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NABARD RESEARCH STUDY - 44

Terminal Evaluation of Adaptation Fund Project titled 'Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan

ICAR-Central Research Institute for Dryland Agriculture (ICAR-CRIDA), Hyderabad

आर्थिक विश्लेषण एवं अनुसंधान विभाग
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National Bank for Agriculture and Rural Development, Mumbai

2023

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Research and Development Project Funded by NABARD

NABARD

Implemented by

ICAR – Central Research Institute for Dryland Agriculture, Hyderabad

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Evaluation Team

DISCLAIMER

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Terminal Evaluation of Adaptation Fund Project titled 'Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan by ICAR-CRIDA, Hyderabad

About NABARD Research Study Series

The NABARD Research Study Series has been initiated to enable wider dissemination of research conducted/sponsored by NABARD on the thrust areas of Agriculture and Rural Development among researchers and stakeholders. The current study titled 'Terminal Evaluation of Adaptation Fund Project titled 'Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan' conducted by ICAR - Central Research Institute for Dryland Agriculture (ICAR-CRIDA) is the forty-fourth in the series.

NABARD was accredited as National Implementing Entity (NIE) for accessing resources under Adaptation Fund for India in 2012. NABARD is entrusted with overall project screening, implementation, monitoring and fund distribution of the AFB projects in India. 'Climate proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan' is a project of Adaptation Fund implemented by NABARD that focussed on building adaptive capacities of the communities to shifting rainfall patterns and extreme weather events exacerbated by climate change in the rainfed areas of these two states. Rajasthan and Tamil Nadu are characterised by low rainfall with uneven distribution. Delay in onset of monsoon, high intensity rainfall of short duration and prolonged dry spells during monsoon are major threats to sustainable crop and animal production and to livelihoods of farmers in the states.

Upon completion of the project during 2021, NABARD entrusted the responsibility of conducting Terminal Evaluation of the project to ICAR-CRIDA, Hyderabad as it is desirable to monitor the long-term impact of various interventions during post-project period in bringing resilience to farming systems by minimizing the impact of climate change/ extreme weather events. The terminal evaluation process consisted of review of project reports, interactions with representatives of NABARD, executing entities and farmers community in four randomly selected watersheds, two from each state of Tamil Nadu and Rajasthan; and was conducted during January - June 2023. Major outcomes of the project being subjected to terminal evaluation include improved soil and water regimes for enhanced productivity and incomes, strengthened adaptation to climate change, better risk mitigation and knowledge management and dissemination.

Hope this report would make a good reading and help in generating debate on issues of policy relevance. Let us know your feedback.

Dr. K C Badatya
Chief General Manager
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List of abbreviations

AF	Adaptation Fund
AFB	Adaptation Fund Board
AWS	Automatic Weather Station
BSR	Basic Schedule of Rates
CBO	Community Based Organization
COVID-19	COronoa Virus Disease of 2019
CRIDA	Central Research Institute for Dryland Agriculture
EE	Executing Entity
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
GoI	Government of India
HO	Head Office
ICAR	Indian Council of Agricultural Research
IGWDP	Indo-German Watershed Development Programme
IWMP	Integrated Watershed Management Programme
KVK	*Krishi Vigyan Kendra*
M&E	Monitoring & Evaluation
MoAFW	Ministry of Agriculture and Farmers' Welfare
MoEFCC	Ministry of Environment, Forest and Climate Change
MoRD	Ministry of Rural Development
NABARD	National Bank for Agriculture and Rural Development
NAPCC	National Action Plan on Climate Change
NGO	Non-Governmental Organization
NIE	National Implementing Entity
NMSA	National Mission on Sustainable Agriculture
NRAA	National Rainfed Area Authority
NREGS	National Rural Employment Guarantee Scheme
NRLM	National Rural Livelihoods Mission
NRM	Natural Resource Management
PMU	Project Management Unit
PRA	Participatory Rural Appraisal
PRI	*Panchayati Raj* Institution
PSC	Project Selection Committee
RBM	Results Based Management
RO	Regional Office
SC	Scheduled Caste
SHG	Self Help Group
SLNA	State Level Nodal Agency
SLRC	State Level Review Committee
ST	Scheduled Tribe
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VWC	Village Watershed Committee
WA	Watershed Association
WDF	Watershed Development Fund

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Executive Summary

- The AF project commenced in March 2016 in 19 selected watersheds in the two states of Rajasthan and Tamil Nadu. The overall objective of the project was to enhance resilience of agriculture to climate change and variability in the watersheds by adding climate proofing and resilience enhancing components to the already treated watersheds. Though the project was to be completed within a three-year duration, the project was closed in 2021.
- The project was planned and implemented by the National Implementing Entity, National Bank for Agriculture and Rural Development (NABARD) through 14 Executing Entities in 19 watershed locations in semi-arid regions of Rajasthan and Tamil Nadu. Rajasthan falls under dry and semi-arid zone and Tamil Nadu largely falls under dry and moist semi-arid region. The selected states have low rainfall with uneven distribution resulting in prolonged dry spells and drought affecting the crop productivity. Delay in onset of monsoon, high intensity rainfall of short duration and prolonged dry spells during monsoon are major threats to sustainable crop and animal production and to livelihoods of farmers.
- Upon completion of the project during 2021, the NIE entrusted the responsibility of conducting Terminal Evaluation to ICAR-CRIDA, Hyderabad. The terminal evaluation was conducted during January - June 2023. The Evaluation process consisted of review of project reports, interactions with representatives of NIE, EE and farmers' community in four randomly selected watersheds, two from each state. The evaluation process was limited to review of available project reports in case of other 15 watersheds. The project's intended objectives and outcomes are consistent with the goal and objectives of the Adaptation Fund in terms of enhancing resilience of farm production and farmers' livelihoods by strengthening the adaptive capacity of farmers.
- Major outcomes of the project being subjected to terminal evaluation include improved soil and water regimes for enhanced productivity and incomes, strengthened adaptation to climate change, better risk mitigation and knowledge management and dissemination. These outcomes were achieved through promotion of such interventions as adoption of short duration or stress escaping crop varieties, providing agro-met advisory services to the farmers, capacity building of farmers, creation or strengthening of water harvesting structures, promotion of more diverse farming activities, etc. All of these outcomes are relevant to and help achieve various outcomes/ objectives of Adaptation Fund.
- That the project was implemented in states where rainfed agriculture is dominant adds to the relevance and importance in terms of national development priorities as nearly half of agriculture in India is rainfed with little access to irrigation facilities.

- Information elicited from farmers showed that the interventions were '**Satisfactorily**' relevant. Some of the interventions such as growing vegetable crops and tree crops in Rajasthan scored a rating of 6.0 implying that relevance is '***Highly satisfactory***'. Growing of such crops helps enhance farm incomes on one hand and contributes to carbon sequestration on the other. In Tamil Nadu, relatively higher number of interventions received '***Highly satisfactory***' rating. Such interventions include installation of biogas plants, digging farm ponds, efficient irrigation methods such as pitcher irrigation and field bunds whose role in more efficient use of water resources is well acknowledged. The overall rating with respect to relevance of the interventions was '***satisfactory***' in the two states separately and for the project as a whole.
- Farmers didn't find the 'literature' on climate change very useful and relevant, especially in Rajasthan, where the literacy levels were low. While the knowledge and information sharing can be done through other forms of media (audio-visual), the scope for improving the print media in terms of more pictorial illustrations, better texts in local language, etc. to make them more interesting to read should be explored. Enhancing knowledge, information and ability to understand the complex climate change related issues is an important element of adaptive capacity and is an initial step towards adaptation implementation which is nothing but a manifestation of adaptive capacity.
- There were observed noticeable changes in area under different crops as well as in the yield of the crops grown in the project areas. In Rajasthan, area under crops such as maize, soybean, black gram, etc. increased whereas the area under pearl millet decreased considerably. The project's attempts to diversify the cropping pattern towards vegetable crops and tree crops were also reflected in the increased area under these crops. These changes were also accompanied by improvements in yields of many crops that ranged from 9.6% in barley to about 60.7% in pearl millet. In Tamil Nadu, the changes in cropping pattern were not as conspicuous. However, the yield of crops increased compared to pre-project period. The yield changes were in the range of 25% (cotton) to 82% (tamarind). Farmers did believe that the yield changes could be 'somewhat' attributed to the project interventions as reflected in mean scores of around 2 in most cases.
- During a drought or stress year, farmers obtained an average yield of 3.28 q/ha of soybean as against 6.71 q/ha before the project in Rajasthan indicating a resilience of 48.9%. After the project, farmers obtained yield of 12.31 q/ha when exposed to drought compared to 20.8 q/ha during a normal year indicating a resilience of 59.2%. Similar results were obtained in case of other major crops grown in Rajasthan. In Tamil Nadu also, resilience of cotton yields increased to 78% from 65.5%. Further, yield of most crops increased considerably during both normal years and drought years in both the states indicating growth and enhanced resilience due to the efforts of the project that encompassed varietal, natural resource management and information interventions.
- An examination of composition of household income showed that the contribution of farming in own farms contributed more to labour employment and to income in both

states reflecting the improvements in cropping intensity and profitability of farming compared to the pre-project situation. The project interventions were found to lead to enhanced farm income, reduced impact of climate shocks, and more sustainable cropping pattern as per the opinion of a majority of farmers.

- Participation of community and farmers, the primary stakeholders of the project along with those concerned with agricultural research and development in the respective locations largely ensured that interventions were relevant, acceptable, affordable and effective. These consultations were also helpful in identifying and implementing cost-effective adaptations. Participation of research organizations in planning processes also played a role in identifying appropriate interventions. However, no formal cost-benefit analyses were resorted to arrive at those technological choices.
- Overall, the financial risks do not seem to be severe or significant with the overall project receiving a rating of 'moderately likely'. More innovative means of mobilizing financial resources that can be utilized during the post-project period are needed. These can take the form of some incentives, more than the seed money within project budget allocation, for better performance, or when the potential benefits are substantial, local governments can be encouraged or convinced to incentivise such initiatives.
- The dimension of risk to sustainability appears to be not adequately addressed as six out of ten watersheds in Rajasthan received a rating of '***moderately unlikely***' implying presence of some risk to sustainability and progress towards realizing the intended impacts. Lack of technical capacity among the community is a common factor across watersheds that is seen as a risk factor. In Tamil Nadu, institutional- and governance risk was found to be relatively low with five watersheds receiving a rating of 'likely', three 'moderately likely' and one '*moderately unlikely*'.
- Most of the NRM structures put in place are currently in a healthy state and also there were few incidents of them being damaged due to heavy rainfall, etc. in a majority of watersheds in Rajasthan. The situation in Tamil Nadu was also not much different. In fact, it was found to be somewhat better with five watershed scoring '*moderately likely*' and four 'likely'. Thus, environmental risks to sustainability were relatively low in the project as reflected in the overall rating of '***moderately likely***'.
- The project addressed the beneficiary's selection process by considering the concerns of marginalized and vulnerable groups. The consultation process (participatory rural appraisal) involved marginal and vulnerable groups such as women, landless and scheduled caste and scheduled tribes.
- Project focused on the gender equity and women empowerment. Some of the interventions directly benefitted women.
- The project execution was closely monitored by the Programme Management Unit (PMU) of NABARD (a field level unit), located at Madurai (Tamil Nadu) and Udaipur (Rajasthan). The process of execution consisting of sanction, disbursement, progress reporting, monitoring, review, etc., was clearly defined and segregated for the co-funding by NABARD and AFB funding. A separate set of manpower was available at the level of EE and PMU for attending to the works related to regular

watershed projects. To track the real time progress of the project, an on-line monitoring system was introduced. There was a three-tier project monitoring and supervision structure, i.e., at the VWC level, the project was reviewed monthly basis and reported to the *Gram Sabha* on a quarterly basis; at PMU level, the output of the project was monitored and supervised on a quarterly basis; and at the top level, PSC, with high level technical expertise, monitored and supervised the project direction, outcome of the intervention and critical gaps. From time to time, steering committee members also reviewed the project's progress.

- There was some delay in completing the project in a few cases. The reasons for the delay included delayed release of funds, supply disruptions due to COVID pandemic, non-availability of labour and increase in BSR rates.

- The contribution of project's achievements to AF goal was '***Satisfactory***' and to AF Objective '***Highly satisfactory***' whereas contribution to the AF Impact varied from watershed to watershed based on the interventions with overall rating being '***satisfactory***'.

- The overall rating of M&E based on the overall quality of the four dimensions namely, (a) M&E design, implementation & budgeting, (b) indicators (c) Project baselines and (d) Alignment of Project M&E Frameworks to National M&E Frameworks for all 19 watersheds was '***satisfactory***'.

The following recommendations emerged from the Terminal Evaluation:

- The interventions like installation of Automatic Weather Stations (AWS) and generation of agro-advisories, geo-hydrological study and crop-water budgeting exercises need to be done at the beginning of the AF project to make them fully utilizable. This was not possible in this case as the AF project is a kind of continuation of the 'normal' watershed development project. It may be considered by NIE and AF to include the climate proofing component in all the future watershed development projects so that the benefits of resource budgeting exercises can be fully utilized. Such an integration of climate proofing elements with normal watershed development component would facilitate better planning and implementation of project interventions.
- The delaying/extension of the project needs to be avoided by disbursing the fund or releasing the fund in time. The project budgets need to be flexible for accommodating any rise in implementation costs so that the delays can be avoided.
- A few interventions related to information sharing through print media (books, pamphlets, etc.) were not found to be effective because most of the farmers, especially in Rajasthan, are not highly educated. Hence knowledge and information sharing through audio-visual, print media with more pictorial illustrations, better texts in local language, etc. should be explored. This is important because enhancing knowledge, information and ability to understand the complex climate change related issues is an

important element of adaptive capacity and is an initial step towards adaptation implementation which is nothing but a manifestation of adaptive capacity.

- More innovative means of mobilizing financial resources that can be utilized during the post-project period are to be explored. These can take the form of some incentives, in addition to the seed money within project budget allocation, or when the potential benefits are substantial, local governments can be encouraged or convinced to incentivize such initiatives. NIE and EEs may initiate steps for advocating for necessary policy changes at state and local government levels.
- Continued adoption of technologies is critical to enhance resilience which requires that the necessary support systems are in place. An analysis of identification of critical requirements for continued adoption of important adaptation technologies may be attempted in this regard.
- The proportion of project management/ execution cost payable to the EE may be raised considering the remoteness of the project locations and the difficulty to attract quality manpower with necessary skills and capabilities to work in such areas and difficulties in arranging necessary logistics. Such projects require more than routine levels of commitment and passion which deserve incentives in terms of better salaries and other amenities.
- There are a few success stories in some watersheds (e.g. biogas plants in Tamil Nadu which have led to multiple benefits). Efforts may be made to popularize such models by highlighting the factors that led to success and also by highlighting how the constraints, if any, were overcome in the process.
- Though the horizontal spread of technologies was not much evident, there was some awareness built among the surrounding villages about what was being done in the project locations and the benefits thereof which can be a useful starting point for scaling out adaptation technologies. Possibilities to include such adaptation technologies in the ongoing development programmes of the government and non-government agencies may be explored as the likelihood of relevance of successful interventions is relatively better.
- A few sites where the benefits of interventions are more visible may be identified and used for exposure visits by farmers from other villages and regions. Similarly, a few farmers that benefitted substantially from the project interventions may be identified and trained to act as agents of change considering the effectiveness of farmer-to-farmer extension in adoption and diffusion of technologies.

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

1. Introduction

The AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan" was planned and implemented by the National Implementing Agency, National Bank for Agriculture and Rural Development (NABARD) through 14 Executing Entities in 19 watershed locations in semi-arid regions of Rajasthan and Tamil Nadu. Rajasthan falls under dry and semi-arid zone and Tamil Nadu largely falls under dry and moist semi-arid region. The selected states have low rainfall with uneven distribution resulting in prolonged dry spells and drought affecting the crop productivity. Delay in onset of monsoon, high intensity rainfall of short duration and prolonged dry spells during monsoon are major threats to sustainable crop and animal production and to livelihoods of farmers.

The AF project commenced in March 2016 in 19 selected watersheds in the two states of Rajasthan and Tamil Nadu. The overall objective of the project was to enhance resilience of agriculture to climate change and variability in the watersheds by adding climate proofing and resilience enhancing components to the already treated watersheds. Though the project was to be completed within a three-year duration, the project continued till 2021.

Upon completion of the project during 2021, the NIE entrusted the responsibility of conducting Terminal Evaluation to ICAR-CRIDA, Hyderabad. The terminal evaluation was conducted during January - June 2023. The Evaluation process consisted of review of project reports, interactions with representatives of NIE, EE and farmers community in four randomly selected watersheds, two from each state. The evaluation process was limited to review of available project reports in case of other 15 watersheds. The project's intended objectives and outcomes are consistent with the goal and objectives of the Adaptation Fund in terms of enhancing resilience of farm production and farmers' livelihoods by strengthening the adaptive capacity of farmers.

The Terminal Evaluation was conducted as per the Terms of Reference, appended to this document, following the methodology proposed by the evaluators (ICAR-CRIDA, Hyderabad) and accepted by the NIE. This report presents the findings of the evaluation.

1.1.Project/Programme General Information

1.1.1.Project Identification

Adaptation Fund Project ID: IND/NIE/Water/2013/1
Project/programme category: Regular
Country/ies: India
Title of project/programme: Climate Proofing of Watershed Development Projects in the States of Rajasthan and Tamil Nadu
Type of Implementing Entity: National Implementing Entity

Implementing Entity: NABARD
Executing Entity/ies: Executing Entities-

Rajasthan:
Foundation for Ecological Security (FES)
ITC-Rural Development Trust (ITC-RDT)
Rajasthan Rural Institute of Development Management (RRIDMA)
Alert Sansthan
Seva Mandir
Mahan Seva Sansthan
Gayatri Seva Sansthan
Watershed Consultants Organisation (WASCO)
Tamil Nadu:
Mysore Resettlement Development Agency (MYRADA)
Association of Serva Seva Farms (ASSEFA)
Society for People's Action for Change and Education (SPACE)
Centre for Improved Rural Health and Environmental Protection (CIRHEP)
Sri Sakthi Social Economical and Educational Welfare Trust (SWEET)
Voluntary Organisation for Integration of Community and Environment (VOICE)

Amount of financing requested (In U.S Dollars): US$ 1,344,155

1.1.2. Project programme/ Time Table

Project time table	Expected Date	Actual Date
Start of the project implementation	Jan 2016	March 2016
Mid terms review (if planned)	Not planned	
Project closing date	September 2019	March 2021
Final evaluation	Within 7 months after closure of the project	Jan - July 2023

1.1.3. Project/ Programme **Components**

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
Component 1:Improved soil and water regime for better crop productivity	**Output 1.1**: Soil health improved through summer / deep ploughing **Output 1.2**: Increased water availability through farm pond, catch pit, well recharge pit and other water harvesting structures	**Outcome 1:** Soil and water regime improved and crop productivity enhanced	170,585
Component 2: Increased adaptation to climate change through climate	**Output 2.1**: Increased	**Outcome 2:** Improved	655,670

resilient farming system approach and diversification of livelihoods	availability of fodder/fuel through afforestation & pasture land development **Output 2.2**: Improved resilience through adoption of climate resilient farming/ livelihood systems **Output 2.3**: Better energy management through adoption of energy efficient systems	climate resilient farming system and increased livelihood security	
Component 3: Integration of risk mitigation products like crop, weather and market advisory for the farmers	**Output 3.1**: Installation of Automatic Weather Stations and generation of agro-advisories **Output 3.2**: Geo-hydrological study and crop-water budgeting	**Outcome 3:** Reduced climate change vulnerability with improved risk mitigation measures	195,917
Component 4: Creation of knowledge management system for climate proofing of watershed project and livelihoods	**Output 4.1**: Government takes up certain prescriptions and project learning for large scale implementation. **Output 4.2**: Cross learning and replication of practices and lesson learnt with improved knowledge and understanding by stakeholders	**Outcome 4:** Project learning and created knowledge base benefitted similar projects implemented in other states	109,283
4. Project/ Programme Execution cost			107,400
5. Total Project/Programme Cost			1238,855
6. Project Cycle Management Fee charged by the Implementing Entity (ifapplicable)			105,300
7. Total cost US$			1344155

1.1.4. . Project/ Programme Components and Financing

Approved: US$ 1344155
Actual: US$ 1259744

2 Evaluation General Information

The terminal evaluation commenced in the first week of January 2023 with an initial review of information shared by the NIE. Subsequently, project documents were received from all the EEs concerned (for 10 watersheds in Rajasthan and 9 in Tamil Nadu). These documents included the full project proposal, project progress reports (PPR) and project completion reports (PCR) as made available by the NIE. After the review of documents with respect to the interventions and achievements, it was decided to consider watershed (sub-project) as unit of study and undertake a field survey in a sample of watersheds. Keeping in view of the variability in agro-ecology of the two states (arid in Rajasthan and semi-arid/ sub-humid in Tamil Nadu) it was decided to adopt stratified random sampling design taking state as a stratum. A sample of two watersheds were drawn at random from each stratum resulting in four watersheds in the total sample for generalizing the findings for the project as a whole. The field surveys consisting of interactions with farmers' community, EE and IE, and individual structured surveys with a sample of farmers took place between 20 - 28 Feb 2023 simultaneously in the two states by multidisciplinary teams comprising of social, crop, natural resource management and livestock specialists. Structured schedules and checklists, annexed to this document, were prepared for conducting these surveys and interactions and were approved by the NIE. An online discussion with the EEs of the four selected watersheds preceded the preparation of these data collection instruments. Field surveys and interactions were conducted in Mandli and Chainpuria watersheds in Udaipur and Chittorgarh districts of Rajasthan, and Chithalai and Anjukulipatty watersheds in Madurai and Dindigul districts of Tamil Nadu, respectively.

In addition to interactions with EE and focus group discussions with the community, data were obtained from 30-35 randomly selected farmers in each of the four watersheds. Both qualitative and quantitative data were obtained for drawing conclusions with respect to various terms of reference. The data on cropping pattern and yield level of different crops are for the agricultural year 2022-23 unless specified otherwise.

The rating or scoring of farmers with respect to relevance and effectiveness of various interventions on a scale of 1 to 6 (1 is ‘no relevance at all’ for relevance & ‘not effective at all’ for effectiveness and 6 is ‘very high relevance’ for relevance and ‘very highly effective’ for effectiveness) was captured through household schedule. The interventions implemented in each state were segregated according to the four desired outcomes viz., (1) Soil and water regime improved and crop productivity enhanced, (2) Improved climate resilient farming system and increased livelihood security, (3) Reduced climate change vulnerability with improved risk mitigation measures, and (4) Project learning and created knowledge base benefitted similar projects implemented in other States and mean score of relevance and effectiveness for each intervention was presented in the table. Considering the range of score for relevance and effectiveness (6-1=5), 6 classes were made for rating an intervention: 1.0-1.5 as Highly Unsatisfactory (HU), 1.5-2.5 as Unsatisfactory (U), 2.5-3.5 as Moderately Unsatisfactory (MU), 3.5-4.5 as Moderately Satisfactory (MS), 4.5-5.5 as *Satisfactory* (S) and 5.5-6.0 as *Highly satisfactory* (HS), which makes extreme categories less probable like tails in normal distribution.

The ToR include rating of achievements in each project outcome. As the number of beneficiaries vary from intervention to intervention even within a watershed, rating of relevance/effectiveness in a project outcome based on average score over interventions would be misleading. Household is the unit which receives benefit of various interventions and aggregate rating of a household on a group of interventions and aggregate of such rating over all the households benefitted from interventions targeted for an outcome in a watershed would indicate a true rating for a project outcome in a given watershed. Simple average of relevance (or effectiveness) over the two watersheds would assess the rating of the project outcome at state level. The overall project level means are to be obtained as a weighted average of 2 state means with weights proportional to number of watersheds in a state (Rajasthan: 10/19 and Tamil Nadu: 9/19).

Lowest score among relevance and effectiveness is used for final rating of a project outcome and category of rating is identified as per the classes given above on 1-6 scale. Overall rating of the project based on the four intended outcomes for relevance (or effectiveness) is computed as a simple average of relevance (or effectiveness) score of four outcomes. Category of rating for the project as a whole should be again based on lowest score among relevance and effectiveness of the project as a whole.

The quantitative data (e.g. crop yields, incomes, crop acreages) were analysed by computing means. It is important to assess the impact of the interventions undertaken as part of the project on reducing yield losses during stress years, so that those interventions could be scaled up. In simple terms, a crop is said to be resilient if it gives yield when exposed to stress or shock as it gives when it is not exposed to stress. Comparison of yield losses as per cent of normal year (absence of stress) yields after the project with those of before project gives the impact of project in reducing yield losses. In fact, yield of a crop in a stress year expressed as a percent of normal year measures the resilience of the crop to the stress (Rama Rao et al., 2017[1], 2018[2]). Such a measure of resilience can be called an outcome-based measure of resilience. The resilience to stress can be enhanced through certain interventions, and the gain in resilience be attributed to the project. Gain in resilience was assessed by subtracting resilience before project from resilience after the project.

In case of data obtained through the project reports and documents, state level means were obtained as simple mean of 10 (9) watersheds in Rajasthan (Tamil Nadu) and project mean as a simple mean of all 19 watersheds.

[1] Rama Rao, C.A., B.M.K. Raju, A.V.M. Subba Rao, K.V. Rao, Josily Samuel, Kausalya Ramachandran, K. Nagasree, R. Nagarjuna Kumar, K. Ravi Shankar 2017. Assessing vulnerability and adaptation of agriculture to climate change in Andhra Pradesh. *Indian Journal of Agricultural Economics*. 72 (3) 375-384

[2] Rama Rao, C.A. et al. (2018). Assessing resilience of agriculture to climate change and variability. Technical Brief 02/2018. ICAR-CRIDA, Hyderabad. P.12

The section on the risks to sustainability and realization of impacts involved more detail data and analysis which is described below:

(i) Financial and economic risks and assumptions

Each of the 19 watersheds was given a score that aggregated the measures of (i) expected life span of soil and water conservation structures (scores of 0 < 5 years, 1 if 5 – 10 years, 2 if > 10 years), (ii) if financial arrangements were made for upkeep and maintenance of those structures (1 If yes, 0 otherwise) and (iii) adequacy of those measures (0 if not adequate, , 1 partially adequate and 2 if adequate). Based on the total score on the three attributes, watersheds were categorized into four classes delineated by dividing the possible range of the score into four equal interval classes. Higher these scores, lower are the financial and economic risks and hence the progress towards impacts is more likely. Thus, the progress is 'likely', '***moderately likely***', ***moderately unlikely***' and 'unlikely' if the scores are in the range of 3.75 to 5, 2.5 to 3.75, 1.25 to 2.5 and 0 to 1.25, respectively.

ii). Socio-political risks and assumptions

This sub-category of risk to sustainability was assessed based on (i) whether interventions violated the existing legal framework or any informal conventions (0 if yes, 1 otherwise), (ii) location of SWC/RWH structures yielding common benefits (0 if in private land, 1 if in common land but without necessary consent from PRI/ *gram sabha*, etc. and 2 common land with the necessary consent from PRI, *gram sabha*, etc.), and (iii) farmers perception on the long-term benefits of the structures/ interventions (0 if they are to a negligible extent, 1 if to some extent and 2 if to a large extent). Categorization of watersheds with respect to the extent of risks was done in the same manner as in case of financial and economic risks.

(iii). Institutional framework and governance risks and assumptions

This dimension was assessed based on the information related to (i) how likely, in the opinion of community, the structures will be taken care of (0 if unlikely, 1 somewhat likely and 2 if likely), (ii) if there is technical capacity (0 if no, 1 if yes) and (iii) whether some guidelines to do the necessary arrangements are put in place (0 if no, 1 if yes). Similar method of categorization as done in previous case on likelihood of sustainability and progress towards impacts was followed.

(iv). Environmental risks and assumptions

This sub-category of risk to sustainability was assessed based on (i) whether structures were damaged since their construction due to heavy rainfall events (more than once (0), once (1) and never so far (2), (ii) perceived possibility of structures being rendered dysfunctional in the event of any extreme event (high (0), medium (1) and low (2), and (iii) need for frequent repairs and maintenance (0 if frequent, 1 if occasional and 2 if rare). The scoring in this sub-category was also divided into four categories as described earlier.

Since all the dimensions are considered critical, the 'lowest' rating among the four dimensions of risks becomes the final rating for the respective watershed. For state level rating, a simple mean of the watersheds within the state were computed for each of the four dimensions and the lowest rating is taken as the overall rating for the state. For the project as a whole, the ratings/ scores for each dimension was obtained as a weighted mean of two state means, which were computed as simple mean of 10 watersheds in Rajasthan and 9 watersheds in Tamil Nadu. The 'lowest' rating among the four dimensions was taken as the final rating for the project as a whole.

3. Evaluation Results

3.1. Evaluation of project/programme outcomes: criteria for assessing achievement of outcomes and ratings

The results framework identifies four outcomes, viz., (1) improved soil and water regime for higher productivity, (2) strengthened resilience to climate change and variability, (3) better risk management and (4) creation of knowledge management systems, which were to be achieved through various technological interventions. Table 1 gives the achievement of these outcomes obtained using the primary data collected from a sample of farmers in two watersheds from each state. However, no quantifiable target in terms of number of households was fixed for the outcome 4, except that whether or not the system was put in place related to creation of knowledge management system.

Table 1. Beneficiaries covered in various outcomes of the project

S No	State	Outcome 1		Outcome 2		Outcome 3		Overall*	
		No	%	No	%	No	%	No	%
1	Rajasthan	62	89.86	65	94.20	39	56.52	67	97.10
2	Tamil Nadu	36	66.67	29	53.70	49	90.74	52	96.30
Overall		98	79.67	94	76.42	88	71.54	119	96.75

* Households that benefitted from at least one intervention related to Outcome 1/ Outcome 2/ Outcome 3

3.1.1. Relevance

Relevance to AF goals, objectives and strategic priorities

The project's intended objectives and outcomes are consistent with the goal and objectives of the Adaptation Fund in terms of enhancing resilience of farm production and farmers' livelihoods by strengthening the adaptive capacity of farmers. India, a signatory to the Kyoto Protocol and Paris Agreement, is among the countries that are more vulnerable to the adverse effects of climate change. With nearly half of the work force dependent on agriculture for their livelihoods, supporting India, the world's most populous country, enhancing resilience of agriculture to climate change is highly consistent with the Adaptation Fund goal of assisting "developing country Parties to the Kyoto Protocol and the Paris Agreement that are

particularly vulnerable to the adverse effects of climate change in meeting the costs of concrete adaptation projects and programmes in order to implement climate-resilient measures".

Major outcomes of the project being subjected to terminal evaluation include improved soil and water regimes for enhanced productivity and incomes, strengthened adaptation to climate change, better risk mitigation and knowledge management and dissemination. These outcomes were achieved through promotion of such interventions as adoption of short duration or stress escaping crop varieties, providing agro-met advisory services to the farmers, capacity building of farmers, creation or strengthening of water harvesting structures, promotion of more diverse farming activities, etc. All of these outcomes are relevant to and help achieve various outcomes/ objectives of Adaptation Fund.

For example, promotion of stress escaping short duration crop varieties and understanding vulnerability of the project sites and communities help enhance resilience by reducing exposure to climate related hazards and threats (AF Outcome 1). As part of executing the project, officers of the EE's and the NIE were exposed to and trained in planning and implementing various adaptation measures which is directly related to "strengthened institutional capacity to reduce risks associated with climate-induced socio-economic and environmental losses" (AF Outcome 2). The training programmes conducted and the communication material prepared by the project executing agencies helped strengthen the awareness and the capacity of local communities to deal with climate change which forms the AF Outcome 3 "strengthened awareness and ownership of adaptation and climate reduction processes at local level". Involving the communities in vulnerability assessments as done in some of the watersheds included in this project is also an important element in this regard. Some of the project interventions such as measures for ground water recharge (e.g. recharge pits) helped strengthen or improved functioning of the water harvesting structures or other water resources already created and thus contribute the AF Outcome 4 concerned with increased adaptive capacity within development sector services. Also, participation of local research and development agencies proved to be mutually beneficial as it helped identify the appropriate interventions for the project and better appreciate the local contexts and conditions of agricultural development vis-à-vis climate change. AF Outcomes 5 and 6 related to increased ecosystem resilience, and diversified and strengthened livelihoods were pursued through strengthening soil and water conservation measures and promotion of more diverse land use or cropping pattern that help enhance resilience. Thus, the project interventions helped in taking forward the AF outcomes/ objectives. The rating for this aspect of relevance is '***Highly satisfactory***'.

