

Pilot Andhra Pradesh Drought Adaptation Initiative (AP DAI)

Draft Concept Note

1. Background: Development Context and Rationale for Bank Involvement

The mitigation of the impacts of drought has been a key area of focus of the Government of Andhra Pradesh, as evident from a large variety of on-going centrally-sponsored schemes and programs by different state government departments aimed to help drought-affected communities. Nevertheless, the failure of monsoons continues to have a disastrous effect on the agricultural sector of Andhra Pradesh, and the human and social costs of droughts remain devastating, as a large share of the population depends on agriculture for livelihood, employment, and income. The impact is particularly felt in the eight districts in the rain-shadow region of the state: Anantapur, Chittoor, Cuddapah, Kurnool, Rangareddi, Mahbubnagar, Nalgonda and Prakasam, where about 35 million people live. Not surprisingly, most of these districts have lower socio-economic indicators than the state average.

The recently completed World Bank study, *Drought in Andhra Pradesh: Long-term Impacts and Adaptation Strategies*, points to a growing gap between declining vulnerability of the state-wide economy to drought and continued devastation brought by drought to farmers/rural communities in rains-shadow areas of the state, addressing which requires intensified efforts at the micro scale (i.e. at the level of a group of villages or a watershed). The impacts of drought vary significantly at small geographic scales due to the natural variability in weather patterns, differences in soil types and water availability, access to markets and social circumstances. Responses to drought need to be planned at this level with local, district and state governments facilitating the effectiveness of the planning and implementation process and taking into account both short-term and long-term effects of drought management strategies.

The conclusions of the study were widely supported at a workshop of stakeholders in Hyderabad (19th July 2005), and closely matched the vision of the GoAP about the need to intensify, coordinate and increase effectiveness of government assistance to drought-prone areas with a view to promoting sustainable development in those areas. To facilitate this vision, the government established a dedicated Rain-Shadow Areas Development Department. There was

strong support for a follow-on initiative to design a framework for, and to pilot, integrated community scale plans and approaches to drought adaptation, building on, complementing and consolidating existing activities.

2. Development Objectives

The objective of the proposed Andhra Pradesh Drought Adaptation Initiative (AP DAI) pilot is to develop, test, evaluate and demonstrate drought adaptation mechanisms, institutional models and measures at the local government and community levels for enhancing drought adaptation capacity of affected communities and reducing their vulnerability to drought risks in the long-term. The AP DAI pilot will assist the selected drought-affected communities through a better coordination, integration, packaging and enhancing of various programs, currently delivered by different departments/institutions in a fragmented manner. It will also identify policy and institutional opportunities and constraints for a more effective and longer-term oriented drought-related service delivery and scaling up of the pilot results.

To support these objectives, the AP DAI pilot will: (i) identify gaps and missing links in the ongoing drought-related programs and activities in the select areas/rural communities of AP chosen for participating in the pilot; (ii) facilitate institutional integration for delivering drought-related assistance to these communities by strengthening Community Based Organizations CBOs and Panchayat Raj Institutions (PRIs) and their linkages to relevant district and state-level agencies; (iii) design and test innovative methods and instruments for helping selected communities to adapt to drought, targeting different groups within these communities (e.g. medium farmers, marginal/small farmers, landless and poorest); and (iv) improve awareness on drought adaptation options and approaches and disseminate the results of the pilot efforts in order to build support and demand for wider replication. This will be achieved by working with farmers and villagers through CBOs, such as women Self-Help Groups (SHG), farmer's Rythumitra Groups, Watershed Committees and the like, in jointly analyzing and identifying sustainable solutions to both technical and institutional aspects of problem analysis.

Lessons from the pilot phase are expected to be applicable to other states in India with drought prone areas. Bank support for scaling up the AP DAI approaches and models in AP and elsewhere can be provided through the next generation of rural poverty/water management/land management/climate risk adaptation projects at the state or national level.

