executed the project and provided in-kind financing. The project had a GEF allocation of USD 909,091. FAO's co-financing was USD 1,300,000 and in-kind contribution mobilized by PNGOs was USD 1,553,563.

ES7 Considering that the main focus of the project was capacity building via training and pilot testing and local institutional strengthening, the project indicators were largely process and institutional indicators such as: tools developed (monitoring system of climate variability and its impacts; climate change adaptation plans; Farmer Climate Schools (FCS) curriculum; and manuals on best adaptation technologies) and levels of created capacities (CBOs with operating climate change adaptation committees and leaders/members trained in integration of adaptation measures in SLWM practices; farmers graduating from FCS and participating in pilot testing of adaptation measures; and pilots producing results on the adaptation performance of alternative technologies and practices). On-the ground impact indicators (average crop yields; improved annual groundwater balance; volume of water harvested or water saved through usage of water harvesting and saving devices/methods; soil moisture availability; and/or organic carbon content) will, however, also be monitored in relation to each pilot testing of adaptation measures. With the participation of farmers, a baseline was to be established in the case of each pilot to allow for this monitoring essential to evaluate the adaptation performance of the technologies and practices under trial.

2. Project background and brief history

ES8 The project area was selected keeping in mind the high climate variability and recurrent droughts in the eight rain-shadow districts of Andhra Pradesh and Telangana that have been declared drought-prone by the GoI (seven of these were chosen for implementation, with pilot activities in nine HUs within the districts. Ranga Reddy, one of the eight rain shadow districts was not chosen as it is in the vicinity of Hyderabad and is target of large-scale urbanization). The project was also selected to address (a) the weak/limited capacity of the farming community to cope with the impacts of climate variability in the project districts through building resilience and adaptive capacity; and (b) improve integration of adaptation measures into the number of land and water management initiatives in the states to address the impacts of drought on agricultural production – examples include building on the successful experiences of Farmer Water Schools (FWS) from the FAO supported Andhra

Pradesh Farmer Managed Groundwater Systems project (APFAMGS); watershed development programmes for rainfed areas, Rural Development of the GoAP; the 'Andhra Pradesh Irrigation and Livelihood Improvement Project'; the 'Andhra Pradesh Community Based Tank Management Project (APCBTMP)'; and the (in the pipeline) World Bank funded Andhra Pradesh Water Sector Improvement Project (APWSIP). While these investments contributed to improving agricultural production, there was no systematic development of capacities of communities of the drought-prone districts to adapt to climate variability and change and thus gains from the above initiatives stood to be limited. The concept was thus to leverage the opportunity to build on the APFAMGS project, develop the farmer schools concept further to include climate change concerns and assist local communities in managing climate risk through the SPACC project.

ES9 Since the APFAMGS (2004 – 2009) project had been successfully implemented by BIRDS, which had developed a network of local NGO partners. As such, BIRDS was chosen to implement the SPACC project as well, to ensure coordination and optimal synergy between the projects. BIRDS were the executing agency responsible for the implementation of project activities, with the support of a Project Management Unit, consultants and partner NGOs. The target beneficiaries of the project were the farming communities in 143 habitations in nine HUs of the seven drought-prone districts of Andhra Pradesh and Telangana: Anantapur, Kadapa, Kurnool, Chittoor, Prakasam, Mahbubnagar and Nalgonda. During project preparation stakeholder participation was ensured through: national consultations and workshops; meetings of the project formulation team; meetings with community leaders; workshops and technical meetings; and meetings of the FAO-APFAMGS project partners.

3. Project Achievements

ES10 The biggest accomplishment of the project was that it was able to successfully demonstrate integration of climate change adaptation in sustainable land and water management in drought-prone areas through innovative farmer driven grass-root level environmental action, contributing to improved soil organic matter to improve soil organic carbon while raising agricultural productivity, improving livelihoods, and protecting critical ecosystems. The main achievements of the project against each of its stated outcomes have been:

(i) Information tools and local institutional capacities developed for farmers and CBOs to make informed decisions on land and water management based on scientific and local knowledge, taking into account impacts of climate variations:

a. A study on local and scientific knowledge on impacts of climate variability/change on natural resources was completed;

b. PCM systems, run by farmers, covering key climate variability and impact parameters has been made operational;

c. CBOs referred to as CCACs have been built at the habitation and HU levels

The CCACs have demonstrated ownership of the PCM, have identified various adaptation technologies/practices in SLWM, and have participated in development of Climate Change Adaptation Plans.

(ii) Pilots on adaptation measures integrated into SLWM practices:

a. Farmers have been equipped with skills and knowledge in climate variability and adaptation through participation in FCS;

b. Pilot testing of adaptation technologies and practices in SLWM has been undertaken;

c. Manuals on climate adaptation in four agro-climatic zones (ACZ) have been developed.

(iii) Platform for scaling up climate change adaptation measures suitable for drought prone areas:

a. The 'knowledge products' developed by the project include – ACZ specific manuals on adaptation technologies/ practices, curriculum for FCS training, and, project process documentation such as strategy papers and progress reports.

b. Dissemination of these products has been done through the project website, district and state level meetings, etc., and will be useful to other existing and emerging adaptation projects/programs in the country.

ES11 The project has created a cadre of 295 trained farmer resource persons [3] (including 35 percent women), trained 1156 farmers through FCS, and facilitated the formation of CCACs at the habitation and HU levels. This capacity and institution building has led farmers in the project areas to actively engage in decision-making on crop management using PCM data, soil fertility and moisture measurements, and, groundwater data. It has involved farmers in evaluating various adaptation technologies/practices through pilot testing (e.g., water harvesting/storage, water conservation, intercropping and border cropping, mulching, integrated pest management [IPM]/non-chemical pest management [NPM], fodder cultivation, etc.). These interventions have resulted in reduced input costs and sustained yields. There is also increased awareness of adaptation measures beyond the project implementation areas, and as a result, there is increasing demand from other HU level CBOs in the two states for establishment of PCM stations.

ES12 A key feature of the project has been the close involvement of the stakeholder communities institutionalized through the CCACs (for example, the land for the PCM stations has been donated by individual farmers, the daily PCM data collection and dissemination is done by volunteer farmers, the FCSs are conducted by trained 'farmer resource persons', etc.). The project has institutionalized the continuance of various core project activities such as PCM data collection, operation and maintenance of the PCM equipment, periodic CCAC meetings, etc., through agreements with HU level CCACs and setting up of a HU level CCA fund.

[3] These were multi-skilled – as barefoot climatologists, hydro-geologists, agri-scientists, institutional specialist, etc.

ES13 BIRDS as the Project Executing Agency has set up a PMU consisting of a Project Manager, a team of technical specialists and personnel for finance and administration. Field Officers in each partner NGO coordinated the implementation of the project activities at the HU level. The CBOs have a MoU with the partner NGOs describing mutual roles and responsibilities in the project. Providing for the required expertise at the PMU and partner NGO levels, and delivering this expertise to the field staff using multiple channels (training, strategy papers, field visits) has helped in communicating clear deliverables and in ensuring quality across the project. The key project instruments that enabled feedback-based planning, consistent monitoring and timely remedial action were: Annual Work Plans and Budgets; Half Yearly Progress Reports; Project Partner's Meetings; and, Plan and Review Meetings. The financial resources management has been responsive to the project results framework. In line with the issues, problems and risks noted during implementation, some of the original allocations were altered as per the provisions in the Project Document and in consultation with the FAO. The budget of USD 909,091 from GEF and USD 1,300,000 from ~~NEX~~ FAO and were utilized to deliver the overall project outputs.

ES14 As the GEF Agency for the project, FAO provided supervision and technical guidance services during project execution. The Government' participation in the project has been at all key levels – National, State and District. The Project Steering Committee provided the forum for various key stakeholders in the national and state Governments to be associated with the project – providing overall guidance, approving AWPBs and facilitating linkages with Government programs. These include: MoEF, GoI (SLEM-Technical Facilitation organization, United Nations Convention to Combat Desertification Focal Point, GEF operational focal point, Climate Change Division); Central Ground Water Board; State Government Departments of Rural Development, Agriculture, and, Forest. At the district level, involvement of the district level line departments was facilitated through planning and dissemination workshops that brought together the CBO leaders, scientists from Krishi Vignan Kendras, and officers from the Agriculture and Rural Development departments.

ES15 The nine PNGOs implementing SPACC[4] (including the project executing agency, BIRDS) have been working in a partnership mode since the APFAMGS project (2004-2009). This partnership model continued into the SPACC and brought with it the advantages of technical capacity, long-term association with the community and a proven working relationship with both the executing agency as well as with each other. The CBOs involved in the project were also in existence as Groundwater Monitoring Committees and HU Networks during the APFAMGS project – and expanded their agenda as well as membership base to focus on climate adaptation.

4. Project Challenges

ES16 The main challenges for the SPACC project have been:

[4] Details of the PNGOs are given below in subsection 1.2 of this report

- Demystifying Climate Variability, Change and Adaptation: Understanding climate variability/change and adapting to it is a challenge. The first FCS curriculum was broad in nature focusing on impacts of climate variability and change (on agriculture, water resources, livestock) and generic adaptation measures (soil water conservation, nutrient management, pest management, etc.). Based on the need for making climate adaptation more relevant and concrete, the FCS curriculum in the later two years was made crop and season specific – it focused on the required climatic parameters for various crop stages, the observed PCM data, the selection and piloting of relevant SLWM measures, the evaluation of the piloted SLWM measures, etc., through a 'learning-by-doing' approach.
- Sustainability: The key challenges with regard to post-project sustainability are: continued involvement of the CCACs in participatory monitoring of climate variability and its impact; sustaining the process of planning, testing, adopting and promotion of adaptation measures. Through agreements with HU level CCACs and setting up of a HU level CCA fund (with contribution from the community as well as the project), the project has institutionalized the continuance of PCM data collection, operation and maintenance of the PCM equipment, periodic CCAC meetings, etc.
- Time frame: Projects 'breaking new ground' such as SPACC – need time to 'learn by doing' (for example, the FCS curriculum evolved over 3 seasons of 'trial-and-error'). Considering this, and the multiple deliverables, the original 3-year time frame of the project was a challenge. A longer timeframe (say an additional year of implementation) would have given the project the required room for consolidation, stabilization and systematic withdrawal.

ES17 The indicators in the project results matrix appear to have been well considered and chosen; as such, there does not appear to have been any significant issues with measurement of results.

5. Lessons

ES18 Even within the short time frame of the SPACC project – about 3½ years – its contribution to the knowledge base in the country on participatory climate monitoring and community adaptation is significant. While there has not sufficient time for policy outcomes to have resulted from project interventions, there has been considerable diffusion of awareness of the relevance and importance of PCM mechanisms in the project areas and districts and there is anecdotal evidence of increasing demands from non-project areas to take up similar interventions. This is also reflective of the strong relationships the project has been able to build with stakeholders in the project area, including with district administrations and relevant government officials (especially with Agriculture Department personnel), among others.

ES19 All approaches and interventions developed and deployed were innovative; the extensive project process documentation developed will ensure that these could easily be adapted and applied to other geographical and developmental

contexts in other parts of Andhra Pradesh and Telangana, as well as in other states and elsewhere outside of India.

ES20 The project faced multiple (technical, operational and other) and sometimes complex challenges during various stages of implementation; however, it has been able successfully address these challenges through systematic improvisation (some of these are articulated in various project documents and presentations).

ES21 Some of the key lessons from the project, that will be useful for other existing and emerging projects on climate adaptation, are:

- Participatory Climate Monitoring: PCM – as opposed to monitoring using automatic weather stations – actively engages the farmer in seeking and utilizing weather data. While this requires substantial inputs in community involvement and capacity building, there is more ownership of the data and appreciation of its value.
- Farmer Climate Schools: FCS help in several ways – analysis of the PCM data and its utilization for farming decisions, evaluation of selected adaptation technologies and practices by systematic examination of pilot and control farm plots, institutional building of the CCACs, etc. Farmer resource persons can be trained to conduct FCS on their own, with limited external facilitation support.
- Strong institutions and building on existing capacities: The project was built upon the foundation of the APFAMGS project. The CBOs as well as partner NGOs had a history of working together and of working on participatory hydrological monitoring, crop water budgeting, etc. This institutional readiness gave SPACC a head start in terms of its ability to secure community involvement and to demystify the abstract concepts of climate variability, change and adaptation into concrete action for livelihood enhancement. Having strong institutions is a necessary precondition for a participatory climate adaptation intervention.
- Mechanisms for widening the stakeholder group: The Project Steering Committee was an important mechanism that helped to bring in significant institutions – especially of the state Government – into the stakeholder group of the project.

ES22 Given that the SPACC project has been able to successfully address/complete all planned intervention elements within agreed budgetary frameworks suggests that the project was to a large degree cost effective.

6. Next Steps

ES23 SPACC has enabled the farming communities in the project area to build their capacities in climate adaptation. However, building adaptive capacity is not a one-time milestone – rather, it is an on-going process. For supporting the CBO's work on climate adaptation, augmenting the adaptive capacity already generated in the intervention HUs, and towards scaling up interventions to other areas, it may be useful to explore the following as next steps:

- CCAC linkages with existing projects/schemes of the State and Central Governments: By establishing linkages with the Gram Panchayat, and with other CBOs operating at the village level, and by actively participating in the Gram Sabha, the CCACs may be able to tap resources from existing Government schemes to support the climate adaptation interventions (for example, the National Rural Employment Guarantee Act);
- Partner NGO linkages with other sources of support such as the Adaptation Fund. The National Bank for Agricultural and Rural Development (NABARD) has been accredited by the Adaptation Fund Board of UNFCCC as National Implementing Entity in India. NGOs are eligible to submit projects directly to NABARD for accessing the Adaptation Fund and to act as Executing Entities;
- Federating CBOs: Considering that the CBOs associated with the project have a long history and are strong entities, it may be useful to federate the HU-CCACs at larger levels – district and state. The federations will be able to negotiate with Government departments, private businesses as well as NGOs to source technical expertise, market linkages, etc., to support climate-smart agriculture; and
- Integrating capacity building on coping with/managing the outcomes of extreme events including building linkages and mechanisms for deploying and adopting weather and index based insurance and micro-insurance measures.

7. Pathways to Scale and Transformational Impact

ES24 SPACC has demonstrated the considerable value-add that local climate variability monitoring and adaptation technologies/practices can give to agriculture and related livelihoods. As of now, considering that the project has been of a relatively short duration and that while there it has been extensively documented, interventions currently remain confined to the project areas. At the same time, the project has taken a number of steps to lay the ground for facilitating convergence at the local, state, and other levels, including provision of technical advice to GoAP (Department of Rural Development) on integration of PCM in Integrated watershed Management Programmes (IWMPs), sharing of the PCM concept and practice shared at various district level dissemination workshops, facilitation of SPACC – GEF Small Grants Programme (SGP)[5] exchange visits, exposure visits to representatives of other HUs to PCM stations and SLWM pilots, etc.

ES25 The successfully demonstrated SPACC approaches and interventions – particularly the PCM, SLWM pilots, etc. – could be potentially replicated

[5] The Small Grants Programme (GEF UNDP/SGP) globally in 122 countries is funded by Global Environment Facility (GEF) as the corporate program of the GEF is executed by the United Nation Development Program (UNDP), on behalf of the GEF partnership. GEF SGP primarily works in five GEF focal areas: conservation and sustainable use of biodiversity, mitigation and adaptation to climate change, protection of international waters, reduction of chemicals such as persistent organic pollutants (POPs), and prevention of land degradation, including sustainable forest management. Adaptation to climate change activities are funded by the GEF Strategic Priority for Adaptation and other donors.

elsewhere – not only in Andhra Pradesh and Telangana, but also in other developmental contexts in India or elsewhere. These could also be valuable for augmenting existing government programs (on rural livelihoods, agriculture and natural resources management). Some of these programs that will benefit from integrating the SPACC approaches and interventions and using the 'knowledge products' developed and disseminated by SPACC include:

- National Rural Livelihood Mission, Ministry of Rural Development, Government of India – especially through the GEF supported 'Sustainable Livelihoods and Adaptation to Climate Change (SLACC)' project.
- Community Managed Sustainable Agriculture, Society for Elimination of Rural Poverty, Departments of Rural Development, Governments of Andhra Pradesh & Telangana – especially through the World Bank supported 'Rural Inclusive Growth' projects currently under preparation.
- IWMPs, Departments of Rural Development, Governments of Andhra Pradesh & Telangana.