Relevance to country or region priorities

Given India's current stage of development, adaptation is more critical to achieve its development goals related to poverty reduction, eliminating hunger and malnutrition, more sustainable and equitable growth, etc. The National Action Plan on Climate Change, which is the overarching policy framework of climate action in the country, contains eight missions of which at least four are related to climate change. Two missions in particular viz., National

Mission on Sustainable Agriculture (NMSA) and National Water Mission have the objectives that are in tune with those of the Adaptation Fund and consequently of the current project being evaluated. Both Government of India and several state governments have recognized the urgent need to deal with climate change to be able to pursue the economic development in a sustainable manner and are implementing various adaptation measures either through specific programmes or as part of other development programmes. That the project is implemented in states where rainfed agriculture is dominant adds to the relevance and importance in terms of national development priorities as nearly half of agriculture in India is rainfed with little access to irrigation facilities. Government of India places high importance to making rainfed agriculture more sustainable as leads to more equitable growth and development. These rainfed tracts are also home to the bulk of rural poor in the country and lag behind with respect to various development indicators compared to the irrigated tracts.

National Rainfed Area Authority (NRAA), Government of India, lists all the districts selected in Rajasthan in 'very high priority' category for prioritizing development resource allocation based on a composite index that combines a suite of natural resources and socio-economic and livelihoods related indicators. Also, the districts in Tamil Nadu are place in the 'very high priority' category based on the status of natural resources (NRAA, 2020[3]). A district level climate change vulnerability assessment (Rama Rao et al., 2013[4], 2016[5]) identified all the project districts in both states as 'very highly' vulnerable to climate change. Another climate change risk assessment (Rama Rao et al., 2019[6]), based on the IPCC's AR5 Framework puts all the project districts in Rajasthan in 'very high' risk category and Dindigul in Tamil Nadu in 'very high' vulnerability category. The rating for this aspect of relevance is also ***Satisfactory***'.

[3] NRAA (2020) Prioritization of rainfed areas for development planning: A composite index approach. National Rainfed Area Authority, Ministry of Agriculture and Farmers' Welfare, Government of India, New Delhi. P.110

[4] Rama Rao, C.A., B.M.K. Raju, A.V.M. Subba Rao, K.V. Rao, V.U.M. Rao, Kausalya Ramachandran, B. Venkateswarlu and A.K. Sikka (2013). Atlas on Vulnerability of Indian Agriculture to Climate Change. National Initiative on Climate Resilient Agriculture (NICRA). Central Research Institute for Dryland Agriculture

[5] Rama Rao, C.A., B.M.K. Raju, A.V.M. Subba Rao, K.V. Rao, V.U.M.Rao, Kausalya Ramachandran, B. Venkateswarlu, A.K. Sikka, M. Srinivasa Rao, M. Maheswari and Ch. Srinivasa Rao. 2016. A district level assessment of vulnerability of Indian agriculture to climate change. *Current Science*, Vol.110, No.10, 1939-1946

[6] Rama Rao, C.A., Raju, B.M.K., Adlul Islam, Subba Rao, A.V.M., Rao, K.V., Ravindra Chary, G., Nagarjuna Kumar, R., Prabhakar, M., Sammi Reddy, K., Bhaskar, S., Chaudhari, S.K. (2019). Risk and vulnerability assessment of Indian agriculture to climate change. National Innovations in Climate Resilient Agriculture, ICAR-CRIDA, Hyderabad, India, P.124

Relevance of project interventions to local stakeholders

The relevance of various project interventions was also discussed with individual farmers[7], watershed committees and with the EE during the field visits to the project locations. The rating or scoring of farmers with respect to relevance and effectiveness of various interventions on a scale of 1 to 6 (1 is 'no relevance at all' for relevance & 'not effective at all' for effectiveness and 6 is 'very high relevance' for relevance and 'very highly effective' for effectiveness) is presented in Table 2. As can be seen from the table, the mean ratings for a majority of interventions in both states exceed 4.5 indicating that the interventions were '**Satisfactorily**' relevant. Some of the interventions such as growing vegetable crops and tree crops in Rajasthan scored a rating of 6.0 implying that relevance is '***Highly satisfactory***'. Growing of such crops helps enhance farm incomes on one hand and contributes to carbon sequestration on the other. In Tamil Nadu, relatively higher number of interventions received '***Highly satisfactory***'. Such interventions include installation of biogas plants, digging farm ponds, efficient irrigation methods such as pitcher irrigation and field bunds whose role in more efficient use of water resources is well acknowledged. Among the four components, component 1 scored highest rating in Rajasthan and component 2 in Tamil Nadu. The average rating of the two watershed projects in Rajasthan and Tamil Nadu states were 4.94 and 4.80, respectively indicating "***Satisfactory***" relevance. For the project as a whole too, the mean rating obtained as a weighted mean (4.87) with respect to relevance was "***Satisfactory***". It is to be noted, however, that farmers saw in a few interventions only "**Moderately *satisfactory***" relevance with mean relevance rating ranging between 3 and 4. These interventions are related to information sharing through print media (books, pamphlets, etc.) and other technologies such as crescent bunds. As most of the farmers are not highly educated, especially in Rajasthan, such findings are not surprising. While the knowledge and information sharing can be done through other forms of media (audio-visual), the scope for improving the print media in terms of more pictorial illustrations, better texts in local language, etc. to make them more interesting to read should be explored. Enhancing knowledge, information and ability to understand the complex climate change related issues is an important element of adaptive capacity and is an initial step towards adaptation implementation which is nothing but a manifestation of adaptive capacity.

3.1.2. Effectiveness

An intervention or a project is effective when it is able to lead to desired or planned outputs or outcomes and in the long term to intended impacts. The transformation of outputs and outcomes into impacts is, however, dependent on other contextual factors as well as on the behavioural changes of those affected by the project or intervention directly. In the context of the present AF supported project, enhancing the resilience of agriculture to climate change and variability through building adaptive capacity of the farmers is the principal outcome intended. In order to understand whether these outcomes are achieved, information was

[7] The descriptive statistics of sample farm households surveyed in both the states are provided in Annexure 3.

obtained through structured interviews with a sample of farmers in two selected watersheds from each of the two states. Using the information so collected, inferences were drawn on whether the project interventions led to higher yields (and higher incomes), protected yields against climate variability, more diverse cropping and farming systems, improved availability of water, improved availability of fodder, reduced soil erosion, reduced migration, etc.

Plate 1. Check dam strengthened in Mandli watershed, Udaipur district, Rajasthan

Changes in cropping pattern

Tables 3 and 4 present the changes in the cropping pattern in terms of changes in area under different crops as well as the changes in crop yields compared to the pre-project period in Rajasthan and Tamil Nadu, respectively. It also presents whether and to what extent these changes are attributed to the activities and interventions of the AF supported project. There are observed noticeable changes in area under different crops as well as in the yield of the crops grown in the project areas. In Rajasthan, area under crops such as maize, soybean, black gram , etc increased whereas the area under pearl millet decreased considerably. The project's attempts to diversify the cropping pattern towards vegetable crops and tree crops were also reflected in the increased area under these crops. These changes were also accompanied by improvements in yields of many crops that ranged from 9.6% in barley to about 60.7% in pearl millet. In Tamil Nadu, the changes in cropping pattern were not as conspicuous. However, the yield of crops increased compared to pre-project period. The yield changes were in the range of 25% (cotton) to 82 % (tamarind). Farmers did believe that the

yield changes could be 'somewhat' attributed to the project interventions as reflected in mean scores of around two in most cases.

Table 2. Relevance and effectiveness of various interventions as perceived by farmers in selected watersheds in Rajasthan and Tamil Nadu

State/ Intervention or Technology	Relevance (Mean score*)	Effectiveness (Mean score*)
Rajasthan		
Comp 1: Improved soil water regime for better water productivity		
Deep Ploughing	5.03	5.00
Farm pond	5.46	4.75
Gully plugs	4.68	4.21
Recharge Pits	4.87	4.68
Well Recharge Pits	4.90	4.63
Comp 1 mean	*4.99*	*4.65*
Comp 2: Climate resilient farming systems		
Crescent bunds	4.45	4.00
Gradonis	4.45	4.00
In situ SWC	5.31	4.44
INM	5.00	4.00
IPM	4.75	5.11
Micronutrient application	4.83	4.86
Mulching	5.00	5.67
Organic fertilisers	4.89	4.94
Pitcher Irrigation	4.00	3.00
PVC pipes	5.05	5.08
Sprinkler	5.00	6.00
Stone Bunding	4.81	4.53
Tolerant variety	4.79	4.60
Tree crops	6.00	6.00
Vegetable crops	6.00	5.00
Comp 2 mean	*4.95*	*4.68*
Comp 3: Risk mitigation		
Agro Advisory Services	4.72	4.59
Budgeting inputs	4.89	4.22
Water budgeting Inputs	5.33	4.00
Comp 3 mean	*4.98*	*4.27*
Comp 4: Knowledge management		
Audio recordings	4.50	3.70
Awareness Camp	4.88	4.54
Books	3.92	3.75
Exposure Visits	4.63	4.39
Interactive materials	4.40	4.40
Pamphlets	4.38	3.85

Training Programme	4.82	4.43
Videos	4.00	4.00
Comp 4 mean	*4.82*	*4.57*
All components mean	**4.94**	**4.54**
Tamil Nadu		
Comp 1: Improved soil water regime for better water productivity		
Catchment Pits	4.75	4.75
Deep Ploughing	5.44	5.44
Farm pond	6.00	6.00
Recharge Pits	5.00	5.00
Summer Ploughs	4.30	4.30
Tank Silt Application	5.71	5.71
Well Recharge Pits	4.55	4.36
Comp 1 mean	*5.01*	*4.98*
Comp 2: Climate resilient farming systems		
Fodder crops	6.00	6.00
Biogas	6.00	6.00
Compost Pit	6.00	6.00
Crescent bunds	5.00	5.00
Field Bunds	5.50	5.00
Kitchen Gardening	6.00	6.00
Micro Irrigation	5.33	4.67
Napier	6.00	6.00
Pitcher Irrigation	6.00	6.00
Sprinkler	5.40	5.40
Stone Bunding	4.50	4.50
Vermicompost	5.00	5.00
Use of weeders	6.00	6.00
Comp 2 mean	*5.60*	*5.52*
Comp 3: Risk mitigation		
Agro-Advisory Services	4.31	4.27
Comp 3 mean	*4.31*	*4.27*
Comp 4: Knowledge management		
Awareness Camp	4.29	4.26
Display Boards	4.62	4.62
Exposure Visits	4.62	4.55
Pamphlets	3.82	3.73
Training Programmes	4.24	4.22
Video communication material	4.20	4.20
Comp 4 mean	*4.30*	*4.26*
All components mean	**4.80**	**4.76**
Project mean	**4.87**	**4.65**

*See section 2 for interpretation of ratings.

Plate 2. Water tank with drinking water facility for animals at Chithalai watershed, Madurai district

There were also reported a few cases of farm households that witnessed noticeable improvements in crop yields, farm incomes and resource availability. These are given in Annexure 4. Such sites can be used as 'demonstration' or 'exposure' site for farmers from other regions.

Farmers also attributed these changes in area and yields partly to the project activities that included promotion of improved varieties, better natural resource management, agro-met advisories, etc. Given the fact that both national and state governments are implementing several agricultural development programmes and that farmers would be responding to changing input and output markets, attributing the observed changes solely to one single project or intervention is difficult without conducting a carefully designed objective analysis, which is beyond the scope of this terminal evaluation. NREGA, various capacity building programmes conducted by KVKs, Rainfed Area Development Programme, *Pradhan Mantri Krishi Sinchay Yojana* micro-irrigation schemes supported by the state government, creation of natural resource management structures by NGOs are some of the programmes being implemented in project villages in both the states. That the farmers linked the observed changes crop yields and area at least partially to the project interventions is a testimony to the effectiveness of the project interventions.

Table 3. Changes in cropping pattern and yield levels in selected watersheds in Rajasthan

S No	Season/ Crop	Area (Ha/Household)				Yield (q/ha)			
		Before	After	% change	Change attribution to project*	Before	After	% change@	Change attribution to project*
I	Kharif								
1	Maize	0.904	1.017	12.5	2.30	13.73 (0.38)	17.93 (0.46)	30.6	1.41
2	Soybean	0.304	0.347	14.1	2.00	6.71 (0.18)	8.63 (0.26)	28.6	1.50
3	Groundnut	0.271	0.297	9.6	2.10	9.11 (0.27)	12.75 (0.52)	39.9	1.57
4	Black gram	0.033	0.037	12.1	2.57	1.46 (0.09)	1.33 (0.04)	-9.4	1.00
5	Pearl millet	0.055	0.026	-52.7	2.40	3.50 (0.32)	5.63 (0.42)	60.7	1.67
6	Other Crops	0.041	0.028	-31.7	2.22				1.50
	Total	1.608	1.753	9.0	2.27				1.44
II	**Rabi**								
1	Wheat	0.686	0.876	27.7	1.94	17.64 (0.51)	23.27 (0.56)	31.9	1.65
2	Mustard	0.361	0.359	-0.55	2.28	9.07 (0.18)	10.54 (0.30)	16.1	1.89
3	Barley	0.196	0.210	7.1	2.38	16.51 (0.67)	18.10 (0.89)	9.6	1.69
4	Chickpea	0.100	0.100	0.00	2.06	6.25 (0.25)	7.65 (0.33)	22.3	1.86
III	**Summer**								
1	Moong	0.014	0.032	128.57	1.43	2.38 (0.29)	2.40 (0.19)	1.1	2.00
IV	Fodder Crops								
1	Berseem	0.022	0.026	18.18	2.55	18.75 (0.00)	18.75 (0.00)	0.00	2.13
2	Sorghum	0.123	0.148	20.41	2.33	75.00 (0.00)	112.50 (0.00)	50.0	3.00
3	Pearl millet	0.063	0.063	0.00	2.50	62.50 (0.00)	87.50 (0.00)	40.0	2.25
V	Vegetables								
1	Tomato	0.0001	0.006	5350.00	1.09	2.50	2.50	0.0	3.00
2	Okra	0.001	0.004	300.00	1.50	150.00	150.00	0.0	3.00

3	Chilli	0.001	0.003	200.00	1.40	25.00	25.00	0.00	3.00
4	Cucurbits	0.001	0.001	0.00	3.00	62.50	62.50	0.00	2.27
VI	Fallow								
7	Fallow	0.084	0.046	-45.2	0.86				

Figures in parentheses are standard errors. @ The yield change was statistically significant at p=0.5 at least in a majority of crops; * Change attribution to project: Largely 1.0-1.5, Somewhat 1.5-2.5, and Not at all 2.5-3.0

Table 4. Changes in cropping pattern and yield levels in selected watersheds in Tamil Nadu

S No	Season/Crops	Area (Ha/HH)				Yield (q/ha)			
		Before	After	Change, %	Change attribution to project*	Before	After	Change@, %	Change attribution to project*
I	Kharif								
1	Cotton	0.198	0.209	5.56	2.81	33.33 (2.43)	40.77 (2.94)	22.32	1.95
2	Rice	0.174	0.174	0.00	3.00	45.11 (4.25)	58.75 (5.45)	30.24	2.00
3	Sorghum	0.030	0.026	-13.33	2.67	17.92 (3.30)	25.00 (4.32)	39.51	2.00
4	Groundnut	0.015	0.015	0.00	3.00	17.50 (2.12)	27.50 (2.83)	57.14	2.00
5	Other Crops	0.008	0.008	0.00	3.00	68.75 (15.91)	110.00 (25.46)	60.00	2.00
II	Rabi								
1	Cotton	0.007	0.007	0.00	3.00	50.00	62.50	25.00	2.00
III	Annual Crops								
1	Sugarcane	0.022	0.022	0.00	3.00	458.33	625.00	36.36	2.33
IV	Fodder Crops								
1	Napier	0.000	0.009	0.00	3.00	458.33	625.00	36.36	2.33
V	Perennial Crops								
1	Mango	0.280	0.287	2.50	2.76	10.71 (1.75)	16.49 (2.61)	53.97	1.95

2	Coconut (Nos/ha)	0.180	0.180	0.00	2.83	7812.50 (306.89)	12708.33 (614.73)	62.67	1.92
3	Guava	0.131	0.135	3.05	2.67	15.73 (3.11)	24.17 (3.92)	53.66	2.00
4	Tamarind	0.059	0.063	6.78	2.86	7.86 (0.31)	14.29 (0.17)	81.81	1.86
5	Other Crops	0.047	0.054	14.89	2.93				1.88
VI	Vegetable Crops								
1	Tomato	0.001	0.001	0.00	1.00	0	37.50	-	2.00
2	Chilli	0.002	0.002	0.00	2.00	0	5.00	-	2.00

Figures in parentheses are standard errors. @ The yield change was statistically significant at p=0.5 at least in a majority of crops; * Change attribution to project: Largely 1.0-1.5, Somewhat 1.5-2.5, and Not at all 2.5-3.0

Change in yield resilience

Since the key objective of the project as well as of the AF is to enhance the resilience of agricultural production, it will only be appropriate to judge whether the resilience has actually increased. Given the multi-dimensional nature and the associated difficulties in quantifying resilience, we have chosen to measure resilience in a simple measure that captures how close the crop yields obtained in a stress/ drought year are to those obtained in a 'normal' year (A normal year refers to absence of any climatic stress such as drought, long dry spells, heavy rains, heat wave, etc. during the crop growing period). Such a measure of resilience, which we may call as an outcome-based measure, is close to the definition of Holling[8] (1973) which says resilience is the ability of a system (crop in this case) to come back to normal structure and function (yield) after being exposed to a shock (drought). Applying this definition, the resilience of crop yields to drought was assessed using the data collected from a sample of farmers in four watersheds (two in Rajasthan and two in Tamil Nadu) (Tables 5 and 6). During a drought or stress year, farmers obtained an average yield of 3.03 q/ha of soybean as against 6.33 q/ha before the project in Rajasthan indicating a resilience of 47.8%. After the project, farmers obtained a yield of 4.55 q/ha when exposed to drought compared to 8.288 q/ha during a normal year indicating a resilience of 54.98%. Similar results were obtained in case of other major crops grown in Rajasthan. In Tamil Nadu also, resilience of cotton yields increased to 79.23% from 72.65% and from 69.5 to 75.45% in case of rice yields. Further, yield of most crops increased considerably during both normal years and drought years in both the states indicating growth and enhanced resilience due to the efforts of the project that encompassed both varietal, natural resource management and information interventions.

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Holling, C. S. 1973. Resilience and stability of ecological systems. *Ann. Review Ecol Syst* 4:1-23.

Table 5 . Yield resilience in major crops in Rajasthan

S No	Season/ Crop	Before project			After project			Change in resilience	Change in Normal Year Yield (relative to before project yield), %
		Normal year (q/ha)	Stress year (q/ha)	Yield resilience (%)	Normal year (q/ha)	Stress year (q/ha)	Yield resilience (%)		
I	Kharif								
1	Maize	13.88	6.05	43.60	18.13	10.00	55.17	11.57	30.63
2	Soybean	6.33	3.03	47.83	8.28	4.55	54.98	7.16	30.83
3	Groundnut	9.18	4.50	49.05	12.08	6.88	56.94	7.89	31.61
4	Black gram	1.13	0.45	40.00	1.28	0.90	70.59	30.59	13.33
5	Pearl millet	6.25	4.38	70.00	9.70	7.50	77.32	7.32	55.20
II	Rabi								
1	Wheat	17.60	9.23	52.41	23.28	13.30	57.14	4.73	32.24
2	Mustard	9.30	4.85	52.15	11.20	6.60	58.93	6.78	20.43
3	Barley	17.80	9.03	50.70	21.20	12.58	59.32	8.61	19.10
4	Chickpea	5.95	2.90	48.74	7.25	4.28	58.97	10.23	21.85
V	Vegetables								
1	Tomato	2.50	6.25	25.20	37.50	20.00	53.33	28.33	50.00
2	Okra	150.00	75.00	50.00	200.00	150.00	75.00	25.00	33.33
3	Chilli	25.00	12.50	50.00	37.50	25.00	66.67	16.67	50.00
4	Cucurbits	62.50	12.50	20.00	100.00	50.00	50.00	30.00	60.00

Table 6. Yield resilience in major crops in Tamil Nadu

S No	Season/Crops	Before project			After project			Change in resilience	Change in Normal Year Yield (relative to before project yield), %
		Normal year (q/ha)	Stress year (q/ha)	Yield resilience (%)	Normal year (q/ha)	Stress year (q/ha)	Yield resilience (%)		
I	Kharif								
1	Cotton	41.68	30.28	72.65	51.63	40.90	79.23	6.58	23.88
2	Rice	45.13	31.38	69.53	58.75	44.33	75.45	5.92	30.19
II	Rabi								
1	Cotton	41.68	30.28	72.65	51.63	40.90	79.23	6.58	23.88
III	Annual Crops								
1	Sugarcane	1125.00	1000.00	88.89	1250.00	1175.00	94.00	5.11	11.11
IV	Fodder Crops								
1	Napier	833.33	541.67	65.00	1225.00	970.83	79.25	14.25	47.00
V	Perennial Crops								
1	Mango	10.73	5.83	54.31	16.50	11.68	70.76	16.45	53.85
2	Coconut	7812.50	4479.18	57.33	12708.33	9229.18	72.62	15.29	62.67
3	Guava	8.50	5.25	61.76	18.00	12.63	70.14	8.37	111.76

Other indicators of short- and medium-term impacts are changes in availability of water, fodder and employment opportunities. Some of these indicators also reflect resilience. An examination of composition of household income shows that the contribution of farming in own farms contributed more to labour employment and income in both states reflecting the improvements in cropping intensity and profitability of farming compared to the pre-project situation (Table 7). Such increase was observed in both relative and absolute terms. Correspondingly, the dependence for employment outside their own farms decreased.

Table 7. Structural change in household employment and income in Rajasthan and Tamil Nadu

Source	Employment			Income (₹/Year/HH)					
				Before		After		Change in Income (₹)	Change, %
	Before (Days/Year)	After (Days/Year)	Change, %	Amount (₹)	%	Amount (₹)	%		
Rajasthan									
Business	275	250	-9.09	1594	2.35	2101	1.99	507	31.81
Migration	120	117	-2.50	174	0.26	217	0.21	43	24.71
Non-agriculture	165	161	-2.42	19038	28.08	24662	23.33	5625	29.54
NREGA	97	73	-24.74	6638	9.79	7217	6.83	580	8.72
Own Farm	142	184	29.58	21551	31.79	41413	39.17	19862	92.16
Pension	365	365	0.00	870	1.28	1739	1.65	870	99.89
Remittances	21	22	4.76	11478	16.93	18783	17.77	7304	63.64
Wages	69	70	1.45	6452	9.52	9580	9.06	3128	48.48
Total	157	155	-1.27	67795	100	105713	100	37918	55.93
Tamil Nadu									
NREGA	75	48	-36.00	3816	11.95	5310	9.33	1494	-36.00
Own Farm	200	243	21.50	1449	4.54	2319	4.08	870	21.50
Salary	193	227	17.62	26307	82.42	48829	85.83	22522	17.62
Wages	80	100	25.00	348	1.09	435	0.76	87	25.00
Total	137	155	13.14	31920	100	56893	100	24972	13.14
Overall	147	155	5.44	50802		82588		31786	5.44

3.1.3. Efficiency

Efficiency in terms of meeting time and financial targets is an important dimension of project performance. However, this project scores better on efficiency as it was designed as a continuing phase of the typical watershed development projects in both states which were also financed by the NIE in its capacity as a financing organization for agricultural and rural development. This provided an opportunity for extending the presence and role of the EE in

project locations and also led to better and sustainable utilization of the assets created till the beginning of the AF project. This project actually had chosen, with participation and involvement of local stakeholders, those interventions that were complementary and added value to the efforts made already. The EE also didn't lose any time in 'breaking the ice' with and winning the confidence and trust of the community. In spite of all this, the project over ran the time lines in many watersheds because of the delay in initial release of funds and later due to the COVID19 pandemic.

But this approach led to some of the interventions such as water budgeting exercises not being utilized properly as the design and execution part of the hard structures was already completed in 'normal' watershed development phase leaving little scope to work on them keeping in view the implications of climate change.

Participation of community and farmers, the primary stakeholders of the project along with those concerned with agricultural research and development in the respective locations largely ensured that interventions were relevant, acceptable, affordable and effective. These consultations were also helpful in identifying and implementing cost-effective adaptations. Participation of research organizations in planning processes also played a role in identifying appropriate interventions. However, no formal cost-benefit analyses were resorted to arrive at those technological choices.

Thus, the project deserves a ' ***Satisfactory***' rating as far the efficiency is concerned.
Exceeding the time lines, especially at the beginning of the project, is what prevented the project being given a '*Highly satisfactory*' rating.

Overall rating: All the three dimensions of relevance, effectiveness and efficiency were given a rating of '***satisfactory***' and hence the overall rating was also '***satisfactory***'.

4. Evaluation of Risks to Sustainability of Project Outcomes and Progress towards Impacts

Risks to sustainability were assessed using the information provided in project reports as well through the information obtained through interactions with NIE, EE, village community, and primary data obtained from the sample survey. The information provided in the project reports with respect to various aspects of sustainability was translated into semi-quantified information to arrive at a measure of risk which in turn determine the likelihood of progress towards impacts (Table 8).

Sustainability of outcomes were evaluated at four dimensions of risks to sustainability:

4.1. Financial and economic risks and assumptions

Overall, for Rajasthan these risks to sustainability were found to be relatively low as the mean rating for all the watersheds in the state is '***moderately likely***' which means there are only moderate financial risks that affect sustainability of the project impacts**.** However, individual watersheds varied with five watersheds having a rating of '***moderately unlikely***', two each

scoring '***moderately likely***' and 'likely' and one 'unlikely'. The financial risks to sustainability have been found to be somewhat different in each of the ten watershed regions, because each region varied in terms of financial support, type of demonstrations, implementing agency type, etc. In Dhuvala watershed, demonstration activities include earthen embankment, stone fencing bund, automatic weather station which require maintenance. The other activities were related to farming system like tree seeding, grass sowing. The other activities included fodder banks, azolla cultivation, backyard poultry, etc. Awareness programs were also carried out in terms of crop insurance awareness programme, community-based livestock insurance, etc. Based on information available in the reports, it appears that the community in Dhuvala has only partial commitment to maintain the structures supported by the project. Due to these reasons, the financial and economic risks were found to be significant leading to a rating of '***moderately unlikely***'. Similarly, Chainpuria watershed is the extension of Indo-German watershed Development Programme for climate proofing. Mandli watershed falls into the category of 'likely' which suggests that there are negligible risks to sustainability, with key outcomes on track to be achieved by the project's closure and expected to continue into the foreseeable future. Even though the area is falling under difficult terrain, owing to implementation of majority of adaptation activities like soil and water conservation, horticulture, fodder, agronomic practices, azolla culturing, backyard poultry, climate change related trainings and awareness programs, the outcomes are better visible and are likely to lead to impacts. Apart from this, mid-term corrections or recommendations were given while monitoring, like timely renovation and recharge of wells, supply of fruit plants and seeds for forestry plants on the onset of monsoon, timely conduct of awareness programmes, supply of HDPE pipes for improving water use efficiency, which NABARD also confirms to be of ***satisfactory*** level. Many of the investments in the watersheds require maintenance fund, non-provisioning of which can pose some risk in the area of implementation.

In case of Tamil Nadu, the situation appears to be better with the overall rating being 'likely' indicating presence of negligible risks to sustainability and to impact realization. However, individual watershed did differ in terms of financial risks to sustainability. The Bettamugilalam, Salivaram, Srirampuram, Chithali, Peikulam, Ayampallayam and Anjukulipatti watersheds received a 'likely' rating and the other two watersheds received '***moderately likely***'. The VWC is active and well placed to ensure sustained maintenance of the assets created.

Overall, the financial risks do not seem to be severe or significant with the overall project receiving a rating of '***moderately likely***' . More innovative means of mobilizing financial resources that can be utilized during the post-project period are needed. These can take the form of some incentives for better performance; or when the potential benefits are substantial, local governments can be encouraged or convinced to incentivize such initiatives.

4.2. Socio-political risks to sustainability have been observed to be negligible with a rating of 'likely' for the watersheds in Rajasthan as a whole. This was a result of absence of any violation of legal rules, consent of the community at large including that of the local PRI and

farmers' conviction about the long-term benefits of the interventions made. Eight out of 10 watersheds in the state received the rating 'likely' and two '***moderately likely***' reflecting the care taken in locating the conservation/ water harvesting structures. Involvement of local stakeholders at different stages of planning and implementation of the project is a key reason behind the absence of any significant risk to sustainability within the gambit of socio-political dimension. Sustainability and impacts were found to be '***moderately likely***' in five watersheds and 'likely' in four in Tamil Nadu with an overall rating of '***moderately likely***' indicating some risks to sustainability. There weren't any legal issues, care was taken while selecting the sites for erecting structures and farmers were largely convinced about the long-term benefits. The project as a whole also obtaining a rating of 'likely'.

4.3. Institutional framework and governance risks and assumptions

This dimension of risk to sustainability appears to be addressed not adequately as six out of ten watersheds in Rajasthan received a rating of '***moderately unlikely***' implying presence of some risk to sustainability and progress towards realizing the intended impacts. Lack of technical capacity among the community is a common factor across watersheds that is seen as a risk factor. In a few cases, even the EEs did not formulate or define guidelines as to how the process of mobilizing or using the resources needed for repair and maintenance of the structure in most of the watersheds in Rajasthan. The overall rating for the state is '***moderately unlikely***' underscoring the need for better addressing these risks.

In Tamil Nadu, institutional- and governance risk was found to be relatively low with five watersheds getting a rating of 'likely', three '***moderately likely***' and one '***moderately unlikely***'. Lack of technical skills and absence of any guidelines were the reason for the '***moderately unlikely***' rating for the Thally Kothanur watershed. All the nine watersheds in Tamil Nadu received an aggregate rating of 'likely'. The project as a whole was '***moderately likely***' lead to sustainability and to realizing impacts with respect to governance risks.

4.4. Environmental risks and assumptions

Most of the NRM structures put in place are currently in a health state and also there were no more than one incident of them being damaged due to heavy rainfall, etc. in a majority of watershed in Rajasthan. Also, farmers didn't perceive that the structured needed frequent attention for repair and maintenance. All of these factors together resulted in negligible environmental risks to sustainability and led to a rating of '***moderately likely***' with respect to sustainability of impacts vis-à-vis environmental risks. The situation in Tamil Nadu was also not much different. In fact, it was found to be somewhat better with five watershed scoring '***moderately likely***' and four 'likely'. Thus, environmental risks to sustainability were relatively low in the project as reflected in the overall rating of '***moderately likely***'.

Uncertainties of climate change impacts is another risk factor that can affect the sustainability but is difficult to be addressed too. There were attempts in the project, through calling for the contributions of experts, to consider the implications of climate change in terms of changes in

rainfall, temperature and the consequent potential impacts of crop yields and animal productivity. All of these changes vary with models, scenarios and time periods considered. Most of such information is available only at a coarser resolution than at which it is required for planning projects of this nature. Further, there is also trad-off between the scale at which projections are made and certainty with which they are made: in general projections are more uncertain at finer geographical resolution. Because of such difficulties, this dimension was not given any rating. But, it is to be noted that best possible efforts were made by EE and NIE to bring together the information on climate change and its possible impacts on crop yields.