Expected outcomes/results of the AP DAI pilot include:

1. Tested drought adaptation packages of interventions (DAPs) and demonstrated benefits to farmers/communities from diversification/drought adaptation measures;
2. Tested methodologies and toolkits for community level drought adaptation planning and implementation;
3. Dissemination materials for community planning
4. Recommendations on institutional processes, including linkages to the *National Rural Employment Guarantee Scheme* (NREGS);
5. Identified and field-tested opportunities for strengthening a policy and institutional support framework for the AP DAI service delivery and scaling up of the pilot results;
6. Proposal for/design of a larger program

3. Linkages with Ongoing Projects and Activities and Added Value

The APDAI pilot will facilitate synergy with the on-going relevant projects and activities supported by the GoI, GoAP, the Bank, and other donors, such as DFID (Figure 1). Specifically, the APDAI project will closely coordinate and build upon the World Bank Andhra Pradesh Rural Poverty Reduction Project (AP RPRP), and the proposed WB technical assistance on groundwater management (see sections below for more details). It will also draw on the India-wide study on adaptation to climate variability and change, which has drought-related components in AP and Maharashtra and is developing an interactive decision support tool to assess the drought risks and adaptation strategies, as well as on technical assistance provided by the Bank to the Agriculture Insurance Corporation of India (AICI).

The identification and selection of pilot communities in Anantapur, Mahbubnagar and Nalgonda districts will be done in coordination with already on-going related activities in the areas where farmers schools under the DoA program are operational and successful or/and where the capacity of facilitating NGOs and community groups has been already significantly strengthened through involvement with Livelihood Enhancement Action Plans (LEAPs) under the APRPRP, watershed programs under the Drought-Prone Areas Programme (DPAP), and DFID-funded Rural Livelihood Project.

DAI and Relevant Ongoing Programs

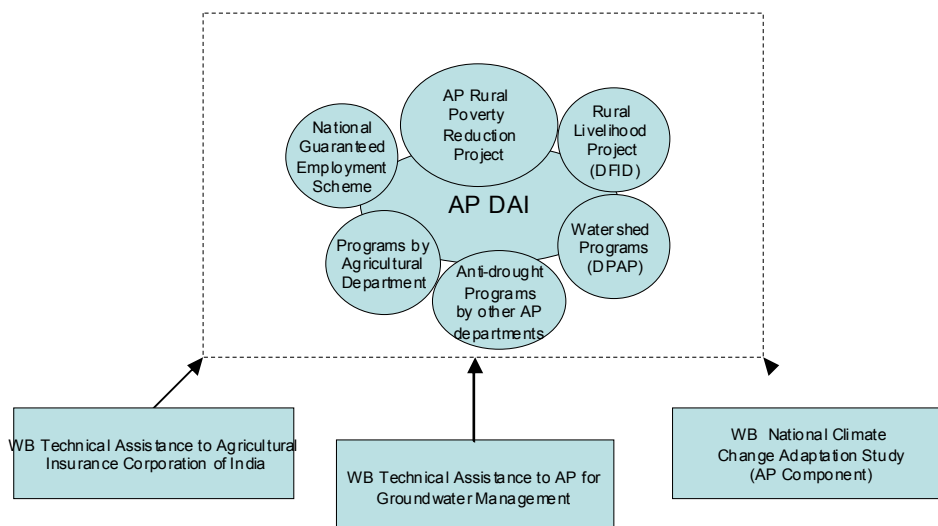


Figure 1. Linkages of APDAI with On-going Relevant Projects and Activities

It is also important to stress that in addition to strengthening links between existing programs for more effective drought management; the APDAI will bring a new perspective and a focus on a long-term adaptation to a drought risk in the context of global climate changes which will go beyond the traditional rural development/agricultural assistance programs. As emphasized by the Bank’s strategies for environment, rural development and water resources, drought must be considered as a long-term development issue in the context of climate change and variability. The proposed APDAI adopts an integrated approach to drought adaptation needs and supports long-term drought risk management focusing on development of an institutional delivery structure (with wider institutional partnership and stakeholder participation), strengthening the policy framework, introduction of monitoring and evaluation systems, development of innovative drought insurance mechanisms, enhancing community planning based on locally developed drought mitigation methods and coping measures.