ES26 The knowledge products as well as the large pool of trained and 'aware' stakeholders that the SPACC project has generated provide the means by which its expertise is available to other similar projects and for scaling up. Beyond government programmes, the private sector is already making inroads into agriculture and allied sector programmes through initiatives such as contract farming, and as such there are opportunities for to take the SPACC interventions to scale. The project approach and interventions (PCM in particular) could also find potential usage in related sub-sectors such as animal husbandry and dairying, poultry farming, etc. Together with other interventions such as risk transfer through weather-based index insurance etc., the SPACC interventions have the potential to larger support climate-smart agriculture contexts in the target states as elsewhere.

1 Project overview

1.1 Key climate risks and development objective

1. The geographical boundary of the project was the States of Andhra Pradesh and Telangana [6] in southern India. The state experiences high climate variability with some areas worst affected by recurrent droughts. These areas include eight rain-shadow districts - Anantapur, Kadapa, Kurnool, Chittoor (in the Rayalaseema region), Mahbubnagar, Nalgonda, Ranga Reddy (in Telangana region) and Prakasam (in Coastal Andhra region) - which have been declared drought-prone by GoI. The project covered seven of the drought-prone districts with pilot activities in nine HUs within the districts[7]. The Ranga Reddy district was not been included as it is in the vicinity of Hyderabad and is target of large-scale urbanization.

2. The probability of occurrence of droughts is considerably high in the proposed project area with drought frequency of at least one event every 6 years[8]. In the last 20 years (1988 to 2007) the dependable rainfall decreased during the months of June, July and October. An increasing temperature trend (0.2-0.3^{O}C) has also been observed in some project districts in the Telangana region[9].

3. Negative impacts of drought affect millions of people dependent on agriculture for their livelihood. During the past eight drought events (1980-1, 1984-5, 1985-6, 1986-7, 1994-5, 1999-2000, 2002-3) the eight drought prone districts accounted for about 70 percent of the decrease in agricultural production at the state level[10]. Significant yield losses in major crops occurred during the events. In the case of rice, the yield loss, as a percentage of yields in normal years, ranged from 8 to 62 percent depending on the drought severity. During the severe 2002-3 drought, the production of rice and other cereals decreased to an extent that they had to be imported from other states. The total employment loss was estimated at more than 4.4 million Indian Rupees (INR). At the household level, droughts lead to a sharp decline in income[11]. Small farmers, rural labourers, women and the landless poor were the worst affected

[6] The original project boundary at the time of project design was the State of Andhra Pradesh; subsequently, on 2 June 2014, the state was bifurcated into Andhra Pradesh and Telangana; the latter became the 29th state of India, consisting of the ten north-western districts of Andhra Pradesh with Hyderabad as its capital.

[7] The seven drought-prone districts have been delineated into 63 HUs in the Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) project. A HU can be a sub-basin or a basin. Activities in the APFAMGS project, which the Project was closely linked to, are centred on the HUs.

[8] Spatial pattern of trends in Indian sub-divisional rainfall (Department of Hydrology, the Indian Institute of Technology, and Central Water Commission, 2007)

[9] Agro met-Cell, Agricultural Research Institute, Acharya N. G. Ranga Agricultural University (ANGRAU) study on climate variability in Andhra Pradesh

[10] Overcoming Drought – Adaptation Strategies for Andhra Pradesh (World Bank, 2006)

[11] Climate Change Impacts in Drought and Flood Affected Areas: Case Studies in India (World Bank, 2008)

with their incomes falling close to or below the poverty line further increasing their vulnerability to future drought events. Responses ranged from changing farming decisions to migration, extreme cases of starvation, loss of health, and even life itself (including cases of suicides).

4. Frequent droughts coupled with unsustainable agricultural practices are contributing to land degradation in the project area. It was estimated that about 7 percent of the total geographical area and 12 percent of cultivable area of (the undivided) Andhra Pradesh was degraded [12]. As a result of land degradation, the net area sown in Andhra Pradesh had declined from 41 percent of the total geographical area in 1990-91 to 37 percent in 2004-05[13].

5. Groundwater levels are also affected by droughts and overexploitation of water resources in the state. Groundwater is used throughout the state for irrigation and household consumption. In an estimate made by the Andhra Pradesh Ground Water Department in 2007, 9 percent of groundwater in the state was categorized as over-exploited, 6 percent as critical and 15 percent as semi-critical. In total 30 percent of groundwater basins are in semi-critical to over-exploited stage, with groundwater levels declining in many districts. Environmental impacts could be far-reaching due to the inter-connectedness of the aquifers and interactions between the aquifers and the surface water. Modelling efforts indicate that dry- season surface water flows could decline by up to 75 percent if historical patterns of drought and over- exploitation continue.

6. Climate change projections indicated that rainfall during the southwest monsoon season will likely decrease and become more variable in the drought-prone areas of Andhra Pradesh (and Telangana) by 2041-60. The decrease in rainfall will be accompanied by a significant decrease in average annual runoff and yield decline in some of the major crops[14]. Some projections for 2050 showed a decrease in rice yield and an increase in yields of other rain-fed crops (maize, sunflower, jowar and groundnut). The differences in the predictions reflected the uncertainties inherent in climate change impact predictions. They also highlighted the need to better understand the impacts of climate variability and change at the local level in order to develop effective adaptation strategies.

7. While climate variability (droughts) and effects of climate change are unavoidable, the communities' resilience and adaptive capacity to deal with the impacts can be enhanced. The GoI and the GoAP have established a number of land and water management initiatives to address the impacts of drought on agricultural production. However, these initiatives were mostly focused on physical inputs and less on community capacity building, and lack of understanding of climate change impacts was causing weak integration of adaptation in these investments. The capacity of communities to incorporate climate risk into their decision-making and to respond to climate change remained weak.

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[12] National Remote Sensing Agency (2005)

[13] Andhra Pradesh Human Development Report, 2007

[14] Climate Change Impacts in Drought and Flood Affected Areas: Case Studies in India (World Bank, 2008)

8. Given the above conditions, the development objective of the SPACC project was to strengthen the knowledge and capacities of communities to respond to climate variability and change impacts in pilot HUs in seven drought-prone districts of Andhra Pradesh and Telangana. The global environmental objective was to contribute to knowledge building and experiences in integrating climate change adaptation in sustainable land and water management in drought-prone areas. Through an innovative farmer driven grass-root level environmental action, which takes into account the effects of climate variability and change, the project was to contribute to the rehabilitation and protection of critical ecosystems, and improved soil carbon sequestration while raising agricultural productivity.

1.2 Key Partners

9. The major institutional stakeholder was MoEF of the GoI, in its capacity as the Country GEF Operational Focal Point and custodian of the SLEM programme. MoEF was to play a crucial role in providing support to project implementation and mainstreaming learning into the government policy framework. Other institutional stakeholders were FAO, the World Bank and UNDP - as the GEF Implementing Agencies for the SLEM program, and the ICFRE as the TFO to facilitate learning exchange between SLEM projects.

10. At the state level, the GoAP through the Principal Secretary PR&RD, was the key stakeholder. BIRDS were the executing agency responsible for the implementation of project activities, with the support of a PMU, consultants and partner NGOs (see Table 1 below). Other stakeholders, on account of their engagement in similar work included: M. S. Swaminathan Research Foundation, International Crop Research Institute for Semi Arid Tropics (ICRISAT), Madras School of Economics (MSE), Central Research Institute for Dry land Agriculture (CRIDA), Acharya N.G. Ranga Agricultural University (ANGRAU), World Wide Fund for Nature (WWF), Centre for Economic and Social Studies (CESS), National Geophysical Research Institute (NGRI), GoAP Departments of Rural Development (DRD), Agriculture, Horticulture and Animal Husbandry, and Groundwater, University of Hyderabad, Osmania University, Action for Food Production (AFPRO), and Agriculture Man and Ecology Foundation (AMEF). Support from these agencies were to have been utilized to achieve specific tasks based on their area of expertise.

Table 1: Details of the PNGOs contracted for implementation of SPACC Project

Acronym	Full Name of the Society	Base Town	District
CARE	Centre of Applied Research and Extension	Achampet	Mahabubnagar
CARVE	Collective Activity for Rejuvenation of Village Arts and Environment	Markapur	Prakasam
DIPA	Development Initiatives and People' s Action	Giddalur	Prakasam
GVS	Gram Vikas Samstha	Madanapalli	Chittoor
PARTNER	People' s Activity and Rural Technology Nurturing Ecological Rejuvenation	Porumamilla	Kadapa
SAFE	Society For Sustainable Agriculture And Forest Ecology	Kambhum	Prakasam

SAID	Social Awareness for Integrated Development	Miryalaguda	Nalgonda
SYA	Star Youth Association	Guthi	Anantapur

11. At the HU level in the seven drought-prone districts of Andhra Pradesh: Anantapur, Kadapa, Kurnool, Chittoor (in the Rayalaseema region), Mahbubnagar, Nalgonda (in Telangana region) and Prakasam (in Coastal Andhra region), farmers and communities as well as the CBOs and were the main direct beneficiaries of the capacity building provided by the project and they were to be involved in the development and application of measures in adaptation. The CBOs represented populations highly affected by drought and land degradation and had established working relationships with the selected partner NGOs and they had been involved in the project design.

1.3 Main Activities

12. The key element of the project strategy was the capacity building 'Climate Change Schools' approach that was adapted from the successful FAO promoted Farmer Field Schools (FFS) approach. The approach is based on an 'experiential learning cycle' where a group of farmers are encouraged to assemble at regular intervals to go through pre-determined number of FFS sessions to identify a problem, consider different options for problem solving and implement the best option. The method of interaction was non-formal using visuals, models and other tools. The approach has been used in the APFAMGS project to develop a methodology for conducting annual crop budgeting workshops led by farmers and other sessions covering all the topics of Farmer Managed Groundwater Systems in one full hydrological cycle/year. These new Farmer Water Schools (FWS) with an established set of sessions, session guides, and Non Formal Education tools, have already shown great success in allowing farmer groups to gain the necessary skills and knowledge to manage their aquifer systems in a sustainable manner. The strategy had been highly effective because the knowledge and skills generated through experiential learning and collective sharing processes tended to get internalized within the community and contributed to the sustainability of the project outcomes and impact.

13. The pilot testing of adaptation measures with full participation of the communities was designed to allow for identification of the best practices and their wide adoption in the target districts. The project was designed such that it built on the community-based institutions (Groundwater Management Committees and HU Networks) already active in groundwater management in the proposed project area. It also built on the capacity developed in the APFAMGS project, which had already trained more than 9000 farmers and CBO leaders in scientific data collection, analysis and dissemination. Project implementation by BIRDS, which had been implementing the APFAMGS project in partnership with local NGOs, would allow an optimal exchange of information and shared project management costs.

14. The project had three components: 1) Information tools for decision making and local institutional capacity development; 2) Pilots on adaptation measures integrated into SLWM practices in farming systems in drought prone areas; and 3) Platform for scaling up climate change adaptation measures suitable for drought prone areas.

Component 1 -- *Information tools for decision making and local institutional capacity development*: The aim of this component was to give farmers and CBOs the necessary knowledge, capacities and tools to understand climate variability, assess the related vulnerability of land, water and crop production, and identify adaptation measures to be integrated into SLWM practices. In order to develop tools with local relevance, the component activities focussed on combining scientific historical data and climate change impact predictions with local knowledge on climate variability and its impacts on land, water and crop production. The variables included in building the local knowledge on vulnerability and identification of adaptation measures were: conditions of land degradation and soil fertility; water availability, usage and annual groundwater recharge; and crop yields, changes in crop growth cycles, and pests and diseases change in gestation periods. In the development of local institutional capacities, the project built on the existing CBOs in 7 pilot HUs.

In this component, technical assistance was provided for: (i) conducting a study on local and scientific knowledge on climate change/variability and its impacts on land, water and crop production in Andhra Pradesh; (ii) establishing a local farmer-led monitoring system of key indicators of climate variability and its impacts on land, water and crop production; (iii) establishing climate change adaptation committees in at least 9 CBOs and training of at least 50 CBO leaders and representatives in climate variability monitoring and integration of adaptation measures into SLWM practices; and (v) identification of local adaptation measures and development of local Climate Change Adaptation Plans for at least 7 CBOs.

Key expected outputs included: (i) completed study on local and scientific knowledge on impacts of climate variability/change on natural resources in Andhra Pradesh; (ii) local monitoring system of climate variability and impacts; (iii) CBOs with capacities to integrate climate adaptation measures in SLWM. The main expected outcome of the component was: (i) farmers and Community Based Organizations (CBOs) make informed decisions on land and water management based on scientific and local knowledge taking into account impacts of climate variability and change.

Component 2 -- *Pilots on adaptation measures integrated into SLWM practices in farming systems in drought prone areas*: This component supported farmers in acquiring skills in managing climate variability and testing adaptation technologies in farming systems. Adaptation pilots were to allow for the assessment of the performance of alternative technologies and practices identified in component 1. The pilots were selected based on areas highly affected by drought and land degradation and socio- economic needs.

The component was to finance inputs and technical assistance to support: (i) development of a curriculum for the FCS with a focus on managing climate variability in drought-prone areas as part of SLWM; (ii) establishment of at least 7 FCS with at least 350 female and male farmers participating; (iii) at least 3 pilots testing technologies and practices and assessment of their performance; and (iv) preparation of at least 3 manuals on best adaptation practices and technologies.

Key outputs will included: (i) farmers participating in FCS and in pilot testing adaptation technologies in farming systems; and (ii) adaptation technologies and practices in SLWM pilot tested. The main outcomes of the component will be: (i) farmers with skills in managing climate variability and change; and (ii) adequate adaptation technologies and SLWM practices in farming systems in drought prone areas identified.

Component 3 -- *A Platform for scaling up climate change adaptation measures suitable for drought prone areas*: The aim of this component was to systemize project results and products and create a knowledge hub, or platform, from which the results will be projected. The dissemination and scaling up was to include institutional and learning approaches to climate variability management as part of SLWM, and best adaptation practices and technologies in farming systems.

This component was to finance technical assistance for: (i) systemizing project results and products (FCS Curriculum, field testing methods, adaptation technology and practices manuals, and institutional approaches) and making them publicly accessible on a platform website; (ii) conducting at least 3 dissemination workshops with at least 150 participants; and (iii) preparation of media materials, meetings with media representatives, and media field visits.

The key outcome for this component will be: adoption of a package of methods, tools and institutional approaches in support of district and state level natural resource management initiatives to address the impacts of drought. The documentation and dissemination of these SLWM approaches will be hosted and projected by the platform.

1.4 GEF grant funding, non-GEF co-financing

15. The total GEF financing amounts to USD 909 091. In addition to the GEF financing, other co-financiers are BIRDS and partners NGOs (USD 1 553 563 in-kind) and FAO (USD 1.3 million).

1.5 Key Indicators

16. Considering that the main focus of the project was capacity building via training and pilot testing and local institutional strengthening, the project indicators were largely process and institutional indicators such as: tools developed (monitoring system of climate variability and its impacts; climate change adaptation plans; FCS curriculum; and manuals on best adaptation technologies) and levels of created capacities (CBOs with operating climate change adaptation committees and leaders/members trained in integration of adaptation measures in SLWM practices; farmers graduating from FCS and participating in pilot testing of adaptation measures; and pilots producing results on the adaptation performance of alternative technologies and practices). On-the ground impact indicators (average crop yields; improved annual groundwater balance; volume of water harvested or water saved through usage of water harvesting and saving devices/methods; soil moisture availability; and/or organic carbon content) will, however, also be monitored in relation to each pilot testing of adaptation measures. With the participation of farmers, a baseline was to be established in the case of each pilot to allow

for this monitoring essential to evaluate the adaptation performance of the technologies and practices under trial.

2 Project background and brief history

2.1 Global and national context

17. Global climate change is expected to have wide-ranging effects on the environment, and on socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity. In many parts of the world including India, these impacts are already being felt. India's economy and a majority of its population are highly dependent on climate sensitive sectors such as agriculture, animal husbandry, fisheries, tourism, etc. Since climate change is expected to impact natural and human systems adversely by inducing changes these systems, India can be considered highly vulnerable. Climate change is only likely to exacerbate India's already high physical exposure to climate-related disasters (65 percent of India is drought prone, 12 percent flood prone, and 8 percent susceptible to cyclones).

2.2 State contexts

18. The southern Indian states of Andhra Pradesh and Telangana, which encompass the project area, have a combined population of 84.5 million accounting for 7.4 percent of the country's population. About 67 percent of the population lives in the rural areas. The total rural population in the seven districts covered by the project – Anantapur, Kadapa, Kurnool, Chittoor, Prakasam, Mahabubnagar and Nalgonda – is around 19,690,000[15].