The final rating considering all the four dimensions of risk to sustainability is ‘moderately unlikely' for Rajasthan though the ratings were better for three out of the four dimensions as all four dimensions of risks were considered critical for arriving at the final rating. Also, except for two watersheds, the ratings were based on the information available in the project reports shared with the evaluation team and were not validated with field study. In case of Tamil Nadu, the overall rating for the three watersheds is 'likely'. The project as a whole however scored a rating of '***moderately likely***' based on all the four dimensions of risks to sustainability and impact realization.

Table 8. Scoring of different watersheds with likelihood of sustainability and progress towards impacts

S No	**Watershed**	**Financial & economic risks***	**Socio-political risks***	**Institutional and governance***	**Environmental risks***	**Over rating**
	Rajasthan					
1	Dhuvala	MU	L	L	ML	MU
2	Nayagaon-I	MU	L	MU	ML	MU
3	Nayagaon-II	ML	ML	MU	ML	MU
4	Balua	ML	L	MU	ML	MU
5	Vagda	MU	L	MU	ML	MU
6	Jhabla	MU	L	U	ML	U
7	Malvi	MU	L	MU	ML	MU
8	Mandli	L	L	L	L	L
9	Chainpuria	L	L	L	L	L
10	Khad	U	ML	MU	ML	U
A	**Rajasthan mean**	**ML**	**L**	**MU**	**ML**	**MU**
	Tamil Nadu					
11	Bettamugilalam	L	ML	ML	ML	ML
12	Thally Kothanur	ML	ML	MU	ML	MU
13	Salivaram	L	ML	ML	ML	ML

14	Chithalai	L	L	L	L	L
15	Chinnapoolampatti	ML	ML	L	ML	ML
16	Peikulam	L	L	L	L	L
17	Anjukulipatty	L	L	ML	ML	ML
18	Srirampuram	L	ML	L	L	ML
19	Ayampallayam	L	L	L	L	L
B	**Tamil Nadu Mean**	**L**	**L**	**L**	**L**	**L**
	Project Mean	**ML**	**L**	**ML**	**ML**	**ML**

* **Likely (L)**: Negligible risks to sustainability, with key outcomes on track to be achieved by the project's closure and expected to continue into the foreseeable future; ***Moderately likely*** **(ML)**: Moderate risks, but expectations that at least some outcomes will be sustained due to the progress towards results on outcomes at the Midterm Evaluation; ***Moderately unlikely*** **(MU)**: Significant risk that key outcomes will not carry on after project closure, although some outputs and activities should carry on; **Unlikely (U)**: Severe risks that project outcomes as well as key outputs will not be sustained

4.5. Farmers' perception on sustainability and impacts thus far

In the four watersheds where field work was done, opinion of farmers with respect to impacts and sustainability were elicited. Farmers were asked to rate various changes that reflect the impacts or outcomes of the project and how sustainable they are in the medium and long term. Farmers were asked to give their responses on a scale of 1 to 6 with higher scores indicating better sustainability and impacts. A look at the findings (Table 9) shows that farmers' ratings varied between 2.52 for 'increased area under tank irrigation' to 4.86 for 'improved crop performance in the downstream areas' for the project as a whole. Most of the impact statements received a rating of around 4 indicating a relatively better outcomes/impacts. However, sustainability was found to be relatively low (2.10) for 'increased area under tank irrigation' and high (4.96) for 'environment became greener'. Again, most of the scores exceeded 4 indicating relatively higher sustainability if not very high sustainability.

Plate 3. Thor fencing to arrest soil loss in Mandli watershed, Udaipur district, Rajasthan

Table 9. Impact and Sustainability of the Benefits received under AF Project

S No	Particulars	Rajasthan						Tamil Nadu						Overall	
		Chittorgarh		Udaipur		Impact	Sustain ability	Dindigul		Madurai		Impact	Sustain ability	Impact	Sustain ability
		Impact	Sustain ability	Impact	Sustain ability			Impact	Sustain ability	Impact	Sustain ability				
3	Increased crop yields	4.02	4.49	3.84	4.53	3.93	4.51	5.32	5.48	4.19	4.08	4.75	4.78	4.32	4.64
4	Increased water availability for agriculture	4.13	4.58	3.94	4.39	4.03	4.48	5.52	5.74	4.15	4.00	4.83	4.87	4.41	4.67
5	Increased no. of bore wells	3.29	3.79	2.35	2.69	2.82	3.24	5.43	5.20	3.63	3.96	4.53	4.58	3.63	3.88
6	Decreased no. of defunct bore wells	3.05	3.29	2.12	2.53	2.58	2.91	4.00	4.00			4.00	4.00	3.25	3.43
7	Increased area under tanks	3.51	3.70	1.85	2.48	2.68	3.09	2.33	1.00			2.33	1.00	2.52	2.10
8	Increased cropping intensity	3.51	3.85	3.91	4.36	3.71	4.10	5.41	5.40			5.41	5.40	4.52	4.72
9	Increased drinking water availability	3.68	4.24	4.00	4.41	3.84	4.32	5.25	5.55	4.07	4.12	4.66	4.83	4.23	4.56
10	Increased labour employment	3.95	4.38	3.62	4.28	3.78	4.33	5.09	5.38			5.09	5.38	4.40	4.83
11	Decreased migration	3.50	3.71	3.06	3.81	3.28	3.76	4.00	3.67			4.00	3.67	3.62	3.71
12	Improved fodder	3.95	4.05	3.94	4.61	3.95	4.33	5.33	5.33	4.59	4.52	4.96	4.93	4.43	4.61

	availability during summer													
13	Improved soil fertility/ water holding capacity	3.73	4.13	4.03	4.39	3.88	4.26	5.00	5.00	4.52	4.42	4.76	4.71	4.30	4.47
14	Improved crop performance in upstream (ridge)	3.62	3.78	3.71	4.13	3.66	3.95	4.00	4.00			4.00	4.00	3.82	3.98
15	Improved crop performance in downstream (valley)	4.28	4.34	3.91	4.27	4.09	4.31	5.71	5.57			5.71	5.57	4.86	4.91
16	Environment became ‘greener’	4.29	4.64	3.94	4.42	4.12	4.53	5.26	5.43			5.26	5.43	4.66	4.96
17	Increased area under tree-plantations	4.22	4.64	3.46	4.18	3.84	4.41	5.42	5.50			5.42	5.50	4.59	4.93
18	Reduced area under cultivable wasteland	4.08	4.76	3.60	3.82	3.84	4.29	3.00	3.00			3.00	3.00	3.44	3.68
19	Reduced area under salt affected land	3.91	4.75	2.63	2.97	3.27	3.86	5.62	5.48			5.62	5.48	4.38	4.62
20	Reduced scarcity of fodder	3.98	4.31	3.85	4.28	3.91	4.29	5.50	4.00	4.00	4.00	4.75	4.00	4.31	4.15
21	More diversified	3.93	4.23	3.79	4.35	3.86	4.29	5.00	4.25	4.37	4.16	4.69	4.21	4.25	4.25

	livelihood options													
22	Reduced dependence on purchased fodder	3.93	4.18	3.97	4.31	3.95	4.25	5.00	4.25	4.46	4.25	4.73	4.25	4.32	4.25
23	Enhanced capacity to deal with climate change	3.68	4.23	3.79	4.19	3.74	4.21	5.67	5.43	4.19	4.16	4.93	4.80	4.30	4.49

Impact is measured on 1-6 scale such that 1 is ‘not at all’ and 6 is ‘to a very large extent’; Sustainability is measured on 1-6 scale such that 1 is “not at all sustainable’ and 6 is ‘highly sustainable’

5. Evaluation of Processes Influencing Achievement of Project/Programme Results

(Note that evaluators are not expected to provide ratings on these issues)

5.1. Preparation and readiness :

- Before implementing the project, a general baseline scenario of the proposed project area, preparation meeting, stakeholder analysis with NGOs (EEs), strategy meet with PMU, RO and lead NGOs, 1-day strategy meet with selected NGOs (EEs), orientation workshop for field teams (with a specific focus on PRA/ FGD), meeting of climate expert with NABARD PMU/ RO/HO, Lead NGO and EEs, workshop to finalise the (AFB) project activities–with the participation of VWCs, EEs and NIE, were carried out.
- The possible stakeholders were thoroughly involved in the project preparation and their feedback and suggestions were incorporated for the fine-tuning of the implementation of the project. A number of workshops and meetings were carried out as part of the planning and implementation of the project. .
- At the state level, in each watershed, stakeholder consultation meetings were organised. Stakeholders who participated in the consultation and discussion process were from the state watershed department (SLNA), technical institutions like the State Agricultural University, civil society organisations, the state Department of Environment. These meetings were useful in bringing together their diverse expertise, resources, and perspectives that aided comprehensive planning, inclusive decision-making, and effective implementation of sustainable and equitable watershed strategies.
- A separate capacity building and training programme for EE staff and field coordinators was held by IE before inception workshop.
- At the watershed level, in the proposed project area, a series of consultations with farmers and landless persons was carried out for understanding the problems of degradation of natural resources, low productivity of crops, and issues connected with livelihood and to arrive at appropriate treatment measures. Based on this information a detailed project proposal/report was formulated.
- Resorting to a variety of PRA tools, trend analysis was conducted to see how farmers saw changing climate over decades and the expected changes in climate. The information on the latter was brought to the community with the help of experts. These PRA exercises also involved juxtaposing scientific information with the knowledge of the community with respect to crop production, impact of climate on crop yields, possible interventions, etc.
- All these consultations and interactions involved the representatives of all strata of community and farmers and considered interests and views of all. A detailed study was carried out on existing climate risk, impact and probability of occurrence matrix in view of climate change scenario in watersheds.
- Information on beneficiary numbers and categories (small farmers, marginal farmers, BPL households, SC households, ST households, women headed households etc.) was collected during the preparation of the project in the watershed area, which played a significant role in implementing the project.

Thus, efforts were made to ensure the participation of all sections of the community in the project planning and implementation, the participation of local stakeholder organizations in project planning especially in terms of obtaining technical information necessary for identification of technological interventions

5.2. Country Ownership

- The project was processed and approved by the MoEFCC, GoI and was funded, facilitated and monitored by NABARD, which is the NIE.
- The project followed the major domestic environmental law/policies / rules like (1) National Forest Policy-1988, (2) The Environment (Protection) Act, 1986 and Rules, 1986, (3) The Forest (Conservation) Act, 1980 and Rules, 1981. Further, the project activities followed state-specific Panchayat Raj and Gram Swaraj Act (local governance); land tenancy laws and other administrative orders of the Subnational Government.
- The present project areas were delineated separately with the consent of the respective State Governments (State Level Nodal Agency - SLNA).
- The project was executed after consultation and discussion process with the state watershed department (SLNA), technical institutions like State Agricultural University, civil society organisations, bilateral agencies, the state department of Environment, NGOs, climate experts etc.
- The entire process of the project was planned as participatory and voluntary in nature. This was expected to result into the informed participation of community members in to program implementation.
- The project addressed the beneficiary's selection process by considering the concerns of marginalized and vulnerable groups. The consultation process (participatory rural appraisal) involved marginal and vulnerable groups such as women, landless and scheduled caste and scheduled tribes.
- The project did not lead to any adverse effect on any individual or group.
- The project did contain certain interventions that are woman-friendly. Project fulfilled the criteria of the Core Labour Rights. Project did not engage child labour in any of its activities and all forms of forced or compulsory labour were eliminated.
- Current project was consistence with applicable international and national instruments and looks at benefiting the indigenous people through project inputs.
- The project activities were undertaken at the level of household and community level.
- The restoration and promotion of natural habitats as a strategy for greater resilience and adaptation capacity was adopted for Protection of Natural Habitats.
- Project was promoted only tested and approved species under alternative / mixed cropping system for the conservation of Biological Diversity. Project did not introduce any known invasive species.

5.3. Stakeholder involvement

- During the designing and implementation of the project, different stakeholders were involved at different stages of project development/progress.
- The present project areas have been delineated separately with the consent of the respective State Governments (State Level Nodal Agency - SLNA). SLNA- While

selecting the project area, it was ensured that the same does not overlap with any other projects of similar nature/funding.

- The present project concept was designed based on the learning from the Climate proofing of rainfed areas on watershed basis implemented in collaboration with GIZ by NABARD in Tamil Nadu and Rajasthan.
- Seven projects were taken up for climate proofing from out of 31 IGWDP for AF project. The interventions for climate proofing of these 7 watersheds were designed based on the learnings from the 2 watershed projects implemented with GIZ support in Rajasthan with AF support. Three watersheds implemented by NABARD under Watershed Development Fund (WDF) was considered for AF support. Similarly, 10 watersheds were selected in Tamil Nadu funded under WDF for AF support, based on the learnings from the projects implemented in collaboration with GIZ.
- The Project Sanction Committee (PSC) at national level in which MoRD representative was a member. Similarly, State Level Nodal Agency (SLNA) representative was a member in the State level PSC.
- The Stakeholders involved in the consultation and discussion process viz., state watershed department (SLNA), technical institutions like State Agricultural University, civil society organisations, state department of environment etc.
- The NGOs (EE), Climate Expert, Scientific Community, NABARD officials involved in the implementation of the projects from both the States.
- At watershed level, beneficiaries (farmers particularly small and marginal, women, landless, representatives of SCs and STs etc.) were actively involved in the project area.
- During project design, implementation and monitoring, community-based organizations (CBOs) like Village Watershed Committees (VWCs), Self Help groups (SHGs), Water User Associations (WUA), etc. were involved. Village Watershed Community (VWC) was the main Community Based Organisation (CBO) involved in maintenance and management of the project along with EE.
- The project actively involved local-level organizations, including Panchayati Raj Institutions (PRIs), for implementation. The PRIs, line departments, and other developmental partners played important roles in converging their developmental activities with the proposed activities during and post-project for better sustainability.
- NABARD was responsible for the overall management of the project. NABARD was the funding agency and was responsible for monitoring, and reporting activities.
- Executing Entities worked as per the sanctioned project document and other conditions stipulated at the time of sanction or from time to time by NABARD. The Village Watershed Committee (VWC) and the EE jointly worked together for satisfactory work execution.
- The EE and the VWC were involved in the maintenance of all records relating to the watershed development project.
- The line departments, like Animal husbandry, Agriculture, Forest, etc. were involved at local level for convergence of activities like Animal health camps, seed distribution, saplings, afforestation, etc. Panchayati Raj institutions were also involved in convergence of different developmental schemes like MGNREGA for land development.

- NABARD and EEs have already established linkages with scientific institutions like Krishi Vigyan Kendra (KVK), Agriculture University, College of Veterinary and Animal sciences, etc. that were involved in technology transfer, training and extension activities.
- The role of private was elicited in such areas as provision of crop-weather advisories to the community in the project area.

5.4. Financial management

- The budget sanctioned was credited by NABARD directly to the bank account of VWC jointly operated by EE and VWC. All payments for project implementation were made with due endorsement by the VWC.
- A detailed budget with budget notes on Implementing Entity management fee use, and an explanation and a breakdown of the execution costs were mentioned in the project proposal documents.
- Budget notes for climate-proofing watershed projects in Rajasthan and Tamil Nadu were clearly mentioned in the project documents for each project component with explanation.
- During the execution of the project, the EEs were closely monitored by the Programme Management Unit (PMU) of NABARD (a field level unit), located at Madurai (Tamil Nadu) and Udaipur (Rajasthan).
- The process of execution consisting of sanction, disbursement, progress reporting, monitoring, review, etc., was clearly defined and segregated for the co-funding by NABARD and AFB funding.
- EEs maintained a separate book of accounts, records, registers and all other documents, necessary for tracing the flow of funds and end use of the fund.
- A separate set of manpower was available at the level of EE and PMU for attending to the works related to regular watershed projects. To track the real time progress of the project, an on-line monitoring system was in place.
- The outcome/output envisaged under each of the activities funded by AFB, was monitored separately by the Field Coordinator attached to EE and by the Consultants attached to PMU, thereby ensuring achievement of physical and financial targets.

5.5. Implementing Entity Supervision and backstopping

- IE (NABARD) through PMUs monitored of the project on a quarterly basis. Two Consultants were stationed in each of these PMUs or respective ROs, who were exclusively to attend the works related to AFB projects. In addition, six monthly basis monitoring was done by the Regional Offices (Rajasthan and Tamil Nadu).The Project Sanctioning Committee (PSC) as constituted under WDF and IGWDP functioned as State Level Review Committee (SLRC) for guidance and review of the implementation of projects at State Level. In PSC there were State Government representatives from Agriculture/Horticulture Department, Dept of Rural Development, State Level Nodal Agency (SLNA) for watershed etc.
- The state nodal agency for watersheds provided technical inputs during the implementation stage and was involved in regular monitoring and review.

- The EE appointed a field co-ordinator who was responsible for executing the project activities.
- A grievance mechanism was set up at NIE level for addressing the grievances. At each watershed level (EE), the VWC addressed the grievance mechanism.
- NIE / NABARD monitored the process related to consultation and public disclosure on ESMP.
- IE supervised the project based on the half-yearly report (end of every six months), annual report (end of each year), project review & monitoring meeting (monthly) and final audit (3 months after the end of the Project).
- In summary, there was a three-tier project monitoring and supervision structure , i.e., at the VWC level, the project was reviewed monthly basis and reported to the *Gram Sabha* on a quarterly basis; at PMU level, the output of the project was monitored and supervised at quarterly basis; and at PSC level, with high level technical expertise was monitored and supervised the project direction, outcome of the intervention and critical gaps. From time to time, steering committee members also reviewed the project's progress.

5.6. Delay in project /programme start up and implementation

- In Rajasthan, the duration of the project ranged between 3 to 6 years under different watersheds. One watershed started in the year 2015, six watersheds in the year 2016 and three watersheds started in 2018.
- The start date and year of the project also varied in different watersheds. In Chainpuria watershed, Chittorgarh, it started on 23/06/2015; in Mandli and Malvi watershed, Udaipur it started on 01/04/2016; in Khad watershed, Udaipur, it started on 22.01.2016; in Dhuvala watershed, Bhilwara it started in 16/03/2016. In Vagda watershed, Udaipur, it started on 22.08.2016; in Jhabla watershed Udaipur it started on 18/04/2016; in Balua watershed Udaipur and Nayagaon-I and Nayagaon-II watershed, Jhalawar started 01.4.2018.
- Although, the completion date of the project was the same for all the watersheds i.e., 31-3-2021, about 50% of the watersheds did not complete the task in the stipulated time and went beyond the planned completion date.
- The main reason for delay/extension of the project was the delay in fund disbursement. Although in one watershed, the reason for delaying was poor community response and delay in project instalment (Dhuvala watershed, Bhilwara). In Vagda watershed, Udaipur, delays occurred due to the late release of funds. At the same time, the labours were attracted to other avenues of employment. Therefore, it took time to re-mobilize the labours for the manual implementation of project activities. Also, increase in the BSR rates affected labour availability. Lack of provision in the project to accommodate such increases is an issue to be addressed.

6. Evaluation of Contribution of Project/Programme Achievements to the Adaptation Fund Targets, Objectives, Impact, and Goal: elements and ratings

This section discusses how the project achievements contribute to AF goal, impact and objectives and whether the project objectives were aligned with Adaptation Fund strategic.

6.1. Project achievements

The ToR provides the targets to be achieved by the end of the project in all the 20 watersheds together. However, one sub-project in Tamil Nadu did not take off and to that extent these physical targets could not be revised in the absence of information for that particular watershed. Further, there were also observed differences in the units of measurement which made the assessment of achievements clearly. However, we compiled the information on targets and achievements of all the 19 watersheds together. Achievement is presented in both physical and financial terms and was supplemented with the information on targets as mentioned in the Results Framework of the project (Table 10). In those cases where the physical targets compiled from individual watersheds differ widely from those given in the Results Framework of the Project, an assessment on achievement can be made from the financial achievement. Almost all targets were met fully or in some cases achievements even exceeded the targets. Most of such interventions were those which can be done at individual level or those that can be executed by the VWC/ EE. Only in case of improved farm implements, less than 10% of the target was fulfilled in physical terms. But, the financial expenditure was more than planned. This indicates that cost estimates were not properly done or the need for implements could not be properly assessed. The project also executed many interventions for which targets were not mentioned in the Results Framework. Also, there were some interventions (e.g. desilting, plugging stone walls, bund plantation/ castor seeding, riparian buffer plantation, livestock field school, soil test kits) in the Results Framework for which information was not available in the project documents. On the whole, this brings out the need for better standardizing and harmonizing data sets and requires capacity building of the EEs.

Table 10. Project achievements in relation to targets and targets provided in Results Framework

		Physical	Physical		Financial			
Intervention / Component	**Unit**	**Target**	**Achievement**	**Achievement, %**	**Target**	**Achievement**	**Achievement, %**	**Target_RFD**
Component 1								
Catch pit	Nos	200	200	100.0	205000	205000	100.0	800
Check dam/WHS	Nos	5	7	140.0	1102575	1091120	99.0	4
Deep tillage	Ha	866	866	100.0	151550	151550	100.0	966
Earthen Embankment	Nos	3	3	100.0	719098	758786	105.5	3
Farm ponds	Nos	6	6	100.0	450000	441199	98.0	6
LDPE	Nos	4	5	125.0	430436	443644	103.1	4
Masonry Gabion	Nos	1	1	100.0	125483	121231	96.6	1
Open recharge pit	No	2264	1171	75.6	292104	275281	94.2	
Recharge pit	Cum	4980.53	4484	90.0	666480	542218	81.4.9	6300
Summer ploughing	Ha	1122	1118	99.7	1963500	1963500	100.0	1607

Component 2								
Azolla	Nos	549	581	105.8	1218600	1214051	99.6	589
Backyard Poultry	Nos	1060	831	78.4	200000	191873	95.9	198
Best package of practices	No	317	394	124.3	652500	757747	116.1	350
Biogas	Nos	84	74	88.1	1707940	1710100	100.1	88
Bund plantation/tree seeding	Nos	2275	2275	100.0	117375	110837.5	94.4	10500
Cattle tanks	Nos	6	8	133.3	480000	480000	100.0	17
Chaff cutter	Nos	8	8	100.0	144000	144000	100.0	1007
Crescent bund	Nos	1530.7	10868	710	259990	302276	116.3	11500
Fodder banks	Nos	10	10	100.0	350000	323657	92.5	10
Fodder development	Nos	227	227	100.0	953400	953400	100.0	
Fodder/fuel trees planted	Nos	22821	61747	270.6	1168578	1070297.5	91.6	25750
Glyricidia plantation	Nos	1121	1057	94.3	560500	547495	97.7	1121
Gradonis	Ha	4	2	50.0	169200	91420	54.0	7
Gradonis	Nos	2500	1202	48.1	132500	150964	113.9	
Grass seeding	Ha	152	142	93.4	96804	87284	90.2	162
Herbal gardens	Nos	4	4	100.0	125000	125000	100.0	5
Improved AH practices	Nos	7	116	1657.1	1638150	1716850	104.8	2
Improved cook stoves	Nos	100	64	64.0	165000	96565	58.5	100
Improved farm implements	Nos	12	1	8.3	849112	959040	112.9	2
Integrated Farming System	Nos	44	44	100.0	1254000	1254000	100.0	50
Kitchen garden	NU	25	25	100.0	405000	405000	100.0	
Kitchen garden	Nos	1109	1099	99.1	1183200	1189697	100.5	1217
Micro irrigation/UG pipe	N0	150	170	113.7	2111250	2169805	102.8	170
Micro sprinkler	Nos	18	19	105.6	666855	666855	100.0	
Micro sprinkler	NU	12	12	100.0	480000	480000	100.0	
Mixed cropping of Maize and Wheat	Nos	115	151	131.3	111000	107292	96.7	105
Mushroom cultivation units	Nos	1	1	100.0	50000	50000	100.0	5
Nursery for forestry spices	Nos	1	1	100.0	25000	25000	100.0	1
Organic farming promotion	Nos	6	6	100.0	50000	50000	100.0	
Pitcher irrigation	Nos	2000	1660	83.0	80000	93000	116.3	3000
Pitting and tree seeding	Nos	70000	83826	119.8	432850	365464	84.4	80000
Refilling of CCT	Rmt	14000	12405	88.6	93000	93007	100.0	17000
RWHS for backyard	Nos	27	27	100.0	1119840	865314	77.3	16

plantation								
Seed bank	Nos	3	2	66.7	340000	340000	100.0	22
Silage making demo	NU	0	0		37000	2088	5.6	20
Solar lights	Nos	195	347	177.9	840000	845899	100.7	120
Solar Pumps	Nos	20	23	115.0	3450000	2763571	80.1	23
Stone fencing Bund	m-length	840	1817	216.3	374906	378246	100.9	340
Tank silt application	Nos	380	375	98.7	2587500	2594393	100.3	447
Thor fencing	Nos	11200	8670	77.4	226000	225210	99.7	11200
Tree Seeding	Rmt	9000	9000	100.0	15570	12860	82.6	9000
Tree Seeding	Nos	60	60	100.0	53340	53360	100.0	60
Vegetable with trellis	Nos	70	214	305.7	1809850	1916329	105.9	66
Vermicompost	Nos	556	556	100.0	3846328	3841482	99.9	1693
Wadi/Horti plantation	Nos	2820	6930	245.7	1345900	1417395	105.3	3820
water absorption material	Nos	5000	5000	100.0	15000	15000	100.0	5000
Component 3								
Geo-hydrological studies undertaken	Nos	12	15	125.0	2850000	2592791	91	20
No of studies	NU	0	1		60000	60320	100.5	
No of studies	Nos	9	5	55.6	300000	253279	84.4	
RML.Subscription (3Years)	Nos	1095	1348	123.1	2473093	1629906	65.9	2000
Sediment observation units	Nos	1	1	100.0	315000	312000	99.0	4
Component 4								
Audio-visuals	NU	1	2	200.0	530000	530500	100.1	
Audio-visuals	Nos	8	13	162.5	520000	416427	80.1	
Audio-visuals	Lmp	1	1	100.0	70000	69783	99.7	
Awareness and mobilization	NU	0	0		100000	100000	100.0	
Exposure visits	Nos	12	32	266.7	1541942	119710	98.6	36
Information board	NU	0	0		60000	60000	100.0	12
Reading kit/manual	NU	500	501	100.2	350000	300025	85.7	
Reading kit/manual	Lmp	1	1	100.0	100000	96368	96.4	
Reading kit/manual	Nos	7	6	85.7	550000	475789	86.5	22
Training on NRM/Climate change	Nos	4	14	350.0	258000	171144	66.3	62
Village knowledge centre	NU	0	0		70000	70000	100.0	1

6.2 Contribution towards Adaptation Fund Goal (discussion and rating)

The Adaptation Fund Goal aims to assist developing-country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change in meeting the costs of concrete adaptation projects and programmes, in order to implement climate-resilient measures.

India, being a developing country is highly vulnerable to the adverse effects of climate change. Many parts of the country are experiencing frequent weather aberrations and extreme events causing reduction in crop yield or crop failure and income loss. Nearly 86% of the Indian farmers are small and marginal with land holdings less than 2 ha and are more vulnerable to the adverse effects of changing climate. The increase in the magnitude of heat waves, frequent droughts, floods, sea level rise and cyclones increase the risk of food security. The selected project locations are highly vulnerable due to several factors and the central and state Governments have prioritized these areas for improving its the adaptive capacity to cope with the changing climatic situations. The National Action Plan on Climate Change (NAPCC) also recognised the threat of climate change and identified agriculture as a vulnerable sector with large number of rural population, particularly the poor depending on agriculture and livestock for their livelihood.

The two locations selected in this project lies in two Indian states namely, Tamil Nadu in South-east and Rajasthan in North-west India where the state level action plans were prepared under the NAPCC and adaptation to climate change in agriculture was prioritized. In addition to this, soil erosion, degradation of irrigated lands (Tamil Nadu), degradation of pastures, water pollution (Rajasthan) and overexploitation of groundwater and forest also contribute to the low resilience in the Indian farming systems. (also see section 3.1)
Many watershed programmes for rainfed and drought prone areas were implemented in the selected project states under different schemes. The AF programme was designed based on the learning from the "Climate proofing of rainfed areas on watershed basis" implemented in collaboration with GIZ by NABARD in Tamil Nadu and Rajasthan. The pilot projects were undertaken with GIZ following the climate proofing tool developed by GIZ for integrating climate change adaptation into the development planning. However, the adaptation fund project added value to this watershed programme without duplication and helped improve the resilience to climate variability and enhanced the adaptive capacity.

Since some of the interventions are site-specific, they cannot be replicated in other parts of the country. Based on the agro-ecological conditions, topography and resource availability, some of these interventions can be scaled-out. Large scale adoption of these interventions can be taken up in convergence with line departments, State and National agencies or missions like National Rural Employment Guarantee Scheme (NREGS), Integrated Watershed Management Programme (IWMP), National Rural Livelihood Mission (NRLM), Rainfed Area Development program of National Mission on Sustainable Agriculture (NMSA) etc. with necessary adaptive adjustments to the interventions so that country can achieve concrete adaptation measures to cope with climate change. However, the uncertainties associated with

incidence of hazards, the need for creation of enabling mechanisms especially for NRM interventions and location specificity are the major challenges to enhance the resilience and to scaling out of these interventions

NREGS indirectly helps in the construction of soil and water conservation structures in a landscape even though its primary objective is to provide local employment. NRLM also attempts to create efficient and effective institutional platforms for enabling the rural poor to increase their household income through sustainable livelihood enhancement and improved access to financial services. The biggest upscaling platform by the Government of India is the Integrated Watershed Management Programme (IWMP) and it works under the similar guidelines. IWMP is to restore the ecological balance in a watershed by conserving the soil and water and developing the vegetative cover thereby providing sustainable livelihoods to the local people. Hence, these interventions can be integrated in the upcoming IWMP projects. The major challenges or risks to attain increased resilience include awareness and access to adaptation technologies in the absence of adequate enabling or facilitation institutional arrangements.

The overall project rating of project achievements to the Adaptation Fund goal is '***satisfactory***' .

6.3 Contributions towards AF Impact

The project reduced the vulnerability, increased the resilience and adaptive capacity to respond to the impacts of climate change, including variability at different levels.

The project's interventions helped increase the resilience of crop yields as is evident (see section VI 1.2) against the impacts of climate variability and climate change at farm level and watershed levels to a certain extent through increased soil moisture storage, groundwater recharge, water availability, stress tolerant crop varieties, diversification of farm enterprises, increased crop yield and capacity building of farmers. Further, providing agro-advisories helped farmers take tactical decisions on crop management that helped better yields, higher incomes and cost reduction.

A look at the AF core indicators would be helpful to understand how the project achievements contribute to the AF impacts. AFB emphasizes on evaluating project outcomes in terms of two impact level results - increased adaptive capacity and increased ecosystem resilience through five associated indicators. The findings for this project on these five indicators are presented in tables 11-16. These tables also present what interventions (Tables 11-13) that are largely responsible for the achievements in terms of core indicators. The increased adaptive capacity is captured through four indicators such as total number of beneficiaries, number of early warning systems created, assets produced and income gains. The project benefitted 26599 individuals directly and 19698 indirectly. Eighteen agro-meteorological advisory services created through partnership of private sector. Though ten automatic weather stations were established, the data gathered would be useful in future. However, their continued functioning is to be ensured if such investments yield desired

utility. A number of different types of assets were created with the project investments which are useful in enhancing adaptive capacity. The project led yield gains of more than 30% in both states and helped reduce yield losses by 7.35% in Tamil Nadu and by 19.84% in Rajasthan. A number of interventions were implemented that help improved ecosystem resilience.

Table 11. Number of Direct and Indirect beneficiaries of the project vis-à-vis target

S No	Particulars	Rajasthan	Tamil Nadu	Total
1	Direct beneficiaries	8508	18091	26599
2	Indirect beneficiaries	10429	9269	19698
	Total	**18937**	**27360**	**46297 (13005)**

Figure in parentheses is the revised target. (The original target (56751) fixed at the beginning of the project was revised after one year of project commencement).