The World Bank has strong advantage in supporting this initiative due to the multi-sectoral scope of its assistance program, ability to forge cross-sectoral integration, and its substantial expertise in

all areas relevant to this initiative, such as environmental sustainability, water resource management, rural development and agriculture, community-driven approaches, and policy and institutional reforms. The proposed activity is well aligned with the India CAS, which attaches high priority to rural poverty reduction, effective service delivery and sustainable water resource management, as well as acknowledges the importance of reducing vulnerability of the economy and population to climate risks. Adaptation to climate variability and change is an emerging new priority for the Bank and GoI.

4. Pilot Program Description

The pilot program will be implemented in the selected villages of the Mahbubnagar, Nalgonda and Anantapur districts. An assessment of the needs and support gaps of the drought-prone communities through field visits and discussions with various stakeholders has identified the following priority areas for the drought adaptation interventions: (i) management of the common natural resource base with a focus on (ground) water use and common land issues; (ii) production systems (agricultural diversification and intensification, and innovative technologies); (iii) economic and financial instruments (incentives and marketing assistance); and (iv) institutional support and capacity building. Non-NRM livelihood and income diversification is an integral part of the drought adaptation concept; however, for the purposes of the pilot and the selected sites (see below), it appears that this area of assistance would be sufficiently covered by other on-going and proposed programs (AP DPIP and AP RPRP, AP Rural Livelihood Program, DFID Convergence Program, etc).

The pilot sites will be selected according to the criteria jointly agreed between GoAP and the Bank. Criteria for selection will include (but not be limited to):

- Areas to represent different drought severity and agro-ecological conditions;
- Active and relatively well organized community institutions, such as SHGs and farmers' associations/societies
- Areas where relevant programs (AP RPRP, NRGES, DFID RLP) are on-going

This pilot program will be implemented at the local level by the MMs and CBOs with support of, extension agencies, and NGOs. Existing well functioning SHGs, farmer groups and other village organizations will participate actively. The activities to be financed under this component would thus be a few demand-driven subprojects at the village or GP level, selected by farmer

associations and cooperatives, and/or women SHGs, through a community planning process supported by necessary capacity building and training. The communities will choose these sub-projects from a menu of options developed through a participatory exercise involving experts with scientific knowledge in farming systems, new agricultural technologies, investment planning, market analysis, and other issues relevant to drought adaptation technical and economic areas. The sub-projects would aim to close critical gaps in, or strengthen synergy between the existing programs in these villages. The process of the community-based identification and design of APDAI packages of activities is described and illustrated in Annex 1.

The identified community-tailored drought adaptation packages of measures (DAPs) will be introduced gradually and in incremental steps during the APDAI pilot implementation. This will be based on experiences from community level planning and project implementation in such ongoing programs and activities as watershed management and land development programs, DFID Rural Livelihood Project, and APRPRP. Specifically, the APDAI pilot activities will include:

- (a) Detailed inventory of on-going activities in the pilot villages and assessment of critical gaps and needs in drought adaptation measures for each selected community. The APDAI will first identify the critical gaps in and missing links between the on-going programs in the selected pockets/communities that might hinder the drought adaptation process. This will be done in consultations with the respective communities, NGOs, and local and district authorities.
- (b) Studies and surveys to establish a baseline set of indicators for monitoring and evaluation of the pilot implementation.
- (c) Design and establishment of the pilot's monitoring and evaluation system.
- (d) Social mobilization activities including community awareness raising and knowledge dissemination around the concept of drought adaptation and about possible long-term technical and socio-economic solutions to drought-related issues.
- (e) Participatory process of identification of drought adaptation packages of measures in the context of the selected pilot communities.
- (f) Detailed designs and technical feasibility studies for investment proposals.
- (g) Implementation of pilot investments in the selected communities.

- (h) Extensive training and capacity building in drought adaptation at the community, mandal and district levels (strengthening farmers organizations, women's SHGs, and CBOs to undertake participatory drought adaptation planning and action at the community level).
- (i) Development of a scaling-up APDAI program to be implemented at the state and, possibly, national level.