19. The performance of the social sectors in the states as a whole have not been satisfactory as compared with many other states in India. Poverty, high infant mortality, high incidence of child labour and educational deprivation are major issues. The districts of Anantapur, Kurnool, Mahabubnagar, Prakasam and Kadapa are among the ten districts considered as having the lowest adaptive capacity (a composite measure based on parameters including poverty, literacy, gender gap in literacy, access to markets, road connectivity, electrification, etc.)[16].

20. Agriculture (crop production, livestock, forestry and fisheries) contributed to more than one third of the Gross State Domestic Product of the undivided state, and was the primary source of livelihood for about 70 percent of the state's population. Agriculture provides employment directly or indirectly to nearly 90 percent of the workforce in the rural areas. Of the 27.5 million hectares total area of the two states, about 40 percent is sown. Rice is one of the main crops, while the other major crops include maize, sorghum, sugarcane, mango, groundnut and sunflower. Agriculture is largely dependent

[15] Census of India, 2011. *Primary Census Abstract*. Viewed at http://www.censusindia.gov.in.

[16] Rama Rao C A, Raju B M K, Subba Rao A V M, Rao K V, Rao V U M, Kausalya Ramachandran, Venkateswarlu B and Sikka A K (2013). *Atlas on Vulnerability of Indian Agriculture to Climate Change*. Central Research Institute for Dryland Agriculture, Hyderabad P 116.

on rainfall. An estimated 46 percent of the net crop area is irrigated, with about 2.5 million hectares under groundwater irrigation (in 2011-12). The rest of the sown area is rainfed[17].

21. The influence of south-west monsoon is predominant in Telangana (764.5 mm) followed by the two regions of Andhra Pradesh – Coastal Andhra (602.26 mm) and Rayalaseema (378.5 mm). Whereas the north-east monsoon provides a high amount of rainfall to Coastal Andhra (316.8 mm) and Rayalaseema (224.3), followed by Telangana (97.1 mm)[18].

22. The project districts of Anantapur, Kadapa, Kurnool, Chittoor, Prakasam, Mahabubnagar and Nalgonda – receive average annual rainfall well below the average of the states they belong to and are the worst affected by drought. The Government of India has declared these districts drought prone[19].

23. Changes in average temperature and rainfall have been observed in the drought-prone districts. In the 20 years from 1988 to 2007, there has been a decreasing trend in the June, July and October rainfall. There has also been an increasing trend in average temperature with an increase of about 0.2-0.3°C. Climate change projections indicate that rainfall will decrease in the drought prone areas by 2041-60. Rainfall will decrease by 5 to 20 percent during the southwest monsoon season, with a 5 to 10 percent decrease in the number of rain days per year[20]. A significant reduction in the average annual runoff from 150 mm to 110 mm in the Pennar River basin, which covers four of the project districts, has been predicted. Overall, the drought-prone districts are expected to face 'chronic water scarcity and drought conditions' under climate change.

24. Drought has adverse economic, social and environmental impacts. It has a significant negative impact on agriculture as it induces yield loss, unemployment and loss of income. These in turn increase vulnerability of the population to climate variability. The impact is felt most by farmers, agricultural labourers and the communities in rainfed areas. Under climate change, crop yields and production will likely decline, leading to an increase in the number of people at risk of food insecurity[21].

25. Potential risks to the agricultural system from changing climatic conditions can be identified at multiple levels. Climatic variability directly impacts yields at crop level and also affects soil quality; water resources; brings in pests, diseases and weeds, etc. further aggravating the impact on the cropping system, thereby reducing the yield per hectare of land or per unit of livestock at the farm level. The adverse impact of climatic variability on agriculture production at farm level gets aggregated to the level of the food system in terms of food shortages and rising prices, which can also endanger food and

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[17] Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. Viewed at http://lus.dacnet.nic.in/dt_lus.aspx.

[18] Institute of Health Systems. *Agricultural Profile of Andhra Pradesh*. Viewed at http://www.ihsnet.org.in/apstateprofile/apagriculturalprofile1.htm.

[19] FAO SPACC Project Document, subsection 1.1 General and Sectoral Context

[20] Overcoming Drought – Adaptation Strategies for Andhra Pradesh (The World Bank, 2006)

[21] FAO SPACC Project Document, subsection 1.1 General and Sectoral Context

livelihood security. The districts of Chittoor and Anantapur are regarded as having 'very high' vulnerability of agriculture to climate change, while Mahabubnagar and Kurnool are regarded as having 'high' vulnerability[22].

2.3 Sectoral Policy and Plans

26. Given the role of agriculture in livelihoods of the rural poor, the Government of India has placed agriculture and food security at the centre of strategies for socio-economic development. This is reflected in the National Agriculture Policy (2000) and national five-year plans. The National Agricultural Policy aims at sustainable development of agriculture, creation of gainful employment in the rural areas, raise standards of living for farm communities, environmental preservation and a resurgent economy. Over the next two decades it aims to attain: a growth rate in excess of 4 percent per annum in the agriculture sector, based on efficient use of resources that conserves soil, water and biodiversity; and growth which is widespread across regions and farmers.

27. The Tenth Five-Year Plan (2002–07) emphasized that while India must target a high rate of economic growth, it must simultaneously strive for enhancement of human well-being. This includes adequate levels of consumption of food and other consumer goods, access to basic social services, expansion of economic and social opportunities for all individuals and groups, reduction of disparities, and greater participation in decision-making. The Tenth Five-Year Plan period saw several milestones in environmental policy and law. The first National Environmental Policy came into effect in May 2006. The Environmental Impact Assessment Notification and Coastal Zone Regulation Notification were amended to improve the quality of environmental governance. The Eleventh Five-Year Plan (2007-2012) builds on the tenth, recognizing the increasing dangers of environmental degradation and accumulation of evidence of global warming and climate change. The plan calls for initiatives to integrate environmental concerns into planning and development activities across all sectors. The eleventh plan recognizes the need to prioritize the process of adaptation, considering that even optimal mitigation response will not be able to address the unavoidable effects of climate change.

28. The Prime Minister formally launched India's National Action Plan on Climate Change (NAPCC) in June 2008. The focus of NAPCC is on promoting understanding of climate change adaptation and mitigation, energy efficiency and natural resource conservation. One of the main components of the plan is the National Mission on Agriculture under which strategies integrating traditional knowledge and scientific knowledge will be developed. Under the aegis of the NAPCC, each state in India has been asked to prepare a State Action Plan for Climate Change (SAPCC); as in the case of the NAPCC, the SAPCCs are expected to also contain a chapter of on agriculture (and allied sectors), in line with and complementary to the imperatives of the National Mission for Sustainable Agriculture.

[22] Rama Rao C A, Raju B M K, Subba Rao A V M, Rao K V, Rao V U M, Kausalya Ramachandran, Venkateswarlu B and Sikka A K (2013). *Atlas on Vulnerability of Indian Agriculture to Climate Change*. Central Research Institute for Dryland Agriculture, Hyderabad P 116.

29. The project, through strengthening the knowledge and capacities of communities to better understand and adapt to climate variability and change, contributes to the achievement of the priorities and goals set in the national plans. It is also in line with the priority areas identified in the National Medium Term Priority Framework (NMTPF) 2009-2012 developed by the Government of India and FAO. The project is especially consistent with component 3 of the NMTPF whose objective is to pilot innovative approaches in agriculture and rural development in partnership with the government, NGOs and the private sector.

2.4 Project concept and design

30. The SPACC project evolved based on the experience of the previous FAO supported ~~NEX~~ project viz., APFAMGS. While APFAMGS organized communities for the purpose of sustainable groundwater management, SPACC aimed to further build the capacity of the CBOs, so that they could facilitate grass-root action for suitable adaptation, especially through participatory climate monitoring and sustainable land & water management practices. The global environmental objective (GEO) of SPACC project is stated as: "Establish a knowledge base for large-scale intervention on climate change adaptation". The project development objective (PDO) is: "Knowledge and capacities of communities in pilot HUs in Andhra Pradesh, India are strengthened to respond to climate change impacts".

31. The basic premise of the project is that the farmers with their practices aiming towards sustainable groundwater management have proved their technical and organizational capability and are capable of engaging themselves in the pursuit of community based climate change adaptation. In other words, the SPACC project broadened the agenda of CBOs from sustainable groundwater management to community based climate change adaptation.

32. Thus, from a concept standpoint, the Project is directly relevant to the United Nations Framework Convention on Climate Change (UNFCCC) Subsidiary Body for Scientific and Technological Advice (SBSTA): Five-year Programme of Work on Impacts, Vulnerability and Adaptation to Climate Change (UNFCCC/SBSTA/2006/5) [23] , now renamed as "Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change", which highlights the need for action in the above identified priority areas through practices and approaches that mainstream climate change adaptation and mitigation in agriculture practices (i.e. "Climate Smart Agriculture").

33. It is also in line with FAO's global goals and five strategic priorities[24] namely: (a) Contribute to the eradication of hunger, food insecurity and malnutrition; (b) Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner; (c) Reduce rural poverty; (d) Enable more inclusive and efficient agricultural and food systems at local,

[23] Adaptation to climate change in agriculture, forestry and fisheries: perspective, framework and priorities. FAO 2007.

[24] Reviewed Strategic Framework (2010 – 2019), FAO, March 2013. Conference document for the 38th Session, Rome 15 - 22 June 2013.

national and international levels; and (e) Increase the resilience of livelihoods to threats and crises.

34. The project concept is complementary and consistent with the specific outcomes established in the results framework of GEF's Special Climate Change Fund (SCCF) strategy [25] through a range of initiatives and interventions achieving:

- Reduced vulnerability through (a) mainstreamed adaptation in broader development frameworks at State level and in targeted vulnerable areas; (b) reduced vulnerability to climate change in development sectors; and (c) diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas.
- Increased adaptive capacity through: (a) increased knowledge and understanding of climate variability and change-induced threats at State level and in targeted vulnerable areas; (b) strengthened adaptive capacity to reduce risks to climate-induced economic losses; and (c) strengthened awareness and ownership of adaptation and climate risk reduction processes at local level.
- Knowledge and technology transfer through: (a) successful demonstration, deployment, and transfer of relevant adaptation techniques and tools in targeted areas and (b) enhanced enabling environment to support adaptation-related knowledge and technology transfer.

35. At the National Level, the Project is line with the NAPCC in general, and especially the imperatives of the National Mission on Sustainable Agriculture (NMSA), as also the National Biodiversity Strategies and Action Plans (NBSAPs) through its component of augmentation of natural resource base, its sustainable utilization and ensuring inter and intra generational equity. The Project also complements the Andhra Pradesh State Action Plan for Climate Change (SAPCC) in general and the priorities outlined in the agriculture chapter therein in particular.

36. The project adopted a results based management (RBM) approach, and a results framework was developed, and revised during the inception phase. The results framework also formed the basis for annualised planning using annual results frameworks. Internal annual reviews formed part of the project design. This approach demonstrated a flexible approach.

37. Given the problem statement as elaborated in the project document[26], the project's GEO, PDO and three stated outcomes/components – (a) Information tools for decision making and local institutional capacity development; (b) Pilots on adaptation measures integrated into Sustainable Land and Water Management (SLWM) practices in farming systems in drought prone areas; and (c) Platform for scaling up climate change adaptation measures suitable for drought prone areas – and the relevant outputs planned exhibit strong coherence and causal relationships.

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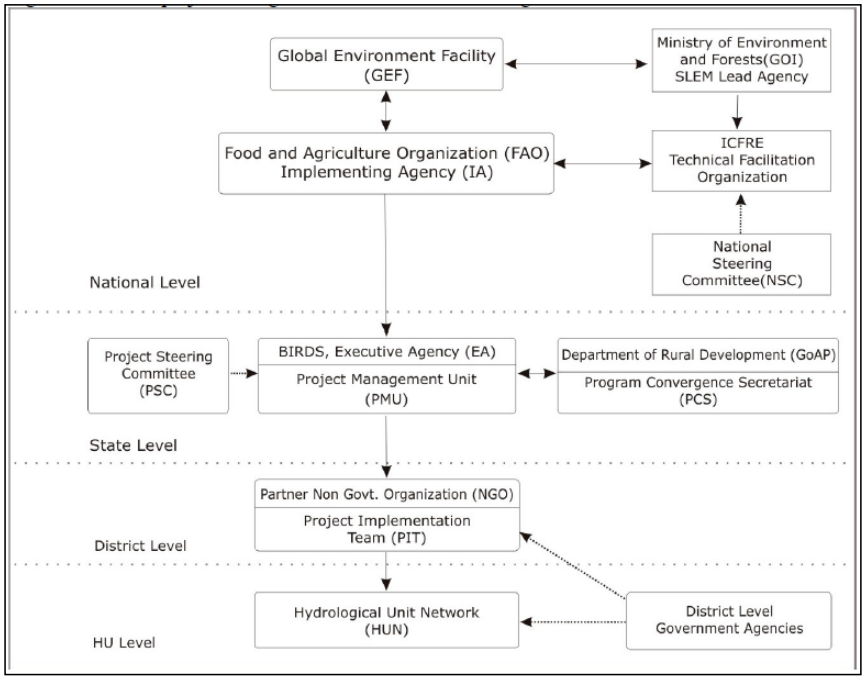
[25] Strategy on Adaptation to Climate Change for the Least Developed Countries Fund (LDCF) and The Special Climate Change Fund (SCCF), GEF (http://www.thegef.org/gef/pubs/Strategy_on_Adaptation_2011).

[26] FAO/GEF Project document; GEF Project ID: 3882, FAO Project ID: 604144

38. Indicators chosen in the results framework appear valid, robust and appropriate to the planned outcomes/outputs. While risks and assumptions do not find any significant mention in the results matrix itself, the project document (in subsection 3.5) details these, and appears to be appropriate. Further risk management has been adopted in the implementation arrangements and project management methods (see subsection 4.1 below). Conscious efforts also have been made to address social, and economic and equity concerns both in the project design (through inclusion of appropriate indicators) and in implementation (validated during the field visits of the consultants through anecdotal evidence) through balanced representation of gender and vulnerable groups/sectors in stakeholder participation and beneficiary selection.

39. Institutional and project management arrangements for the project are shown in Figure 1 below. FAO was the GEF Agency for the project and provided supervision and technical guidance services during project execution. Administration of the GEF grant was to be in compliance with the rules and procedures of FAO, and in accordance with the agreement between FAO and the GEF Trustee. A FAO Project Task Manager was nominated, to be responsible for the management of the GEF resources and all aspects in the agreement between FAO and BIRDS as the project executing agency.

Figure 1: Institutional arrangements for the SPACC project



40. The selection of BIRDS as the project executing agency appears was done based on its track record in the prior association with FAO's APFAGMS

project and in recognition of its access to a strong network of partner agencies/NGOs.

41. Appropriate arrangements for fostering convergence with government policies and programmes at all levels – from the district to the national level were inherent in the design.

42. The project, with duration of 3 years, started on December 6, 2010, with an overall budget of USD 3,762,654. Due to delayed start of the project, the project completion date was extended till 30 June 2014. However, the 9 field units closed their field operations on 30 April 2014.

3 Project achievements

3.1 Achievement at Objective level

43. The biggest accomplishment of the project was that it was able to successfully demonstrate integration of climate change adaptation in sustainable land and water management in drought-prone areas through innovative farmer driven grass-root level environmental action, contributing to improved soil carbon sequestration while raising agricultural productivity, improving livelihoods, and protecting critical ecosystems. Overall, the project seems to have significantly contributed to 'strengthening the knowledge and capacities of communities to respond to climate variability and change impacts in pilot HUs in seven drought-prone districts of Andhra Pradesh'.

3.2 Achievements at Outcome level

44. The project has been successful in developing PCM as a key information tool to aid in decision making on adaptation by communities. The project has developed local institutions – Community Climate Adaptation Committees – that have demonstrated ownership of the PCM, have identified various adaptation technologies/practices in SLWM, and have participated in development of Climate Change Adaptation Plans. The project has been successful in building skills of farmers in climate adaption technologies/practices through FCS. It has tested various adaptation technologies/practices and has documented these in the form of manuals for 4 agro-climatic zones. The project has been successful in documentation of – adaptation technologies/practices (ACZ specific manuals), capacity building inputs (curricula, strategy papers) and project processes (progress reports).