Table 12. Number of Early Warning Systems*

S No	Particulars	Rajasthan	Tamil Nadu
1	Number of Watershed projects with RML Subscription	9/10 (830)	9/9 (550)
2	Number of Watershed projects with AWS Installed	6/10	4/9

*Number of Watershed projects with RML subscription (Rainfall, Crop and Marketing Advisories in the form of messages to mobiles of farmers) and Number of Watershed projects with AWS installed]; Figures in parentheses are number of farmers covered. The revised target for number of farmers covered is 1000.

Table 13. Assets produced, developed, improved, or strengthened

S No	Particulars	Units	Rajasthan		Tamil Nadu	
			Quantity	Expenditure (₹)	Quantity	Expenditure (₹)
1	Biogas	Nos	13	366300	61	1343800
2	Catch Pits	Nos	-	-	200	205000
3	Cattle Tanks	Nos	-	-	8	480000
4	Chaff Cutter	Nos	-	-	13	282000
5	Deep Tillage	Ha	-	-	866	107800
6	Drip Irrigation	Nos	-	-	24	483145
7	Fodder Development/Chaff Cutter	Nos	-	-	56	123000
8	Improved cook stoves	Nos	64	96565	-	-
9	Improved farm implements	Nos	1	609928	-	-
10	Micro Irrigation/UG Pipes	Nos	131	1759131	-	240000

11	Open recharge pit	Nos	104	75024	-	-
12	Recharge Pit	Cum	2627.35	307162	0	0
	Recharge Pit	Ha	1505.70	185334	0	0
	Recharge Pit	Nos	575	90972	0	0
13	Refilling of Alternative CCTs and tree seeding	Nos	12405	93007	-	-
14	Sprinkler Irrigation	Nos	-	-	25	906855
15	Summer Ploughing	Ha	-	-	1118	1963500
16	Trellis Installation	Nos	-	-	5	175550
17	Trives Installation	Nos	-	-	6	36000
18	Vermicompost	Nos	-	-	556	3841482
19	Well Recharge Pit	Nos	43	493171	468	2709143
Total				**40,76,594**		**1,28,97,275**

Table 14. Interventions undertaken as part of the project those help protect or rehabilitate natural assets and increase the ecosystem resilience

S No	Particulars	Units	Rajasthan		Tamil Nadu	
			Quantity	Expenditure (₹)	Quantity	Expenditure (₹)
1	Agro-Forestry in Channel	Nos	-	-	15467	222000
2	Avenue plantation	Nos	1001	72026	-	-
3	Bund plantation/castor seeding	Nos	2313	112528.5	-	-
4	Compost Pit	Nos	-	-	52	124000
5	Crescent Bunds	Nos	10868	302276	-	-
6	Fodder Banks	Nos	4	323657	143	600600
7	Fodder Development	Cents	0	0	412	708900
	Fodder Development	Nos	0	0	388	1065900
8	fodder/fuel trees planted	Nos	60192	1001100	-	-
9	Gliricidia Plantation	Nos	-	-	1057	547495
10	Grass Seeding*	**Ha**	**142**	**87284**	-	-
11	Herbal Garden	Nos	-	-	4	125000
12	Minor Millets	Ha	-	-	147.3	943700
13	Organic Farming Promotion	Nos	-	-	6	50000
14	Pitcher Irrigation	Nos	800	53000	860	40000
15	pitting and tree seeding	Nos	83826	612964	-	-
16	RWHS for backyard plantation	Nos	27	865314	-	-
17	Seed Bank	Nos	2	340000	-	-
18	Solar Lights	Nos	347	845899	-	-
19	Solar Pumps	Nos	23	2763571	-	-
20	Stone Bund	Nos	1555	69197.5	-	-

21	Stone Fencing Bund	Mtr	1023	209626	-	-
22	Stone Fencing Renovation	Cum	794	168620	-	-
23	Tank silt Application	Nos	-	-	375	2594393
24	Thor Fencing	Nos	8670	225210	-	-
25	Tree Plantation	Mtr	9000	12860	-	-
	Tree Plantation	Nos	60	53360	-	-
26	Wadi/Horticulture Plantation	Ha	12834	2439133	-	-
27	Water Absorption Material	Nos	5000	15000	-	-
Total				**1,05,72,626**		**70,21,988**

*Core indicator (target 10.6 ha)

Table 15. Interventions that helped in increasing income, or avoiding decrease in income

SNo	Particulars	Units	Rajasthan		Tamil Nadu	
			Quantity	Expenditure (₹)	Quantity	Expenditure (₹)
1	Azolla	Nos	207	537639	374	676842
2	Backyard Poultry	Nos	852	248888	68	102000
3	Best package of practices	Nos	308	652827	-	-
4	Community-based livestock insurance	Nos	62	413383	-	-
5	Crop insurance awareness programme	Nos	23	232600	-	-
6	IFS	Nos	-	-	37	1054500
7	Improved AH practices	Nos	116	1636850	-	-
8	Kitchen Garden	Nos	563	199822	511	1104875
9	Mixed cropping of Maize and Wheat	Nos	151	107292	-	-
10	Mushroom Units	Nos	-	-	1	50000
11	Nursery	Nos	-	-	1	25000
12	Sheep	Nos	-	-	5	40000
13	Silage Making Demo	Nos	-	2088	-	-
14	Vegetable with Trellis	Nos	209	1740779	-	-
Total				**57,72,168**		**30,53,217**

Table 16. Yield gains and avoided yield losses

S No	Particulars	Rajasthan	Tamil Nadu
1	Increased Yield in normal years	37.53%	30.35%
2	Avoided decrease in yield in drought years	19.84%	7.35%

Note: Interventions in tables 11, 12, 13 helped in enhancing of yields in normal years and avoided decrease of yields in Stress (drought) years (based on data collected from a random sample of 2 watersheds (35 households in each watershed) each in Rajasthan and Tamil Nadu)

Overall Impact of the Project

The project interventions were found to lead to enhanced farm income, reduced impact of climate shocks, more sustainable cropping pattern as per the opinion of a majority of farmers (Table 17). How these enhanced incomes were used varied considerably, as can be seen in table, as it is dependent on the specific household needs and circumstances. Farmers used the enhanced incomes to invest in agriculture, repay the outstanding debt, construct or renovate their dwellings, invested in education of children, etc. A few farmers also felt that the project was instrumental in building contacts with various development agencies, which is also a dimension of adaptive capacity.

Plate 4. Sprinkler irrigation to enhance crop productivity at Chithalai watershed, Madurai district, Tamil Nadu

In case of livestock too, the dependence on purchased fodder decreased considerably due to improved fodder availability in CPRs (grazing lands, etc) and improved availability of crop residues. These changes are more conspicuous in Rajasthan than in Tamil Nadu. Other changes that were evident are the higher milk yield: milk yield of buffalo increased from 2.55 to 3.7 L/day in Rajasthan and from 7.11 to 9.65 L/day in Tamil Nadu. In case of small ruminants, there was considerable weight gain >20%) at the marketable age in both states which was reflected in higher income.

Another important dimension of the outcomes is improved groundwater status. In both states, farmers reported visible increases in water levels with Tamil Nadu showing considerably higher change (>8ft) compared to Rajasthan (2.5 ft).

Thus, the effectiveness of the project and its interventions was given a rating **'*Satisfactory*'** for the two states separately as well as for the project as a whole though there were visible gains in terms of yield and income growth as well as resilience enhancement as these gains could not be attribute to the 'climate proofing' phase alone. Further, discussions with farmers' community in the adjacent comparable villages indicated that such improvements didn't happen in those villages and some farmers during the interactions did acknowledge the improvement with respect to crop yields and incomes, water availability, better farming practices, etc. Some of them even requested for similar project or interventions to be initiated in their own village.

Table 17. Overarching impact of the project

SNo	Particulars	Rajasthan						Tamil Nadu					
		Chittorgarh			Udaipur			Dindigul			Madurai		
		Yes	No	Percentage	Yes	No	Percentage	Yes	No	Percentage	Yes	No	Percentage
1	Farm Income Increased Considerably	34	0	100	35	0	100	25	0	100.00	29	0	100.00
2	Reduced Impact of Climate Shocks on farm income	33	1	97.06	27	8	77.14	24	1	96.00	24	5	82.76
3	Enhanced Nutrition status	29	5	85.29	25	10	71.43	3	26	12.00	28	26	96.55
4	More sustainable crop Pattern	25	9	73.53	24	11	68.57	1	6	4.00	1	28	3.45
5	Invested in Agriculture	19	15	55.88	28	7	80.00	3	22	12.00	3	26	10.34
6	Re-paid an outstanding long loan	18	16	52.94	8	27	22.86	8	24	32.00	8	21	27.59
7	Supported children Education	32	2	94.12	23	12	65.71	18	18	72.00	18	11	62.07
8	Construction or renovation of the house	21	13	61.76	17	18	48.57	7	11	28.00	7	22	24.14

9	Fulfilled social obligations	21	13	61.76	16	19	45.71	15	1	60.00	15	14	51.72
10	Built contacts with different departments	21	13	61.76	28	7	80.00	21	4	84.00	11	18	37.93

Geo-hydrological study and crop-water budgeting were conducted at a later stage and could not be fully utilized in planning interventions. Efforts were made to build awareness and sensitize community about the climate change related issues through various print media (Reading kits/manuals/pamphlets, etc) and by conducting camps/sensitization programmes for stakeholders.

However, the interventions/project results were mostly confined to the 19 watershed locations in Tamil Nadu and Rajasthan. Horizontal spread of project's interventions has not been evident yet. However, there were a few cases where farmers from other locations were brought for exposure visits to these locations to see for themselves the benefits of different resilience enhancing interventions. Large scale adoption of these interventions can be taken up in convergence with line departments, state and national agencies or missions so that country can achieve concrete adaptation measures to enhance resilience to climate change impacts with proper care for fine-tuning the technologies to the local contexts. As adaptation is local in nature, most of the adaptation benefits were limited to the places of adaptation implementation.

In the selected watersheds, incidence of drought, intermittent dry spells, delayed onset of monsoon and extreme temperature, extreme events are some of the climate related hazards against which resilient is to be strengthened. These issues were well recognized during project planning. However, there are a number of non-climatic challenges that interact with climatic hazards leading to compounded risks. Thus, incidence of multiple risk factors is a potent constraint to building resilience warranting a concerted action from multiple institutions and at different layers of governance and administration. Uncertainties associated with climate change, effectiveness of interventions at different intensities of hazard, variable performance of technologies, etc. are some other problems that come in the way of building resilience.

Some of the interventions implemented are helpful only when the climatic shock is encountered which makes adoption of such technologies less effective or farmers see more opportunity cost. Continued adoption of technologies is critical to enhance resilience which requires that the necessary support systems are in place. For example, adoption of stress tolerant crop varieties depends on the availability of seed material; effective agro-met advisories require coming together of expertise from different disciplines and departments, etc. How the resilience gains occurred during and in the immediate future of the project may fizzle out if such necessary support systems are not put in place.

6.3.1 Resilience at different levels

The interventions helped increase the resilience against the impacts of climate variability and climate change at farm (increased and stable crop yields), farmer (increased income levels) and at watershed or community levels. Reflection of these gains at district and other higher geographical scales require these interventions and approaches are replicated and scaled out which need further effort. However, these project sites can serve as 'learning centres' for building awareness about the potential benefits of various adaptation interventions. Based on the agro-ecological conditions, topography and resource availability, some of these interventions can be upscaled in convergence with line departments, state and national agencies or missions so that country can achieve concrete adaptation measures to increase its resilience.

Achieving resilience gains is a long-term process of strengthening the ability of systems to foresee, adjust, adapt and cope with shocks. Most of the projects or programmes focus on some particular (class of) shocks, like the current project addresses climate related shocks. However, farmers and farming are exposed to multiple stresses and shocks, sometimes simultaneously. Understanding the incidence of multiple shocks is still less than adequately understood, which is important to build resilience of farming and of farmers for more sustainable agriculture and livelihoods.

Rating of Contribution

The interventions in the project helped increase the resilience. This is reflected in various indicators such as improved water availability, increased crop yields, increased cropping intensity, better water management, reduced migration. However, installation of Automatic Weather Stations (AWS) and generation of agro-advisories, geo-hydrological study and crop-water budgeting were conducted after most of the hard structural measures were completed before the commencement of 'climate proofing' phase of the project and hence could not be fully utilized.

The project rating towards project impacts in the individual watersheds namely, Nayagaon - I, Nayagaon -II, Balua, Mandli and Khad in Rajasthan and Salivaram, Chithalai, Chinnapoolampatty, Peikulam and Srirampuram in Tamil Nadu was ***satisfactory*** *(S)* whereas Dhuvala, Vagda, Jhabla, Malvi, Chainpuria in Rajasthan and Ayampallayam, Bettamugilalam, Thally Kothanur and Anjukulipatty watersheds of Tamil Nadu was ***moderately satisfactory*** *(MS).* The project rating pertaining to individual watersheds is detailed in Annexure 1. Similarly, overall project rating in the contribution of project achievements in Rajasthan (10 watersheds) and Tamil Nadu (9 watersheds) was also '***satisfactory'***. The overall project rating in the contribution of project achievements in 19 watersheds to the Adaptation Fund impacts is ***satisfactory***.

6.4 Contributions towards AF Objective

The overall objective of this program is to improve climate resilience and build adaptive capacities of the communities to climate change in the rainfed areas of Tamil Nadu and Rajasthan. The program was designed to deliver this objective through four components:

Component 1: Improving adaptation to climate variability / change in farm sector with better management and maintenance of soil and water regime enabling better crop / pasture land productivity and resultant increase in income of small and marginal farmers.

Component 2: Promoting climate resilient farming system and diversification of livelihoods engaging community and their associations in the concrete adaptation pathway.

Component 3: Reducing climate change vulnerability and process of marginalization with integration of risk mitigation products, like crop, weather and market advisory; and information system.

Component 4: Creation of knowledge management system on climate change adaptation and sharing the learning to wider audience for replication and technology cascading.

The components 1 and 2 of current project have direct linkage to reduce vulnerability to the impacts of climate change and project components 3 and 4 have linkages to increase the adaptive capacity to respond to the impacts of climate change, including variability. The overall objective of the project was in line with the National Action Plan on Climate Change (NAPCC) and the State Action Plan on Climate Change (Tamil Nadu and Rajasthan). Secondly, the project was governed as per the policy and preference of State Governments and was adhered to the national scientific criteria with regard to adaption such as economic, social and environmental benefits. The key stakeholders were involved in the project formulation, management and implementation in the participatory mode.

The project has helped reduce the vulnerability of farming to drought incidence as various interventions led to better soil water regimes. The interventions in the four components are complementary with one another that together helped higher and more resilient crop yields and farm incomes. Efforts on dissemination of knowledge on climate change and adaptation measures led to increased adaptive capacity which would be reflected in better adaptation and thus reduced vulnerability and strengthened resilience. Investments and efforts in building social capital (e.g. watershed committees, self-help groups, contacts with various development agencies) also strengthen adaptive capacity of local communities.

There are examples, in Rajasthan, that promoted homestead or kitchen gardening for growing a variety of fruits and vegetables which can reduce the cash of farmers on one hand and enhance income and nutrition outcomes on the other. The NRM interventions as a whole will help in supporting various agricultural activities better even in periods of stress.

The main challenges or risks to attain reduced vulnerability and increased adaptive capacity are the natural resource endowments in terms of low and erratic rainfall, inter-annual variability, low fertility of soils and dominance of small holders with low investment capacity. The needed improvements in the condition of natural resources can happen only in long term provided the necessary technologies are adopted on a continuous basis. Implementation of NRM interventions (farm pond, check dam, percolation tanks etc) involve significant expenditure and there was difficulty in convincing farmers to contribute while implementing such interventions.

Rating of Contribution

The overall project rating of project achievements to the Adaptation Fund objective is '***Highly satisfactory*** (HS)'.

Overall Rating of Contribution

The project overall rating in the contribution of project achievements to the Adaptation Fund targets, objectives, impact, and goal was ***Satisfactory*** **(S)**.

7. M&E Systems

The monitoring system was designed to capture the implementation progress against planned targets as per the Annual Work Plan and Budget (AWPBs). The monitoring system was periodically monitoring the (1) quality of inputs (2) adequacy of the input, (3) physical progress of activities (4) financial achievement (5) project outputs (6) project outcomes etc. Overall, the monitoring and evaluation frame of the project has examined the formative aspect (process monitoring) and summative aspects (impact monitoring) of the project.

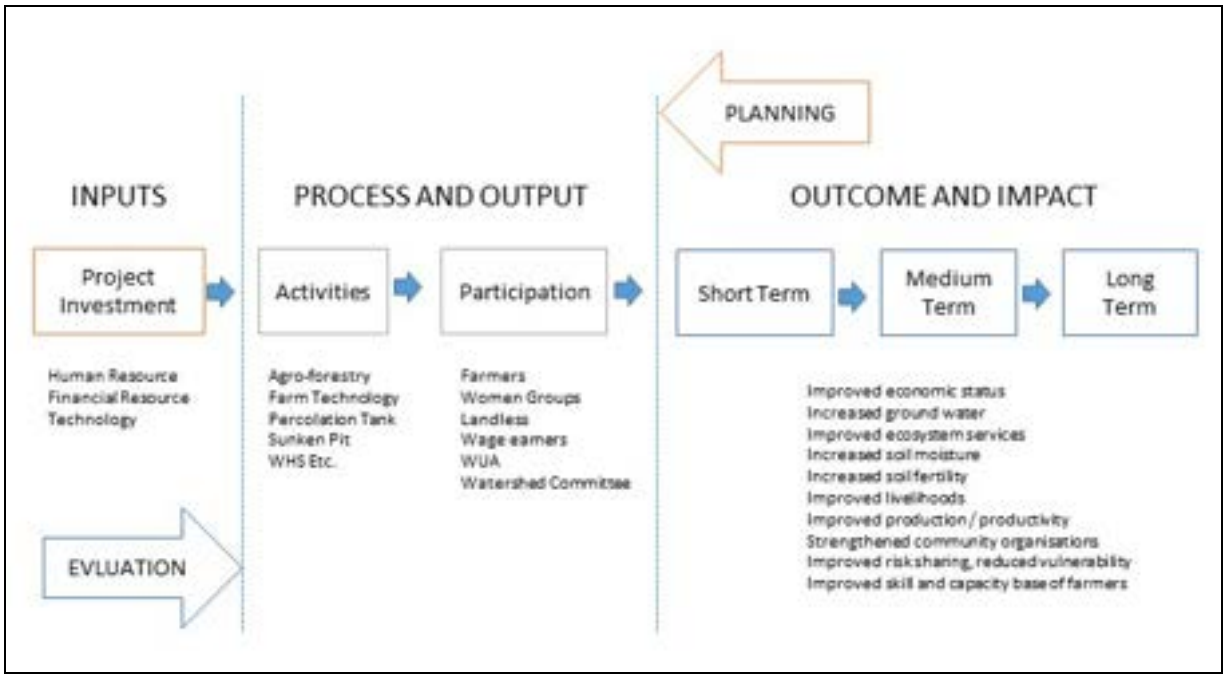

Fig 1. Project inputs, processes and expected outcomes

The M&E plan was based on the project RBM framework. The plan (Table 18) provided a timetable for various M&E activities, such as specific evaluations, reviews, and supervisions.

Table 18. Monitoring and Evaluation (M&E) Plan

Type of M&E Activity	**Responsible Parties**	**Time Frame**
Project Inception Workshop	EE/NIE	Within first three Months
Half-yearly report	EE/NIE	End of every six Months
Annual report	EE/NIE	End of each year
Project review & monitoring Meeting	Dept. of Govt /EE/NABARD	Monthly
End term evaluation	External Evaluator/Representatives of MOE/ Dept. of Govt / Technical Consultants/ Project Director	At the end of Project Cycle
Final Audit	EE/NIE	3 months after end of the Project

The M&E system tracked the progress towards the project objectives by collecting information based on selected AF standard/core indicators throughout the project period. The core indicators include percentage reduction in livelihood vulnerability of farmers through increased water availability, number of farmers adapted to climate resilient farming system, number of energy efficient systems demonstrated, number of farmers benefitted from crop weather advisories and crop-water budgeting, number of reading kits/manuals on climate proofing prepared, number of studies undertaken and number of awareness camps/sensitization programme conducted.

The Monitoring and Evaluation of the project and knowledge management component was the responsibility of the Project Management Unit (PMU) and Regional Offices of NABARD. A results-based approach was adopted, involving the regular recording and accounting of the progress against the AWPB targets and the routine, periodic assessments of movement towards the impact. The same was monitored through on-site and off-site monitoring by a dedicated team. Three-tier project monitoring and supervision structure was imposed, viz., at the VWC level, at the PMU level and at PSC level. VWC reviewed the progress on a monthly basis and reported to the Gram Sabha on a quarterly basis. PMU has taken the stock of the project output on a quarterly basis while PSC, with high level technical expertise monitored the project direction, outcome of the interventions and the critical gaps. At regular intervals, the steering committee members reviewed the progress and taken up required corrective measures. Finally, the project progress was tracked at the EE level, PMU level and PSC level. Deviations from the designed plan was identified and corrective measures were taken up as per the requirement.

The annual project reports (PPR) were complete only in case of a few watersheds . The project rating with respect to M&E activities at all 19 was ***satisfactory*** *(S).*

The information provided by the M&E system was used during the project implementation to improve the performance and to meet the changing needs (adaptive management). Also, the projects had an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be compiled and was used after project closure. The adaptation project was taken up in the best performing watersheds under the watershed programme implemented just before the AF project and it was easy to make the arrangements to ensure the use of data after project closure. The project reports and measurement books were in order.

Budgeting and funding for M&E activities: The M&E plan was sufficiently budgeted at the project planning/design stage. But M&E Budget was managed by NIE/NABARD during implementation due to certain constraints and there was no separate budget allocation for M&E.

The effectiveness of M& E system was also evident in achieving the physical and financial targets. The project was efficient in achieving the intended or targeted physical outputs as can be seen from the tables 19-20 (and Annexure 4) that the achievement exceeded 75 % 232 interventions in Rajasthan and 176 out of 182 interventions in Tamil Nadu. Achievement exceeded 100% in case of a few interventions. Achievement fell short by more than 50% only 34 interventions in Rajasthan and four in Tamil Nadu. Even financial progress was also impressive with 258 interventions out of 460 in the whole project witnessing more than 75% achievement. However, no expenditure was incurred on 21 interventions in spite of allocation.

Table 19. Physical achievements in the AF Project in Rajasthan and Tamil Nadu (No. of interventions)

	% target achieved							
Component	**<50%**	**50-75%**	**75-100%**	**>100%**	**No Target & No Achievement**	**No Target but Achievement**	**Targeted but Not Achieved**	**Total**
Rajasthan								
Component 1	1	1	11	2	0	2	0	17
Component 2	6	10	90	35	11	11	11	163
Component 3	0	0	16	3	3	1	3	23
Component 4	1	4	32	9	4	9	2	57
Total	8	15	149	49	18	23	16	260
Tamil Nadu								
Component 1	0	1	20	1	0	0	0	22
Component 2	1	0	82	9	0	0	1	93

Component 3	0	1	5	0	13	3	4	13
Component 4	0	0	2	1	29	9	0	12
Total	1	2	109	11	42	12	5	142
Project								
Component 1	1	2	31	3	0	2	0	39
Component 2	7	10	172	44	11	11	12	256
Component 3	0	1	21	3	16	4	7	36
Component 4	1	4	34	10	33	18	2	69
Total	9	17	258	60	60	35	21	400

Table 20. Financial achievements in the AF Project in Rajasthan and Tamil Nadu (No. of interventions)

	% target achieved					
Outcome	0-50%	75-100%	>100%	50-75%	No Target & Achievement	Total
Rajasthan						
Component 1	1	12	4	0	0	17
Component 2	18	105	42	8	1	174
Component 3	7	16	2	1	0	26
Component 4	8	42	9	2	0	61
Total	34	175	57	11	1	278
Tamil Nadu						
Component 1	0	21	0	1	0	22
Component 2	0	88	5	0	0	93
Component 3	2	23	0	0	1	26
Component 4	2	39	0	0	0	41
Project	4	171	5	1	1	182
Component 1	1	33	4	1	0	39
Component 2	18	193	47	8	1	267
Component 3	9	39	2	1	1	52
Component 4	10	81	9	2	0	102
Total	38	346	62	12	2	460

7.1. Indicators

The adaptation indicators selected for monitoring were related to the project activities (e.g. number of meetings to be conducted, outputs (e.g. number of recharge pits dug), and outcomes (e.g. yield change). There were measurable indicators that were monitored. Emphasis was more however on achieving physical and financial targets with the assumption that they would lead to desired outcomes too given the care and diligence that went into selection of interventions. However, not all outcome based indicators could be measured. For example, knowledge gains are difficult to measure. Also, the resilience doesn't lend itself to be measured easily given its multiple dimensions (this Terminal Evaluation made some effort to measure resilience). However, the targets defined to be achieved are measurable and can largely be related to the core indicators of AF. The data collected based on the AF standard/core indicators as mentioned above has helped to assess the Adaptation Fund project.

7.2. Project baselines

The baselines have been designed through participatory approach by involving different stakeholders. Previous watershed project was continuing in many watersheds during the baseline period of the present AF project. Different adaptation scenarios were considered by the project in selected watersheds of Tamil Nadu and Rajasthan. The vulnerability baselines, climate-risk baselines, and adaptive capacity baselines were described and assessed in the project report. The baselines pertaining to vulnerability, climate risks, and reference and adaptation scenarios have been reviewed during project implementation. The farmers in the selected watersheds were vulnerable due to low investment capacity, poor water availability and low crop productivity. Farmers were not following climate resilient farming systems and no systematic efforts for afforestation and pasture land development was done. Farming systems were less diverse. Also, there were no energy efficient systems in place. There were no crop weather advisories & crop-water budget inputs available and no awareness/sensitization programmes conducted for knowledge management and capacity building.

7.3. Alignment of Project M&E Frameworks to National M&E Frameworks

In India, the Development Monitoring and Evaluation Office, attached to NITI Ayog, is entrusted with, among other things, to develop and implement M&E that are more data driven, dynamically relevant and aid decision making for improvements in project or programme implementation. Though at present, it is providing support and assessing the preparedness of various departments and ministries in terms of their data collection arrangements, scale, data security, etc. The M&E framework of this project has certain elements that the National M&E framework in terms of emphasis on measurable indicators.

The project monitoring and evaluation system has made the best use of existing (local, sectoral, national) monitoring and evaluation systems and indicators. However, monitoring of AF project was limited up to the end of project duration. It is desirable to monitor the long-term impact of various interventions during post-project period in bringing resilience to farming systems by minimizing the impact of climate change/ extreme weather events.

The project has incorporated a well-structured M&E system for periodic monitoring of the progress of the project and evaluation of various interventions as per the approved program. The Monitoring and Evaluation of the project and knowledge management component was the responsibility of the Project Management Unit (PMU) and Regional Offices of NABARD.

The project included plans for feedback and dissemination of results, lessons learned and good practices identified to a wider community of adaptation planners and practitioners at all levels and other existing M&E systems.

Ratings for Evaluation of M&E systems

As per the terminal evaluation, the overall rating of M&E based on the overall quality of the four dimensions namely, (a) M&E design, implementation & budgeting, (b) indicators (c) Project baselines and (d) Alignment of Project M&E Frameworks to National M&E Frameworks for all 19 watersheds were '***satisfactory***' (S). The minor shortcoming was only due to the coincidence period of previous watershed project with the baseline period of the present AF project.

Fig 2. Rating the AF project on different dimensions (1: Highly Unsatisfactory, 2: Unsatisfactory, 3: Moderately Unsatisfactory, 4: Moderately Satisfactory, 5: Satisfactory, 6: Highly Satisfactory)

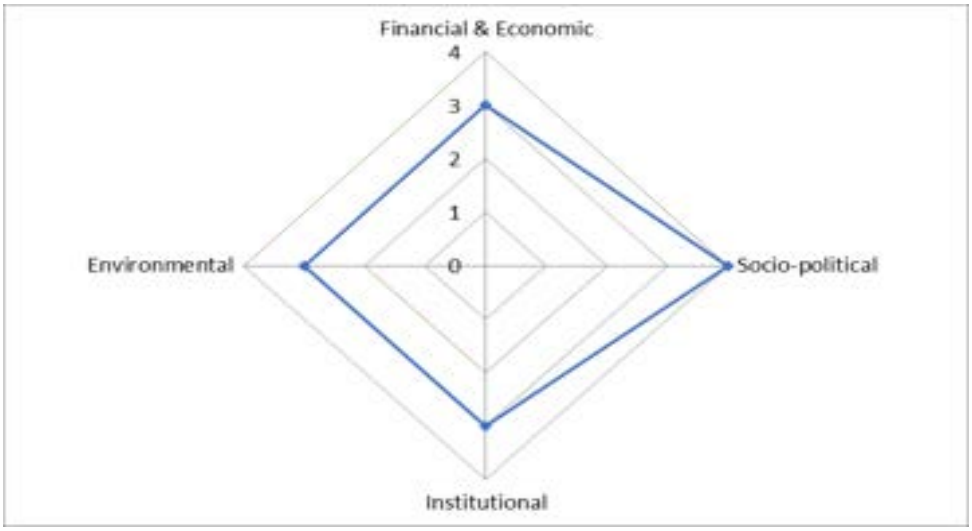

Fig 3. Rating of the project with respect to various types of risks to sustainability and progress towards impacts (1: Unlikely; 2: Moderately Unlikely, 3: Moderately Likely, 4: Likely)

8 Conclusions, Lessons learned and Recommendations

8.1. Conclusions

- The selected project locations are highly vulnerable due to several factors and the central and state Governments have prioritized these areas for adaptation investments. The National Action Plan on Climate Change (NAPCC) also recognised the threat of climate change and identified agriculture as a vulnerable sector. The districts of Rajasthan and Tamil Nadu selected for the project were identified as high priority districts by NRAA. The climate change risk assessment, based on the IPCC's AR5 Framework puts all the project districts in Rajasthan in 'very high' risk category and Dindigul in Tamil Nadu in 'very high' vulnerability category.
- The relevance of the project interventions with AF goals and outcomes and of interventions to the local adaptation needs was found to be "***Satisfactory***".
- It is to be noted that few interventions showed "***Moderately satisfactory***" relevance by the farmers because these interventions were related to information sharing through print media (books, pamphlets, etc.). As most of the farmers are not highly educated, especially in Rajasthan, such findings were not surprising.
- The effectiveness of the project and its interventions was given a rating '***Satisfactory***' for the two states separately as well as for the project as a whole though there were visible gains in terms of yield and income growth as well as resilience enhancement; but these gains could not be attributed to the 'climate proofing' phase alone.
- This project actually chose, with the participation and involvement of local stakeholders, those interventions that were complementary and added value to the efforts made already. The EE also didn't lose any time in 'breaking the ice' with and winning the confidence and trust of the community. The project deserved a '***Satisfactory***' rating as far the efficiency is concerned. Exceeding the time lines in a few cases is what prevented the project being given a '***Highly satisfactory***' rating.

- The overall rating of the project with respect to project outcomes was '***Satisfactory***'.