Pilot Program Duration and Phasing. The pilot program will be implemented in two phases over a period of 2.5 years. The first phase will be of duration of 6 months and focus on 10-15 selected villages in Mahbubnagar where a substantial social capital was built through development of community level institutions over the last 10 years. Specifically, three mandals – Kosgi, Daulatabad and Bomraspet are proposed for the Phase 1 implementation where capable and well established Mandal Mahila Samakhya (MMS) were formed under the earlier South Asian Poverty Alleviation project (SAPAP). The interventions for the community pilots will be selected in view of targeting community groups with different socio-economic status so as to apply and test different approaches that may be required for these groups. The Phase 1 activities will focus on community mobilization and organization of the participatory process, village level program design and initial investments in the identified APDAI pilot activities.

Following the initial experience and lessons of Phase 1 implementation in Mahbubnagar over the first 6 months, Phase 2 of the project will start its pilot activities in Anantapur district. At the same time, the implementation of the community based investments in the selected pilot villages will continue in Mahbubnagar. The duration of Phase 2 will be about 18 months. The assistance required for implementation of specific drought adaptation measures (e.g. with marketing, credit products, seed supply, etc.) will be done either by linking the community to the relevant existing program operating in the state, when possible, or by providing the needed assistance directly by the APDAI.

Components / Areas of APDAI Interventions

The specific set of activities to be applied in tailor made combinations for different communities will be identified on the basis of the communities' specific drought adaptation needs and be drawn from the four generic groups as outlined below. A tentative list of detailed activities is attached in Annex 3. The categories of interventions to be provided by the APDAI pilot are as follows:

Component A: Management of Common Natural Resources

The principle objective with this component is to utilize the common natural resource base available to the communities in a more sustainable way. Currently, several factors encourage farmers to either utilize resources, especially groundwater beyond its restoration capacity or that various forms of common land resources are not utilized in the most efficient way possible. The proposed assistance could support the following type of initiatives:

a) Community level (ground) water management. Groundwater is now extracted through privately owned bore-wells with no regulations in place to control the water use. The GoAP has successful experience in development and implementation of watershed programs in some areas of AP, however their impact on groundwater was so far limited. The DAI process will identify existing gaps and complement on-going activities with additional interventions, focusing on groundwater conservation and replenishment measures and utilizing the existing AP pilot experience in social regulation of groundwater use, development of micro level water budgets, etc.

b) Management of Common land. There are various forms of common land whose user rights can be reserved for resource poor families or women SHGs or be used as a buffer for drought. The user rights are related to biomass (grazing) and to Non Timber Forest Products (NTFPs) such as Neem.

Component B: Production Systems

a) Diversification and Intensification in agriculture, livestock and horticulture: The current farming system with its excessive dependence on paddy-rice must be diversified to include other crops and lines of production to arrive at sustainable farming systems. Currently the paddy crop often fails due to failed monsoons and, linked to that, shortage of water for irrigation. In order to overcome this over-dependence on paddy, the area planted with traditional dryland crops (groundnuts, sorghum, millet and pigeon pea for example) as well as with tree crops will have to increase at the expense of paddy. Yields from these crops can also be increased by improving traditional cultivation practices, using new improved varieties and by introducing new technologies ones they have been adequately adapted to prevailing local conditions both in terms of biophysical and socio-economic conditions of communities and farmers (see further below).

Tree crops, thanks to their deep root systems are better suited to withstand periods of prolonged droughts and yield a harvest even under severe drought conditions and they thus provide a more secure income than annual crops. For the same reason livestock is part of traditional dryland farming systems as they, if fodder is stored and available during drought periods, will continue to produce egg, milk and meat to sustain the farming family. Sheep and goat are also yielding wool that serves as a basis for alternative income generating activities.

b) Technology innovation: New technologies will be introduced that are better adapted to the socio-economic conditions of small and marginal dryland farmers. A range of options will be tested and developed such as the locally available product Neem that has proven to be a very efficient alternative to commercial pesticides to control pests in cotton. This method is spreading fast in the dryland districts of AP. More efficient utilization and improvements of traditional technologies and the introduction of new technologies through an action research process will address issues such as soil fertility, soil water holding capacity, pest control as exemplified above and irrigation techniques. Technology innovation will include post harvest treatment and storage of farm produce so that farmers and communities are better equipped to take advantage of optimum market opportunities and store fodder to be able to keep livestock over extended drought periods.