45. The main achievements of the project against each of its stated outcomes have been:

(i) Information tools and local institutional capacities developed for farmers and CBOs to make informed decisions on land and water management based on scientific and local knowledge, taking into account impacts of climate variations:

a. A study on local and scientific knowledge on impacts of climate variability/change on natural resources was completed;

b. A participatory climate monitoring (PCM) system, run by farmers, covering key climate variability and impact parameters has been made operational;

c. Community Based Organizations (CBOs) referred to as Community Climate Adaptation Committees (CCACs) have been built at the habitation and HU levels

The CCACs have demonstrated ownership of the PCM, have identified various adaptation technologies/practices in Sustainable Land and Water

Management (SLWM), and have participated in development of Climate Change Adaptation Plans.

(ii) Pilots on adaptation measures integrated into SLWM practices:

a. Farmers have been equipped with skills and knowledge in climate variability and adaptation through participation in Farmer Climate Schools (FCS);

b. Pilot testing of adaptation technologies and practices in SLWM has been undertaken;

c. Manuals on climate adaptation in four agro-climatic zones have been developed.

(iii) Platform for scaling up climate change adaptation measures suitable for drought prone areas:

a. The 'knowledge products' developed by the project include – ACZ specific manuals on adaptation technologies/ practices, curriculum for FCS training, and, project process documentation such as strategy papers and progress reports.

b. Dissemination of these products has been done through the project website, district and state level meetings, etc., and will be useful to other existing and emerging adaptation projects/programs in the country.

An overview of the project's achievements against the stated outcomes is given in the table below.

Table 2: Summary table of project achievement against outcomes

Outcomes and Outcome Indicators[27]	**Baseline Value**	**Target Value**	**Achievement**	**Evidence noted during field visits[28]**
Outcome 1: Information tools and local institutional capacities developed for farmers and community based organizations (CBOs) to make informed decisions on land and water management based on scientific and local knowledge, taking into account impacts of climate variations.				
Number of scientific tools for information on climate variability.	1	2	2 (Participatory Hydrological Monitoring, Participatory Climate Monitoring).	FCS participant farmers report enhanced knowledge and skills in PCM.

[27] BIRDS-SPACC. *Strategy paper Project Monitoring and Evaluation.* Undated note shared with review team on 11 June 2014.

[28] PCM record books and PCM village display boards were noted in all 7 HUs visited; Minutes book of CCAC meetings were checked in 3 of the 7 HUs visited. The review team interacted with CCAC members, PCM volunteers and SLWM pilot farmers in all 7 HUs visited.

Number of farmers accessing scientific information.	0	50	The PCM data is being collected daily by 295 trained volunteer farmers and shared through village display boards and mobile phone.	PCM record books and PCM village display boards have up-to-date data entry, minutes book of CCAC meetings.
Number of CBOs conducting climate monitoring.	0	9	9	CCAC members report high degree of confidence in sustaining the institution and for continuing monthly meetings, management of the CCAC Fund, operation and maintenance of the PCM stations, etc.
Outcome 2: Pilots on SLWM including climate variability adaptation in farming systems in drought prone areas.				
Number of pilots on climate variability adaptation in SLWM.	0	9	At least 3 SLWM pilots have been implemented in each of the 9 pilot HUs.	Minutes book of CCAC meetings, farmers' field dairy/record.
Number of farmers conducting pilots.	0	350 (FCS participants)	139 farmers have participated in the SLWM pilots[29] and 1156 farmers monitored the pilots through the FCSs[30].	CCAC members report significant adoption of SLWM practices by other farmers (for example, fodder cultivation reported to be adopted by about 70% farmers in Racherlaparam village, Narsireddypallevagu HU, Prakasam district). CCAC members report high degree of confidence in sustaining SLWM practices by individual farmers.
Number of CBOs facilitating pilots.	0	9	9 pilot HU-CCACs and 3 non-pilot HU level CBOs.	Minutes book of CCAC meetings.
Number of manuals on climate variability technologies/practices.	0	3	4 ACZ specific manuals.	-

[29] BIRDS-SPACC. *SLWM Pilot Farmers List 2012-13 and 2013-14*. Database files shared with review team on 11 June 2014.

[30] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad*. Presentation made to review team on 11 June 2014.

Outcome 3: A platform for land based climate change adaptation measures suitable to drought prone areas developed; adoption of a package of methods, tools and institutional approaches in support of District and State level natural resource management initiatives to address the impacts of drought.				
Project website.	0	1	1	-
Number of dissemination workshops.	0	3	11 (9 HU level dissemination workshops and 2 state level dissemination workshops).	-

Box 1: Climate Resilient Groundnut Farming[31]

Groundnut accounts for 33 percent of the total area cropped in the project and is thus an important livelihood support to the communities. The Sustainable Land and Water Management (SLWM) pilot 'Climate Resilient Groundnut Farming' was implemented in the Kharif season of 2012 and 2013, with 15 farmers from Anantapur. Each farmer had a pilot plot measuring 2,000 m2 (0.2 ha) and a control plot of same size for comparison between the pilot measures and the conventional farmer practices.

The SLWM pilots and the Participatory Climate Monitoring (PCM) are brought together in the Farmer Climate Schools (FCS). The FCS sessions involve a discussion on the weekly climate data of the past 30 years, on trends in temperature and rainfall, on the PCM data collected in that particular week and on the crop impact. The participating farmers undertake tests on soil moisture, soil field capacity and wilting point, and, soil organic carbon. They conduct systematic observations on crop growth, pest and disease incidence, weed infestation, presence of natural predators, etc. Based on these discussions, test results and observations, decisions on crop management are made (water management, pest and disease management, etc.).

Climatic factors influencing the groundnut cultivation in the pilot area were identified as: i) continuous dry-spells in flowering stage reduces the crop yield; ii) high humidity (above 90 percent) causes leaf spot disease; iii) low humidity (below 40 percent) and high temperatures (above 35°C) increases the incidence of leaf miner pest; and iv) absence of warm and dry weather (temperatures between 30°C to 34°C) results in improper pod setting, and prolongs the growing period. For reducing the climate risk in groundnut cultivation, the following interventions were piloted: introduction of the drought-resistant groundnut variety K-9, measures to improve soil moisture availability, integrated pest and disease management, inter-cropping and low-cost nutrient management.

In the pilot plots, three dry spells occurred during the vegetative, flowering and pod formation stages – with the longest dry spell of 22 days being at the flowering stage. Conservation of soil moisture was therefore critical. The

[31] BIRDS-SPACC. *Climate resilient farming: Groundnut. Lessons from Sustainable Land and Water Management Pilots.*

interventions on water management included conservation furrows (four meters apart with depth of 15-20 cm) before the first shower and mulching with rice husk (2.5 ton per hectare). The soil moisture test results clearly showed that the moisture status in the pilot plot was higher throughout the critical stages of the crop. For example, at the critical period of 6-8 weeks, the soil moisture in the pilot plot averaged 9% while in the control plot it was 7.6%.

Of the 12 pilot plots in 2012, 8 were found have low (less than 0.5 percent) and 4 were found to have medium (0.5 - 0.75 percent) soil organic carbon content. The interventions for fertility management in the pilot plots included: crop residue incorporation into the soil after harvest; addition of organic manure (4-5 tons per hectare), Neem cake (100 kg per hectare), rice husk (2.5 ton per hectare), Rhizobium (200 gm per 20 kg of seed), etc. As a result of the interventions, soil organic carbon content in the pilot plot increased from 0.48 to 0.54 percent.

The district average yield for Kharif groundnut is 581 kg per hectare in Anantapur (2005-2010). The yield in the pilot plots during Kharif 2012 ranged between 735 and 1130 kg per hectare while that of the control plots ranged between 630 and 945 kg per hectare. The cost-benefit ratio for the control plot was 0.98 while that of the pilot plot was 1.44. While the pilot plots had higher input costs for land preparation, seed and nutrient management; they incurred lower costs for pest/disease control and weed management; and, had higher revenue from sale of the main crop as well as intercrops, which contributed to the higher returns.

3.3 Achievements at Outputs level

46. An overview of the project's achievements is given in the table below.

Table 3: Summary table of project achievement against outputs

Project Outcomes and Outputs	End-of-Project Target	Achievement
Outcome 1: Information tools and local institutional capacities developed for farmers and CBOs to make informed decisions on land and water management based on scientific and local knowledge, taking into account impacts of climate variations.		
Output 1.1: Completed study on local and scientific knowledge on impacts of climate variability/change on natural resources in Andhra Pradesh.	At least 450 farmers interviewed with balanced representation of gender and vulnerable groups/sectors in at least 9 pilot HU covering key indicators on climate variability and its impact.	A KASP (knowledge, attitudes, skills, practice) study was undertaken to assess community understanding on climate variability/change, its impact, and, current adaptation practices. 499 farmers were interviewed, covering all 9 HUs. The sample included women (52%), SC/ST (19%), small and marginal farmers (59%) and landless labour (14%)[32].
	Farmers understanding of	The 'Baseline Study Report: Local and

[32] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad.* Presentation made to review team on 11 June 2014

Project Outcomes and Outputs	End-of-Project Target	Achievement
	climate change in pilot HUs documented and combined with available scientific data, 9 months from project start.	Scientific Knowledge on Impacts of Climate Variability/Change on Natural Resources in Andhra Pradesh, India ' has been brought out in March 2013. The report has 2 parts: Part I - Local Understanding, and, Part II - Scientific Understanding. The findings of the Baseline Study were disseminated to farmers in the 143 habitations through village assemblies in 2013[33].
Output 1.2: Local monitoring system of climate variability and its impacts operating.	At least 9 CBOs in pilot HU are collecting data on at least 3 key indicators by the end of the second project year.	PCM covering 7 key climate variability parameters (rainfall, temperature, humidity, evaporation, wind velocity, wind direction and sunshine radiation) is operational in the 9 HU-CCACs since July 2012. Data available in project database up to April 2014 and with HU-CCACs till date[34]. Monitoring of key climate impact parameters at the SLWM pilot farms was undertaken (average crop yields, water harvested, water saved in Kharif and Rabi in 2010-11, 2011-12, 2012-13 and 2013-14; soil moisture availability in Kharif and Rabi 2013-14; organic carbon content in Kharif and Rabi in 2012-13 and 2013-14)[35]. The PCM data is being collected daily by 295 trained volunteer farmers (including 35% women, 18% SC and ST[36]) and shared through display boards and mobile phone. The data is accessible to the village community, mandal and district level line department officials, as well as a few schools on a daily basis.
Output 1.3: CBOs with capacities to integrate climate	At least 9 committees 6 months after project start	Habitation level and HU level CCAC committees formed in 9 HUs in 2011 with

[33] BIRDS-SPACC. *Annual Work Plan and Budget 2013*.

[34] BIRDS-SPACC. *PCM Database*. Database file shared with review team on 11 June 2014; HU-CCAC PCM Record Books verified by Review Team during field visits undertaken between 12-16 June 2014.

[35] BIRDS-SPACC. *Climate Impact Database*. Database file shared with review team on 11 June 2014.

[36] BIRDS-SPACC. *PCM Volunteers List*. Database file shared with review team on 11 June 2014.

Project Outcomes and Outputs	End-of-Project Target	Achievement
variability adaptation measures in Sustainable Land and Water Management (SLWM).	At least 100 leaders and representatives trained by the end of year two At least 9 CBOs have participated and identified measures 18 months after project start At least 7 CBOs have adaptation plans 18 months after project start	significant representation of women (47%[37]), small and marginal farmers; committees meeting regularly. Orientation camps for CCAC members were organized – 27 in 2011, and, 39 in 2013[38]. Exposure visits were organized for 105 CCAC leaders (including 40% women) from all 9 HUs[39] in 2012. SLWM measures were identified for testing through pilots in all 9 HUs through district level 'CBO Leaders, Officers and Scientists Workshops' organized in 2012 and 2013 (with participation from 927 farmers and 77 officers/scientists)[40]. CCA Plans have been developed in 2014 in all 9 HUs – the plans include season-specific and crop-specific adaptation strategies for key crop stages including pest and disease management, soil moisture and irrigation management, and, soil nutrient management[41]. CCA Fund established in all 9 HUs in 2014 with both project and community contribution; Handing over of assets and CCAC Fund to HU-CCACs completed in 2014.
Outcome 2: Pilots on SLWM including climate variability adaptation in farming systems in drought prone areas.		
Output 2.1: Farmers acquire skills in managing climate variability and testing adaptation technologies in farming systems through	Curriculum developed 18 months after project start. At least 7 FCS functioning by the end of the project. At least 350 female and	Curriculum developed for Farmer Climate Schools (FCS) including generic curriculum in 2012, and, crop-specific curricula for Kharif and Rabi seasons in 2013; Farmer Resource Persons (FRPs) have been trained

[37] 47% of the HU-CCAC General Body members are women farmers. BIRDS-SPACC. *Gender Mainstreaming in SPACC Project*. Undated note shared with review team on 11 June 2014.

[38] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad*. Presentation made to review team on 11 June 2014.

[39] BIRDS-SPACC. *Report on CBO Leaders Exposure Visits*. Undated note shared with review team on 11 June 2014.

[40] BIRDS-SPACC. A report on SLWM measures and technologies identified by Climate Change Adaptation Committees (CCACs). Undated note shared with review team on 11 June 2014.

[41] BIRDS-SPACC. *Climate Change Adaptation Plans*. CCA Plans of 9 HUs shared with review team on 11 June 2014.

Project Outcomes and Outputs	End-of-Project Target	Achievement
participation in Climate Change Schools (FCS).	male farmers attending by the end of the project.	in conducting FCS (20 FRPs in 2012-13, 31 in Kharif 2013, and 35 in Rabi 2013-14) (58% of the FRPs are women)[42]. 9 FCSs have been organized in 2012-13, 20 in Kharif 2013, and 18 in Rabi 2013-14 – including exclusive 'Women FCS' [43]. 1156 farmers (including 56% women, and, 27% SC and ST) have graduated from the FCSs[44].
Output 2.2: Pilot testing of adaptation technologies and practices in SLWM.	At least 3 pilots produce results on adaptation performance of technologies and practice, by the end of the project. At least 7 CBOs and 50 female and male farmers have participated in the pilots, by end of the project. At least 3 manuals elaborated on SLWM pilots, by the end of the project.	The SLWM pilots implemented are as follows[45]: • Kharif 2012: 2 crops, 4 HUs (including 1 non-pilot HUs) • Rabi 2012-13: 10 crops, 7 pilot HUs • Kharif 2013: 6 crops, 9 HUs • Rabi 2013-14: 6 crops, 11 HUs (including 3 non-pilot HUs) 9 pilot HUs as well as 3 non-pilot HUs have implemented SLWM pilots. A total of 139 farmers including 68 women farmers (49%) have participated in the SLWM pilots[46]. Comprehensive adaptation manuals have been developed in 2014 on 4 agro-climatic zones (ACZs)[47]: • Scarce Rainfall ACZ • South Telangana ACZ • Southern ACZ • Krishna ACZ Each manual elaborates on the following: physical setup, issues in SLWM,

[42] BIRDS-SPACC. *Gender Mainstreaming in SPACC Project*. Undated note shared with review team on 11 June 2014.

[43] BIRDS-SPACC. *Farmers Climate Schools Reports (2012-13, Kharif 2013, Rabi 2013-14)*. Reports shared with review team on 11 June 2014.

[44] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad*. Presentation made to review team on 11 June 2014.

[45] BIRDS-SPACC. *SLWM Pilot Farmers List 2012-13 and 2013-14*. Database files shared with review team on 11 June 2014.

[46] BIRDS-SPACC. *SLWM Pilot Farmers List 2012-13 and 2013-14*. Database files shared with review team on 11 June 2014.

[47] By the time of this review, one of the manuals (*Adaptation in Scarce Rainfall Agro-climatic Zone Andhra Pradesh India*) had been printed, while the other 3 were made available as soft copies.