- Sustainability of outcomes were evaluated based on four dimensions of risks to sustainability namely, financial and economic risks and assumptions, socio-political risks and assumptions, institutional framework, governance risks and assumptions and environmental risks and assumptions. Overall, for Rajasthan these risks to sustainability were found to be relatively high as the mean rating is '***moderately unlikely***' which means there are significant risks that affect sustainability of the project impacts. However, for individual watersheds varied in their rating with respect to these risks.
- The financial risks to sustainability varied in terms of financial support, type of interventions, role played by implementing agency, etc. In case of Tamil Nadu, the situation appears to be better with the overall rating being 'likely' indicating the presence of negligible risks only to sustainability and to impact realization. However, individual watershed did differ in terms of financial risks to sustainability. The VWC is active and well placed to ensure sustained maintenance of the assets created. Overall, the financial risks do not seem to be severe or significant with the overall project receiving a rating of '***moderately likely***'.
- Socio-political risks to sustainability have been observed to be negligible with a rating of '***likely***' for the watersheds in Rajasthan as a whole. Sustainability and impacts realization were found to be '***moderately likely***' in five watersheds and 'likely' in four in Tamil Nadu with an overall rating of '***likely***' indicating negligible risks to sustainability. There weren't any legal issues; care was taken while selecting the sites for erecting structures and farmers were largely convinced about the long-term benefits. The project as a whole also obtained a rating of 'likely'.
- In terms of institutional framework and governance risk factors, sustainability and progress towards impacts realization is '***moderately unlikely***' in Rajasthan and 'likely' in Tamil Nadu. This underscores the need for better addressing these risks in Rajasthan. The project as a whole was '***moderately likely***' lead to sustainability and to realizing impacts with respect to governance risks.
- Most of the NRM structures put in place are currently in a healthy state and also there were almost no incidents of them being damaged due to heavy rainfall, etc. in a majority of watersheds in Rajasthan. Also, farmers didn't perceive that the structures needed frequent attention for repair and maintenance. All of these factors together resulted in negligible environmental risks to sustainability and led to a rating of '***moderately likely***' with respect to sustainability of impacts vis-à-vis environmental risks. The situation in Tamil Nadu was also not much different. In fact, it was found to be somewhat better with five watershed scoring '***moderately likely***' and four 'likely'. Thus, environmental risks to sustainability were relatively low in the project as reflected in the overall rating of '***moderately likely***'.
- The final rating considering all the four dimensions of risk to sustainability was 'moderately unlikely' for Rajasthan though the ratings were better for three out of the four dimensions as all the four dimensions of risks were considered critical for arriving at the final rating. Also, except for two watersheds, the ratings were based on

the information available in the project reports shared with the evaluation team and were not validated with field study. In case of Tamil Nadu, the overall rating for the nine watersheds was 'likely'. The project as a whole however scored a rating of '***moderately likely***' based on the four dimensions of risks to sustainability and impact realization.

- Regarding farmers' perception on sustainability and impacts, findings showed that sustainability was found to be relatively low for 'increased area under tank irrigation' and high for 'environment became greener'. Again, most of the scores indicated relatively higher sustainability.
- The preparatory process of the project consisted of consultations with various stakeholders including the research and development organizations and capacity building of both the EE and the community. The project was processed by MoEFCC and NIE and the project area was also approved by the State Level Nodal Agency of respective states and thus ensured national and state level ownership.
- The project followed the major domestic environmental law/policies / rules like National Forest Policy, The Environment (Protection) Act and Rules and the Forest (Conservation) Act and Rules, state-specific Panchayat Raj and Gram Swaraj Act (local governance); land tenancy laws and other administrative orders of the Subnational Government. It offered opportunities for promoting land and soil conservation, improved the environmental conditions of the locality, negating the potential to cause environmental or social harm.
- The budget of project measures sanctioned was credited by NABARD directly to the bank account of VWC jointly operated by EE and VWC. All payments for project implementation were made with due endorsement by the VWC. During the execution of the project, the EEs were closely monitored by the Programme Management Unit (PMU) of NABARD (a field level unit), located at Madurai (Tamil Nadu) and Udaipur (Rajasthan).
- The NABARD through PMUs monitored the project on a quarterly basis through their PMUs in Udaipur and Madurai. There was a three-tier project monitoring and supervision structure, i.e., at the VWC level, the project was reviewed monthly basis and reported to the Gram Sabha on a quarterly basis; at PMU level, the output of the project was monitored and supervised at quarterly basis; and at PSC level, with high level technical expertise was monitored and supervised the project direction, outcome of the intervention and critical gaps. From time to time, steering committee members also reviewed the project's progress.
- In Rajasthan, the duration of the project ranged between 3 to 6 years under different watersheds. The start date and year of the project also varied in different watersheds. Although, the completion date of the project was the same for all the watersheds, about 50% of the watersheds did not complete the task in stipulated time and went beyond the planned completion date due to delayed fund disbursement. Although in one watershed, the reason for delaying was poor community response and delay in project instalment (Dhuvala watershed, Bhilwara).

- The contribution of project achievement of AF goal was '*Satisfactory*' and to AF Objective '*Highly satisfactory*' whereas contribution to the AF Impact varied from watershed to watershed based on the interventions with overall rating being ' ***satisfactory***'.
- The overall rating of M&E based on the overall quality of the four dimensions namely, (a) M&E design, implementation & budgeting, (b) indicators (c) Project baselines and (d) Alignment of Project M&E Frameworks to National M&E Frameworks for all 19 watersheds was '***satisfactory***'.

8.2. Lessons Learned

- Participation of community and farmers, the primary stakeholders of the project along with those concerned with agricultural research and development in the respective locations largely ensured that interventions were relevant, acceptable, affordable and effective. These consultations were also helpful in identifying and implementing cost-effective adaptation measures. Participation of research organizations in planning processes also played a useful role in identifying appropriate interventions.
- Involvement of local stakeholders at different stages of planning and implementation of the project was a key reason behind the absence of any significant risk to sustainability within the gambit of socio-political dimension.
- Farmers found only "***Moderately satisfactory***" relevance for the interventions related to information sharing through print media (books, pamphlets, etc.). As most of the farmers are not highly educated, especially in Rajasthan, such findings were not surprising.
- There were visible gains in terms of yield and income growth as well as resilience enhancement but these gains could not be attributed to the 'climate proofing' phase alone. Given the timing of commencement of climate proofing phase, these can be may be somewhat overestimates. Difficulty in separating the baselines for the initial watershed development phase and the climate proofing phase was also observed.
- Diversification of cropping pattern towards fruit, vegetable and tree crops helped enhance farm incomes on one hand and contributed to carbon sequestration on the other. These interventions also helped enhance nutritional security at household level and led to improved cash flows and to woman empowerment.
- In Tamil Nadu, relatively higher number of interventions received '***Highly satisfactory***' which includes installation of biogas plants, digging farm ponds, efficient irrigation methods such as pitcher irrigation and field bunds whose role in more efficient use of water resources is well acknowledged.
- Some of the interventions like installation of Automatic Weather Stations (AWS) and generation of agro-advisories, geo-hydrological study and crop-water budgeting exercises were carried out at a later stage and hence could not be utilized properly as the design and execution part of the hard structures was already completed in 'normal' watershed development phase leaving little scope to work on them keeping in view the implications of climate change.

- Close monitoring of the project helped in achieving most of targets set at the beginning of the project and also enabled adaptive adjustments or additions to the project portfolio as reflected in 'newer' interventions being implemented. However, it is important that M& system continues to track the outcomes achieved and see whether they are leading to the intended impacts which will be useful for planning and implementation of new AF projects.
- The project over ran the time lines in some watersheds because of various reasons such as delay in initial release of funds, disruptions owing to COVID19 pandemic, poor community response. Non-availability of labour and increase in BSR rates were other obstacles responsible for the delay in completing the project on time.
- Lack of technical capacity among the community is a common factor across watersheds that is seen as a risk factor. Even the EEs, in a few cases, did not formulate or define guidelines as to how the process of mobilizing or using the resources needed for repair and maintenance of the structure in most of the watersheds in Rajasthan.
- Uncertainties of climate change impacts is another risk factor that can affect the sustainability and realization of impacts intended. However, best possible efforts were made by EE and NIE to bring together the information on climate change and its possible impacts on crop yields.
- It was found difficult to attribute the outcomes to the AF project alone as most of the watershed structures were created during the preceding phase of the project which themselves would take time to be reflected in visible outcomes. The outcomes/ impacts observed are likely to be cumulative effects of watershed development and climate proofing phases.
- EEs need to be trained or supplement their capacities in database creation and management. This need was evident different EEs mentioned different units of measurement for same interventions that makes comparisons difficult and summing the achievements across watersheds which is required for Terminal Evaluation. Creation of harmonized databases across watershed would come handy even for NIE for monitoring and reporting.

8.3. Recommendations

- The interventions like installation of Automatic Weather Stations (AWS) and generation of agro-advisories, geo-hydrological study and crop-water budgeting exercises needs to be done at the beginning of the AF project to make it fully utilizable. This was not possible in this case as the AF project is a kind of continuation of the 'normal' watershed development project. It may be considered by NIE and AF to include the climate proofing component in all the future watershed development projects so that the benefits of resource budgeting exercises can be fully utilized. Such an integration of climate proofing elements with normal watershed development component would facilitate better planning and implementation of project interventions.

- The delaying/extension of the project needs to be avoided by disbursing the fund or releasing the fund in time. The project budgets need to be flexible for accommodating any rise in implementation costs so that the delays can be avoided.
- A few interventions related to information sharing through print media (books, pamphlets, etc.) were not found to be effective because most of the farmers, especially in Rajasthan, are not highly educated. Hence knowledge and information sharing through audio-visual, print media with more pictorial illustrations, better texts in local language, etc. should be explored. This is important because enhancing knowledge, information and ability to understand the complex climate change related issues is an important element of adaptive capacity and is an initial step towards adaptation implementation which is nothing but a manifestation of adaptive capacity.
- More innovative means of mobilizing financial resources that can be utilized during the post-project period are to be explored. These can take the form of some incentives in addition to the seed money within project budget allocation, or when the potential benefits are substantial, local governments can be encouraged or convinced to incentivize such initiatives. NIE and EEs may initiate steps for advocating for necessary policy changes at state and local government levels. For example, policy advocacy may be made for including the repair and maintenance of conservation measures in list of permissible works under MGNREGA. Similarly, financial provisions may be extended to the PRI in the villages where the conservation measures are being well taken care of and where the institutions created are functioning effectively.
- Continued adoption of technologies is critical to enhance resilience which requires that the necessary support systems are in place. An analysis of identification of critical requirements for continued adoption of important adaptation technologies may be attempted in this regard.
- The proportion of project management/ execution cost payable to the EE may be raised considering the remoteness of the project locations and the difficulty to attract quality manpower with necessary skills and capabilities to work in such areas and difficulties in arranging necessary logistics. Such projects require more than routine levels of commitment and passion which deserve incentives in terms of better salaries and other amenities.
- There are a few success stories in some watersheds (e.g. biogas plants in Tamil Nadu which have led to multiple benefits). Efforts may be made to popularize such models by highlighting the factors that led to success and also by highlighting how the constraints, if any, were overcome in the process.
- Though the horizontal spread of technologies was not much evident, there was some awareness built among the surrounding villages about what was being done in the project locations and the benefits thereof which can be a useful starting point for scaling out adaptation technologies. Possibilities to include such adaptation technologies in the ongoing development programmes of the government and non-government agencies may be explored as the likelihood of relevance of successful interventions is relatively better.

- A few sites where the benefits of interventions are more visible may be identified and used for exposure visits by farmers from other villages and regions. Similarly, a few farmers that benefitted substantially from the project interventions may be identified and trained to act as agents of change considering the effectiveness of farmer-to-farmer extension in adoption and diffusion of technologies.

Annexure 1

Project/ Programme time table – sub-project (watershed)-wise

A. Rajasthan

II.	Project Timetable	Balua	Chainpuria	Dhuvala	Jhabla	Khad	Malvi	Mandli	Nayagaon-1	Nayagaon-II	Vagda
1.	Start of project										
	Expected Date	March 2016									
	Actual Date	April 01, 2018	June 06,2016	March 16, 2016	April 18, 2016	January 22, 2016	April 18, 2016	April 18, 2016	April 01, 2018	April 01, 2018	August 22, 2016
2.	Mid-term Review	Not planned									
	Expected Date	Not applicable									
	Actual Date	Not applicable									
3.	Project closing										
	Expected Date	March 2019	September 2019	September 2019	Sept 2019	September 2019	September 2019	September 2019	September 2019	September 2019	September 2019
	Actual Date	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021	March 31, 2021
4.	Final Evaluation										
	Expected Date										
	Actual Date	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023	Jan-Jul 2023

B. Tamil Nadu

I I	Project Timetable	Anjukulipatty	Ayampallayam	Bettamugilalam	Chinnapoolampatti	Chithalai	Peikulam	Salivaram	Sriramppuram	Thally Kothanur
1	Start of project									
	Expected Date	March 2016								
	Actual Date	2016	February 26, 2016	February 10, 2016	September, 2016	September, 2016	September, 2016	February 10, 2016	February, 2016	February 10, 2016
2	Mid-term Review	Not planned								
	Expected Date	Not applicable								
	Actual Date	Not applicable								
3	Project closing									
	Expected Date	September2019	March 2019	September 2019	September 2019	September 2019	September2019	September2019	September 2019	September2019
	Actual Date	March 2021	March, 2021	December 31, 2020	March, 2021	March, 2021	March, 2021	March 31, 2021	March, 2021	March 31, 2021
4.	Final Evaluation									
	Expected Date									
	Actual Date	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023	Jan-Jul2023

Annexure 2

Project/ Programme Components and Financing – sub-project (watershed)-wise

A. Rajasthan

Project Components and Financing	Balua	Chainpuria	Dhuvala	Jhabla	Khad	Malvi	Mandli	Nayagaon-1	Nayagaon-II	Vagda
Amount Financing Requested	40,18,998	32,85,914	35,17,862	40,08,616	40,29,370	35,88,180	43,61,600	39,06,414	34,13,237	34,76,323
Approved	40,18,998	32,85,914	35,17,862	40,08,616	40,29,370	35,88,180	43,61,600	39,06,414	34,13,237	34,76,323
Actual	38,41,064	32,85,914	28,68,700	34,98,310	40,29,370	24,19,065	44,02,185	37,62,070	32,40,674	34,76,323

B. Tamil Nadu

Project Components and Financing	Anjukulipatty	Ayampallayam	Bettamugulalam	Chinnapoolampatti	Chittalai	Peikulam	Salivaram	Srirampuram	Thally Kothanur
Amount Financing Requested	37,59,450	46,67,900	31,91,812	32,85,775	40,78,100	26,59,271	38,84,991	37,80,975	38,43,656
Approved	37,59,450	46,67,900	31,91,812	32,85,775	40,78,100	26,59,271	38,84,991	37,80,975	38,43,656
Actual	37,59,450	46,67,900	31,91,812	32,85,775	40,78,100	26,63,100	38,84,991	37,80,975	38,43,641

Annexure 3

Descriptive statistics of sample households

Education level of respondents in the project villages in Rajasthan and Tamil Nadu

SNo	Particulars	Rajasthan		Tamil Nadu		Total	
		number	%	number	%	number	%
1	Illiterate	18	26.09	8	14.81	26	21.14
2	Primary (1-5th)	24	34.78	16	29.63	40	32.52
3	Higher Primary (6 – 9th)	15	21.74	8	14.81	23	18.70
4	Secondary (10th)	9	13.04	17	31.48	26	21.14
5	Higher Secondary (12th)	3	4.35	3	5.56	6	4.88
6	Degree and above	0	0.00	2	3.70	2	1.63
7	Total	69	100.00	54	100.00	123	100.00

Social Category of the respondents in the project villages in Rajasthan and Tamil Nadu

SNo	Particulars	Rajasthan		Tamil Nadu		Total	
		number	%	number	%	Number	%
1	SC/ST	60	86.96	5	9.26	65	52.85
2	Other Categories	9	13.04	49	90.74	58	47.15
Total		69	100.00	54	100.00	123	100.00

Family composition of the respondents in the project villages in Rajasthan and Tamil Nadu

SNo	Particulars	Rajasthan		Tamil Nadu		Total	
		number	%	number	%	number	%
1	Male	2.32 (1.08)	42.11	3.10 (1.97)	36.47	2.71 (1.16)	38.66
2	Female	1.83 (0.91)	33.21	3.00 (2.21)	35.29	2.42 (0.93)	34.52
3	Children	1.36 (1.10)	24.68	2.40 (1.07)	28.24	1.88 (1.32)	26.82
	Total	5.51 (2.19)	100.00	8.50 (3.03)	100.00	7.01 (2.33)	100.00

Average farm size of respondents in the project villages in Rajasthan and Tamil Nadu (ha)

State	Rainfed	Irrigated	Total
Rajasthan	0.70 (1.38)	1.23 (2.41)	1.94 (2.34)
Tamil Nadu	0.20 (1.12)	1.03 (2.72)	1.24 (2.58)
Overall	0.47 (1.41)	1.14 (2.55)	1.60 (2.59)

Figures in parentheses are standard deviations

Credit Sources of the respondents (₹/Year/HH)

Purpose	Informal Sources			Formal Sources		
	Before	After	Percent Change	Before	After	Percent Change
Rajasthan						
Consumption	2130	884	-58.50	145	804	455.00
Production - Short term	1014	319	-68.54	275	1594	478.95
Production - Term loan	580	942	62.41	6652	13362	100.87
Tamil Nadu						
Production - Short term	0	1852		12963	21296	64.28
Production - Term loan	926	0	-100.00	648	1389	114.35
Term Loans	1111	1852	66.70	19907	36759	84.65

Annexure 4

Some success stories

Mandli watershed, Udaipur district, Rajasthan

Success story: Transforming agricultural prosperity through innovation in bore well recharge - Mr. Hurji's success story

Site Location Latitude 24°13'26.19"N and Longitude 73°48'46.89"E

Introduction: Groundwater, the world's largest accessible source of freshwater, plays a pivotal role in ensuring global food security. In India, where 80% of the population relies on groundwater for various needs, addressing the challenges of groundwater depletion and low borewell yields is of paramount importance. This case study highlights the remarkable success story of Mr. Hurji, a farmer from the village of Mokat, whose life took a transformative turn thanks to the pioneering efforts of *Gayatri Seva Sansthan* (GSS).

The Challenge: Mr. Hurji, a Below Poverty Line farmer, depended on agriculture for his livelihood. However, he had been facing the daunting challenge of low borewell yields, which significantly affected his agricultural productivity and income. With the livelihoods of millions of small and marginal farmers like Mr. Hurji at stake, finding an innovative and cost-effective solution was imperative.

The GSS Approach: GSS recognized the critical role of groundwater in agriculture and embarked on a mission to address the issue of low bore well yields. GSS in association with Bore Charger, an Indian start-up, introduced a ground breaking approach known as the "Bore Charger" technique. This innovative method involved using a bore well scanning camera system to conduct a comprehensive hydro-geological investigation and lithological mapping. By analyzing primary field observations and existing data on geology and groundwater hydrogeology, GSS observed the groundwater aquifer systems.

The Bore Charger Technique: The heart of the innovation lay in the Bore Charger tool, which made precise perforations to the impervious bore well casing from within, at an appropriate depth. This breakthrough technique allowed water from the upper aquifer to enter the bore well, effectively injecting the deep aquifer layers with fresh water during and after the monsoon seasons. The results were transformative, with significant improvements observed in groundwater quantity and quality.

Innovative Bore charger technique for bore well recharge

Key Benefits and outcomes:

1. **Rapid Yield Improvement:** The Bore Charger technique rapidly revived Mr. Hurji's previously failing borewell, increasing its yield considerably.
2. **Cost-Effective Solution:** Traditional methods were costly and often required excavation. In contrast, the in-situ puncturing of the borewell casing reduced costs and saved time.
3. **Improved Water Quality:** Deeper puncturing ensured that only naturally filtered water entered the borewell, enhancing water quality.
4. **Long-Term Water Supply:** The technique ensured continuous water supply throughout non-rainy seasons, recharging the confined aquifers and providing more extended access to groundwater.

Transformation in Mr. Hurji's Life: The implementation of the Bore Charger technique at Mr. Hurji's farm was like a game-changer for him. His agricultural yields increased substantially, resulting in higher income and improved livelihood. With a reliable and sustainable source of water, he could now focus on crop diversification and achieve greater food security for his family.

Conclusion: GSS' innovative Bore Charger technique not only revitalized Mr. Hurji's farm but also served as a beacon of hope for countless farmers facing similar challenges. By harnessing the potential of groundwater in an environmentally friendly and cost-effective manner, GSS helped farmers progress towards ensuring water security, agricultural prosperity, and the well-being of rural communities. This success story underscores the importance of innovation and community engagement in addressing critical water management issues worldwide.

Bore Charger technique implemented at Mr. Hurji's farm

Success story: Transforming Agricultural Well Infrastructure - Shankar's Success Story

Site Location Latitude 24°11'51.49"N and Longitude 73°49'7.64"E

Introduction: Agricultural well infrastructure plays a crucial role in ensuring water access and security for farmers. This case study highlights the remarkable transformation brought about by GSSin the life of Mr. Shankar, a farmer whose open well was in urgent need of renovation.

The Challenge: Mr. Shankar, the son of Prem Ji Meena, had been grappling with a challenging situation. His open well lacked proper protection, leading to soil and debris entering the well, contaminating the water source and making it unsafe for agricultural use. This situation posed a significant obstacle to his agricultural activities and overall livelihood.

The GSS Approach: Recognizing the importance of safe and sustainable water sources for agricultural communities, GSS took on the mission of renovating Mr. Shankar's open well. The primary objective was to provide a secure and efficient water source that would enable him to continue his agricultural activities without hindrance.

The Renovation Process: GSS embarked on a comprehensive renovation process that included the following key steps:

1. **Assessment and Planning**: GSS experts assessed the condition of the open well and devised a renovation plan tailored to Mr. Shankar's specific needs.

2. **Construction of Stone Masonry Wall:** The renovation project involved the construction of a stone masonry wall around the well. This protective wall prevented soil, debris, and contaminants from entering the well, ensuring the safety and cleanliness of the water source. Recharge drainage is also constructed.

3. **Infrastructure Improvement:** In addition to the protective wall, GSS made necessary improvements to the well infrastructure, ensuring its efficiency and longevity.

Key Benefits and Outcomes:

1. **Safe Water Source:** The construction of the stone masonry wall effectively safeguarded the well from external contaminants, providing Mr. Shankar with a safe and reliable water source for his agricultural needs.

2. **Enhanced Agricultural Productivity:** With a secure well, Mr. Shankar was able to significantly improve his agricultural productivity. He could now irrigate his crops without worrying about water quality issues.

3. **Sustainable Livelihood:** The renovated well contributed to a sustainable livelihood for Mr. Shankar and his family, ensuring their continued access to water for farming and domestic use.

Transformation in Mr. Shankar's Life: The renovation of Mr. Shankar's open well was a transformative moment in his life. He no longer had to contend with the challenges posed by a contaminated water source. Instead, he could focus on his agricultural activities with confidence, leading to increased crop yields and improved economic well-being for his family.

Conclusion: GSS' dedication to improving water infrastructure had a profound impact on Mr. Shankar's life. By renovating his open well and providing him with a safe and reliable water source, GSS not only enhanced his agricultural productivity but also contributed to his overall well-being and the prosperity of his family. This success story exemplifies the importance of investing in water infrastructure to empower farmers and uplift rural communities.

Open well renovated at Mr. Shankar's farm

Chainpuria Watershed, Chittorgarh district, Rajasthan

This story is related to the progressive farmer, Mr. Nathu Singh, son of Mr. Nathu Singh. He was following the conventional farming system growing soybean and maize crops, and ws earning about Rs. 20,000 to Rs. 25,000 per annum. Later, he met the Watershed Development Committee, Chainpuria, under the AFB project who suggested him to adopt Trellis method of cultivating vegetables. During November 2017, he received 80 poles and wires for making the trellis. He installed polls 10 x 10 feet apart and connected them with wires to form the trellis structure. Later, Mr. Nathu Singh grew vegetables such as cluster bean, ladies finger (*bhendi*), chilly, etc. under the trellis, and vegetables such as ridged gourd, bitter gourd, bottle gourd, etc. were grown on wire-net in the trellis structure. By doing so, his income increased to about Rs. 60,000 - Rs. 70,000 per annum. Now he is considered a progressive farmer, and his economic condition has improved a lot as compared to the previous condition. He is

Vegetables cultivation in Trellis method

“I am Geeta, the wife of Prabhu Lal, and I reside in Chainpuria Village. I got the information on roof rainwater harvesting techniques from the AFB during the Watershed Development Committee meeting. I was planning to construct one rainwater storage tank. Later, I contacted WDC and WASCO. At that time, the AFB project was going on in the village. With the support of the AFB project, one rainwater storage tank was constructed at my home. Earlier, I was facing a water shortage problem at my home. Now, during the rain, my rainwater storage tank is full of rainwater. And this stored water is used for drinking and other domestic purposes. Earlier, for drinking purposes, I generally needed to go to hand pump and tube wells. Now I have collected the rain into a rainwater storage tank for drinking and other domestic purposes. Moreover, the rainwater does not contain fluoride, which is better for health. The stored rainwater is available and has lasted for 6-7 months. If rainwater is not available, the rainwater storage tank will be filled with the supplied water. Overall, due to this intervention, there was a reduction in cost, time, and labour”.

Roof rainwater storage tank constructed with the support of AFB project.

Catch pits to enhance water availability in the rainfed farms at Anjukulipatty watershed, Dindigul district, Tamil Nadu

Shri.K.BalaChandran AGM NABARD Dindigul monitoring the catchpits during his field monitoring visit

Under AF project, 200 catchpits were constructed in rainfed farms at Anjukulipatty watershed. It occupied a small piece of land. The catch pits were constructed at the end of the slope to collect maximum runoff water. The catchpit also serves as a drinking water source for the cattle during grazing.

Shri. R.Vanaraj is the farmer having rainfed area with 150 mango trees. The EE constructed field bunds and catch pits in his field (survey no is 972). After the formation of catchpits, the yield of the mango tree increased up to 40%.. With the enhanced income, he managed his children's college fees and they have completed BSW and are now working in a commuinty based organization.Thus, the AFB climate proofing interventions helped improve the socio-economic status of Mr.Vanaraj.


Advantages:

- The catch pit acts like a tiny farm pond in the field.
- The harvested rain water helps the trees for increased yield.
- The animals drink the water when they are thirsty while grazing..
- They act as a landscape.

Catchpits constructed at Anjukulipatty watershed (S.No :999: Palanisamy)

Well recharge pits to enhance water availability in the open wells at Anjukulipatty watershed, Dindigul district, Tamil Nadu

Under AF project, 107 well recharge pits were constructed in rainfed farms at Anjukulipatty watershed. A well recharge pit allows the rainwater to replenish groundwater by recharging the underground aquifers. It can be built to recharge a defunct open well or just to help the water infiltration in an area.




Well recharge pits to enhance water availability in open wells

A well recharge pit can be nearly invisible when finished. As it is filled of stones, it doesn't present any danger (contrary to an open well for example). The water percolates slowly because there is no hydrostatic pressure in the pit. The AF project supported formation of such well recharge pits with specifications given below:

- The site should have a sufficiently clean and large catchment.
- Location should be such that it permits fast infiltration and percolation
- If the pit aims to recharge a defunct well, it should be built as close to it as possible
- Ideally it should be in the valley of the surface layout

Site selection for infiltration: Many factors affect the suitability of a site as an infiltration facility for the disposal of recharge pit. Among these, the following are most important: Depth to groundwater, Surface and underlying soil type.

After the construction of well recharge pits, the farmers are able to collect the water from open defunct wells. The unutilized defunct wells were brought under utilization after 17 years

by these interventions in the project area. Farmers started cultivation in the barren land. About 47 ha area was brought under cultivation through this intervention.

Shri Sukandhiran is a 68 years old farmer in the project location. He had shifted his home from field to main village due to non-availability of water in the well. There was no adequate water for drinking and for animals. His life support was two milch animals. So he shifted to his ancestor's old house in the village. In this situation, under AF project, a field bund was constructed in his field. After one year, a well recharge pit was also constructed near to his defunct well. The defunct open well got recharged in the following rainy season. Now he started agriculture practices in the same field. He shifted back to his farm with his animal and he regained his lost paradise. At present, he is very thankful to nature and to NABARD.

Fodder development for Climate Resilient Farming System at Anjukulipatty watershed

Climate resilient farming system

Fodder development in the field of Smt.Sumati and VairaGoun

Fodder Development was carried out in 270 Cents. Napier grass is one of the important perennial tropical forage crops belong to family Poaceae. It is also called Uganda grass or elephant grass. It is native to Africa but is now grown in many tropical countries. It is a C4 plant and can grow well in marginal land. The grass grows tall and forms large clumps like bamboo. It grows well up in Anjukulipatty watershed area. The main mode of propagation is by stem cuttings. The cuttings with five internodes are planted by inserting into furrows at 75 cm apart, both along and between the rows .The project provided the farmers with these stem cuttings and guided them in raising a copious fodder crop.

Mr Vaira Goun's (above) and Ms. Sumathi's (below) fodder farms

To obtain satisfactory results, this grass should not be fed alone but only with legumes, concentrate or oil cakes. It contains 8-12% crude protein and 26-28% crude fiber. The total digestible nutrient ranges from 55-58%.Mainly used as fodder crop. Generally, it is fed directly to cattle or made into silage or hay. It produces huge biomass and can be harvested multiple times in a year. Through this fodder development intervention, the cow population doubled in the village after one year period. The fodder development enabled farmers for taking up animal husbandry. Women farmers and elderly farmers found it more attractive and were very comfortable to manage additional cows. The quality of the milk also was improved and fetched better market price for milk. The quantity of the milk also increased up to 7% to 13%. Smt. Sumathi is a woman farmer in the Anjukulipatty village and she is having 1.75 acres of land with water source. We asked her to go for fodder cultivation initially, after initial reluctance, she agreed after the benefits were explained by the project team. She cultivated in 10 cents and was able to realize the benefits such as reduction in labor and hardship. She had applied for loan and purchased 3 more cows and maintaining them well. She had extended the fodder cultivation area to 50 cents. Her children are having good

education. She is economically comfortable now. Her relative Smt. Vellaiammal also was motivated by her development and started cultivating fodder profitably.

Project sites where significant difference was made:

1. **Shift from paddy to other crops (Millets, pulses, vegetables, floriculture and tree crops) – Shift in 250 ha which is equivalent 22% of the Project area (1150 Ha)**

Paddy is a crop which is highly water demanding. On an average, paddy requires around 10 mm of water per day. This is too large a quantity of water especially in areas where the average rainfall is less than 1000 mm. Continued cultivation of paddy in such areas, will potentially deplete water table considerably, especially in the watershed area, where the water availability is limited. Therefore, it was felt necessary pertinent that farmers shift from high water demanding crop of paddy to less water demanding crops of non-paddy for sustainable crop production in the long run. Accordingly, through support of this project, farmers were encouraged to cultivate millets, vegetables, floriculture (jasmine flowers) and tree crops with further support through drip irrigation and sprinkler irrigation (micro sprinklers). This comprehensive support to farmers enabled them to switch to alternatives and they gladly adopted non-paddy crops for cultivation.

The efforts led to farmers in Chithalai watershed shifting from paddy to non-paddy crops like millets, pulses, vegetables, floriculture and tree crops. This shift happened in around 250 hectares. This is equivalent to 22% of the total watershed area. All these crops require less than 800 mm of water. Shifting of cultivation to crops other than paddy means saving of around 400 mm of water over an area of 250 Ha. This is approximately equal to saving of more than 10,000 m^3 of water. This is a huge saving, which has not been removed from the subsoil.

Secondly it is also true that cultivating non- paddy crops like millets, pulses, vegetables, floriculture and tree crops has also enhanced bio-diversity in the area and we could see a multiple crops being grown in a large area. This will also help in adaptation to climate change as farmers will not have to depend on high water intensive paddy anymore for their regular income. Cultivation of millets, pulses and vegetables will also help in food and nutrition security in the watershed area as in many cases in rural areas, a part of the millets and pulses are retained for household consumption. This helps in improving the nutrition status at the household level. Thus, in Chithalai watershed area, multiple objectives have been met, in not only conserving water, but also increasing bio-diversity and food and nutrition security.

Pulses cultivation by Mrs. Jeyakodi, Urappanur village, Survey No. 192

Mrs. Jeyakodi was able to cultivate pulses in an area where previously she had been cultivating paddy. This has provided her with high yield of pulses of black gram and cowpea. Accordingly, she was able to retain a part of the pulses of black gram and cowpea for household consumption.

Millet cultivation by Sekhar – Punganкulam, Survey No. 83.