This component will work with villagers and farmers to design more diversified farming systems that spread risks and are able to sustain long periods of drought. It will take account of each farmer's individual situation in considering farm size, water availability, soil conditions and economical and family situation. At village level the planning will take account of the water budget as discussed above and the situation of the landless. It will improve marketing facilities and opportunities as discussed below.

Component C. Economic Instruments and Marketing

The need for diversifying agricultural activities is increasingly recognized by farmers, as well as other stakeholders. Despite farmer preference for paddy-rice cultivation due to assured price and market, sustained shift to alternative, less water-intensive crops, such as maize, oilseeds, soyabean, Bengal gram and pulses, has been observed in the few past years, particularly in the areas irrigated by wells. The nature and extent of crop diversification, however, is highly dependent upon (i) availability of seed; (ii) marketing potential; (iii) addressing food security of

villages, as a sizable portion of rice production, particularly by small and marginal farmers, is for subsistence use; and (iv) availability of processing facilities such as chaff cutters. The project will seek to provide marketing assistance, technical knowledge and capacity building, together with economic incentives and risk assurance, to farmers who are willing to diversify.

(a) *Improve access to marketing systems.* Communities will also be supported in learning about and utilizing the marketing systems that are available for less known produce and also when best to sell and buy various livestock so as to get the best economic return on this investment both in good and bad years.

(b) *Improved access to financial services.* In order to allow for the above changes to be implemented it will be necessary to support the communities and farmers financially so that they are able to invest in such things as new seeds, livestock, irrigation equipment, storage facilities for seed and fodder, etc. To this end credit systems will be provided through mechanisms developed and tested by other programs such as the APRPRP. Communities will also be supported in learning about and utilizing the marketing systems that are available for less known produce and also when best to sell and buy various livestock so as to get the best economic return on this investment both in good and bad years. It will also be necessary to develop insurance systems, both in kind and financial systems that will carry communities and individual farmers through difficult periods. In kind insurance can be provided through community seed banks and fodder banks while community based financial insurance schemes can protect farmers from economic loss in the case of the death of livestock. All these systems will be based on proven experiences to the extent possible.

(c) *Designing and testing innovative financial assistance schemes.* To further improve access to financial services, support will be provided to local micro-finance institutions (such as BASIX, and Nabard) with designing and testing innovative drought adaptation financial instruments, such as Drought Adaptation Credit and Drought Adaptation Insurance, which would give farmers incentives to shift to long-term viable farm and non-farm activities that encourage drought adaptation activities by transferring risks from the farmers (see Annex 4). Given the on-going pilot weather insurance and livestock programs in AP, one particular focus would be on identifying viable ways to make weather-based insurance available to small and marginal farmers in drought-prone areas.

Component D. Institutional Support and Capacity Building

(a) *Community mobilization.* A necessary prerequisite for success is that communities have gone through a process of social mobilization and group formation. This new initiative does not only require the introduction of new ways of doing things it also requires a new way of thinking based on a paradigm that drought is here to stay and communities as well as individuals will have to prepare for this situation as compared to a mindset in which droughts are abnormalities and should be handled through drought relief until better and normal conditions are back. It is for this reason that the first year of the pilot phase will be implemented in three mandals which have already gone through considerable community development and have functioning SHGs, VOs as well as various committees. Even so the implementation of the pilot will be accompanied and indeed be based on a very intensive interaction with village and community based organizations as it is likely that the strain on them will be considerable in undertaking a whole new set of activities in a new way of planning that will require considerable solidarity and cooperation.

(b) *Awareness and Knowledge Sharing:* This will target all key stakeholder groups, increasing their awareness on drought adaptation options and experiences through knowledge generation and dissemination. It will support activities on information exchange, education and communications, including awareness raising campaigns, creating a network of knowledge centers on diversification and drought adaptation, training, workshops, experience sharing study visits, and demonstrations in village communities

(c) *Capacity Building of Key Stakeholders:*

- Capacity building of district level institutions: This activity will assist in capacity building for convergence and improving coordination between the various line departments, agencies and other stakeholders to be involved in the integrated multi-sectoral drought adaptation process at the district level in Mahbubnagar and Anantapur.¹
- Capacity Building of Panchayati Raj Institutions (PRIs). Assistance will be provided to defining a proper role of PRIs vis-a-vis other institutions involved in the drought adaptation process (Watershed Committees, Rythumitra groups, women's SHG

¹ A list of district and community level organizations is attached in Annex 5.