Project Outcomes and Outputs	End-of-Project Target	Achievement
		Participatory Climate Monitoring, SLWM, and, Farmer Climate Schools. Results on the adaptation performance of the SLWM technologies/practices are captured for the following key impact parameters: average crop yields, water harvested, water saved, soil moisture availability, and, organic carbon content. The results have been incorporated into the ACZ-wise adaptation manuals.
Outcome 3: A platform for land based climate change adaptation measures suitable to drought prone areas developed; adoption of a package of methods, tools and institutional approaches in support of District and State level natural resource management initiatives to address the impacts of drought.		
Output 3.1: Project lessons, results, and products (CCFS Curriculum, field testing methods, adaptation technology and practices manuals, and institutional approaches) documented and disseminated.		Project documentation (processes and products) is extensive and includes: • Products: Baseline Study, PCM data, ACZ specific manuals on CCA, case studies on SLWM pilots • Process Documents: FCS Curriculum, Strategy papers on various project elements, Half-yearly progress reports Dissemination includes: • Project Website (2407 visitors in 2013-14[48]) • Project Steering Committee which has engaged several significant Government units (e.g., SERP, IWMP, etc.) in the project through 7 biannual meetings • 9 HU level dissemination workshops organized in December 2013 with outreach to 749 farmers (including 27% women and farmers from non-pilot HUs) and 76 district/mandal line department officials[49] • 2 state level dissemination workshops organized in June 2014 with outreach to ___ state line department officials • Daily SMS with PCM data to relevant line departments at mandal and district

[48] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad*. Presentation made to review team on 11 June 2014.

[49] BIRDS-SPACC. *HU Level Dissemination Workshops Report*. Undated note shared with review team on 11 June 2014.

Project Outcomes and Outputs	End-of-Project Target	Achievement
		levels

47. The indicators in the project results matrix appear to have been well considered and chosen; as such, there does not appear to have been any significant issues with measurement of results.

48. As detailed in the table, the project has exceeded targets for several of the outputs – especially in terms of:

- Out-reach to farmers (for example, the number of farmers involved in SLWM pilots were 139 as against the target of 50)
- Out-reach to non-pilot HUs (for example, non-pilot HUs have been involved in implementation of 3 SLWM pilots)
- Climate indicators monitored (for example, monitoring of 7 climate variability and 5 climate impact indicators as against the target of 3 key indicators)
- Capacity building (for example, a total of 47 FCSs including crop-specific and women-exclusive FCSs were organized as against the target of 7 FCSs)
- Knowledge products generated (for example, 4 ACZ specific manuals on climate adaptation are being brought out as against the target of 3 manuals)

However, some of the project activities have slipped back from their original timeframe – the notable ones being:

- Baseline study report slipped to 2013 from the original timeframe of 9 months from project start.
- Initiation of PCM slipped to July 2012 from the original timeframe of end of the second project year.

3.4 Efficiency and effectiveness of the institutional arrangements including Government's participation

49. As the GEF Agency for the project, FAO provided supervision and technical guidance services during project execution. The FAO National Program Coordinator – Land and Water provided support through review of annual work plans and budgets, participation in the Project Steering Committee meetings, review of project output documents, etc.

50. The Government' participation in the project has been at all key levels – National, State and District. The project was represented in the National Steering Committee meetings and The India Sustainable Land and Eco-system Management Country Partnership (SLEM) Program partners meeting with Department of Economic Affairs, GoI.

51. The Project Steering Committee (PSC) provided the forum for various key stakeholders in the national and state Governments to be associated with the

project – providing overall guidance, approving AWPBs and facilitating linkages with Government programs. These include:

- MoEF, GoI (SLEM-Technical Facilitation organisation [TFO], United Nations Convention to Combat Desertification [UNCCD] Focal Point, GEF operational focal point [OFP], Climate Change Division);
- Central Ground Water Board, GoI;
- Department of Rural Development, GoAP;
- Department of Agriculture, GoAP; and
- Forest Department, GoAP.

Examples of the linkages made with Government programs include:

- Involvement of resource persons from the following Government institutions in the FCS curriculum development workshop[50]:
  - Community Managed Sustainable Agriculture (CMSA) being implemented by the Society for Elimination of Rural Poverty, Department of Rural Development, GoAP;
  - Integrated Watershed Management Program (IWMP), Department of Rural Development, GoAP;
  - Central Ground Water Board, Ministry of Water Resources, GoI; and
  - Central Research Institute for Dryland Agriculture, Ministry of Agriculture, GoI.
- Linkages with the CMSA through exchange visits for farmers, sharing of FCS curriculum, joint FCS sessions for CMSA farmers, etc.
- Linkages with the IWMP through sharing of list of Farmer Resource Persons and FCS Graduate farmers who can be utilized as trainers in IWMP training programs.

52. At the district level, the following activities facilitated active involvement of the district level line departments in the project:

- CBO Leaders – Officers and Scientists Workshops: 43 Government officers and 34 agriculture scientists were involved in 9 workshops organized in 2012 to identify SLWM measures along with CCACs[51].
- HU level dissemination workshops: 76 Government officers and agriculture scientists were involved in 9 workshops organized in 2013 to disseminate experiences and learning from PCM, SLWM and FCS[52].

In addition, some of the HUs had greater involvement of the line departments – either by initiative of the partner NGO or of the line departments. Some examples[53] are:

[50] BIRDS-SPACC. *Farmer Climate Schools – Curriculum Development Workshop Report.* May 2012.

[51] BIRDS-SPACC. *A report on SLWM measures and technologies identified by CCACs.*

[52] BIRDS-SPACC. *HU Level Dissemination Workshop Report.*

- PCM data sharing: In Yadalavagu HU, Prakasam district, the PCM data is shared every day through SMS with several district and mandal level line department officials including Agriculture Officer, Assistant Director Agriculture, Joint Director Extension Agriculture, Krishi Vignan Kendra, Soil Testing Lab, District Water Management Agency, Deputy Director Groundwater, Mandal Development Officer, etc.
- Learning exchange: In Nathiganicheruvu HU, Nalgonda district, on initiative of the District Collector, exposure visits were organized for all the watershed committees in the district to the SPACC project area.

53. Overall, the project has made effort to establish linkages with key Government departments at various levels. However, considering the need and potential for mainstreaming climate adaptation into mainstream Government programs, stronger linkages especially at the state level are desirable; the project could potentially have leveraged opportunities for convergence with the Andhra Pradesh SAPCC.

3.5 Gender equality

54. The project document emphasizes the inclusion of gender issues through emphasis on participation of both men and women in all activities. The project's results framework specifically tracks the participation of women farmers in the baseline KASP study, in the Farmer Climate Schools, and in the SLWM pilots. The results on women participation in these activities are as follows:

- Of the 499 farmers who were interviewed for the baseline KASP study 52 percent were women[54].
- Of the 1156 farmers who have graduated from the FCSs, 56 percent are women[55].
- Of the 139 farmers who participated in the SLWM pilots, 49 percent are women[56].

55. However, the project's mainstreaming of gender is not limited to the above results. The project norms specify that at least 50 percent of the participants are women farmers in all project activities, 50 percent of CCAC members are female farmers, and 50 percent of CCAC office bearers at habitation and HU level are female farmers. The project strategy for mainstreaming gender has included staff sensitization, motivating women farmers and their families, capacity building women for the role of 'farmer resource persons' and,

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[53] Shared by respective partner NGOs and CCAC members with the review team during the field visits.

[54] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad.* Presentation made to review team on 11 June 2014

[55] BIRDS-SPACC. *Final Project Review Meeting, 11 June 2014, Hyderabad.* Presentation made to review team on 11 June 2014.

[56] BIRDS-SPACC. *SLWM Pilot Farmers List 2012-13 and 2013-14.* Database files shared with review team on 11 June 2014.

organizing FCS exclusively for women farmers. The outputs of this focused effort are[57]:

- 47 percent of the HU-CCAC General Body members are women
- 42 percent of the HU-CCAC Executive Committee members are women
- 47 percent of the HU-CCAC Office Bearers are women
- 35 percent of PCM Volunteers are women
- 58 percent of Farmer Resource Persons are women

The field visits undertaken by the review team corroborate the above data. Women farmers in the 7 HUs visited by the review team are actively engaged as PCM volunteers, CCAC members and SLWM pilot farmers.

[57] BIRDS-SPACC. *Gender Mainstreaming in SPACC Project*. Undated note shared with review team on 11 June 2014.

Box 2: Fodder Cultivation for Climate Resilient Livestock Rearing[58]

Yadalavagu HU in Prakasam district covers 16 habitations. Frequent drought has led to many households relying on livestock rearing for their livelihood. However, fodder availability has always been a challenge – women spent up to 4 hours every day harvesting grass. In view of this situation, an SLWM pilot on cultivation of the Co-4 fodder grass variety was implemented. The fodder yield from 0.5 acres of land is about 4 tons (for 3 cuttings). Fodder cultivation has led to multiple benefits: saving of time spent in harvesting green fodder – especially for women; saving of up to Rs. 30,000 on purchase of dry fodder for the summer months; additional milk yield of 0.5-1.5 litre per animal; increase in fat content of milk; and, increase in earnings from sale of milk.

3.6 Capacity development

56. Capacity development is integral to the SPACC. The development objective of the project is 'to strengthen the knowledge and capacities of communities to respond to climate variability and change impacts in pilot HUs in seven drought-prone districts of Andhra Pradesh'. The component 1 of the project focuses on local institutional capacity building and aims to give farmers and CBOs the necessary capacities and tools to understand climate variability, assess the related vulnerability of land, water and crop production, and identify adaptation measures to be integrated into SLWM practices.

57. The project's strategy for capacity building is multi-pronged and involves several activities including Farmer Climate Schools (FCS), CCAC orientation camps and exposure visits. The capacity development outcomes of SPACC include:

- Farmer volunteers with demonstrated capacity for climate monitoring.
- Farmer Resource Persons with demonstrated capacity for conducting FCS.
- Farmer Climate School graduates with demonstrated capacity to select and implement adaptation technologies and practices (an evaluation of the participant's knowledge, attitudes and skills for the 2012-13 FCS showed an average improvement of 37.5 percent[59]).
- CCAC members with demonstrated capacity to convene, discuss and take decisions on CCA.

58. Some specific illustrations of enhanced capacity that participants cited to the review team during the field visits include:

[58] Based on: Field observations of the Review Team; BIRDS-SPACC. Case Studies (*Mahilala Atmasthiryam Penchina Pasugrasam*; *Pasugrasamtho Melaina Jeevanopadhi*; *Sirulu Andistunna Pasugrasam*).

[59] BIRDS-SPACC. *Results of Ballot Box Tests*. Undated note shared with review team on 11 June 2014.

- Ability of individual farmers to apply PCM data for decision-making on agriculture operations. Some illustrative examples:
  - Rainfall of 2-4 cm indicates the land is ready for sowing – depending on the soil type.
  - Wind speed of more than 40 kmph is not suitable for sowing or pesticide spraying.
  - At evaporation of more than 8 mm the field needs to be irrigated every 2 days.
  - If animals are sent for open grazing at temperature of more than 38^0 C the milk yield will reduce.
  - Mulching is necessary for horticulture crops if humidity is less than 40 percent.
- Recognition by farmers that SLWM technologies and practices have helped in adaptation by reducing costs and sustaining yields. Some illustrative examples:
  - Substitution of chemical fertilizers and pesticides with organic manures and non-chemical pest management (NPM) methods in cotton (Kharif 2013) led to a reduction in costs of up to Rs. 4000 per acre while yielding an additional 2 quintals per acre.
  - Cultivation of bitter gourd using organic inputs (neem oil, farm yard manure) and mulching (groundnut shells) gave an additional yield of about 2 quintals in a pilot plot while reducing costs by Rs. 2000.
  - Cultivation of CO-4 variety of fodder has led to increase in milk yield of about 1 litre/animal/day and increased fat content giving an additional income of Rs. 4/litre. Fodder cultivation has also led to savings of time and drudgery for women (about 4 hours per day were being spent on fodder collection earlier).

59. While SPACC has led to significant capacity development in farmers and CBOs, there are specific areas where further strengthening is required (specific recommendations to this effect including time-frames have been included in Section 6 of this report). The interactions with CCAC members during the field review corroborate this. The areas for further strengthening are as follows:

- While PCM skills have been acquired and farmers are utilizing the data, it is important to bear in mind that this is a relatively newfound skill-set (PCM has been operational since July 2012) as compared to PGM (operational since APWELL/APFAMGS) and complete withdrawal of support may be pre-mature – a phased exit may be more appropriate.
- Skills in soil nutrient and soil moisture testing need further strengthening – including operation and maintenance of the soil testing equipment. While this was part of the FCS, the CCAC members interacted with during the review were not fully confident about being able to independently carryout the operation and maintenance of the soil testing equipment.

- Capacity of CCACs for CCA planning at the HU level needs strengthening especially in the areas of linkages with Gram Panchayats and other CBOs (e.g., Federations of Self Help Groups). Such linkages are not evident in the CCA plans that have been developed by the CCACs.

3.7 Partnerships and Alliances

60. The key partnerships and alliances in SPACC are:

- Partnership between the project implementation PNGOs
- Partnership between CBOs and PNGOs

61. The 9 NGOs implementing SPACC (including the project executing agency, BIRDS) have been working in a partnership mode since the APFAMGS project (2004-2009). This partnership model continued into the SPACC and brought with it the following advantages:

- The partner NGOs had proven technical capacity of working on groundwater–agriculture, which provided the base for expanding into climate adaptation
- The partner NGOs had long-term association with the community in the project area – some dating back to the APWELL project (1999-2003).
- The partner NGOs had a proven working relationship with both the Executing Agency, BIRDS as well as with each other.

62. The CBOs involved in SPACC are the CCACs at the habitation and the HU levels. These institutions were in existence, albeit with a somewhat different composition of members, as Groundwater Monitoring Committees and HU Networks during the APFAMGS project. The CCACs have a MoU with the partner NGOs describing mutual roles and responsibilities in the project. There is also a project-end 'handing over' agreement between the CCACs and partner NGOs that specifies the post-project roles and responsibilities of both these partner institutions. The CBOs interacted with during the field visits by the review team conveyed a strong sense of trust in and respect for the work of the partner NGOs.

Table 4: Details of the partner HUNs of SPACC Project

SN	Name of the Hydrological Unit Network (HUN)	PNGO	District
1.	Chinneru Hydrological Unit Groundwater Management Committee	BIRDS	Kurnool
2.	Mallappavagu Neeti Parivahaka Prantha Bhugarbha jalala Yajamanya Committee	CARE	Mahabubnagar
3.	Yadalavagu Bhoogarbajala Yajamanya Committee	CARVE	Prakasam
4.	Narsireddypallivagu Bhugarbhajala yajamanya committee	DIPA	Prakasam
5.	Kadirinayani Cheruvu Prantha Bhoogarbha Jala Yajamanya Committee	GVS	Chittoor
6.	Bokkineruvagu Neeti Parivahaka Prantha Yajamanya Committee	PARTNER	Kadapa
7.	Jampaleruvagu Bhugarbhajala Yajamanya Committee	SAFE	Prakasam
8.	Nathigani Cheruvu Bhugarbbajala Yajamanya Committee	SAID	Nalgonda

SN	Name of the Hydrological Unit Network (HUN)	PNGO	District
9.	Upparavanka parivahakapranta bhugarbhajala yajamanya committee	SYA	Anantapur

3.8 Project Management

63. BIRDS as the Project Executing Agency has set up a Project Management Unit (PMU) consisting of a Project Manager, a team of technical specialists and personnel for finance and administration. Field Officers in each partner NGO coordinated the implementation of the project activities at the HU level. The key project instruments that enabled feedback-based planning, consistent monitoring and timely remedial action were:

- Annual Work Plan and Budget (AWPB): The AWPB was prepared in annual workshops that included participation of the PMU and all partner NGOs. 3 AWPBs for 2011, 2012 and 2013 have been prepared. Each AWPB outlines the progress achieved and details the component-wise plan for the year including output-wise listing of activities along with deliverables, targets, responsible actors, timeframe, etc., and the detailed budget. This annual exercise, anchored in the Project Results Framework, is viewed as very useful by the PMU and partner NGOs.
- Half Yearly Progress Reports (HPRs): 6 HPRs were prepared during the project period – each reflecting on the progress in reaching the target indicators established in the Project Results Framework, plan for addressing any identified problems/risks, and the work plan for the next six month reporting period. Some examples of the risks identified and addressed through this instrument are:
  - Inconsistency in project execution across the 9 HUs – addressed by developing 'Strategy Papers' for important project activities[60].
  - Challenge of staff retention in partner NGOs – addressed by hiking staff salaries[61].
  - Possible delay in compilation of lessons from SLWM pilots – hired consultants for specific tasks[62].
- Project Partner's Meetings: 19 meetings were organized between 2011-2014 bringing together all implementing partners (PMU, BIRDS, partner NGOs) for reviewing progress and planning future action[63].
- Plan and Review Meetings: 26 meetings were organized at the PMU between 2011-2014, with the Field Officers from all partner NGOs, for the purpose of monitoring progress and planning future action[64].