Mango plantation of Thennarasu, Survey No, 205, Melaurappanur

In the photo below, the farmer Mr. Thennarasu had planted mango trees in a field where he previously cultivated paddy. This has reduced water demand for the land as mango requires less water and management attention compared to paddy. Moreover, he uses the land space available between the trees as a grazing land for his cattle.

Shifting from paddy to millets by Ponnamangalam – Jeyaraj

2. **Shift from complete free grazing to partial grazing – leading to reduction in the grazing load on grazing land thereby reducing the rate of degradation of common lands and increases in fodder availability, livestock population, milk production and organic manure availability, etc.**

Another notable shift in the watershed area is that the project had encouraged farmers to go in for fodder cultivation in their own land. Some farmers have begun cultivating fodder in a portion of their land where previously they were growing paddy, while other farmers began cultivating fodder in fallow lands. Fodder is an important component in any livestock unit for the sustainability of the livestock unit. The importance of fodder comes into focus during drought period. Inadequate availability of fodder force farmers to sell livestock, often at the less than competitive prices, and thus adversely affect their livelihoods. In order to mitigate this situation, the project envisaged establishment of fodder development with 105 units at a unit cost of Rs. 4200. Due to this activity, fodder availability increased in the project area. Fodder crops including Co4, CoFS 29, Subabool, Sesbania etc were raised to augment fodder availability in the project area. They were raised mostly under irrigated conditions. Fodder availability increased among those who have raised these crops and as a result of this, the number of livestock has increased in the project area. This has led to increase in assets among farmers and a sustained source for income for farmers. Due to increased number of livestock units, the potential for availability of organic manures has also increased. This also is expected to contribute to the increase in soil organic matter in crop lands.

Fodder crop, Hybrid napier and CoFS 29 by Kaatu raja – Ponnamangalam Pudur – Survey No. 97

This has led to a situation wherein grazing pressure was reduced on common land because a portion of fodder requirement is being met by cultivation of fodder in farmer's own land. Moreover, cultivation of fodder has also led to provision of assured quantity of fodder for cattle of appropriate nutrition leading increase in productivity of cattle and increase in milk yield by around 15 – 20%.

2. **Farmers who were benefited from the project interventions significantly: Given below are success story of 2 farmers who have benefited greatly from the implementation of AFB project. Though many farmers were benefited, the success story of just 2 of the farmers are presented here.**

Farmer 1. Chandrasekharan. Melaurappanur, Urappanur Po, 625706, Tamil Nadu. Mr.

Chandrasekharan, has implemented the Integrated Farming System in his farm. This is an excellent concept wherein there are a number of components in the farm. The components include crop cultivation, livestock raising, poultry, biogas, fodder raising, fisheries etc. The components are all well integrated in the sense that the output of one component becomes the input of another component. The output from crop production, especially crop residues, are used as dry fodder for cattle, while cattle dung is used to produce biogas (methane) through the biogas digester. The entire needs of the household are met by using the biogas. Since Mr. Chandrasekhar has around 10 cows, the amount of cattle dung available is quite substantial and more than enough is available for generating biogas for his kitchen. He also sells milk on a daily basis for a dairy unit and earns a decent income from the sale of milk. The digested cattle dung which is available in the form of a slurry, is used as an excellent manure for cultivation of green fodder. The slurry is mixed with irrigation water and the fodder plot is irrigated with the digested slurry. This is an excellent organic manure and the green fodder that is produced in the field is again used as fodder for cattle, thus repeating the cycle. Slurry is also used for cultivating crops, like pulses, millets, horticulture crops etc. This brings further income to the farm.

Livestock and Biogas units of Mr. Chandrasekhar

Farm pond and fish culture Chandrasekhar

Fodder cultivation by Mr.

Poultry Unit of Mr. Chandrasekhar

Kaatu Raja, Ponnamangalam Pudur, Tirumangalam Tk, Tamail Nadu

Biogas unit

Farm Pond and fisheries

Green Manure crop

Fodder crop

Livestock raised by Mr. Kaatu Raaja

Poultry (Turkey) and Tree planting within Kaatu Raaja's farm

Annexure 5

Achievement of physical and financial targets

(a) Achievement of physical targets in different watersheds of AF project in Rajasthan (%)

Watershed	Outcome	<50 %	50-75%	75-100 %	>100%	No Target & No Achievement	No Target but Achievement	Targeted but Not Achieved	Total
Balua	Climate Resilient Farming system	1		15	4				20
	Knowledge base		1	4	1				6
	Risk mitigation measures			2				1	3
	Soil & water regime			1	1				2
	Total	**1**	**1**	**22**	**6**			**1**	**31**
Chainpuria	Climate Resilient Farming system		1	9	1	1			12
	Knowledge base			4	1				5
	Risk mitigation measures			1	1				2
	Soil & water regime			1					1
	Total		**1**	**15**	**3**	**1**			**20**
Dhuvala	Climate Resilient Farming system	1	1	8	3			1	14
	Knowledge base		1	4	1				6
	Risk mitigation measures			1	1				2
	Soil & water regime			1					1
	Total	**1**	**2**	**14**	**5**			**1**	**23**
Jhabla	Climate Resilient Farming system					8	6		14
	Knowledge base					3	2		5
	Risk mitigation measures					2	1		3
	Soil & water regime						1		1
	Total					**13**	**10**		**23**
Khad	Climate Resilient Farming system		3	9	5		2	1	20
	Knowledge base			4	1				5
	Risk mitigation measures			2				1	3
	Soil & water regime			2	1				3
	Total		**3**	**17**	**7**		**2**	**2**	**31**
Malvi	Climate Resilient Farming system	2	1	9	3			1	16
	Knowledge base			5					5

	Risk mitigation measures			2					2
	Soil & water regime		1						1
	Total	**2**	**2**	**16**	**3**			**1**	**24**
Mandli	Climate Resilient Farming system		1	10	4	2	1		18
	Knowledge base					1	5		6
	Risk mitigation measures			3		1			4
	Soil & water regime			1			1		2
	Total		**1**	**14**	**4**	**4**	**7**		**30**
Nayagaon- I	Climate Resilient Farming system			11	5			5	21
	Knowledge base		1	4	1			2	8
	Risk mitigation measures			2				1	3
	Soil & water regime			2					2
	Total		**1**	**19**	**6**			**8**	**34**
Nayagaon- II	Climate Resilient Farming system			17	3			1	21
	Knowledge base		1	5	2				8
	Risk mitigation measures			2					2
	Soil & water regime			2					2
	Total		**1**	**26**	**5**			**1**	**33**
Vagda	Climate Resilient Farming system	2	3	2	7		2	2	18
	Knowledge base	1		2	2		2		7
	Risk mitigation measures			1	1				2
	Soil & water regime	1		1					2
	Total	**4**	**3**	**6**	**10**		**4**	**2**	**29**
Rajasthan	**Climate Resilient Farming system**	**6**	**10**	**90**	**35**	**11**	**11**	**11**	**174**
	Knowledge base	**1**	**4**	**32**	**9**	**4**	**9**	**2**	**61**
	Risk mitigation measures	**0**	**0**	**16**	**3**	**3**	**1**	**3**	**26**
	Soil & water regime	**1**	**1**	**11**	**2**	**0**	**2**	**0**	**17**
	Total	**8**	**15**	**149**	**49**	**18**	**23**	**16**	**278**

(b) Achievement of physical targets in different watersheds of AF project in Tamil Nadu (%)

Watershed	Outcome	<50%	50-75 %	75-100 %	>100%	No Target & No Achievement	No Target but Achievement	Targeted but Not Achieved	Total
Anjukulipatty	Climate Resilient Farming system			7					7
	Knowledge base					1	4		5
	Risk mitigation measures			1		2	1		4
	Soil & water regime			4					4
	Total			**12**		**3**	**5**		**20**
Ayampallayam	Climate Resilient Farming system			8				1	9
	Knowledge base					5			5
	Risk mitigation measures					3		2	5
	Soil & water regime			3					3
	Total			**11**		**8**		**3**	**22**
Bettamugilalam	Climate Resilient Farming system	1		5	1				7
	Knowledge base				1		2		3
	Risk mitigation measures					1	1		2
	Soil & water regime			1					1
	Total	**1**		**6**	**2**	**1**	**3**		**13**
Chinnapoolampatti	Climate Resilient Farming system			12	3				15
	Knowledge base					5			5
	Risk mitigation measures			1		1			2
	Soil & water regime			2	1				3
	Total			**15**	**4**	**6**			**25**
Chittalai	Climate Resilient Farming system			16	3				19
	Knowledge base					6			6
	Risk mitigation measures					2		1	3
	Soil & water regime			3					3
	Total			**19**	**3**	**8**		**1**	**31**
Peikulam	Climate Resilient Farming system			13					13
	Knowledge base					6			6
	Risk mitigation measures			1		1			2

	Soil & water regime			3					3
	Total			**17**		**7**			**24**
Salivaram	Climate Resilient Farming system			5	1				6
	Knowledge base						3		3
	Risk mitigation measures			2			1		3
	Soil & water regime		1						1
	Total		**1**	**7**	**1**		**4**		**13**
Srirampuram	Climate Resilient Farming system			11					11
	Knowledge base					5			5
	Risk mitigation measures					3			3
	Soil & water regime			3					3
	Total			**14**		**8**			**22**
Thallykothanur	Climate Resilient Farming system			5	1				6
	Knowledge base			2		1			3
	Risk mitigation measures		1					1	2
	Soil & water regime			1					1
	Total		**1**	**8**	**1**	**1**		**1**	**12**
Tamil Nadu	Climate Resilient Farming system	1	0	82	9	0	0	1	93
	Knowledge base	0	0	2	1	29	9	0	41
	Risk mitigation measures	0	1	5	0	13	3	4	26
	Soil & water regime	0	1	20	1	0	0	0	22
	Total	**1**	**2**	**109**	**11**	**42**	**12**	**5**	**182**
Rajasthan + Tamil nadu	**Climate Resilient Farming system**	**7**	**10**	**172**	**44**	**11**	**11**	**12**	**267**
	Knowledge base	**1**	**4**	**34**	**10**	**33**	**18**	**2**	**102**
	Risk mitigation measures	**0**	**1**	**21**	**3**	**16**	**4**	**7**	**52**
	Soil & water regime	**1**	**2**	**31**	**3**	**0**	**2**	**0**	**39**
	Total	**9**	**17**	**258**	**60**	**60**	**35**	**21**	**460**

(c) Achievement of financial targets in different watersheds of AF project in Rajasthan (%)

Watershed	Outcome	0-50%	50-75%	75-100%	>100 %	No Target & Achievement	Total
Balua	Climate Resilient Farming system		1	15	4		20
	Knowledge base	2		3	1		6
	Risk mitigation measures	1		2			3
	Soil & water regime			1	1		2
	Total	**3**	**1**	**21**	**6**		**31**
Chainpuria	Climate Resilient Farming system	1		8	3		12
	Knowledge base			4	1		5
	Risk mitigation measures			1	1		2
	Soil & water regime			1			1
	Total	**1**		**14**	**5**		**20**
Dhuvala	Climate Resilient Farming system	2		12			14
	Knowledge base			4	2		6
	Risk mitigation measures			1	1		2
	Soil & water regime			1			1
	Total	**2**		**18**	**3**		**23**
Jhabla	Climate Resilient Farming system	6		8			14
	Knowledge base	3		2			5
	Risk mitigation measures	2		1			3
	Soil & water regime			1			1
	Total	**11**		**12**			**23**
Khad	Climate Resilient Farming system	1		13	5	1	20
	Knowledge base	1		4			5
	Risk mitigation measures	1		2			3
	Soil & water regime			1	2		3
	Total	**3**		**20**	**7**	**1**	**31**
Malvi	Climate Resilient Farming system	2	3	2	9		16
	Knowledge base		2	1	2		5
	Risk mitigation measures	1		1			2
	Soil & water regime			1			1
	Total	**3**	**5**	**5**	**11**		**24**
Mandli	Climate Resilient Farming system			10	8		18
	Knowledge base			6			6
	Risk mitigation measures	1		3			4
	Soil & water regime			1	1		2
	Total	**1**		**20**	**9**		**30**

Nayagaon-I	Climate Resilient Farming system	1		16	4		21
	Knowledge base			8			8
	Risk mitigation measures	1		2			3
	Soil & water regime			2			2
	Total	**2**		**28**	**4**		**34**
Nayagaon-II	Climate Resilient Farming system	1		17	3		21
	Knowledge base			8			8
	Risk mitigation measures			2			2
	Soil & water regime			2			2
	Total	**1**		**29**	**3**		**33**
Vagda	Climate Resilient Farming system	4	4	4	6		18
	Knowledge base	2		2	3		7
	Risk mitigation measures		1	1			2
	Soil & water regime	1		1			2
	Total	**7**	**5**	**8**	**9**		**29**
Rajasthan	**Climate Resilient Farming system**	**18**	**8**	**105**	**42**	**1**	**174**
	Knowledge base	**8**	**2**	**42**	**9**	**0**	**61**
	Risk mitigation measures	**7**	**1**	**16**	**2**	**0**	**26**
	Soil & water regime	**1**	**0**	**12**	**4**	**0**	**17**
	Total	**34**	**11**	**175**	**57**	**1**	**278**

(d) Achievement of financial targets in different watersheds of AF project in Tamil Nadu (%)

Watershed	Outcome	0-50%	50-75%	75-100%	>100 %	No Target & Achievement	Total
Anjukulipatty	Climate Resilient Farming system			7			7
	Knowledge base			5			5
	Risk mitigation measures	1		3			4
	Soil & water regime			4			4
	Total	**1**		**19**			**20**
Ayampallayam	Climate Resilient Farming system			9			9
	Knowledge base			5			5
	Risk mitigation measures			5			5
	Soil & water regime			3			3
	Total			**22**			**22**
Bettamugilalam	Climate Resilient Farming system			6	1		7
	Knowledge base	1		2			3
	Risk mitigation measures	1		1			2
	Soil & water regime			1			1
	Total	**2**		**10**	**1**		**13**
Chinnapoolampatti	Climate Resilient Farming system			15			15
	Knowledge base			5			5
	Risk mitigation measures			2			2
	Soil & water regime			3			3
	Total			**25**			**25**
Chittalai	Climate Resilient Farming system			19			19
	Knowledge base			6			6
	Risk mitigation measures			3			3
	Soil & water regime			3			3
	Total			**31**			**31**
Peikulam	Climate Resilient Farming system			13			13
	Knowledge base			6			6
	Risk mitigation measures			2			2
	Soil & water regime			3			3
	Total			**24**			**24**
Salivaram	Climate Resilient Farming system			4	2		6
	Knowledge base			3			3
	Risk mitigation measures			3			3
	Soil & water regime		1				1

	Total		**1**	**10**	**2**		**13**
Srirampuram	Climate Resilient Farming system			11			11
	Knowledge base			5			5
	Risk mitigation measures			3			3
	Soil & water regime			3			3
	Total			**22**			**22**
Thallykothanur	Climate Resilient Farming system			4	2		6
	Knowledge base	1		2			3
	Risk mitigation measures			1		1	2
	Soil & water regime			1			1
	Total	**1**		**8**	**2**	**1**	**12**
Tamil Nadu	Climate Resilient Farming system	0	0	88	5	0	93
	Knowledge base	2	0	39	0	0	41
	Risk mitigation measures	2	0	23	0	1	26
	Soil & water regime	0	1	21	0	0	22
	Total	**4**	**1**	**171**	**5**	**1**	**182**
Grand Total	**Climate Resilient Farming system**	**18**	**8**	**193**	**47**	**1**	**267**
	Knowledge base	**10**	**2**	**81**	**9**	**0**	**102**
	Risk mitigation measures	**9**	**1**	**39**	**2**	**1**	**52**
	Soil & water regime	**1**	**1**	**33**	**4**	**0**	**39**
	Total	**38**	**12**	**346**	**62**	**2**	**460**

Annexure 6

Details of project rating towards project impacts in the individual watersheds

At Dhuvala watershed in Bhilwara district of Rajasthan, the interventions like earthern embankments (2 nos.) and stone fencing bunds (794 cum) improved the water availability to certain extent; planting of fodder/fuel trees (11710 nos.), grass seeding, fodder banks and azolla interventions (12 nos.) increased fodder availability and solar lights (136 nos.) & solar pumps (3 nos.) increased the awareness about renewable energy utilization. Backyard poultry (21 nos.) and tree seeding (9000 rmt.) and kitchen garden (93 nos.) also improved the livelihood. The project rating in the contribution of project achievements in Dhuvala watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In Nayagaon -I watershed of Jhalawar district, Rajasthan, the interventions like farm ponds (4 nos.), check dam/WHS (2 nos.), well recharge pits (5 nos.), micro irrigation/UG pipe (20 units) and fodder trees planted for gully stabilization (34125 nos.) improved the water availability, planting of fodder trees (1555 nos.), grass seeding (1 ha), *thor* fencing (600 nos) and azolla interventions (50 nos.) increased fodder availability; wadi/horti plantation (4203 ha), kitchen garden (60 nos.) improved AH practices (59 nos.), improved farm implements and introduction of best package of practices (86 nos.) enhanced the crop yield and livelihood security and improved cook stoves (10 nos.), biogas (1no.) & solar pumps (7 nos.) increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements in Nayagaon -I watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

Similarly, in case of Nayagaon -II watershed of Jhalawar district, the interventions like farm ponds (2 nos.), check dam/WHS (3 nos.), micro irrigation/UG pipe (15 units), well recharge pits (2 nos.) and stone bunds (1555 nos.) improved the water availability, planting of fodder trees (758 nos.), grass seeding (1 ha), thor fencing (600 nos.) and azolla interventions (50 nos.) increased fodder availability; wadi/horti plantation (5561 ha), bund plantation (758 nos.), improved AH practices (49 nos.), improved farm implements, kitchen garden (80 nos.) and introduction of best package of practices (25 nos.) improved the crop yield and livelihood security and improved cook stoves (44 nos.), biogas (5 nos.) & solar pumps (7 nos.) increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes helped to improve the resilience of farmers. The project rating in the contribution of project achievements in Nayagaon -II watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Balua watershed in Udaipur district of Rajasthan, the interventions like LDPE (2 nos.), gradonis (1 ha), recharge pits (1380), refilling of CCT (7305 cum), crescent bunds (765) and fodder trees planted for gully stabilization (1484) improved the water availability, planting of fodder trees, tree seeding (18615) , fodder banks and azolla interventions increased fodder availability; mixed cropping (30 nos.), vegetable with trellis (65 nos.), improved AH

practices (1 no.), backyard poultry (400 nos.), community based livestock insurance (30 nos.) and introduction of best package of practices (35 nos.), kitchen garden (40 nos.) enhanced the crop yield and livelihood security and biogas (1 no.), solar lights (105 nos) & solar pumps (1 no.) increased the awareness about renewable energy utilization. The project rating in the contribution of project achievements in Balua watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

In Vagda watershed in Udaipur, Rajasthan, the interventions like masonry gabion (1 no.), gradonis (1 ha), recharge pits (460 nos.) and micro irrigation/UG pipe (33 units) improved the water availability, planting of fodder trees (3210 nos.), tree seeding (45000 nos.), fodder banks and azolla interventions (10 nos.) increased fodder availability; mixed cropping (83 nos.), vegetable with drip irrigation (12 nos.), improved AH practices (3 nos.), and introduction of best package of practices (20 nos.) enhanced the crop yield and livelihood security and solar lights (50 nos) & solar pumps (2 nos.) increased the awareness about renewable energy utilization. The project rating in the contribution of project achievements in Vagda watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In case of Jhabla watershed in Udaipur, Rajasthan, the interventions like gradonis (1 ha), crescent bunds (8632), recharge pits (1505) and micro irrigation/UG pipe (5 units) improved the water availability, tree seeding, fodder banks and azolla interventions increased fodder availability; vegetable with trellis (37 nos.), wadi/horti plantation, bund plantation, improved AH practices, and introduction of best package of practices (11 nos.) enhanced the crop yield and livelihood security and solar pumps (2 nos.) increased the awareness about renewable energy utilization. The project rating in the contribution of project achievements in Jhabla watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

At Malvi watershed in Dungarpur district of Rajasthan, the interventions like gradonis (1202), open recharge pits (575) and micro irrigation/UG pipe (30 units) improved the water availability, planting of fodder trees (6750 nos.), tree seeding (1250 nos.), and azolla interventions (16 nos.) increased fodder availability; vegetable with trellis (15 nos.), wadi/horti plantation (800 nos.), kitchen garden (100 nos.) enhanced the crop yield and livelihood security and biogas (5 nos.), solar lights (45 nos) & solar pumps (3 nos.) increased the awareness about renewable energy utilization. The project rating in the contribution of project achievements in Malvi watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In case of Mandli watershed in Udaipur, Rajasthan, the interventions like check dam/WHS (2 nos.), micro irrigation/UG pipe, open recharge pits (1031 cum), well recharge pits (6 nos.), pitcher irrigation (800 nos.) and water absorption material (5000 nos.) improved the water availability, planting of fodder trees (750 nos.), fodder bank, thor fencing (7470 nos.) and azolla interventions (10 nos.) increased fodder availability; vegetable with trellis (2 nos.), wadi/horti plantation (6100 nos), and introduction of best package of practices (5 nos.) improved the crop yield and livelihood security and improved cook stoves (10 nos.) & solar pumps (11 nos.) created the awareness about renewable energy utilization. Training and other

capacity building programmes helped to improve the resilience of farmers. One ecological study was also done. The project rating in the contribution of project achievements in Mandli watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Chainpuria watershed in Chittorgarh, Rajasthan, the interventions like open recharge pits (104 cum), well recharge pits (30 nos.) and micro irrigation/UG pipe (15 units), improved the water availability, fodder bank and azolla interventions (23 nos.) increased the fodder availability; vegetable with trellis (20 nos.), wadi/horti plantation (30), tree seeding (5000 nos.), backyard poultry (21 nos.) and introduction of best package of practices (200 nos.) improved the crop yield and livelihood security. Knowledge management, training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Chainpuria watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In Khad watershed of Udaipur, Rajasthan, the interventions like earthern embankment (1 no.), LDPE (3 nos.), recharge pits (1135 cum), gradonis (1 ha), refilling of CCT (5100 rmt), crescent bund (1471 nos.) and micro irrigation/UG pipe (13 units) has improved the water availability; fodder bank, fodder/fuel trees planted (1405 nos.), stone fencing bund (1023 m length) and azolla interventions (13 nos.) increased the fodder availability; vegetable with trellis (70 nos.), tree seeding (13961 nos.), backyard poultry (400 nos.), community based livestock insurance (25 nos.) and introduction of best package of practices (12 nos.) improved the crop yield and livelihood security. Interventions like biogas (1 no.), solar & solar pumps (1 no.) increased the awareness about renewable energy utilization. Training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Khad watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

In Bettamugilalam watershed in Krishnagiri, Tamil Nadu, the interventions like well recharge pit (36 nos.) was introduced for increasing water availability, planted glyricidia (280 nos.), introduced tank silt application (31 nos.), vermi-compost pits (157 nos.) for improving soil health, azolla (88 nos.) and Fodder development/Chaff cutter (56 nos.) for livestock and biogas (10 nos.) for creating awareness about renewable energy utilization. Training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Bettamugilalam watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

At Thally Kothanur watershed in Krishnagiri, Tamil Nadu, the interventions like well recharge pit (44 nos.) was introduced for increasing water availability, planted glyricidia (447 nos.), introduced tank silt application (103 nos.), vermi-compost pits (165 nos.) for improving soil health, azolla (115 nos.) and fodder development/chaff cutter (5 nos.) for livestock and biogas (20 nos.) for creating awareness about renewable energy utilization. Training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Thally Kothanur watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In case of Salivaram watershed in Krishnagiri, Tamil Nadu, the interventions like well recharge pit (21 nos.) was introduced for increasing water availability, planted glyricidia (330 nos.), introduced tank silt application (79 nos.), vermi-compost pits (156 nos.) for improving soil health, azolla (123 nos.) and fodder development/chaff cutter (161 nos.) for livestock and biogas (15 nos.) for creating awareness about renewable energy utilization. Training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Salivaram watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

In Chithalai watershed of Madurai, Tamil Nadu, the interventions like summer ploughing (94.3 ha.), deep tillage (100 ha.), recharge pits (20 nos.), pitcher irrigation (860 nos.) and micro irrigation (12 units) has improved the water availability; fodder development (105 ha), chaff cutter (4 nos.) and agroforestry in channel (5460 nos.) increased the fodder availability; introduced tank silt application (30 nos.), compost pits (30 nos.) and vermi-compost pits (10 nos.) for improving soil health; minor millets (103 ha), integrated farming system (5 nos.), Jamunaparri cross (5 nos.) and cattle tanks (2 nos.) for improved the crop yield and livelihood security. Interventions like biogas (3 nos.), increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Chithalai watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Chinnapoolampatti watershed of Madurai, Tamil Nadu, the interventions like summer ploughing (107 ha.), deep tillage (105 ha.), well recharge pits (28 nos.), and micro irrigation (10 units) has improved the water availability; introduced tank silt application (51 nos.), compost pits (10 nos.) and vermi-compost pits (8 nos.) for improving soil health; minor millets (44 ha), integrated farming system (5 nos.), fodder development (48 ha), chaff cutter (4 nos.) and cattle tanks (4 nos.) for improved the crop yield and livelihood security. Interventions like biogas (3 nos.), increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Chinnapoolampatti watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Peikulam watershed of Madurai, Tamil Nadu, the interventions like summer ploughing (85 ha.), deep tillage (134 ha.), well recharge pits (10 nos.), and micro irrigation (10 units) has improved the water availability; fodder development (74) and agroforestry in channel (10000 nos.) increased the fodder availability; introduced tank silt application (20 nos.), compost pits (22 nos.) and vermi-compost pits (19 nos.) for improving soil health; organic farming promotion (5 nos.), integrated farming system (5 nos.), and cattle tanks (2 nos.) for improved crop yield and livelihood security. Interventions like biogas (5 nos.), increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes improved the resilience of farmers. The project rating in the contribution of project achievements Peikulam watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Anjukulipatty watershed of Dindigul, Tamil Nadu, the interventions like summer ploughing (300ha.), deep tillage (250 ha.), well recharge pits (107 nos.), catch pits (200 nos.) and micro irrigation (6 units) has improved the water availability; introduced vermi-compost pits (13 nos.) for improving soil health; integrated farming system (8 nos.), kitchen garden (76 nos.) and azolla cultivation (13 nos.) for improved crop yield and livelihood security. Knowledge management, training and other capacity building programmes also improved the resilience of farmers. The project rating in the contribution of project achievements Anjukulipatty watershed to the Adaptation Fund impact is ***moderately satisfactory*** *(MS).*

At Srirampuram watershed of Dindigul, Tamil Nadu, the interventions like summer ploughing (397 ha.), deep tillage (115 ha.), well recharge pits (104 nos.), and micro irrigation (12 units) has improved the water availability; introduced vermi-compost pits (13 nos.) for improving soil health; integrated farming system (7 nos.), minor millets (110) fodder development/ chaff cutter (142 nos.) and azolla cultivation (20 nos.) for improved crop yield and livelihood security. Interventions like biogas (5 nos.), increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes also improved the resilience of farmers. The project rating in the contribution of project achievements Srirampuram watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

At Ayampallayam watershed of Dindigul, Tamil Nadu, the interventions like summer ploughing (135 ha.), deep tillage (162 ha.), well recharge pits (98 nos.), and micro irrigation (5 units) has improved the water availability; introduced tank silt application (50 nos.), vermi-compost pits (8 nos.) for improving soil health; integrated farming system (14 nos.), minor millets (110), fodder development/chaff cutter (143), agricultural equipment (10 nos.), backyard poultry (68 nos.) and azolla cultivation (15 nos.) for improved crop yield and livelihood security. Interventions like biogas (10 nos.) increased the awareness about renewable energy utilization. Knowledge management, training and other capacity building programmes also improved the resilience of farmers. The project rating in the contribution of project achievements Ayampallayam watershed to the Adaptation Fund impact is ***satisfactory*** *(S).*

Annexure 7

List of persons consulted

Dr Sukanta K Sahoo, FSDD, NABARD, Mumbai
Dr R. Ravibabu, , FSDD, NABARD, Mumbai
Mr Shashi Kamal, DDM, NABARD, Udaipur
Mr Mahendra Dudi, DDM, NABARD, Chittorgarh
Mr K Balachandran, AGM, NABARD, Madurai
Mr A Santhosh, AGM, FSD-Watershed Section, NABARD, Madurai
Mr Sakthi Balan, DDM, NABARD, Dindigul
Mr Chetan Panday, Gayathri Seva Sansthan, Udaipur
Mr GS Nahawat, WASCO, Chittorgarh
Staff of Gayathri Seva Sansthan, Udaipur
Mr Ramesh, SPACE, Dindigul
Mr A Daniel, ASSEEFA, Madurai
Mr P Thangaiah, ASSEEFA, Madurai

Focus Group Discussions Held

Tamil Nadu:
Anjukulipatty watershed, Dindigul district
Date: 21/02/2023 Place: Anjukulipatty village No. of participants: 50
Date: 22/02/2023 Place: Ellapatti village (Non-project) No. of participants: 20
Chithalai watershed, Madurai district
Date: 23/02/2023 Place: Chithalai village No. of participants: 30
Date: 24/02/2023 Place: Mela Urappanur village (Non-project) No. of participants: 20

Rajasthan:
Mandli watershed, Udaipur district
Date: 24/02/2023 Place: Moket village No. of participants: 35
Date: 25/02/2023 Place: Bhagurva village (Non-project) No. of participants: 25

Chiainpuria watershed, Chittorgarh district
Date: 26/02/2023 Place: Chainpuria village No. of participants: 30
Date: 27/02/2023 Place: Karzu village (Non-project) No. of participants: 25

Annexure 8

Household Schedule

ICAR – Central Research Institute for Dryland Agriculture, Hyderabad

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Household Schedule

1. Name of the watershed:

2. Gram Panchayat: Mandal/Taluk: District:

3. Name of the family head:

4. Education (years):

5. Whether belongs to SC/ST:

6. Family Size: Men _____ Women_____ Children (<=14 years): ____

7. Land holding particulars (acres):

Particulars	Before project	After project	Source of Irrigation	Method of irrigation
Rainfed			xxxx	XXXXX
Irrigated				

8. **Cropping pattern** and crop yields

Season / crop	Before project		After project commencement		Change is due to project interventions (largely (1) / somewhat (2) / not at all (3))	
	Area (acres/bigha)	Yield (q/acre) or (q/bigha)	Area (Acres/ bigha)	Yield (q/acre) or (q/bigha)	Area change	Yield change
Kharif						
1						
2						
3						
4						
Rabi						
1						
2						
3						
Summer						
1						
2						
3						

Fodder						
1						
2						
Perennial						
1						
2						
Vegetables						
1						
2						
3						
Fallow						

9. **Crop yields (q/acre or q/bigha)** during a normal year and an abnormal/ stress year (in the presence of climatic shock such as drought. flood, dry spell, extreme rainfall, etc)

Crop	Before project interventions		After project interventions	
	Yield during normal year	Yield during stress year	Yield during normal year	Yield during stress year

10**. Livestock holding and productivity**

	Before project interventions			After project interventions			Change is due to project interventions (largely (1) / somewhat (2) / not at all (3))	
Species	No.	Productivity (kg milk/ animal/day)	Income / year / animal	No.	Productivity (kg milk/ animal/day)	Income / year / animal	No.	Productivity
Buffalo								
Cow								
Goat								
		Marketable age (m) & Weight (kg)			Marketable age (m) & Weight (kg)			
Goats								
Sheep								
Pig								
Poultry								
Eggs/bird								
Fodder availability	Scarce throughout year (1) / Scarce during summer			Scarce throughout year (1) / Scarce during summer				

	(2) / Always adequate (3)			(2) / Always adequate (3)				