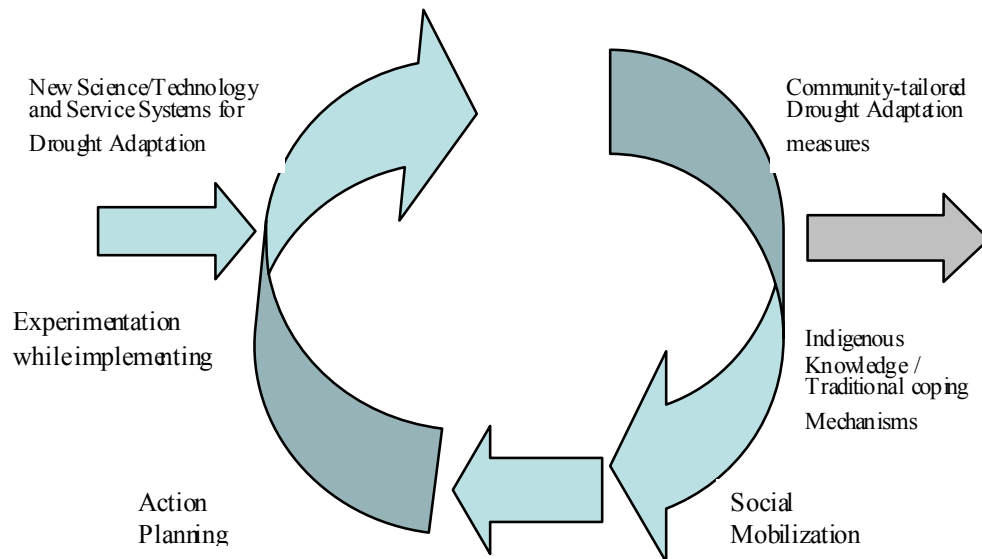
etc.) and strengthening of their capacity to effectively oversee and support the drought adaptation activities.

- Strengthening farmers organizations, women's SHGs, and the CBOs to undertake participatory drought adaptation planning and action at the community level -of farmer's cooperatives and other associations, such as recently created farmer's SHGs (also called "Rythumitra groups"), as well as foster synergies and collaboration between Women's SHGs, Watershed Committees, and farmer organizations at the village level.
- Strengthening capacity of local NGOs, extension agencies, marketing boards and micro-finance institutions to support community-level drought adaptation efforts will be another area of assistance, including developing innovative financial instruments and insurance products that encourage adoption of more sustainable practices, and suitable mechanisms in order to reduce market uncertainty for alternative crops/products.

Monitoring and Evaluation of the Pilot

A *Monitoring and Evaluation (M&E)* system to measure the effectiveness and impact of the improved packaging and delivery of the drought risk management interventions will be set up. This could include a series of monitoring surveys, such as a baseline survey and a follow-up survey. Given the innovative nature and decentralized management structure of the project, the design of the pilots will allow for flexibility to undertake changes based on implementation experience. Additional sources of learning could include special studies on various aspects of the pilot project.

Annex 1. Community-based Design of APDAI activities at Village Level



This graph demonstrates the bottom-up, community driven approach to identification of drought adaptation measures adopted in the APDAI pilot. New science and technology and service systems, before they are absorbed in the routine operations of farmers and villagers, must be tested against traditional or indigenous knowledge and coping mechanisms through a social as well as a technical adaptation process. This social and technological processing of new innovations will ensure that they take account of valuable traditional knowledge and coping mechanisms. The results of the process are community-tailored packages of innovative technologies and service systems for drought adaptation that can be shared with other communities as packages of drought adaptation innovations.

The starting point of this process can be a traditional technique that is studied, analyzed and improved “theoretically” by scientists before it is taken back to the community for the integration process as shown in the graph.