[60] BIRDS-SPACC. *Half-yearly Progress Report 1*.

[61] BIRDS-SPACC. *Half-yearly Progress Report 2*.

[62] BIRDS-SPACC. *Half-yearly Progress Report 6*.

[63] BIRDS-SPACC. *Half-yearly Progress Reports*. (The Project Partner Meetings organized were: 3 in 2011, 9 in 2012, 5 in 2013 and 2 planned in 2014).

3.9 Technical and Operational Backstopping

64. The PMU's team of Subject Experts included expertise in the areas of sustainable agriculture, community organization, water management, land management, non-formal education and documentation. The technical experts at the Partner NGOs included professionals in the areas of land and water management, and, non-formal education. In addition, consultants were appointed for specific technical tasks as required (e.g., agriculture-climate variability and impact data analysis)[65].

65. The key instruments adopted by the PMU for providing technical and operational backstopping support to partner NGOs were:

- Staff Training: Staff training on Climate Change Adaptation Committee (CCAC) Orientation, non-formal education (NFE) techniques and farmers' climate schools (FCS) were organized by the PMU in 2011 and 2012[66];
- Strategy Papers: An important technical input provided to the partner NGOs was detailed description of each key project activity in the form of 'strategy papers'. In all 10 strategy papers were developed covering the themes: CCAC Formation, PCM, FCS, Exposure Visits for CBOs, CCA Plan, Communication, Mass Awareness Campaign, Partners' Meeting, Monitoring and Evaluation;
- PMU Field Visits: The PMU staff provided intensive support to the field units through field visits (for example, 65 field visits were undertaken in 2011 and 130 in 2012[67]);
- Physical Progress Monitoring System (PPMS): Monthly Progress Reports of the Field/Support Units formed the basis for PPMS, using MS Excel as platform of data management. The input for PPMS came from field data collection, with a Field Officer facilitating compilation and ensuring authenticity[68];
- Monthly Plan and Review Meeting (MPRM): Difficulties and challenges in the implementation of the activities were discussed in the MPRM; strategies were also be worked out at MPRM to complete the activities as per the approved work plan[69]; and
- Subject specific meetings.

66. Providing for the required expertise at the PMU and partner NGO levels, and delivering this expertise to the field staff using multiple channels (training,

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[64] BIRDS-SPACC. *Half-yearly Progress Reports*. (The Plan and Review Meetings organized were: 5 in 2011, 12 in 2012, 6 in 2013 and 3 planned in 2014).

[65] BIRDS-SPACC. *Half-yearly Progress Report 6*.

[66] BIRDS-SPACC. *AWPB 2012 and 2013*.

[67] BIRDS-SPACC. *Half-yearly Progress Reports*.

[68] BIRDS-SPACC, *Strategy Paper – Project Monitoring System*

[69] *ibid*

strategy papers, field visits) has helped in communicating clear deliverables and in ensuring quality across the project.

3.10 Financial Resources Management

67. The financial resources of the project were managed as per the procedures described in the Project Document. The PMU submits detailed Annual Work Plans and Budgets to FAO. Six-monthly financial statements are submitted to FAO supported by quarterly internal audits. Annual audited statements of accounts are submitted to FAO.

68. The financial resources management has been responsive to the project results framework. In line with the issues, problems and risks noted during implementation, some of the original allocations were altered as per the provisions in the Project Document and in consultation with the FAO.

    For example, the revised budgets for 2011, 2012 and 2013 included in the AWPBs, showed more than 10 percent deviation for certain budget lines in comparison to the approved budget in the Project Document due to:

    - The late start of the project, which led to certain activities being shifted to later years[70].
    - The need for upward revision of salaries[71].
    - Staff salary costs, training costs, training costs, etc., in view of extension of the project timeframe to 2014[72].

69. As per the total project allocations, expenditure of all the project components, spending in components 2 and 3 were relatively less than planned while in the case of components 1 and Project Management it is more than planned.

70. Given that the SPACC project has been able to successfully address/complete virtually all planned intervention elements within agreed budgetary frameworks suggests that the project was to a large degree cost effective.

3.11 Relevance

71. Given the baseline conditions in the results framework that (a) there was no knowledge on and monitoring of climate change and its impacts on land, water and crop production and integration of adaptation measures in SLWM practices; (b) there is no documented and integrated understanding of local and scientific knowledge on impacts of climate variability/change on natural resources in Andhra Pradesh; (c) there was no systematic monitoring of climate variability and its impacts; (d) farmers knowledge and skills were focused only on hydrological parameters; (e) no adaptation technologies and practices had been tested and no manuals existed; and (f) no platform for land based adaptation measures suitable to drought prone areas existed in India, the

[70] BIRDS-SPACC. *AWPB 2011.*

[71] BIRDS-SPACC. *AWPB 2012.*

[72] BIRDS-SPACC. *AWPB 2013.*

project has been extremely relevant and innovative in its design, approach, and implementation.

72. The outcomes and outputs achieved by the project represent an important example of robust and evidence/data based climate adaptation measures by small farmers, and has the potential to be (a) scaled up; and (b) serve as an source of valuable learnings relevant to not only other areas in Andhra Pradesh and Telangana, but also to small farmers in other states.

73. The Project makes a direct contribution/has relevance to FAO's catalytic role in India through the NMTPF in the thematic areas: technical assistance and capacity building; piloting innovative approaches in critical areas; and crosscutting issues. It is also directly relevant to the two major components of cooperation and partnership between FAO and the GoI:

- *Component 2:* Supporting Government of India to strengthen the implementation of national missions and specific programmes aimed at reducing poverty and achieving food and nutrition security; and
- *Component 3:* Piloting innovative approaches with government, NGO and private sector partners in agricultural and rural development.

74. The Project is also directly relevant to FAO regional priorities (Regional Office for Asia and the Pacific) including:

- Strengthening food and nutritional security;
- Fostering agricultural production and rural development;
- Enhancing equitable, productive and sustainable natural resource management and utilization;
- Improving capacity to respond to food and agricultural threats and emergencies; and
- Coping with the impact of climate change on agriculture and food and nutritional security
- On a conceptual basis, the project demonstrates relevance to and complementarity with India's national agenda on climate change as well as with FAO global goals and strategic objectives, and GEF priorities (see subsection 2 above), as well as the CPP-SLEM Programme. From a design standpoint, the RBM framework adopted by the project and the planned outcomes, outputs and indicators were appropriate/valid and robust, and was complemented by a flexible approach and also included equity considerations.

75. Given that the SPACC project is stated to have been the first of its kind in India, there is substantive comparative advantage to both the project and FAO – in setting and fostering a benchmark set of practices that directly address climate change adaptation of small farmers in India, and indeed, potentially elsewhere.

3.12 Efficiency

76. Given that actual project implementation was delayed, that overall project expenditure has been within the final budgeted numbers (despite deviations/variances in certain budget lines as outlined in subsection 4.3 above), and that the project has been able to achieve virtually all of its planned outcomes and outputs indicates a relatively high degree of efficiency.

3.13 Effectiveness

77. The project design and the results framework included measures for addressing equity concerns; both project implementation data (presented in Table 1) and anecdotal evidence from the field indicate that selection of beneficiaries has been balanced and has included women and other relatively more vulnerable stakeholders.

78. Anecdotal evidence gathered during field visits and some case studies available with the project implementation agency, BIRDS show early and/or proxy signs of improved resilience, increased or stable production, reduced costs and enhanced food/financial security for the communities as a result of the project's interventions.

79. Given that the planned duration of 3 years has been relatively limited, the project has as yet not been able to influence technical approaches and policies at a higher level. However, as indicated in subsection 6.1 above, there is considerable scope for consolidation of project learnings, building appropriate linkages and convergence with government at multiple levels, and as such there is also considerable relevance and scope for replication for scaling up both in Andhra Pradesh and Telangana as also elsewhere.

80. Given the above, there are sufficient grounds to indicate a high degree of overall effectiveness of the project, its significant contribution to the normative and knowledge function of the FAO through dissemination of lessons learnt, and, potential for influencing technical approaches and policies at a higher level.

3.14 Impact

81. The SPACC Project has created a cadre of 295 (Female 104; Male 191) trained 'barefoot climatologists'. It has led farmers in the project areas to actively engage in decision-making on crop management using PCM data, soil fertility and soil moisture measurements. It has engaged farmers in evaluating various adaptation technologies/practices including water harvesting/storage, water conservation, intercropping and border cropping, mulching, IPM/NPM, fodder cultivation, etc., resulting in reduced input costs and increased yields.

82. There is also increased awareness of adaptation measures beyond the project implementation areas, and as a result, there is increasing demand from other HU Networks in the states for establishment of PCM stations in their respective HUs. As indicated above, there is also now recognition by government officials of the importance of PCM stations and data at local levels. There also appears to be some indication that UNDP-GEF-Small

Grants Programme (SGP) partners are contemplating establishment of PCM stations in their operational areas in Rajasthan and Bihar.

83. Beyond the project's own outcomes, there is potential for the lessons from project implementation to inform/influence higher level planning, policy measures, and program/project design both in Andhra Pradesh and Telangana, as also in other states. For example, the knowledge products (manuals, strategy papers, etc.) developed by the project will be directly relevant to the GEF supported 'Sustainable Livelihoods and Adaptation to Climate Change (SLACC)' project, currently under preparation, to be implemented by the Ministry of Rural Development, Government of India.

4 Challenges

84. One of the main challenges faced by the Project was demystifying climate variability, change and adaptation to an audience which had very limited understanding of climate change and variability and adapting to these. As such, considerable effort has been put into developing the curriculum, teaching methods and tools. The first FCS curriculum was broad in nature focusing on impacts of climate variability and change (on agriculture, water resources, livestock) and generic adaptation measures (soil water conservation, nutrient management, pest management, etc.). Based on the need for making climate adaptation more relevant and concrete, the FCS curriculum in the later two years was made crop and season specific – it focused on the required climatic parameters for various crop stages, the observed PCM data, the selection and piloting of relevant SLWM measures, the evaluation of the piloted SLWM measures, etc., through a 'learning-by-doing' approach.

85. Considerable effort also seems to have been taken to ensure involvement of women in the Project, especially in Daily PCM data collection and recording and as participants in the FCSs.

86. There appears to have been challenges in getting suitable land for setting up of the PCM stations; this was circumvented by identifying waste land and or common land of individual farmers which is accessible to community and through convincing farmers/communities to make such land available.

87. The key challenges with regard to post-project sustainability are: continued involvement of the CCACs in participatory monitoring of climate variability and its impact; sustaining the process of planning, testing, adopting and promotion of adaptation measures. The Project strategy to overcome this has been through formalised handing over of all project assets and through agreements with HU level CCACs as well as setting up of a HU level CCA fund (with contribution from the community as well as the project), the project has institutionalized the continuance of PCM data collection, operation and maintenance of the PCM equipment, periodic CCAC meetings, etc.

5 Lessons

88. Even within the short time frame of the SPACC project – about 3½ years – its contribution to the knowledge base in the country on participatory climate monitoring and community adaptation is significant. While there has not sufficient time for policy outcomes to have resulted from project interventions, there has been considerable diffusion of awareness of the relevance and importance of PCM mechanisms in the project areas and districts and there is anecdotal evidence of increasing demands from non-project areas to take up similar interventions. This is also reflective of the strong relationships the project has been able to build with stakeholders in the project area, including with district administrations and relevant government officials (especially with Agriculture Department personnel), among others.

89. All approaches and interventions developed and deployed were innovative; the extensive project process documentation developed will ensure that these could easily be adapted and applied to other geographical and developmental contexts in other parts of Andhra Pradesh and Telangana, as well as in other states and elsewhere outside of India.

90. The project faced multiple (technical, operational and other) and sometimes complex challenges during various stages of implementation; however, it has been able successfully address these challenges through systematic improvisation (some of these are articulated in various project documents and presentations).

91. Some of the key lessons from the project, that will be useful for other existing and emerging projects on climate adaptation, are:

- *Building on existing capacities:* A key advantage of SPACC was that it was built upon the foundation of the APFAMGS project. Community institutions as well as partner NGOs had a history of working together and of working on Participatory Hydrological Monitoring, crop water budgeting, etc. In a way, SPACC provided these institutions a natural extension of this agenda to address climate variability and change. This institutional readiness gave SPACC a head start in terms of its ability to demystify and translate the abstract concepts of climate variability, change and adaptation into concrete action for livelihood enhancement.
- *Widening stakeholder group:* The Project Steering Committee was an important mechanism that helped to bring in significant institutions – especially of the state Government – into the stakeholder group of the project.
- *Participatory Climate Monitoring: PCM* – as opposed to monitoring using automatic weather stations – actively engages the farmer in seeking and utilizing weather data. While this requires substantial inputs in community involvement and capacity building, there is more ownership of the data and appreciation of its value.

- *Farmer Climate Schools:* FCS help in several ways – analysis of the PCM data and its utilization for farming decisions, evaluation of selected adaptation technologies and practices by systematic examination of pilot and control farm plots, institutional building of the CCACs, etc. Farmer resource persons can be trained to conduct FCS on their own, with limited external facilitation support.
- *Strong institutions and building on existing capacities:* The project was built upon the foundation of the APFAMGS project. The CBOs as well as partner NGOs had a history of working together and of working on Participatory Hydrological Monitoring, crop water budgeting, etc. This institutional readiness gave SPACC a head start in terms of its ability to secure community involvement and to demystify the abstract concepts of climate variability, change and adaptation into concrete action for livelihood enhancement. Having strong institutions is a necessary precondition for a participatory climate adaptation intervention.
- *Mechanisms for widening the stakeholder group:* The Project Steering Committee was an important mechanism that helped to bring in significant institutions – especially of the state Government – into the stakeholder group of the project.
- *Time frame:* Projects 'breaking new ground' such as SPACC – need time to 'learn by doing' (for example, the FCS curriculum evolved over 3 seasons of 'trial-and-error'). Considering this, the original 3-year time frame of the project seems rather short. A time frame of 5 years would have given the project enough time to experiment, stabilize and withdraw – in a less hurried and more confident manner.

Commented [gb1]: Repetition of par 88 and 91 – 2 first bullets.

6 Next steps

6.1 Potential next steps

92. The SPACC has enabled the farming communities in the project area to build their capacities in climate adaptation. However, building adaptive capacity is not a one-time milestone – rather, it is an on-going process. For supporting the CBO's work on climate adaptation, augmenting the adaptive capacity already generated in the intervention HUs, and towards scaling up interventions to other areas, it may be useful to explore the following as next steps:

- *CCAC linkages with existing projects/schemes of the State and Central Governments:* By establishing linkages with the Gram Panchayat, and with other CBOs operating at the village level, and by actively participating in the Gram Sabha, the CCACs may be able to tap resources from existing Government schemes to support the climate adaptation interventions (for example, the National Rural Employment Guarantee Act);
- *Partner NGO linkages with other sources of support such as the Adaptation Fund:* NABARD has been accredited by the Adaptation Fund Board of UNFCCC as National Implementing Entity in India. NGOs are eligible to submit projects directly to NABARD for accessing the Adaptation Fund and to act as Executing Entities;
- *Federating CBOs:* Considering that the CBOs associated with the project have a long history and are strong entities, it may be useful to federate the HU-CCACs at larger levels – district and state. The federations will be able to negotiate with Government departments, private businesses as well as NGOs to source technical expertise, market linkages, etc., to support climate-smart agriculture; and
- *Integrating capacity building on coping with/managing the outcomes of extreme events:* including building linkages and mechanisms for deploying and adopting weather and index based insurance and micro-insurance measures.
- *Extension of Support:* All the CBOs (HU level CCACs) that interacted with the review team during the field visit, articulated the need for continuation of facilitation/support by the partner NGOs for at least one/two years – to enable them to gain confidence in climate variability monitoring and in planning for adaptation. A longer timeframe (say an additional year of implementation) would give the project the required room for consolidation, further document field experiences, and build appropriate linkages/convergence to support potential policy uptake at state and national levels, apart from replication elsewhere stabilization and systematic withdrawal.

6.2 Recommendations

To FAO:

93. SPACC is unique in integrating 'learning-by-doing' into climate monitoring and adaptation. Even within the short time frame of the project – about 3½ years – its contribution to the knowledge base in the country on participatory climate monitoring and community adaptation is significant. However, the results of the project, in terms of the farmer's ability to utilize the PCM for decision-making, in terms of community climate adaptation planning, etc., have just begun to emerge (over the past one year).