11. **Adoption of resilient farming technologies**

Technology	Yes/ No	Crop	Area	Relevance(on a scale of 1 to 6; 1 has 'no relevance at all', 6 is 'very high relevance')	Effectiveness(on a scale of 1 to 6; 1 is 'not effective at all', 6 is 'very highly effective)
Farm pond / RWH					
In situ SWC (CCTs)					
Recharge pits					
Stone bunding					
Well recharge pits					
Gradonis					
Crescent bunds					
Gully plugs					
deep ploughing,					
Any other					
Micro-irrigation (Drip Irrigation)					
PVC Pipes					
Pitcher irrigation					
INM/SSNM					
IPM					

Organic Fertilizers					
Mulching (LDPE Sheet/ EDG)					
Tolerant variety (Climate resilience variety /low water requirement variety / Short duration Variety : Wheat, Maize & Mixed Cropping).					
Micronutrient application					
Receiving agro-advisories (AWS, Seed Treatment, Organic Farming)					
Receiving crop water budgeting inputs					
Received information in the form of: Brochures/pamphlets: Videos/ short films: Books: Interactive materials: Audio recordings:					
Participated in exposure visits (outside village)					
Participated in training programmes					
Participated in awareness camp (within village)					
Any other (specify)					

	Yes/No	Crop or animal name	Area or Number
Fodder crops / Azolla cultivation			
Tree crops			
Vegetables (Vegetable Trellies)			
Fruits (Wadi/ Horticulture)			
Kitchen gardening			
Backyard poultry			
Solar lighting			
Solar pumps			
Biogas			
Improved farm implements			
Silage making (quantity)			
Mineral supplementation			
Vaccination			
Deworming			
Improved breed			
Improved shelter			
Drinking water availability			
Trevis			
Others			

12. Income composition of the household:

Source	Before project		After project	
	Days/year	Income/year	Days/year	Income/year
Own farming				
Wage earning – agriculture				
Wage earning - non-agriculture				
NREGA works				
Migration				
Remittances from outside				

Salary				
Others				

13. Ground water table/ water availability

S.No.	Water sources	Depth of water from ground level in summer (ft)		Irrigated area in acres (per yr)	
		Before project	After project	Before project	After project
1	Open/ dugout wells				
2	Bore wells/tube wells				
3	Ponds (seasonal) Ponds (Perennial)				
4	Tanks				
5	Canal				
6	Check dams				
7	Others (specify)				

14. Annual fodder needs met from different sources

S.No.	Source	% need met from different sources	
		Before	After
1	Grazing on common property resources		
2	Grazing on cropped area		
3	Silage/ preserved fodder		
4	Purchase of fodder		

15. Source of credit:

S.No.	Particulars	Before		After	
		Informal sources (Rs.)	Institutions source (Rs.)	Informal sources (Rs.)	Institutions source (Rs.)
1	Short term loan (crop loan)				
2	Term loan (purchase of livestock, cart, bore well, etc.)				
3	Consumption/ personal loan				

16. Implementation and impact of the project

Statement	To a large extent (3) / To some extent (2) / Not at all (1)	How likely to sustain (very likely / somewhat likely / unlikely)	Reason(s)
Implementation			
The project was implemented in a transparent manner			
Community was involved in project preparation and implementation			
Needs of the landless considered and accommodated			
Needs of the women considered and accommodated			
Needs of the *dalits* considered and accommodated			
Impact	On a scale of 1 to 6 (1 is 'not at all' and 6 'to a very large extent'	On a scale of 1 to 6 (1 is 'not at all sustainable' and 6 'highly sustainable	
Increased area under: [crop(s)] 1 2 3			
Decreased area under: [crop(s)] 1 2 3			
Increased crop yields			
Increased water availability for agriculture			
Increased no. of bore wells			
Decreased no. of defunct bore wells			
Increased area under tanks			
Increased cropping intensity			
Increased drinking water availability			
Increased labour employment			
Decreased migration			
Improved fodder availability during summer			
Improved soil fertility/ water holding capacity			
Improved crop performance in upstream (ridge)			
Improved crop performance in downstream (valley)			

Environment became ‘greener’			
Increased area under tree-plantations			
Reduced area under cultivable wasteland			
Reduced area under salt affected land			
Reduced scarcity of fodder			
More diversified livelihood options			
Reduced dependence on purchased fodder			
Enhanced capacity to deal with climate change			
Others, if any (specify)			

15. Over arching impact of the project

SNo		Yes/ No
1	Farm income increased considerably	
2	Reduced impact of climate shocks on farm income	
3	Enhanced nutrition status	
4	More sustainable cropping pattern	
5	Invested in agriculture (purchase of land, machinery, irrigation, etc	
6	Repaid a long outstanding loan	
7	Supported children education	
8	Constructed or renovated house	
9	Fulfilled social obligations (marriage of children, etc.)	
10	Built contacts with different departments	
11	Others:	
12	Others:	
13	Others:	

17. Any other observation(s) not covered above:

Date: Name of the Investigator

Annexure 9

Check list for FGD with WDC / Village Community

ICAR – Central Research Institute for Dryland Agriculture

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Check list for FGD with WDC / Village Community

1. Name of the village:
2. No. in the group: Men: Women:
3. Group represents: Farmers / landless / SCST farmers / Farmers on the 'ridge' / Farmers on the 'valley'/ All habitations of the village (tick appropriate, can tick more than one) / Any other (specify)
4. Since when the organization (EE) is working in the village:
5. When was the community first informed about the project proposal?
6. Were you aware about the project being developed?
7. Did the community participate in project proposal development? Yes / No
8. If yes, nature of participation:

EE with	No. of meetings held					
	Before commencement	Year 1	Year2	Year3	Year4	Year5
Community (*Gram sabha*)						
WDC						
FGD with specific groups (mention)						
FGD with female stakeholders						
FGD with SC/ST etc.						
With other stakeholders (KVK, SAU, DoA, etc.) and community						

Participation of community: Very active / active / Indifferent

Mention a few suggestions / inputs given by the community members:

Are you aware of participation or contribution of other stakeholders (KVK, SAU, DoA, etc)? (Yes / No)

9. Capacity building programmes organized by the EE for farmers and community:

(No_____, number of farmers attended (male_____ and female_____), thematic area of training, etc.

Exposure visits:

Off-location training:

On-location training:

10. Major interventions undertaken in the project:

(i) SWC / RWH measures: (No, area covered, water holding capacity created, etc.)

Intervention	Relevance (on a scale of 1 to 6; 1 has 'no relevance at all', 6 is 'very high relevance'	Effectiveness (on a scale of 1 to 6; 1 is 'not effective at all', 6 is 'very highly effective)	Quantity (No/ length/ m^3/…	Area covered	Water storage capacity created (m^3)	Utilization (%)
CCTs						
Farm ponds						
Check dams						
BBF						
RBF						
Bunding						
Catch pits						
Recharge pits						
Summer / deep ploughing						
Earthern embankment						
Gabions						
Micro-irrigation						
Others (specify)						

(ii) Stress tolerant varieties introduced and promoted:
Crop:

Variety name:

Tolerant to:

No of farmers adopting:

% Farmers adopting:

Area under adoption:

% Area under adoption:

(iii) Other resilience enhancing practices / technologies introduced and promoted:
Crop:

Practice/ technology:

No of farmers adopting:

% Farmers adopting:

Area under adoption:

% Area under adoption:

(iv) Whether crop-water budgeting conducted: Yes / No

(v) Advisory services provided:
Frequency of advisories:
No. of farmers covered:
Communication other than mobile:

(vi) Communication materials developed in local language:
Brochures/ pamphlets, etc:
Videos:
Books:
Interactive communication materials:
Is village information board being maintained?:

(vii) Whether the EE conducted:
Exposure visits: Number: Participation by farmers:> 50% / 20-50% / < 20%
Awareness camps: Number: Participation by farmers:> 50% / 20-50% / < 20%
Animal health camps: Number: Participation by farmers:> 50% / 20-50% / < 20%
Exposure visits: Number: Participation by farmers:> 50% / 20-50% / < 20%
Training programmes: Number: Participation by farmers:> 50% / 20-50% / < 20%

11. Role of community in project implementation:

Particulars	Contribution of community (try to be as specific as possible) (also specify on the participation of women, SC/ST groups etc.)
Planning (cooperation during proposal preparation, information sharing, participation in PRA etc)	
Implementation (Identification of interventions, beneficiaries, sites for SWC/RWH structures; gram sabha resolutions wherever needed, etc)	
Post-project (envisaged role and arrangements)	

12. Changes in land use (ha):

Land use category	Before the project	After the project)	Are project interventions responsible for this change (largely / somewhat / not at all)	Likely change in the next 5-10 years (Increase / Decrease / Stable)
Geographical area				
Cultivated area				
Irrigated				
Rainfed				
Forest land				
Permanent pastures and grazing land				
Current fallows				
Other fallows				
Culturable waste land				
Barren and unculturable land				
Non-agricultural land				

13. Withdrawal arrangements

Financial arrangements made for maintenance and upkeep of NRM works: (WDF / Revolving Fund / Others)

Are such funds adequate for maintenance and upkeep?

Were any guidelines prepared for accessing and using the funds? Yes / No

If yes, indicate one or two:

Who are authorized to use the fund?

Are they equipped with necessary technical skills?

Any resolution made enabling the inclusion of repair of assets created in the 'works list' of NREGA?:

Do any of the interventions violate the existing legal framework or any informal conventions within the village?

Location of SWC/RWH structures yielding common benefits: Private land / Common land with the necessary consent from PRI, gram sabha, etc. / Common land without necessary consent

Whether the community is convinced of the long term benefits of the interventions: To large extent / To some extent / To a negligible extent

Level of ownership of community of various assets created: (very high / High / Medium / Low / Very Low)

Were there any incidence of the interventions being damaged due to heavy rainfall etc? More than once / Once / Never so far

If yes, whether the necessary repairs were attended to?

Does it need frequent maintenance? Frequent / Occasional / rare

Do you see any risk of the interventions being rendered dysfunctional in the event of any extreme event? High risk / Medium risk / Low risk

How likely (very likely / Likely / Unlikely) is that the community continues to take care of the NRM structures and the reasons there for? (We have to arrive at a judgement on this)

14. What arrangements are made to ensure continued availability of seed or other inputs necessary for continued adoption of resilient farming systems?

15. Impact of the project (from Focused Group Discussion)

	To a large extent / To some extent / Not at all	How likely to sustain (very likely / somewhat likely / unlikely)	Reason(s)
The project was implemented in a transparent manner			
Community was involved in project preparation and implementation			
Needs of the landless considered and accommodated			
Needs of the women considered and accommodated			
Needs of the *dalits* considered and accommodated			
The project led to :			
Increased area under: [crop(s)]			
Decreased area under: [crop(s)]			
Increased crop yields			
Increased water availability			
Increased no. of bore wells			
Decreased no. of defunct bore wells			
Increased area under tanks			
Increased cropping intensity			
Increased drinking water availability			

Increased labour employment			
Decreased migration			
Improved fodder availability during summer			
Improved soil fertility/ water holding capacity			
Improved crop performance in upstream (ridge)			
Improved crop performance in downstream (valley)			
Environment became ‘greener’			
Increased area under tree-plantations			
Reduced area under uncultivable/cultivable wasteland			
Reduced area under salt affected land			
Others, if any (specify)			

Annexure 10

Questionnaire for FGD with Executing Entity

ICAR – Central Research Institute for Dryland Agriculture

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Questionnaire for FGD with Executing Entity

1. Name of the EE:
2. Name of the respondent:
3. Since when the organization is involved in agriculture/NRM/Climate change related activities:
4. Staff position:

Name of the officer	Designation	Qualifications	Experience (years)	Time allocation to this project (%)	Whether received any training on CC (Yes / No)

5. How was the project conceived?

6. How was the proposal developed?

a. Internal discussions held: (Number)

b. Discussion with other stakeholder organizations (Mention the names of organizations, key inputs received, no. of meetings, etc)

c. Role of NABARD and MoEFCC in proposal development:

d. Criteria / basis / rationale of selection of district, block, village (e.g. whether it is based on any climate risk or vulnerability assessment, etc):

e. How did you ensure the participation of the community? (No. of meetings held before commencement, issues discussed, contribution of community, etc.)

7. Number and frequency of meetings:

EE with	No. of meetings held					
	Before commencement	Year 1	Year2	Year3	Year4	Year5
Community (Gram sabha)						
WDC						
FGD with specific groups (mention)						
FGD with female stakeholders						
FGD with SC/ST etc.						
With other stakeholders (KVK, SAU, DoA, etc.) and community						

Participation of community: Very active / active / Indifferent

Suggestions / inputs given by the community members:

Are you aware of participation or contribution of other stakeholders (KVK, SAU, DoA, etc)? (Yes / No)

8. How is this project different from other 'routine' watershed projects?
   In planning:
   In implementation/execution:
   In monitoring and evaluation:
   In costing:
   In stakeholder participation:
9. Capacity building programmes attended by the staff of EE: (No, duration, thematic areas, trainer organization, etc.)
10. Major interventions undertaken in the project:

NRM Interventions

Intervention	Quantity (No/ length/ m^3/…)	Area covered	Water storage capacity created (m^3)	Utilization (%)
CCTs				
Farm ponds				
Check dams				
BBF				
RBF				

Bunding

Catch pits/well recharge pits

Recharge pits on upslope

Summer ploughing

Deep ploughing

Earthen embankment

Gabions

Water absorption materials

Gradonis

Crescent bunds

Open recharge pits on drainage line

Pitcher irrigation

Micro-irrigation

Any other

(i) How were interventions identified?

(ii) How were sites for different structures selected?

(iii) How were different structures designed?

(iv) Whether geo-hydrological study conducted? Yes / No
If yes, how and how are they useful?

(v) Whether crop-water budgeting plan prepared? Yes/ No
If yes, how and how are they useful?

11. Stress tolerant varieties introduced and promoted:

Crop:

Variety name:

Tolerant to:

No of farmers adopting

% Farmers adopting:

Area under adoption:

% Area under adoption:

12. Other resilience enhancing practices / technologies introduced and promoted:

Crop

Practice/ technology
No of farmers adopting

% Farmers adopting

Area under adoption

% Area under adoption

13. Whether crop-water budgets were prepared:

14. Advisory services provided:
    Frequency of advisories:
    No. of farmers covered:
    Communication other than mobile:
15. Communication materials developed in local language:
    Brochures/ pamphlets, etc:
    Videos:
    Books:
    Interactive communication materials:

16. Role of community in project implementation:

Particulars	Contribution of community (try to be as specific as possible) (also specify on the participation of women, SC/ST groups etc.)
Planning (cooperation during proposal preparation, information sharing, participation in PRA etc)	
Implementation (Selection of interventions, identification of beneficiaries, sites for SWC/RWH structures, gram sabha resolutions wherever needed, etc)	
Post-project (envisaged role and arrangements)	

17. Changes in land use (ha):

Land use category	Before the project	After the project	Are project interventions responsible for this change (largely / somewhat / not at all)	Likely change in the next 5-10 years (Increase / Decrease / Stable)
Geographical area				
Cultivated area				
Irrigated				
Rainfed				
Forest land				
Grazing land				
Permanent pastures				
Current fallows				
Other fallows				
Culturable waste land				
Unculturable land				
Non-agricultural land				

18. Withdrawal arrangements

(i) Financial arrangements made for maintenance and upkeep of NRM works: (WDF / Revolving Fund / Others)

(ii) Are such funds adequate for maintenance and upkeep?

(iii) Were any guidelines prepared for accessing and using the funds? Yes / No

If yes, indicate one or two:

(iv) Who are authorized to use the fund?

(v) Are they equipped with necessary technical skills?

(vi) Any resolution made enabling the inclusion of repair of assets created in the 'works list' of NREGA?:

(vii) Do any of the interventions violate the existing legal framework or any informal conventions within the village?

(viii) Location of SWC/RWH structures yielding common benefits: Private land / Common land with the necessary agreements from PRI, gram sabha, etc. / Common land without necessary agreements

(ix) Whether the community is convinced of the long term benefits of the interventions: To large extent / To some extent / To a negligible extent

(x) Level of ownership of community of various assets created: (very high / High / Medium / Low / Very Low)

(xi) Were there any incidents of the interventions being damaged due to heavy rainfall etc? More than once / Once / Never so far

(xii) Do you see any risk of the interventions being rendered dysfunctional in the event of any extreme event? High risk / Medium risk / Low risk

(xiii) Does it need frequent maintenance? Frequent / Occasional / rare

How likely (very likely / Likely / Unlikely) is that the community continues to take care of the NRM structures and the reasons there for?

What arrangements are made to ensure continued availability of seed or other inputs necessary for continued adoption of resilient farming systems?

19. Impact of the project (from Focused Group Discussion)

	To a large extent (3) / To some extent (2) / Not at all (1)	How likely to sustain (very likely / somewhat likely / unlikely)	Reason(s)
Implementation			
The project was implemented in a transparent manner			
Community was involved in project preparation and implementation			
Needs of the landless considered and accommodated			
Needs of the women considered and accommodated			
Needs of the *dalits* considered and accommodated			
Impact	On a scale of 1 to 6 (1 is 'not at all' and 6 'to a very large extent')	On a scale of 1 to 6 (1 is 'not at all sustainable' and 6 'highly sustainable)	
Increased area under: [crop(s)] 1 2 3			
Decreased area under: [crop(s)] 1 2 3			
Increased crop yields			
Increased water availability for agriculture			
Increased no. of bore wells			
Decreased no. of defunct bore wells			
Increased area under tanks			
Increased cropping intensity			
Increased drinking water availability			
Increased labour employment			
Decreased migration			
Improved fodder availability during summer			
Improved soil fertility/ water holding capacity			
Improved crop performance in upstream (ridge)			

Improved crop performance in downstream (valley)			
Environment became ‘greener’			
Increased area under tree-plantations			
Reduced area under cultivable wasteland			
Reduced area under salt affected land			
Reduced scarcity of fodder			
More diversified livelihood options			
Reduced dependence on purchased fodder			
Enhanced capacity to deal with climate change			
Others, if any (specify)			

20. Evaluation of M & E Systems

Is there a well defined M & E plan in place?

Who monitors:

Frequency of monitoring (proposed vs actual):

Indicators to be monitored:

Core indicators:

Other indicators:

Were they based on the RBM framework?

Whether intermediate targets defined to be monitored?
Whether budgetary allocation for monitoring provided?

Were reports prepared after every monitoring exercise?

Key recommendations emerged and followed upon:

Who were involved in preparing the baseline?

Who and how were existing vulnerabilities, adaptation capacities and risks were assessed at the beginning?

Were the above reviewed/ revisited during the project period?

21. Impact summary (in terms of core indicators of AF):

Number of beneficiaries – Direct:

Number of beneficiaries – Indirect:

Number of early warning systems:

Increase in income (per household) : _____% over baseline income (Rs/household): _____

Avoided decrease in income during a stress (drought) year: ____%

Natural assets protected or rehabilitated:

Area under SWC measures: _____ha;_____ % cropped area

Annexure 11

Questionnaire for National Implementation Entity (NABARD)

ICAR – Central Research Institute for Dryland Agriculture

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Questionnaire for National Implementation Entity (NABARD)

1. Name of the officer:
2. Designation and address:

3. How was the project proposal conceived?

4. How were the project sites and EEs selected? (describe what made you select these states, districts and watersheds and the EEs)

5. What role did NABARD play in developing the full proposal?

6. Did NABARD staff receive any orientation/training in preparing proposals for financial support under AF?

7. Did the National Designated Authority, NDA (MoEFCC) have any role in identifying the potential projects and screening and selecting candidate projects for funding?

8. What is the nature of interaction between NIE and NDA?

9. How is this project different from 'routine' watershed development projects in terms of selection criteria, design, planning, implementation, monitoring, costing/funding, etc?

10. How do you think the project outcomes will help advance the strategic goals, objectives and outcomes of Adaptation Fund?

11. How do you think the project is in sync with the country's and state's development objectives? Do you see any conflict with the national or state development agenda and that of AF?

12. How did the project ensure that interventions are relevant to stakeholders and effective in achieving intended outcomes?

13. What alternatives were considered before finalizing the set of interventions?

14. What role did NABARD play in implementation and monitoring of the project?

15. Is there a specific budgetary allocation made for monitoring by NABARD?

16. Who is responsible for monitoring?

17. Did monitoring take place as planned?

18. Were monitoring reports submitted on time?

19. What mechanisms are in place to ensure that lessons/recommendations of monitoring exercises are properly acted up on?

20. To what extent recommendations given by the NABARD were implemented by EE?

21. Can you give some examples of recommendations and action taken thereon?

22. Given a chance, what would you do now differently to complete the project in shorter time to achieve similar outcomes?

23. Please mention any lessons learnt in the whole process of dealing with AF projects?

Annexure 12

Format for Evaluation of Natural Resource Management Interventions

ICAR – Central Research Institute for Dryland Agriculture

Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan"

Format for Evaluation of Natural Resource Management Interventions

Work	Amount spent (Rs. lakhs)	Dimensions	Work executed by (UG/ WDC / PIA/ contractor)	People's contribution	Appropriateness of structure/ design (1 to 6; 1 is "not appropriate at all", 6 is "very highly appropriate")	Beneficiaries No	Whether on CPRs / PPRs	Whether approved in the WA	Convergence with scheme	Current status (In tact / Partially damaged / Completely damaged)	When was it previously repaired (Month, year)
Check dams											
Farm ponds											
Percolation tanks											
Desilting of Tanks/ repair											
Contour/graded bunding (rmt)											
CCTs (rmt)											
Plantation (acres)											
Agroforestry (acres)											
Bunding (rmt)											
Catch pits/well recharge pits (nos.)											
Recharge pits on upslope (nos.)											
Summer ploughing (ha)											
Deep ploughing (ha)											
Earthen embankment (nos.)											
Gabions (nos.)											
Water											

absorption materials											
Gradonis (nos.)											
Crescent bunds (nos.)											
Open recharge pits on drainage line (nos.)											
Pitcher irrigation (nos.)											
Micro-irrigation (units)											
Any other											

Annexure 13

Terms of Reference

1 Introduction

The Adaptation Fund (AF) was established under the Kyoto Protocol of the UN Framework Convention on Climate Change (UNFCCC). It was established in 2001 at the 7th Conference of the Parties (COP 7) to the UNFCCC in Marrakech, Morocco and was officially launched in 2007. Since 2010, the Adaptation Fund has committed US$ 878 million to projects and programmes to date, including 127 concrete projects.

NABARD was accredited as National Implementing Entity (NIE) in July, 2012 for accessing resources under Adaptation Fund for India. It is entrusted with overall project screening, implementation, monitoring and fund distribution of the AFB projects in India. NABARD is deploying AF resources to address the needs of building adaptation capacity and enhance resilience of the vulnerable communities and ecosystems in India. So far, 6 concrete projects under AF are being implemented by NABARD. In accordance policies and guidelines of AF, the projects supported by AF are required to undergo a Terminal Evaluation (TE) at the end of the project period.

This Terms of Reference (ToR) sets out the expectations for the Terminal Evaluation of the AF project titled "Climate Proofing of Watershed Development Projects in the States of Tamil Nadu and Rajasthan" implemented through NABARD.

2 Project Background and Context

Rajasthan is characterized by erratic and low rainfall with varying intensity and uneven distribution of heavy intensity rainfall in short spell. In addition, the steep slopes with sandy soils make livelihoods of small and marginal farmers from natural resources a very challenging task. A major portion of rainfall goes off as runoff, which also takes the top layer of soil away from the fields. The water tables in general are very deep and are declining further on account of overdraft. Combination of all these factors makes agriculture a very difficult proposition in the region. Thus, there is a need to focus on works related to water and soil conservation and watershed development.

Tamil Nadu, a southern state of India, is one of the water starved states, where the per capita availability of water resources is 900 cubic meters per year as compared to all India average of 2,200 cubic meters. The annual average rainfall for the state is around 921.50 mm (48% during north-east monsoon, 35% during south-west monsoon, 14% during summer and 3% during winter). In the absence of perennial rivers, rainfall is the only source of water in the state and that too inconsistent due to vagaries of monsoon. There is an urgent need for replenishing the ground water aquifer with each and every drop of rain water to ward-off impending severe water scarcity and for sustainable development.

Objectives: The overall objective of the AF funded project is to improve climate resilience and build adaptive capacities of the communities to climate change in the rain fed areas of Tamil Nadu and Rajasthan.

Objective 1: Improving adaptation to climate variability / change in farm sector with better management and maintenance of soil and water regime enabling better crop / pasture land productivity and resultant increase in income of small and marginal farmers.

Objective 2: Promoting climate resilient farming system and diversification of livelihoods engaging community and their associations in the concrete adaptation pathway.

Objective 3: Reducing climate change vulnerability and process of marginalization with integration of risk mitigation products, like crop, weather and market advisory, and information system.

Objective 4: Creation of knowledge management system on climate change adaptation and sharing the learning to wider audience for replication and technology cascading.

3 Project Execution

The project was sanctioned for implementation in 20 watersheds in Tamil Nadu and Rajasthan. These projects were executed by different Executing Entities (EE). In Rajasthan, 10 watershed projects were executed by 9 Executing Entities and all projects have been completed. In Tamil Nadu, out of the 10 projects, one project did not take off whereas the remaining 9 projects, executed by 5 Executing Entities have been completed. List of watersheds and EEs are given in Annexure 1.

4 Purpose of Terminal Evaluation

The Terminal Evaluation will assess the achievement of project results against what was expected to be achieved, and draw lessons that can both improve the sustainability of benefits from this project, and help in the overall enhancement of AF programming. The Terminal Evaluation report will promote accountability and transparency, and assesses the extent of project accomplishments.

The general **Objectives** of Terminal Evaluation are:

- To promote accountability and transparency within the AF, and to systematically assess and disclose levels of project or programme accomplishments.
- To organize and synthesize experiences and lessons that may help improve the selection, design, implementation, and evaluation of future AF-funded interventions.
- To understand how project achievements contribute to the mandate of the AF.
- To provide feedback into the decision-making process to improve ongoing and future projects, programmes, and policies.
- To assess the relevance, effectiveness, and efficiency of project design, objectives, and performance.

5 Detailed Scope of the Terminal Evaluation

The Terminal Evaluation will assess project performance against expectations set out in the project's Logical Framework/Results Framework (Annexure 2). The Terminal Evaluation will assess results according to the criteria outlined in the Guidance for final evaluation of AF financed Projects

(https://www.adaptationfund.org/document/guidelines-for-projectprogramme-final-evaluations/).

The Findings section of the Terminal Evaluation report will cover the topics listed below. An indicative outline of the Terminal Evaluation report is provided in Annexure 3.

5.1 Evaluation of Achievement of Project Outcomes

Adaptation Fund final evaluations will assess and rate the accomplishment of outcomes (including secondary or medium-term). In evaluating project performance, evaluators can focus on achievements in terms of outputs, outcomes, and impacts.

Although the AF is more interested in assessing impacts, these can take a long time to be achieved. On the other hand, although output achievement would be easier to evaluate, it gives limited information about whether AF interventions were effective in delivering AF goals. Therefore, final evaluations should focus on evaluating short- to medium-term outcomes.

Evaluators are also encouraged to evaluate long-term outcomes and impacts when appropriate through assessment of risks to sustainability and progress towards impacts.

The Adaptation Fund standard/core outcomes include the following:

- Reduced exposure at national level to climate-related hazards and threats;
- Strengthened institutional capacity to reduce risks associated with climate induced economic losses;
- Strengthened awareness and ownership of adaptation and climate risk-reduction processes at the local level;
- Increased adaptive capacity within relevant development and natural resource sectors;
- Increased ecosystem resilience in response to climate change and variability-induced stress;
- Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas; and
- Improved policies and regulations that promote and enforce resilience measures.

As relevant and appropriate, all, or a selection, of the above outcomes will be evaluated according to two dimensions:

- Achievement of outcomes; and
- Risks to sustainability of outcomes and linkages towards impacts.

Each aspect will be given an overall rating based on a multi-dimensional analysis.

5.1.1 Achievements of Outcomes: Criteria

According to international standards, the following criteria should be used when evaluating levels of achievement of project outcomes and objectives, although not all will apply in every case:

- Relevance
  - Were the project's outcomes consistent with the AF goal, objectives, and strategic priorities, and country/region priorities?
- Effectiveness
  - Are the actual project outcomes commensurate with the original or modified project objectives (as a result of adaptive management)? If the original or modified expected results are merely outputs/inputs, the evaluators should evaluate if the project had real outcomes and, if it did, determine whether these are appropriate with realistic expectations from such projects.

- Efficiency
    - Were alternatives considered?
    - How was the process of preparation and implementation compared with other projects?
    - Wherever possible, the evaluator should also compare the costs incurred and the time taken to achieve outcomes with those for similar projects.

5.1.2 Achievement of Outcomes: Rating

The project will have an overall rating based on ratings of achievements in project outcomes for each evaluation criterion (relevance, effectiveness, and efficiency):

Highly satisfactory (HS)	The project/programme had no shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency
Satisfactory (S)	The project/programme had minor shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency
Moderately satisfactory (MS)	The project/programme had moderate shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency
Moderately unsatisfactory (MU)	The project/programme had significant shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency
Unsatisfactory (U)	The project/programme had major shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency
Highly unsatisfactory (HU)	The project/programme had severe shortcomings in outcome achievement in terms of relevance, effectiveness, and efficiency

When estimating the overall rating for the project's outcomes, relevance and effectiveness will be considered to be critical criteria. "Criticality" in this context implies that satisfactory performance on a specific criterion is essential to satisfactory performance overall.

Lack of performance on such criteria is not compensated by better performance on other criteria. If Implementing Entities provide separate ratings on relevance, effectiveness, and efficiency, the overall outcomes rating of the project may not be higher than the lowest rating on relevance and effectiveness. As a result, to have an overall satisfactory rating for outcomes, the project must have at least satisfactory ratings on both relevance and effectiveness.

5.2 Evaluation of Risks to Sustainability of Project Outcomes and Progress towards Impacts

5.2.1 Criteria

Terminal Evaluation should assess the likelihood of sustainability of outcomes and progress towards impact at project completion, and provide a rating for this.

- Sustainability is understood as the likelihood of the achieved outcomes continuing after funding from the Fund ends. The outcomes, according to the chain of results and logical framework of the project, will contribute to achieve the desire impacts.
- Progress towards impacts is understood as the likelihood of clear connections between the achieved outcomes and impacts, as presented in the chain result or

logical framework of the project. Given the long-term nature of impacts in the case of most projects financed by the Fund, it might not be possible for the evaluators to identify or fully assess these at the time of project completion. Nonetheless, evaluators will indicate the steps taken to assess the likelihood of achieving long-term project impacts, replication effects, and other effects.

Assessing the sustainability of outcomes includes evaluating at least four dimensions of risks to sustainability and how these risks comprise linkages from outcomes to impacts:

- Financial and economic risks and assumptions
  - Are there any financial or economic risks that may jeopardize sustainability of project outcomes?
  - What is the likelihood of financial and economic resources being available once the AF grant ends?
- Socio-political risks and assumptions
  - Are there any social or political risks that may jeopardize sustainability of project outcomes?
  - What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained?
  - Do the various key stakeholders see that it is in their interest that project benefits continue to flow?
  - Is there sufficient public/stakeholder awareness in support of the project's long- term objectives?
- Institutional framework and governance risks and assumptions
  - Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits?
  - Are requisite systems for accountability and transparency, and required technical know-how, in place?
- Environmental risks and assumptions
  - Are there any environmental risks that may jeopardize sustainability of project outcomes?
- Uncertainties on climate change Impacts—baselines (including reference and adaptation scenarios) Uncertainties in climate models and vulnerability assessments may have caused the project design and implementation to be inappropriate. The evaluation should consider the quality of the models used and the relevance and appropriates of the design:
  - What is the risk that vulnerability assessments, existing adaptive capacity assessments, reference and scenario development, and other assessments would be insufficient to allow interventions to be sustained or linkages to impacts analyzed?
  - Vulnerability assessments require value judgements, and any attempt to define and measure vulnerability must be the result of a consultative, stakeholder-driven process, rather than the result of sole technical analysis resulting in a simple metric. Was the vulnerability assessment conducted at the beginning of the project appropriate, scientifically based?