Annex 2 :

Basic Characteristics of Kosgi, Daultabad, Bomraspet Mandals in Mahabubnagar District Selected for Phase 1 Pilot:

- The three mandals benefit from developed Community Based Organizations
- The selected mandals are the poorest in the district
- The three mandals have a high out-migration of labor, specifically during drought seasons
- 10-15% of the mandals' population are landless
- 30-40% of the farmers are marginal (with land plots below 2.5 acres)
- 10% are Large farmers (land owners of 15-20 acres) that own about 30-40% of the total arable land
- Common lands constitute about 10% of the total land area of the three mandals
- Soils are generally poor in organic matter and nutrients and in water holding capacity.
- Due to excessive use of groundwater, the groundwater resource is depleted and continues to be overexploited.
- About 10-15 watershed programs are currently active in the 3 mandals
- The National Employment Guarantee Program is starting in the district
- About 10% of the village land in the selected mandals is under the Comprehensive Land Development Program (financed by APGOV)
- Indicative drought adaptation strategies have been developed for the three mandals which will allow for initial tests to be started already during the first year of the pilot.

Annex 3 :

Tentative areas of intervention under Pilot Drought Adaptation Project

	Components / sub-components	Areas of intervention
A.	Natural resource management	
1.	Community level water management system	<ul style="list-style-type: none"> • Management of community oriented bore wells by user groups with non-paddy crops • Efficient management of tank system • Social regulation against overexploitation of ground water and cultivation of high water requiring crops • Provision of drinking water for livestock and human beings particularly during dry year • Adoption of efficient methods of irrigation
2.	Management of common land	<ul style="list-style-type: none"> • Natural regeneration of biomass through social fencing • Leasing of common land to a group of resource poor families (or) Allocation of user rights over biomass exclusively to resource poor families • Use of common land as buffer for drought vulnerability
3.	Community management of private fallow land	<ul style="list-style-type: none"> • Leasing of private fallow land to women SHGs
4.	Development of assigned patta land	<ul style="list-style-type: none"> • Development of land, water and perennial biomass through integration of indigenous and exogenous knowledge systems

	Components / sub-components	Areas of intervention
B.	Production system / livelihoods	
1.	Diversification of livelihoods	<ul style="list-style-type: none"> • Diversification of overall farming systems for each typology of families • Diversification of specific components of the system (cropping system, livestock system, land use system, etc) • Development of livelihood ladders for specific typologies of families
2.	Diversification of assets	<ul style="list-style-type: none"> • Building up of assets with resource poor families • Creation of specific endowments for women headed households
3.	Diversification in agriculture and horticulture	<ul style="list-style-type: none"> • <u>Reducing drought vulnerability through minimizing external and high cost inputs</u> <ul style="list-style-type: none"> ○ Pest management through non-pesticidal methods ○ Soil productivity management through organic methods • Enhancement of lease opportunities for landless and marginal families due to adoption of labour based technologies • Community seed management for normal and contingent years • Cover crop / inter crop system (?) • Adoption of water saving crop management practices e.g. system of rice intensification (SRI)
4.	Community management of	<ul style="list-style-type: none"> • Establishment of fodder bank (of rainfed crops) • Enhancing productivity of livestock through cultivation of

	Components / sub-components	Areas of intervention
	livestock	irrigated fodder (leguminous and non leguminous crops) <ul style="list-style-type: none"> • Disease management through para workers and by community members themselves • Genetic upgradation through community managed breeding systems
5.	Community management of fisheries	<ul style="list-style-type: none"> • Re-organization of fishermen cooperative society to carry out management of fisheries by themselves • Adoption of different components of improved technology (besides improved varieties of fingerlings)
6.	Income diversification	<ul style="list-style-type: none"> • Integration of off-farm livelihoods in lean periods of employment during the year
7.	Household food and nutrition security	<ul style="list-style-type: none"> • Decentralized public distribution system
C.	Economic and institutional support system	
1.	Community managed marketing system	<ul style="list-style-type: none"> • Marketing of NPM / organic produce / indigenous products • Value additional at CBO / farm level • Using CBO platform for procurement of commodities having minimum price support
2.	Community managed credit and related incentives	<ul style="list-style-type: none"> • Utilization of revolving fund for facilitation of new paradigm in rainfed areas • Evolving internal governance system for sustainable use of revolving fund • Development of CBO based MFI by separating credit