94. Therefore, it is recommended that *the SPACC project be sustained for at least another two* crop *seasons (Rabi 2014-15 and Kharif 2015 spanning about one and half years)*. The specific action plan for this extended phase should be identified in discussion with the partner NGOs and the CCACs. However, some elements of such an action plan are suggested here:

a. Critical facilitation support to CCACs: While CCACs are confident about sustaining PCM, they have expressed the need for continued external facilitation for conducting FCS, organizing CCAC meetings, and, for supporting operation and maintenance of soil testing equipment. The role of the 'Field Facilitator' therefore needs to be continued – albeit in a limited scale. As such, FAO might consider a limited time-frame extension of support to enable BIRDS and the PNGO network to sustain this and/or help in leveraging alternative means of support;

b. Strengthen CCA Plans and CCA Fund: The CCA Plans need to be strengthened by expanding their scope to include interventions that need to be taken at the larger village or Gram Panchayat or watershed level – and also link with existing sources of funding available from various Government schemes at these levels;

c. Document utilization of PCM data by farmers: Currently anecdotal evidence is available with the project on how the PCM data is being used by farmers for decision making on cropping practices (e.g., decision making on sowing, inter-cultivation, irrigation frequency, mulching, pesticide spraying, etc.). FAO might want to consider supporting a study to more systematically document such use and validate it technically will be useful for building a case of larger replication; and

d. Undertake a systematic 'end-of-project' study to capture specific details of progress against each indicator and the impacts of the adaptation interventions and assess progress since the 'baseline' study.

To Government:

95. By closely linking its interventions to agriculture, SPACC has demonstrated the value-add that local climate variability data and adaptation technologies / practices can give to livelihood interventions. It will be useful for existing Government programs to integrate the approaches demonstrated as useful by SPACC – particularly the PCM, SLWM pilots, etc.

To FAO, BIRDS and partner NGOs:

96. For supporting the CCACs' work on climate adaptation, it may be useful to explore the following:

a. CCAC linkages with existing projects/schemes of the State and Central Governments: By establishing linkages with the Gram Panchayat, and with

other CBOs operating at the village level, and by actively participating in the Gram Sabha, the CCACs may be able to tap resources from existing Government schemes to support the climate adaptation interventions (for example, the MGNREGS).

b. Partner NGO linkages with other sources of support such as the Adaptation Fund. NABARD has been accredited by the Adaptation Fund Board of UNFCCC as National Implementing Entity in India. NGOs are eligible to submit projects directly to NABARD for accessing the Adaptation Fund and to act as Executing Entities.

c. Federating CBOs: Considering that the CBOs associated with the project have a long history and are strong entities, it may be useful to federate the HU-CCACs at larger levels – district and state. The federations will be able to negotiate with Government departments, private businesses (seed companies, insurance companies, etc.) as well as NGOs to source technical expertise, market linkages, etc., to support climate-smart agriculture (an example is the linkage between the Responsible Soy programme and farmer producer companies in Madhya Pradesh).

97. In future projects, it may be useful to consider the following:

- *CCAC Plans*: Expansion of the scope of the CCAC plans beyond farm-level actions to include interventions required on common resources (irrigation tanks, pasture lands, etc.) may be useful. A stronger focus on linkages with Gram Panchayats and other user groups may help to secure resources for the broader range of interventions (for example, supporting erosion control works, desilting works, etc., through the National Rural Employment Guarantee Scheme).
- *Weather-based Index Insurance*: Availability of local rainfall data is considered a constraint for weather-based index insurance – insurance companies often depend on data available at mandal/block levels. It may be useful to explore designing weather-based index insurance products that are relevant for local crops and that rely on local weather data to trigger payouts. Another possibility to explore is the generation of revenue to the CCACs through the sale of PCM data to insurance companies.

7 Pathways to Scale and Transformational Impact

98. The SPACC Project has demonstrated the considerable value-add that local climate variability monitoring and adaptation technologies/practices can give to agriculture and related livelihoods. As of now, considering that the project has been of a relatively short duration and that while there it has been extensively documented, interventions currently remain confined to the project areas. At the same time, the project has taken a number of steps to lay the ground for facilitating convergence at the local, state, and other levels, including provision of technical advice to GoAP (Department of Rural Development) on integration of PCM in IWMP, sharing of the PCM concept and practice shared at various district level dissemination workshops, facilitation of SPACC-SGP exchange visits, exposure visits to representatives of other HUs to PCM stations and SLWM pilots, etc.

99. The successfully demonstrated SPACC approaches and interventions – particularly the PCM, SLWM pilots, etc. – could be potentially replicated elsewhere – not only in Andhra Pradesh and Telangana, but also in other developmental contexts in India or elsewhere. These could also be valuable for augmenting existing government programs (on rural livelihoods, agriculture and natural resources management).

100. The knowledge products as well as the large pool of trained and 'aware' stakeholders that the SPACC project has generated provide the means by which its expertise is available to other similar projects and for scaling up. Beyond government programmes, the private sector is already making inroads into agriculture and allied sector programmes through initiatives such as contract farming, and as such there are opportunities for to take the SPACC interventions to scale. The project approach and interventions (PCM in particular) could also find potential usage in related sub-sectors such as animal husbandry and dairying, poultry farming, etc. Together with other interventions such as risk transfer through weather-based index insurance etc., the SPACC interventions have the potential to larger support climate-smart agriculture contexts in the target states as elsewhere.

101. The project has institutionalised the continuance of various core project activities such as PCM data collection, operation and maintenance (O&M) of the PCM equipment, periodic CCAC meetings, etc. through agreements with HU level CCACs and setting up of a HU level CCA fund (with contribution from the community as well as the project). While the agreements include a list of key responsibilities for the HU level CCACs, there could have been further elaboration on the matter of how the funds should be deployed. Most HU CCAC members interviewed in the field during the review appear to indicate the presence/setting up of mechanisms for collection of community contributions and also in some cases, innovative use of the fund (such as micro-lending to farmers in the HU on interest basis to support implementation of SLWM practices, etc.). At the same time, in some others, these mechanisms were either not in place or there appeared to be a lack of

clarity as to how the funds should be utilised (beyond O&M of the PCM equipment).

102. There is anecdotal evidence (as yet undocumented by the project) of diffusion of project interventions beyond the beneficiaries or the project (by virtue of other farmers in the vicinity proactively seeking and utilizing PCM data, adopting the SLWM practices, etc.). At the same time, while there currently appeared to be no evidence of institutional uptake and mainstreaming of project interventions, there was anecdotal evidence (as yet undocumented) of government functionaries at the district level proactively advocating the interventions to farmers in non-beneficiary villages. There is also evidence of increasing demand from other HUNs for establishment of PCM stations in their respective HUs and recognition by government officials (Rommonivagu HU, GVS, Chittoor district) that rain gauge stations are essential at gram panchayat level, and PCM station at mandal level for identification of drought hit areas.

103. The project, through its interventions has the potential to contribute to sustainable natural resource management, in terms of maintenance and/or regeneration of the natural resource base including water savings, augmented water harvesting, increased average crop yield; increased soil organic carbon content, and enhanced soil moisture availability, among others.

104. As indicated in earlier and latter subsections, there would have been considerable scope for enhanced sustainability and replication had the project duration been extended to facilitate consolidation, further documenting of lessons and the development of products such as policy briefs, for building the necessary linkages/convergence – all contributing to more systematic withdrawal. These are an important contribution to the knowledge base on adaptation in the country. Dissemination of the project experiences and learnings through the project website, district and state level meetings, etc., will be useful to other existing and emerging adaptation projects/programs in the country.

Annexure 1: terms of Reference for the Final Project Review

1 Background of the project

1.1 **Title:** The project "Reversing Environmental Degradation and Rural Poverty through Adaptation to Climate Change in Drought Stricken Areas in Southern India: A Hydrological Unit Pilot Project Approach", is simply referred to as Strategic Pilot on Adaptation to Climate Change (SPACC) Project, for convenience in the implementation.

1.2 **Rationale:** SPACC Project evolved based on the experience of the previous FAO supported, nationally executed (NEX) project viz., Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project. While APFAMGS organized communities for the purpose of sustainable groundwater management, SPACC aimed to further build the capacity of the community based organizations (CBOs), so that they could facilitate grass-root action for suitable adaption, especially through sustainable land and water management practices.

1.3 **Location:** SPACC Project is implemented in HUs; spread over 143 habitations in India. It is operational in seven drought prone districts of the Andhra Pradesh State (bifurcated into Andhra Pradesh and Telangana, per 2nd June 2014) viz., Anantapur, Chittoor, Kadapa, Kurnool, Prakasam, Mahabubnagar and Nalgonda (the last two districts form part of the new state of Telangana).

1.4 **Duration:** The project duration is 3 years, starting on December 6, 2010. Due to delayed start of the project, the project completion date has been extended till 30th June 2014. However, the 9 field units closed their field operations per 30th April, after formally handing over the project assets and documents to the HU - Climate Change Adaptation Committees (CCAC). These 9 CCACs continue to engage themselves in promoting the activities and ideas they learnt during the project implementation aiming at building community resilience in their respective HUs, with skeletal support from the SPACC partner NGOs.

1.5 **Budget:** The Project is financed by the Global Environment Facility (GEF) and co-financed by the Food and Agriculture Organization (FAO) of the United Nations (UN). A network of nine Non Governmental Organizations (NGOs) executes the project. GEF allocation for the project was USD 909,091. Spending of GEF funds stands at USD 712,437, as on 31st December 2013. FAO planned to co-finance the project to the tune of USD 1,300,000, of which USD 1,144,541 were spent by 31st December 2013. Partner NGOs planned to raise local contribution, in kind, to the tune of USD 1,553,563. The spending under local contribution, per 31st December 2013, stands at USD 1,432,678.

1.6 **Objectives:** The global environmental objective (GEO) of SPACC project is stated as: "Establish a knowledge base for large-scale intervention on climate change adaptation". The project development objective (PDO) is: "Knowledge and capacities of communities in pilot HUs in Andhra Pradesh, India are strengthened to respond to climate change impacts". The project is implemented using "result based management (RBM) framework", forming part of the project document, and later refined in the initial phases of the project implementation. The RBM framework used in the project planning, implementation and monitoring is furnished as **Annex 1**.

1.7 **Key activities/events:** a) baseline study; b) participatory climate monitoring (PCM); c) climate change adaptation committees; d) sustainable land and water management

(SLWM) pilots; e) farmer climate schools (FCS); f) gender mainstreaming; and g) HU climate change adaptation plans (CCAP).

1.8 **Main achievements:** a) historical data sets (past 30 years) along with scientific interpretation were shared with HU-CCACs; b) weather monitoring stations were established and locals were trained in weather data collection; c) locals equipped with apparatus and skills to monitor soil moisture and linkages established to with laboratories to monitor soil organic carbon; d) on farm trials were conducted for exploring options for sustainable land and water management (SLWM), focusing on locally relevant crops; e) platform was provided for farmers through farmer climate schools to discuss historical and current climate parameters, effectiveness of the SLWM trials and work out possible climate adaptation options; and f) 9 HU-CCACs were encouraged to evolve their own HU-specific climate change adaptation plan (CCAP), which they would implement beyond the project period.

1.9 **Institutional set-up:** FAO is the GEF agency for the project, providing supervisory and technical guidance services in project execution. The Ministry of Environment and Forests (MoEF) of the Government of India (GoI) is the focal point Ministry of GEF. The SPACC project is part of the GEF Sustainable Land and Eco-system Management (SLEM) program of the MoEF. The Indian Council of Forestry Research and Education (ICFRE), a subordinated office of the MoEF is the Technical Facilitation Organization (TFO), is responsible for day-to-day management and implementation of the SLEM program. The National Steering Committee, chaired by the Additional Secretary of the MoEF, coordinates the SLEM program. The project activities are implemented by 9 field units (multi-disciplinary teams, lead by a Field Officer), managed by 9 partner NGOs, based on Annual Work Plan and Budgets (AWPB), in partnership with the Community Based Organizations (CBO). Bharathi Integrated Rural Development Society (BIRDS), apart from executing the project in Kurnool district, provides technical and managerial support to other implementing NGOs, through its Project Management Unit (PMU), based at Hyderabad. PMU is constituted with a team of multi-disciplinary professionals, lead by the Project Manager, who is a member of the SLEM-NSC. Apart from facilitating planning of project activities, PMU provides monitoring and support services to field units. The Project Steering Committee (PSC), constituted with national and state level stakeholders, including MoEF, FAO, provides overall guidance to the PMU. PSC is chaired by the representative from the Department of Rural Development (DRD). While the Project Manager acts as the Secretary of the PSC, the Executive Director of BIRDS is the Convener. Flow-chart (**Annex 2**) shows the working relationship of different institutions and individuals in the project implementation.

Purpose of the Review

1.10 **The mandate:** Section 5.2 of the project document foresees the need of the Mid Term Review (MTR), at the beginning of the second year of project implementation. However, MTR was stalled by FAO as the project life is short (3 years) and it took about six months before actual grounding of project activities could take place. Alternatively, it was felt that a final project evaluation would be more appropriate. However, in light of the limited resources available for a full evaluation, and based on consultation with the FAO Office of Evaluation, a review consisting of a more limited exercise will be conducted.

1.11 **Reasons for the review:** The project is nearing its completion (due on 30th June 2014) date and the entire project period (December 2010 to May 2014) could be evaluated. Given the experimental nature of the project intervention, it is expected that there could be number of learning's from it for the national and state level stakeholders, mainly the government agencies. The final review would document the project experiences, especially the good practices emerging out of the project experience. It is likely that the

information is useful to the stakeholders' viz., Government of India, FAO and GEF, apart from Governments of Andhra Pradesh and Telangana, who may wish to incorporate or mainstream the project experiences in their regular programs.

1.12 **Objectives of the review:** Following are the objectives of the final review of the SPACC project.

1.12.1 Inform the stakeholders (GEF, FAO, MoEF, GoAP, PNGOs, and CBOs) about outcome of the project intervention and the lessons that could be learned thereof

1.12.2 Reflect on the possibility of mainstreaming the ideas emerging out of the project in regular government programs

1.12.3 Examine feasibility of up-scaling the project model in other GEF and/or FAO programs, elsewhere in the country/globe.

1.13 **Contribution to the Thematic Evaluation of FAO's Work on Climate Change Adaptation and Mitigation**. While the project review will aim to provide country stakeholders with useful lessons it will also have utility by informing an evaluation being planned of FAO's Work on Climate Change Adaptation and Mitigation, conducted by OED. The aim of this evaluation is to provide FAO's relevant departments and offices with findings and lessons that will enhance FAO's work on the critical global issue of climate change and provide accountability on the organization's achievements to the agency's Governing Bodies and Senior Management. Its focus will be primarily on assessing the contribution FAO has made to climate change adaptation and mitigation in the different sectors (agriculture, fisheries, forestry, livestock, land and water) in its Member Countries. The evaluation will particularly focus on the results reflected in outcomes at country level for small-farmer, -fisher and -forest-user beneficiaries, particularly the poorest and most vulnerable to climate change, as well as in terms of new policies, strategies and practices that have been institutionalized in national systems. The SPACC Final Project Review would therefore contribute to attaining country level output and outcome results, and strengthen the evidence-base of the evaluation. The Final Project Review, in addition to addressing the questions under the evaluative criteria in Section 2.7 below, would also provide answers to the following questions, which will feed into the broader thematic evaluation:

Relevance

- How innovative has the project approach been? Were there any issues or approaches that in hindsight ought to have been applied?
- Where does the comparative advantage of the project and of FAO lie in addressing climate change adaptation of small farmers in India?

Effectiveness and Impact

- Has the project assisted the poorest and most vulnerable to climate change? Has the project as a pilot influenced technical approaches and policies at higher levels, i.e. state and national levels, and are there indications that it be replicated and scaled up by government and partners?
- What, if any, are the early and/or proxy signs of improved resilience, increased or stable production and food security for the communities as a result of the project's interventions?

Partnerships

- To what extent will the NGO partners utilize the knowledge and approaches of the project in their future work in other communities?

2 Evaluation Framework

2.1 Scope

2.1.1 **Period:** The evaluation will be carried out for the entire project period, starting from the start date (December 2010) to the time of evaluation (end June 2014).

2.1.2 **Geographical area:** The evaluation will be limited to the project area i.e., nine HUs, covering 143 habitations in 7 districts of Andhra Pradesh and Telangana States of India.

2.1.3 **Issues:** The evaluation will look into these issues: i) relevance of concept and design; ii) effectiveness of outputs and outcomes; iii) efficiency and effectiveness of project implementation process; iv) analysis of the application of the UN common country programming principles, cross-cutting themes, and of the Humanitarian Principles; v) impact; and vi) sustainability.