5.2.2 Ratings

Each of the above dimensions of risks to sustainability and linkages towards impacts and goals of project outcomes will be rated based on an overall evaluation of the likelihood and magnitude of the potential effect of the risks considered within that dimension. The following ratings will be provided:

Likely (L)	There are no or negligible risks that affect this dimension of sustainability/linkages
Moderately likely (ML)	There are moderate risks that affect this dimension of sustainability/linkages
Moderately unlikely (MU)	There are significant risks that affect this dimension of sustainability/linkages
Unlikely (U)	There are severe risks that affect this dimension of sustainability/linkages

All the risk dimensions of sustainability and linkages are critical. Therefore, overall rating for sustainability/linkages will not be higher than the lowest rated dimension. For example, if a project has an "unlikely" rating in any dimension, its overall rating cannot be higher than "unlikely."

5.3 Evaluation of Processes Influencing Achievement of Project Results

The evaluator should consider the following aspects influencing project implementation and achievement of project results. Note that evaluators are not expected to provide ratings or separate evaluations on these issues, but these should be considered in the performance and results sections of the report:

- Preparation and readiness
  - Were the project's objectives and components clear, practical, and feasible within its time frame?
  - Were the capacities of the executing entities and its counterparts properly consulted when the project was designed?
  - Were lessons from other relevant projects properly incorporated into the project design?
  - Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval?
  - Were climate models considered and vulnerability assessments conducted? What was the quality of the models used?
- Country ownership
  - Was the project concept in line with the national sectoral and development priorities and plans of the country?
  - Are project outcomes contributing to national development priorities and plans?
  - Were the relevant country representatives from government and civil society involved in the project?
  - Has the government approved policies or regulatory frameworks in line with the project's objectives?
  - When appropriate, what was the role of local communities?
- Stakeholder involvement
  - Did the project involve the relevant stakeholders through information sharing and consultation and by seeking their participation in project design, implementation, and M&E? For example, did the project implement appropriate outreach and public awareness campaigns?
  - Did the project consult with, and make use of, the skills, experience, and knowledge of the appropriate government entities, nongovernmental organizations, community groups, private sector entities, local governments, and academic institutions in the design, implementation, and evaluation of project activities?

- Were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account while taking decisions?
- Were the relevant vulnerable groups (including women, children, elderly, disabled, poor) and powerful supporters and opponents of the processes properly involved?
- Were gender balance perspectives of those affected and involved in the project assessed?

- Financial management
  - Did the project have the appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds?
  - Was there due diligence in the management of funds and financial audits? Financial audits of the project, if available at the time of the evaluation, should be used as a source of information.
- Implementing Entity supervision and backstopping
  - Did Implementing Entity staff identify challenges in a timely fashion and accurately estimate their significance?
  - Did Implementing Entity staff provide quality support and advice to the project, approve modifications in time, and restructure the project when needed?
  - Did the Implementing Entity provide the right staffing levels, continuity, skill mix, and frequency of field visits for the project?
- Delays in project start-up and implementation
  - If there were delays in project implementation and completion, what were the reasons?
  - Did the delays affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?

5.4 Evaluation of Contribution of Project Achievements to the Adaptation Fund Targets, Objectives, Impact, and Goal

5.4.1 Criteria

To ensure the integration of Adaptation Fund strategic outcomes into the project or programme level M&E system and their contribution to Result Based Monitoring)RBM), project objective(s) should be aligned with the Adaptation Fund strategic framework. Final evaluations should assess how project outcomes and possible impacts have aligned with, and how they have contributed to, Adaptation Fund goals, impacts, and outcomes.

AF Strategic Framework		**General assessment questions**
Goal:	Assist developing-country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change in meeting the costs of concrete adaptation projects and programmes, in order to implement climate-resilient measures.	Was the project designed and implemented in and by a developing-country Party to the Kyoto Protocol that is particularly vulnerable to adverse effects of climate change? Through this project, would the country be able to achieve concrete adaptation measures and increase its resiliency? If yes, how? What have been the main challenges or risks to attain increased resilience?

Impact	Increased resiliency at the community, national, and regional levels to climate variability and change.	Were the project's results increasing resilience at the community, national, and/or regional levels to climate variability and change? If yes, how? What have been the main challenges or risks to attain increased resilience? Discuss resilience aspects at all levels Assessment of results from other sections should be used to further discussions in this section
Objective	Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels.	Has the project reduced vulnerability to climate change impacts? How did the project reduce vulnerability to climate change at different levels? Has the project increased adaptive capacity to respond to the impacts of climate change, including variability at local and national levels? How did the project increase the adaptive capacity to respond to climate change impacts and variability? What have been the main challenges or risks to attain reduced vulnerability and increased adaptive capacity? Assessment of results from other sections should be used for further discussions in this section.

In addition, Terminal Evaluation should conduct an assessment of AF standard/core indicators found in Annex 1 and 2 of the AF Result Based Management (RBM). Specifically, the evaluation should assess how project indicators have aligned with Adaptation Fund Strategic outcomes and outputs indicators and targets.

5.4.2 Rating of Contribution

The project will have an overall rating in the contribution of project achievements to the Adaptation Fund targets, objectives, impact, and goal. This rating is based on ratings of contribution:

Highly satisfactory (HS)	The project/programme has made clear contributions to the Adaptation Fund targets, objectives, impact, and goal
Satisfactory (S)	The project/programme had minor shortcomings in achieving contribution to the Adaptation Fund targets, objectives, impact, and goal
Moderately satisfactory (MS)	The project/programme had moderate shortcomings in achieving contribution to the Adaptation Fund targets, objectives, impact, and goal
Moderately	The project/programme had significant shortcomings in

unsatisfactory (MU)	achieving contribution to the Adaptation Fund targets, objectives, impact, and goal
Unsatisfactory (U)	The project/programme had major shortcomings in achieving contribution to the Adaptation Fund targets, objectives, impact, and goal
Highly unsatisfactory (HU)	The project/programme had severe shortcomings in achieving contribution to the Adaptation Fund targets, objectives, impact, and goal

5.5 Evaluation of M&E Systems

The Terminal Evaluation should assess the quality of the project Monitoring & Evaluation (M&E) systems according to the following four dimensions: (1) M&E plans; (2) indicators, (3) baselines; and (4) alignment with national M&E frameworks.

5.5.1 M&E plans

- Design
  - What is the assessment of the M&E plan to monitor results and track progress toward achieving project objectives?
  - Was the plan based on the project RBM framework?
  - Did the plan provide a timetable for various M&E activities, such as specific evaluations, reviews, and supervisions, as well as an appropriate budget?
- Implementation
  - The final evaluation should verify the following:
    - an M&E system was in place and facilitated timely tracking of progress toward project objectives by collecting information on chosen indicators (which include selected AF standard/core indicators) continually throughout the project implementation period;
    - annual project reports (PPR) were complete and accurate, with well-justified ratings;
    - the information provided by the M&E system was used during the project implementation to improve performance and to adapt to changing needs (adaptive management); and
    - projects had an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be compiled and used after project closure.
- Budgeting and funding for M&E activities
  - The evaluators will determine whether the M&E plan was sufficiently budgeted for at the project planning/design stage and whether M&E was funded adequately and in a timely manner during implementation.

5.5.2 Indicators

Regarding the type of adaptation indicators that planners and practitioners should select, it is suggested that a mix of quantitative, qualitative, and narrative tools be used, including surveys and scorecards, so that results can be triangulated to give the most accurate picture possible of progress towards adaptation and the factors involved.

Even though attention should be given to all indicators defined in the project in an integral manner, specific assessment on the incorporation and use of AF standard/core indicators is expected, as these would form the data from which information will be gathered to assess the Adaptation Fund.

5.5.3 Project baselines

Review of baselines is a significant part of AF project Terminal Evaluation with the following guiding questions:

- Have baselines been designed through a participatory approach, using cost-effective and accessible information?
- Were reference and adaptation scenarios considered by the project?
- Have vulnerability baselines, climate-risk baselines, and adaptive capacity baselines been described and assessed?
- Have baselines (specifically vulnerability, climate risks, and reference and adaptation scenarios) been reviewed during project implementation?

5.5.4 Alignment of Project M&E Frameworks to National M&E Frameworks

The monitoring and evaluation of long-term changes should be incorporated into AF-supported projects as a separate component and may include determination of baselines, scenarios, and their probability; specification of indicators; and provisioning of equipment and capacity building for data gathering, analysis, and use.

This section of the final evaluation report will describe project interventions and accomplishments toward establishing or using long-term monitoring systems. The review will address the following questions:

- Did this project monitoring and evaluation system make the best use of existing (local, sectoral, national) monitoring and evaluation systems, including existing indicators? Could these systems be used as they are, do they need to be revised, or are new and additional systems required?
- Did this project contribute to the establishment of a long-term monitoring system? If it did not, should the project have included such a component? What were the accomplishments and challenges in establishment of this system? Is the information generated by this system being used as originally intended? Is the system mainstreamed—that is, is it embedded in a proper institutional structure and does it have financing?
- Did the project include plans for feedback and to disseminate results from monitoring and reporting implementation as to allow for lessons learned and good practices identified to be shared with the wider community of adaptation planners and practitioners at all levels and other existing M&E systems?

5.5.5 Ratings for Evaluation of M&E systems

The above aspects should be assessed using the following ratings:

Highly satisfactory (HS)	There were no shortcomings in the project M&E system
Satisfactory (S)	There were minor shortcomings in the project M&E system
Moderately satisfactory (MS)	There were moderate shortcomings in the project M&E system
Moderately unsatisfactory (MU)	There were significant shortcomings in the project M&E system
Unsatisfactory (U)	There were major shortcomings in the project M&E system
Highly unsatisfactory (HU)	The project had no M&E system

The overall rating of M&E will be based on the overall quality of the four dimensions described above.

5.6 Conclusions, Lessons, and Recommendations

The evaluators should present conclusions, lessons, and recommendations in the final evaluation report on all aspects of the project that they consider relevant. Conclusions represent the evaluators' interpretations and judgments based on findings and the empirical data gathered and analyzed. Evaluators will be expected to give special attention to analyzing lessons and proposing recommendations on aspects related to factors that contributed to, or hindered, achievement of project objectives, sustainability of benefits, innovation, replication, and project M&E.

Recommendations should be specific and practical. While developing recommendations, evaluators should take into consideration the socio-economic and political context of the project, programme, or policy evaluated, the strengths and weaknesses of the Implementing and Executing Entities, available resources, and the possibility of change and innovation.

Evaluators should refrain from providing recommendations to improve the project. Instead, they should seek to provide a few well-formulated lessons applicable to the type of project at hand or to the AF overall portfolio. Final evaluation reports should not be undertaken with the motive of appraisal, preparation, or justification for a follow-up phase.

Wherever possible, final evaluation reports should include examples of good practices for other projects in the area, sector, country, or region.

6 Approach & Methodology

The Terminal Evaluation report must provide evidence-based information that is credible, reliable and useful. The Terminal Evaluation team will review all relevant sources of information including the Project Concept, Project Document, Project Inception Report, PPRs, Monitoring Reports, Progress Reports, Meeting Minutes, MIS, and any other materials that the team considers useful for this evidence-based evaluation. The Terminal Evaluation team will review the baseline information and indicators submitted to the AF as part of the project document.

The Terminal Evaluation team is expected to follow a participatory and consultative approach ensuring close engagement with the National Designated Authority (NDA)- Ministry of Environment, Forest and Climate Change (MoEFCC), National Implementing Entity (NIE) – NABARD, Project Management Units (PMU) at Rajasthan and Tamil Nadu, State Government Department and Institutions, Executing Entities, Village Watershed Committed (VWC), direct beneficiaries and other stakeholders.

Engagement of stakeholders is vital to a successful Terminal Evaluation. Stakeholder involvement should include interviews with the relevant stakeholders.

The final methodological approach including interview schedule and data to be used in the evaluation must be clearly outlined in the Terminal Evaluation Inception Report and be fully discussed and agreed between NABARD and the Terminal Evaluation team.

The final report must describe the full Terminal Evaluation approach used and the rationale for the approach making explicit the underlying assumptions, challenges, strengths and weaknesses about the methods and approach of the evaluation.

7 Timeline and Deliverables

The total duration of the Terminal Evaluation will be approximately 45 days. Tentative Terminal Evaluation timeframe and deliverables are as follows:

Sl No	Deliverable	Timelines
1	Inception Report	Within 10 days from the award of works
2	Draft Evaluation Report	Within 20 days after Inception Report
3	Final Evaluation Report	Within 10 days after receiving comments on Draft Report

Kindly note that the evaluator is required to incorporate the observations/ comments on the report by the AF regarding the quality and completeness of the final deliverable.

8 TE Arrangements

The principal responsibility for managing the Terminal Evaluation resides with the Farm Sector Development Department (FSDD), NABARD. The FSDD will contract the evaluator. The Project Management Unit (PMU) at Rajasthan and Tamil Nadu will be responsible for liaising with the Terminal Evaluation team to provide all relevant documents and facilitating stakeholder interviews.

9 Team Composition

The members of evaluation team cannot have participated in the project preparation, formulation and/or implementation (including the writing of the project document), and should not have a conflict of interest with the project's related activities.

The Team Leader should meet the following criteria.

- **Education**
  - Master's degree in climate science (adaptation), environment protection, natural resources management or other closely related field.
- **Experience**
  - Relevant experience with results-based management evaluation methodologies;
  - Experience applying indicators and reconstructing or validating baseline scenarios;
  - Competence in adaptive management, as applied to climate change adaptation;
  - Experience in evaluating projects;
  - Experience in relevant technical areas for at least 10 years;
  - Demonstrated understanding of issues related to gender and climate change adaptation; experience in gender responsive evaluation and analysis;
  - Excellent communication skills;
  - Demonstrable analytical skills;

In order to interact with the project beneficiaries at ground level, team members may consist of qualified professionals versatile in local languages of Tamil Nadu and Rajasthan.

10 Payment Schedule

Payment schedule for the Terminal Evaluation in given below:

Sl No	Milestone	Payment %
1	Inception Report – satisfactory submission of the report to NABARD	20
2	Draft Evaluation Report - satisfactory submission of the report to NABARD	40
3	Final Evaluation Report – Approval of the final report by NABARD	30
4	Acceptance of Terminal Evaluation by AF – after incorporation of observations from AF, if any.	10

List of Watersheds and Executing Entities

S. No.	Name of Watershed	District & State	Name of EE
1.	Dhuvala	Bhilwara, Rajasthan	Foundation for Ecological Security(FES)
2	Nayagaon -I	Jhalawar, Rajasthan	ITC –Rural Development Trust (ITC-RDT)
3	Nayagaon -II	Jhalawar, Rajasthan	(ITC-RDT)
4	Balua	Udaipur, Rajasthan	Rajasthan Rural Institute of Development Management (RRIDMA)
5	Vagda	Udaipur, Rajasthan	Alert Sangsthan
6	Jhabla	Udaipur, Rajasthan	Seva Mandir
7	Malvi	Dungarpur, Rajasthan	Mahan Seva Sangsthan
8	Mandli	Udaipur, Rajasthan	Gayatri Seva Sangsthan
9	Chainpuria	Chittorgarh, Rajasthan	Watershed Consultants Organisation(WASCO)
10	Khad	Udaipur, Rajasthan	Rajasthan Rural Institute of Development Management (RRIDMA)
11	Bettamugilalam	Krishnagiri, Tamil Nadu	Mysore Resettlement Development Agency (MYRADA)
12	Thally Kothanur	Krishnagiri, Tamil Nadu	(MYRADA)
13	Salivaram	Krishnagiri, Tamil Nadu	(MYRADA)
14	Chithalai	Madurai, Tamil Nadu	Association of Serva Seva Farms (ASSEFA)
15	Chinnapoolampatti	Madurai, Tamil Nadu	(ASSEFA)
16	Peikulam	Madurai, Tamil Nadu	(ASSEFA)
17	Anjukulipatty	Dindigul, Tamil Nadu	Society for Peoples Action for Change and Education (SPACE)
18	Srirampuram	Dindigul, Tamil Nadu	Centre for Improved Rural Health and Environmental Protection (CIRHEP)
19	Ayampallayam	Dindigul, Tamil Nadu	Sri Sakthi Social Economical & Educational Welfare Trust (SWEET)
20	Vannikonendal (non-starter)	Tirunelveli, Tamil Nadu	Voluntary Organisation for Integration of Community & Environment (VOICE)

Result Framework of the Project

Outcome/ Output	Indicator	Baseline	Target
Component 1: Improved soil and water regime for better crop productivity and resultant increase of income of small and marginal farmers			
Outcome 1: Soil and water regime improved and crop productivity enhanced	Livelihood vulnerability of percentage of farmers reduced through increased water availability	Farmers are vulnerable due to poor soil water regime and crop productivity	At least 60% farmers living in the project villages directly benefited from reduced vulnerability to climate change related impacts
Output 1.1: Soil health improved through summer / deep ploughing,	Area covered under summer ploughing / deep tillage	Summer ploughing /deep ploughing not done	summer ploughing – 1607 ha; Deep ploughing – 966 ha
Output 1.2: Increased water availability through farm pond, catch pit, well recharge pit and other water harvesting structures	Earthen Embankment with spill way Masonry Gabion, LDPE sheet lining Number of farm ponds/check dam/WHS constructed, desilting Number of catch pit, well recharge pit constructed	Poor soil moisture and less number of water harvesting structures	Earthen Embankment - 3 nos. Masonry Gabion- 1 nos. LDPE - 4 nos. 6 nos. of farm ponds; Check dam/ WHS 4 nos; desilting – 1500 cum, 800 Nos. of catch pit & well recharge pit constructed Recharge Pit on upslope side 6300 cum and open recharge pit in drainage line – 2880 cum.
Component 2: Increased adaptation to climate change through climate resilient farming system approach and diversification of livelihoods;			
Outcome 2: Improved climate resilient farming system and increased	Number of farmers adapted to climate resilient farming system	Farmers are not following climate resilient farming	At least 50% of farmers adopt a climate resilient farming system

Outcome/ Output	Indicator	Baseline	Target
livelihood security		systems	
Output 2.1: Increased availability of fodder/fuel through afforestation & pasture land development	Area covered under structures like Gradonis, refilling of CCT, crescent bund etc for regeneration of plants Number of trees seeding on bund, fodder/fuel trees planted, avenue plantation, pitting and tree seeding Use of water absorption material (near plants) Picher irrigation Thor fencing, stone fencing Pasture group and fodder bank Bund planting/tree seeding Fodder Development Korangad Development Nursery for forest species Green coverage (Glyricidia plantation) Azolla Development Agro forestry in channel	No systematic efforts in afforestation and pasture land development	7 ha of Gradonis, 17000 RM- refilling of CCT 11500 nos crescent bund etc. Tree seeding on bund – 9000 RM Tree plantation – 60 ha 25750 nos. of fodder/fuel trees planted 80000 pitting and tree seeding 162 ha covered under grass seeding 5000 nos. water absorption material Pitcher irrigation – 3000nos Thor fencing – 11200, stone fencing renovation – 340 RM Plugging of stone wall fence 1000 nos. 10 nos of fodder banks established in Rajasthan Bund plantation/castor seeding-10500RM Riparian buffer plantation -1000 plants Fodder development /chaff cutter 1007nos Plantation in 2.8 ha area 1 nursery for forest plants Glyricidia plantation in 1121 units

Outcome/ Output	Indicator	Baseline	Target
			589 units of Azolla 15000 castor seeding unit
Output 2.2: Improved resilience through adoption of climate resilient farming/livelihood systems	Wadi/Horti plantation Vegetable with trellis Kitchen garden RWHS for backyard plantation Well recharge Micro irrigation/UG pipe Seed bank Mixed cropping of Maize and Wheat Improved farm implements Best package of practices Silage making demo Improved AH practices Backyard Poultry Vermicomposting Area covered under Integrated Farming Systems/organic farming Tank silt replication Demo plot on minor millet Herbal garden Cattle tank/ travis Mushroom	Farming system not diversified and hence not resilient to climate change	3820 wadi/horti plantation 66 units of Vegetable with trellis 1217 kitchen garden units 16 nos RWHS for backyard plantation 41 well recharge pit 170 units of set up under micro-irrigation 22 seed banks 105 units of Mixed cropping of Maize and Wheat 2 sets of farm implements 350 units best package of practices 20 nos of Silage making demo Livestock Field School – 2 500 Artificial insemination 24 feed management units 2 programmes on improved animal husbandry practices 12 cattle shed, 50 large animal breed improvement programme 198 units of backyard poultry 1693 no of vermicompost and organic farming unit 50 units of Integrated Farming Systems 447 ha covered under tank silt

Outcome/ Output	Indicator	Baseline	Target
			application 450 soil test kits 191 demo plots 5 herbal gardens 17 cattle tanks 5 mushroom cultivation units
Output 2.3: Better energy management through adoption of energy efficient systems	Number of energy efficient systems demonstrated Improved cook stoves Biogas Solar lights Solar Pumps	Energy efficient systems not in place	100 units of improved cook stoves 88 biogas units 120 solar lights 23 Solar pumps
Component 3: Integration of risk mitigation products like crop, weather and market advisory for the farmers			
Outcome 3: Reduced climate change vulnerability with improved risk mitigation measures	Number of farmers benefitted from crop weather advisories and crop-water budgeting	Crop weather advisories & crop-water budget inputs not available	At least 50% of farmers in the watershed area obtain crop-weather advisories and crop-water budgeting inputs
Output 3.1: Installation of Automatic Weather Stations (AWS) and generation of agro-advisories	Number of AWS installed Number of farmers covered with crop-weather advisories Sediment onservation units	Crop weather advisories on real time basis not available	10 no. of AWS installed 2000 nos. of farmers covered with crop-weather advisories 4 sediment observation units
Output 3.2: Geo-hydrological study and crop-water budgeting	Number of geo-hydrological studies undertaken Number of crop-water budgeting plan prepared	Crop-water budget plan not prepared	Geo-hydrological study and crop water budgeting undertaken in all 20 watersheds
Component 4:Creation of knowledge management system for climate proofing of watersheds			
Outcome 4: Project learning and created	Number of reading kit/manual on climate proofing prepared	No awareness material is available	Reading kit/manual on climate proofing are available for wider

Outcome/ Output	Indicator	Baseline	Target
knowledge base benefitted similar projects implemented in other States	Number of studies undertaken Number of awareness camps/sensitation programme conducted		dissemination Awareness camps/sensitation programmes conducted for creating better awareness among stakeholders
Output 4.1: Resource materials prepared for dissemination among various stakeholders	Number of reading kit/manual on climate proofing prepared Posters nad pamplets Number of audio-visual (short films) produced	No awareness material is available	22 no. of reading kit/manual on climate proofing prepared 20 nos of kits 20 nos. of audio-visual (short films) produced
Output 4.2: Community and other stakeholders are sensitized about the programme	Number of sensitisation/awareness camps/capacity building programmes Exposure visits Training on NRM/Cliamte change IEC activities Veternary camp/silage making/para extension workers Skill training Informations board Village knowledge centre	No awareness/sensitization programmes conducted	62 nos. of sensitisation/awareness camps/capacity building programmes 36 exposure visits 62 training programmes 8 IEC programmes 9 camps 10 programmes 12 boards 1 Village knowledge centre
Output 4.3: Conduct of Grassland ecological study in Rajasthan	Number of studies undertaken	No study report available	12 Grass land ecology study under taken in Rajasthan

Outline for Terminal Evaluation Report

Executive Summary

I. Project/Programme General Information

- Adaptation Fund Project ID:
- Project/programme category:
- Country/ies:
- Title of project/programme:
- Type of Implementing Entity:
- Implementing Entity:
- Executing Entity/ies:
- Amount of financing requested (In U.S Dollars):

II. Projected/Programme Timetable:

Indicate the dates of the following milestones for the proposed project/programme

Project timetable	Expected Date	Actual Date
Start of Project/Programme Implementation		
Mid-term Review (if planned)		
Project/Programme Closing		
Final Evaluation		

III. Project Components

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount(US$)
1.			
2.			
3.			
4. Project/ Programme Execution cost			
5. Total Project/Programme Cost			
6. Project Cycle Management Fee charged by the Implementing Entity (ifapplicable)			

IV. Project/Programme Components and Financing:

	Approved	Actual
Amount of FinancingRequested		

V. Evaluation General Information

All final evaluations will include a description of the following aspects:

- When, and for how long, the evaluation took place;
- Places visited;
- Who was involved in the evaluation; and
- Methodology and Evaluation key questions.

VI. Evaluation Results

1. Evaluation of project/programme outcomes: criteria for assessing achievement of outcomes and ratings:

- Relevance (discussion and rating);
- Effectiveness (discussion and rating);
- Efficiency (discussion and rating); and
- Overall Rating.

2. Risks to sustainability and progress towards impacts: dimensions and ratings

- Financial and economic (discussion and rating);
- Socio-political (discussion and rating);
- Institutional framework and governance (discussion and rating);
- Environmental (discussion and rating);
- Uncertainties on climate change impacts—baselines (discussion and rating); and
- Overall Rating.

3. Evaluation of Processes Influencing Achievement of Project/Programme Results (Note that evaluators are not expected to provide ratings on these issues)

- Preparation and readiness (discussion);
- Country ownership (discussion);
- Stakeholder involvement (discussion);
- Financial management (discussion);
- Implementing Entity supervision and backstopping (discussion); and

- Delays in project/programme start-up and implementation (discussion).

4. Evaluation of Contribution of Project/Programme Achievements to the Adaptation Fund Targets, Objectives, Impact, and Goal: elements and ratings

- Contributions towards AF Goal (discussion and rating);
- Contributions towards AF Impact (discussion and rating); and
- Contributions towards AF Objective (discussion and rating).

5. Evaluation of M&E Systems: dimensions and ratings

- M&E plans (discussion and ratings):
  - Design (discussion and rating);
  - Implementation (discussion and rating); and
  - Budgeting and funding for M&E activities (discussion).
- Indicators (discussion and rating);
- Project/programme baselines (discussion and rating);
- Alignment of Project/Programme M&E Frameworks to National M&E Frameworks (discussion and rating); and
- Overall rating.

Conclusions, Lessons Learned, and Recommendations

Final evaluation reports should include a section synthesizing findings, final conclusions, lessons learned, and recommendations.

References

Final evaluations should include, in text and as a main section, all materials and bibliography, as well as a list of stakeholders/persons consulted during their design and implementation.

Annexes

In addition to other technical annexes, the final evaluation report should include the following two annexes:

- Official response from the project/programme management team regarding the evaluation findings or conclusions; and
- Terms of reference for conducting the evaluation.

Annexure 14

Important features of watersheds in the AF project

A. Rajasthan

Watershed	Total HH	Population	Area of the Watershed (Ha)	Cultivated Area (ha)	Irrrigated Area (ha)	Rainfed Area (ha)	Large Ruminant Population	Small Ruminant Population	Average Rainfall	District Rainfall	Number of Rainy Days	No of Water Harvesting ponds	Principal Soil Type	Major Crops Grown	Water Sources
Dhuvala	488	2375	1180	NA	NA	NA	NA	NA	570.3	743.1	NA	NA	Clay loam and sandy loam	Maize, sorghum, pigeon pea, wheat	Open well
Nayagaon-I	NA	NA	NA	1165.83	850.34	NA	594	246	NA	663.5	NA	NA	NA	Maize, Soybean, Groundnut Rabi - Wheat, Gram, Coriander, Mustard, Garlic	NA
Nayagaon-II	NA	NA	NA	1340.9	721	NA	628	252	NA	663.5	NA	NA	NA	Kharif - Maize, Soybean, Groundnut Rabi - Wheat, Gram, Coriander, Mustard, Garlic	NA

Jhabla	219	1680	1357.85	236	6	230	1600	6611	627	817	28	NA	Loamy sand to Clay loam	Maize, sorghum, paddy, black gram, wheat, bengal gram, Mustard, Barley	open wells and borewells
Mandli	NA	2805	975	NA	NA	NA	NA	NA	560.5	817	NA	NA	Sandy loam	Maize, Wheat, Gram, Mustard, Vegetables, Moong, Fuel and Forage	Well and tube wells
Malvi	NA	4088	1614	247	NA	NA	NA	NA	809	667.8	NA	NA	Sandy loam	Maize, Wheat, Gram, Mustard, Vegetables, Moong, Fuel and Forage	NA
Balua	818	4253	NA	1001.83	750	NA	935	1200	560.5	817	NA	NA		Kharif - Maize Soybean Rabi - Wheat,gram, Coriander, Mustard, Garlic	NA
Khad	380	2127	NA	NA	NA	NA	1086	1081	671.7	817	NA	NA	Sandy loam and red gravell	Maize, Peas, Wheat, Jowar,	Open wells

													y loam	Rice, Urad, Gram and Mustard	
Vagda	380	6516	984.87	NA	NA	671.7	NA	NA	NA	817	NA	NA	NA	NA	NA
Chainpuria	NA	NA	NA	NA	NA	NA	NA	NA	NA	848.0	NA	NA	NA	NA	NA

B. Tamil Nadu

Watershed	Total HH (No)	Population (o)	Area of the Watershed (Ha)	Cultivated Area (ha)	Irrigated Area (ha)	Rainfed Area (ha)	Large Ruminant Population (No)	Small Ruminant Population (No)	Average Rainfall (mm)	District Average (mm)	Number of Rainy Days	No of Water Harvesting ponds	Principal Soil Type	Major Crops Grown	Water Sources	No of working Bore wells	Number of Open Wells
Bettamugilalam	511	4800	1100	640	130	510	2000	3200	850	830	80	9	Red Loamy	Finger Millet, Lablab, Mustard, Groundnut, Beans,	Open Wells Bore Wells Water Ponds	4	188
Anjukulipatty	1875	7786	1398.32	1237.13	26.88	1186	611	1540	742.1	812	32	NA	Red Soil	Paddy, Groundnut, Maize, sorghum, Lab-Lab, red gram, Mango, Sapota, vegetables	Canals, tanks, wells and tube wells	NA	NA

Sriramapuram-Malvarpatty	280	1045	1195	1195	140.8	404	768	3192	728.9	812	28	4	Red sandy soil Red loamy soil and Laterite soil	Maize, millets pulses, groundnut, Gingelly, cotton and onion	Bore wells and Open wells	NA	NA
Thally Kothanur	975	3469	1151.27	1065.32	96.51	833	471	516	875	830	NA	NA	Sandy Loam	Ragi, Lablab, Castor, Paddy, Mustard, Gingelly Maize, Marigold	Bore wells and Open wells	42	36
Salivaram Watershed	671	3400	1174.93	1050	220	830	1100	1550	740	830	80	10	Sandy Loam & Sandy Clay Loam	Ragi, Groundnut, Horse Gram, Lablab, Castor Tomato, Beans, Chrysanthemum Cucumber, Rose	Bore wells and Canal Water	162	1
Chittalai	960	3840	1152	644.03	138	338	786	3192	825	849	NA	7	Sandy loam, loamy sand, alluvial	Sorghum, Millets, Groundnut, Pulses, Cotton Paddy, Vegetabl	Open wells and bore wells	NA	NA

														es, Fruit Trees, Coconut			
Chinnapoolampatti	1470	5430	885		253	543	540	3232	861	849	NA	NA	Sandy loam, loamy sand, alluvial	Cotton, Millets, pulses, Paddy, Cotton, Vegetables,	Tank, Open Wells & Garden land (borewells)	NA	NA
Ayampallayam	2612	2310	1633	450	1400	325	NA	NA	765.7	812	65	38	Red Soil and rock out crops with loamy soil.	Coconut, Lemon, Mango, Banana	Marudhanathi River, wells and bore wells	116	245
Peikulam	793	2658	697.12	592.12	132.73	460	60	2367	825	830	NA	0	Black soil, alluvial	Cotton, Millets, pulses, paddy, vegetables, flower forestry and horticulture and fodder	Open wells and bore wells	NA	NA

Annexure 15

Evaluation Team

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