2.1.4 **Constraints:** The evaluation will base its conclusions and recommendations, fully realizing the constraints under which the project was implemented, for example the short period of project implementation.

2.2 Evaluation criteria

2.2.1 **Criteria:** The project will be critically assessed through the internationally accepted evaluation criteria, i.e. relevance, efficiency, effectiveness, impact, and sustainability.

2.2.2 **Compliance:** In line with the new FAO project cycle, the evaluation will assess compliance with the following UN Common Country Programming Principles: Human Rights Based Approaches (HRBA)/ Right to Food/ Decent Work; Gender equality, Environmental sustainability, Capacity Development and Results Based Management.

2.2.3 **Additional characteristics** to guide the analysis are: robustness, clarity, coherence, realism and technical quality. In the case of emergency projects, special attention should be given to Humanitarian Principles and Minimum Standards.

2.2.4 **Others:** If any of the mandatory features listed here cannot be reasonably assessed during the evaluation, this should be stated under 'Constraints and limitations' within the evaluation methodology section.

2.3 Evaluation issues

2.3.1 **Relevance of the project concept:** The project concept emerged as a result of the previous FAO NEX project, as mentioned in section 1. The basic premise of the project is that the farmer with their practices aiming towards sustainable groundwater management have proved their technical and managerial capability and are capable of engaging themselves in the pursuit of community based climate change adaptation intervention. In other words, the SPACC project broadened the agenda of CBOs from sustainable groundwater management to community based climate change adaptation. The relevance of this concept will be examined in the evaluation, especially with reference to: national/regional development priorities, programs, needs of the population, FAO global goals and strategic objectives, and GEF

priorities. The evaluation would also reflect on the robustness and realism of the theory of change underpinning the project.

2.3.2 **Relevance of the project design:** The project document included a "results framework" to be used in the implementation phase. The result framework was revised during the inception stages. Annual project result frameworks were evolved in annual plan and review workshops, which were used as monitoring tools of project implementation. The evaluation will reflect on this flexible approach, apart from looking at the clarity, coherence and realism of the "results framework", including: i) causal relationship between inputs, activities, outputs, outcomes (immediate objectives) and impact (development objective); ii) validity of indicators, assumptions and risks; iii) approach and methodology; iv) resources (human and financial) and duration; v) stakeholder and beneficiary identification and analysis; and vi) institutional set-up and management arrangements.

2.3.4 **Overall effectiveness:** The evaluation will examine the overall effectiveness of the project actual and potential contribution of the project to the normative and knowledge function of the FAO.

2.3.5 **Outcomes:** The evaluation will describe and analyse the expected or unexpected outcomes produced in terms of quantity, quality and timeliness, essentially including: i) whether or not the farmers and CBOs make informed decisions on land and water management taking into account impacts of the climate variation based on scientific and local knowledge?; ii) whether or not the CBOs have capacities to integrate climate variability adaptation measures in sustainable land and water management (SLWM)?; iii) whether or not the farmers have acquired skills in managing climate variability and testing adaptation technologies in farming systems through participation in farmer climate schools (FCS)?; iv) whether or not adequate adaptation technologies and practices identified based on pilot testing in drought prone areas?; and v) whether or not dissemination of a package of methods, tools and institutional approaches was carried out in support of district and state level natural resource management initiatives to address the impacts of droughts?. The evaluation will also reflect on the robustness of the outcomes and expectations for further uptake or diffusion.

2.3.6 **Outputs:** The evaluation will describe and analyse the expected or unexpected outputs produced in terms of quantity, quality and timeliness, essentially including: i) whether or not a study completed on local and scientific knowledge on impacts of climate variability/change on natural resources in Andhra Pradesh?; ii) whether or not local monitoring system of climate variability and its impacts operating?; iii) whether or not the CBOs have capacities to integrate climate variability adaptation measures in sustainable land and water management (SLWM)?; iv) whether or not farmers acquired skills through participation in farmer climate schools (FCS)?; v) whether or not technology and practice pilots on alternative adaptation technologies in SLWM implemented?; vi) whether or not a platform for dissemination of project lessons, results and products available?; and vii) whether or not institutional linkages reinforced? The evaluation will also reflect on the robustness of the outputs and expectations for further uptake or diffusion.

2.3.7 **Implementation process:** Efficiency and effectiveness of project implementation process will be assessed in the evaluation including the assessment of: i) the project management; ii) institutional set-up; and iii) financial resource management.

2.3.8 **Assessment of project management:** The evaluation will assess the project management, in terms of: i) Quality, realism and focus of work plans; ii) assessment of delivery, causes and consequences of delays and of any remedial measure taken, if any; iii) monitoring and feed-back loop into improved management and operations; iv) staff management; and v) development and implementation of an exit strategy.

2.3.9 **Assessment of institutional set-up:** The evaluation will assess the institutional set-up, in terms of: i) administrative and technical support by FAO HQ, regional, and country office; ii) institutional set-up, internal review processes, coordination and steering bodies; and iii) inputs and support by the Government/s and resource partners.

2.3.10 **Assessment of financial resources management:** The evaluation will assess the financial resources management, in terms of: i) adequacy and realism of budget allocations to achieve intended results; ii) adequacy and realism of Budget Revisions in matching implementation needs and project objectives; and iii) rate of delivery and budget balance at the time of the evaluation and in relation to work-plans.

2.3.11 **Analysis of the application of the UN common country programming principles, cross-cutting themes, and of the Humanitarian Principles:** Given the small evaluation budget, it will probably not be possible to give separate attention to all the areas. The review could look at them only insofar as they are part of the project's objectives or of the communities. In other words, include gender when looking at outcomes at community level, capacity development, when examining capacity of the communities for adaptation, and partnerships with regard to the NGO's role and work.

2.3.12 **Partnerships and Alliances:** Analysis of Partnerships and Alliances will be carried out including: i) how they were planned in the project design and developed through implementation; ii) their focus and strength; and iii) their effect on project results and sustainability.

2.3.13 **Impact:** The evaluation will assess the overall impact of the project, actual or potential, positive and negative, produced directly or indirectly, intended or unintended; and overall contribution of the project to FAO Country Programming Frameworks, Organizational Result/s and Strategic Objectives, as well as to the implementation of the corporate Core Functions.

2.3.14 **Sustainability:** The evaluation will explore the prospects for sustaining and up-scaling the project's results by the beneficiaries and the host institutions after the termination of the project. The assessment of sustainability will include: i) Institutional, technical, social and economic sustainability of proposed technologies, innovations and/or processes; ii) expectation of institutional uptake and mainstreaming of the newly acquired capacities, or diffusion beyond the beneficiaries or the project; and iii) Environmental sustainability: the project's contribution to sustainable natural resource management, in terms of maintenance and/or regeneration of the natural resource base.

2.3.15 **Conclusions and Recommendations:** Based on the above analysis, the evaluation will draw specific conclusions and formulate recommendations for any necessary further action by Government, FAO and/or other parties to ensure sustainable development, including any need for follow-up or up-scaling action. The evaluation will draw attention to specific good practices and lessons to be learned as they are of interest to other similar activities. Any

proposal for further assistance should include specification of major objectives and outputs and indicative inputs required.

2.4 Indicators of the Evaluation

2.4.1 The evaluation would be primarily conducted using the indicators and source of verification listed in the project's "results frameworks". Additional indicators may be used by the evaluation team with mutual consent of the project stakeholders.

3 Review methodology

3.1 The review will adhere to the United Nations Evaluation Group (UNEG) Norms and Standards (http://www.uneval.org/normsandstandards).

3.2 The review will adopt a consultative and transparent approach with internal and external stakeholders throughout the review process. Triangulation of evidence and information gathered will underpin its validation and analysis and will support conclusions and recommendations.

3.3 The review will make use of the methods and tools, which might include: i) review of existing reports; ii) semi-structured interviews with key informants, stakeholders and participants, supported by check lists and/or interview protocols; iii) direct observation during field visits; and iv) surveys and questionnaires.

3.4 Particular attention will be devoted to ensure that women and other under-privileged groups will be consulted in adequate manner. Insofar as possible and appropriate, interaction will also take place with non-participants to canvass their opinions. The Sustainable Livelihoods Framework (http://www.livelihoods.org/info/guidance_sheets_pdfs/section2.pdf; and the Strengths, Weaknesses, Opportunities and Threats (SWOT) framework can be used for assessment of project results.

3.5 The review team will discuss in detail with the key stakeholders of the project and will take into account their perspectives and opinions. Key stakeholders will include: i) the FAO India Representative; ii) FAO Project Task Manager; FAO Project Secretary; GEF Consultant, GoI-MoEF; members of SLEM-NSC; members of PSC; Project Manager and other key members of the Project Management Unit (PMU); Project holder (BIRDS) and partner NGOs; members of the climate change adaptation committees (CCAC); PCM volunteers; FCS participants; SLWM pilot farmers; and local government functionaries.

3.6 The review team will maintain close liaison the Project Task Force members and Project staff at headquarters, regional, sub-regional or country level, and it will share its final report with OED. Although the mission is free to discuss with the authorities concerned anything relevant to its assignment, it is not authorized to make any commitment on behalf of the Government, the donor or FAO.

3.7 The team will present its preliminary findings, conclusions and recommendations to the project stakeholders in the visited country/ies and insofar as possible, in the relevant FAO Decentralized Office and in HQ, to obtain their feedback at the end of the data-gathering phase.

3.8 The draft ToR will be circulated among key stakeholders for comments before finalisation. The draft review report will also be circulated among key stakeholders for comments before finalisation; suggestions will be incorporated as deemed appropriate by the review team.

3.9 The review would start with a briefing meeting, wherein the consultants hired for the purpose, the project implementing agency i.e., FAO (Country Representative, Project

Task Manager, and Program Secretary), and the project executing agency i.e., BIRDS (Project Manager and the Executive Director), would participate. After deliberations, the consultants would sign on the final Terms of Reference (ToR) that would be the basis of the entire exercise.

3.10 The second step would be the interaction of the consultants with the key functionaries of the PMU, including the Project Manager, Subject Experts, Project Officers and Field Officers. PMU would provide the consultants with the reports and other documents needed for primary understanding of the progress of project implementation. After few days of document review, the consultants would finalize the schedule of field visits for interaction with the primary stakeholders i.e., Climate Change Adaptation Committees (CCACs) organized as part of the project implementation.

3.11 Based on the document review, the review team would evolve the data collection tools, either participatory (time-line, seasonality, transect, Venn diagram, etc.) or conventional (questionnaire, checklist, interview schedule, etc.). The consultants will discuss these tools with PMU and run a quick field trial, before use of the tools in field level interviews.

3.12 At the field level, the consultants will start their mission with a one-hour interaction with the chief functionary of the implementing NGO and the Field Officer, who would later assist the review mission in organizing the needed interactive sessions with the primary stakeholders. The field level interviews need to be documented using a dicta-phone, if no interview schedule is filled for later tabulation and analysis.

3.13 The information collected in the form of recorded conversions, filled in interview schedules, photographs will form the basis for making qualitative statements in the report of the review mission. The review team will not make any statement, either verbally or in the report, without documentary evidence, either primary or secondary. The draft report will be compiled and shared with the PMU and after mutual agreement of the consultants and PMU; the team will capture the summary of its mission in a power point presentation.

3.14 A de-briefing meeting will be organized for the participants of the briefing meeting, wherein the consultants will make a power point presentation on key findings of the review mission. The consultants will make necessary changes in the draft report, based on the suggestions coming from the participants of the de-briefing meeting and compile a final report to PMU, no later than a month from the briefing meeting.

4 Roles and responsibilities

4.1 FAO Budget Holder (BH), the Lead Technical Officer (LTO) and the Project Task Force (PTF) of the project to be evaluated are responsible for initiating the review process, drafting the first version of the Terms of Reference, and supporting the review team during its work. They are required to participate in meetings with the team, make available information and documentation as necessary, and comment on the draft final terms of reference and report. Involvement of different members of the project Task Force will depend on respective roles and participation in the project.

4.2 The BH is also responsible for leading and coordinating the preparation of the FAO Management Response and the Follow-up Report to the review, fully supported in this task by the LTO and PTF. OED guidelines for the Management Response and the Follow-up Report provide necessary details on this process.

4.3 FAO Office of Evaluation (OED) may be requested for guidance in drafting the ToR, in the identification of the consultants and in the organization of the team's work; but the project team is responsible for the finalization of the ToR and of the team

composition. The project team shall brief the review team on the review methodology and process and will review the final draft report. For Quality Assurance purposes in terms of presentation, compliance with the ToR and timely delivery, quality, clarity and soundness of evidence provided and of the analysis supporting conclusions and recommendations, the project team and BH may request OED guidance and comments.

4.4 The Review Team is responsible for conducting the review, applying the methodology as appropriate and for producing the review report. All team members, including the Team Leader, will participate in briefing and debriefing meetings, discussions, field visits, and will contribute to the review with written inputs for the final draft and final report.

4.5 The Team Leader guides and coordinates the team members in their specific work, discusses their findings, conclusions and recommendations and prepares the final draft and the final report, consolidating the inputs from the team members with his/her own.

4.6 The Review team will be free to expand the scope, criteria, questions and issues listed above, as well as develop its own review tools and framework, within time and resources available.

4.7 The team is fully responsible for its report, which may not reflect the views of the Government or of FAO. A review report is not subject to technical clearance by FAO or OED, although OED may be requested for comments.

5 Evaluation team

5.1 Mission members will have had no previous direct involvement in the formulation, implementation or backstopping of the project.

5.2 The evaluation team will comprise the best available mix of skills that are required to assess the project, and as a whole, will have expertise in the subject matters: i) project management; ii) agriculture; iii) water management; and iv) institutions and gender. The team will be balanced in terms of geographical and gender representation to ensure diversity and complementarities of perspectives.

5.3 The evaluation team will be constituted by FAO Country Office, in consultation with the project holder (the Executive Director, BIRDS) and the Project Manager. Upon identification of 3 or 4 members of the evaluation team, the Project Manager will draft individual terms of reference (based on individual qualifications and experiences) and finalize in consultation with FAO, GEF and other stakeholders.

6 Evaluation deliverables

6.1 The evaluation report will illustrate the evidence found that responds to the evaluation issues, questions and criteria listed in the ToR. It will include an executive summary. Supporting data and analysis should be annexed to the report when considered important to complement the main report.

6.2 The recommendations will be addressed to the different stakeholders and prioritized: they will be evidence-based, relevant, focused, clearly formulated and actionable.

6.3 The evaluation team will agree on the outline of the report early in the evaluation process. The report will be prepared in English, with numbered paragraphs, using OED's template as a possible guide for report writing. Translations in other languages of the Organization, if required, will be FAO's responsibility.

6.4 The team leader bears responsibility for submitting the final draft report to FAO within four weeks from the conclusion of the mission. FAO will submit to the team its comments and suggestions that the team will include as appropriate in the final report within maximum two weeks.

6.5 Annexes to the evaluation report will include, though not limited to, the following as relevant: i) terms of reference for the evaluation; ii) profile of team members; iii) list of documents reviewed (see Annex 3); iv) list of institutions and stakeholders interviewed by the evaluation team (see Annex 4); v) list of project outputs; and vi) list of evaluation tools.

6.6 Other deliverables of the evaluation, in addition to the final report, would include: i) a power-point presentation on key findings; and ii) data-base used in conducting the evaluation.

7 Evaluation timetable

7.1 The evaluation is expected to take place during second half of May to end of June 2014. The field visit phase is expected to last approximately one week. The timetable below shows a tentative programme of travel and work for the evaluation team. It will be finalised upon the recruitment of the evaluation team.

Tentative timetable of the evaluation

Task	Dates	Duration	Responsibility
Team identification and recruitment	May 2014, last week	1 week	Project Task Manager
Reading background documentation	May 2014, last week	1 week	Reviewing Team of 2
Briefing	May 2014, last week/first week of June	1 day	Project Task Manager
Project visit	June 2014, first/second week	1 week	Project Manager
De-briefing	June 2014, Second/third week	1 day	Project Task Manager
Submission of draft report	June 2014, third/fourth week	1 day	Reviewing Team of 2
Review of the draft report	June 2014, third/fourth week	1 week	Project Task Manager and FAO
Revision and submission of final report	June 2014, last week	1 week	Reviewing Team of 2
Approval of the Evaluation Report	June 2014, last week	1 week	Project Task Manager and FAO