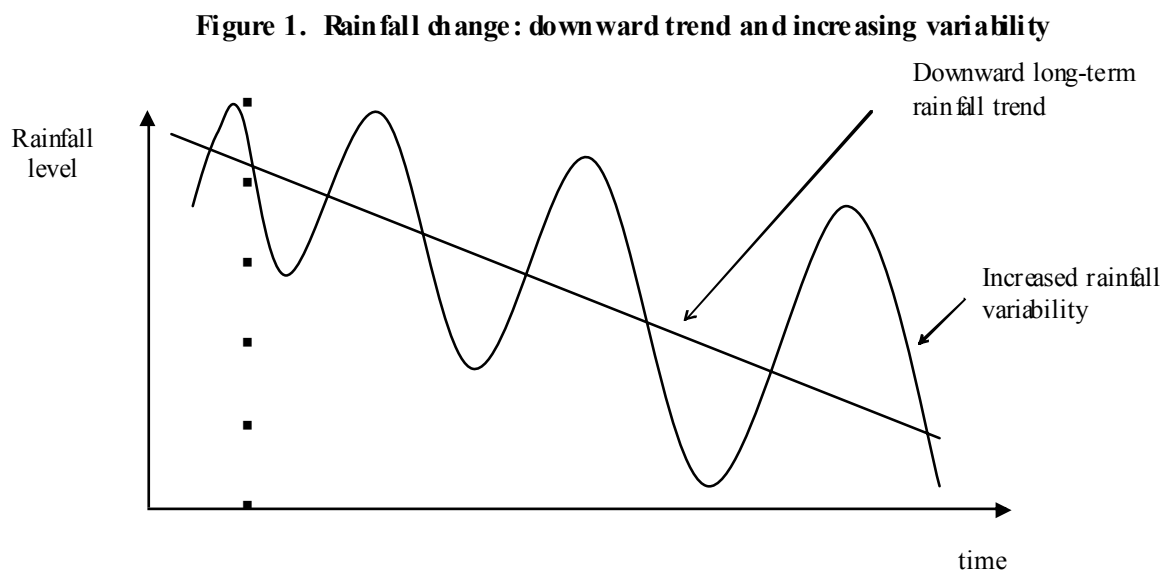
	Components / sub-components	Areas of intervention
	Drought Adaptation Risk Financing	<p>function from federation of SHGs</p> <ul style="list-style-type: none"> • Community managed insurance system • Credit of community level buffers • Drought Adaptation Insurance • Drought Adaptation Credit

Annex 4: Toward a Drought Adaptation Risk Financing Model

Climate change is likely to increase the climate variability experienced by farmers. Increased temperatures and longer drought periods are also likely to depress production. Risk financing instruments can provide farmers with financial incentives to adapt their current planting practices by protecting them against adverse events that may affect the viability of their new business. It is thus critical to develop financial tools that offer the right incentives to invest in long-term sustainable farming systems.

For the sake of simplicity, climate change is limited to rainfall change in the discussion hereafter, although temperature and other weather parameters may be of equal importance. The impact of climate change on drought risk (i.e., rainfall deficiency) can be broadly decomposed into two effects. First, the *rainfall trend effect* captures the long-term decrease/increase in annual rainfall as simulated by global or regional climate models. Second, the *rainfall variability effect* captures the rainfall variability around this long-term trend.

Rainfall is projected to decrease in the drought-prone areas of Andhra Pradesh. Rainfall is also projected to become more variable with fewer rainy days but heavier rainfall events, therefore causing a greater risk of both droughts and floods. This means that drought-prone areas in AP may face a downward rainfall trend effect associated with an increased rainfall variability effect, as illustrated on Figure 1.



Weather-based insurance

Weather index insurance products are insurance contracts that make payments based on an independent weather measure (e.g. rainfall, temperature). Unlike traditional crop insurance that attempts to measure individual farm yields or revenues, weather index insurance directly covers the cause of the loss by making use of variables that are exogenous to both the individual policyholder and the insurer but have a strong correlation to farm-level losses. When yield losses are spatially-correlated due to the occurrence of a wide spread weather event, insurance contracts can be an effective alternative to traditional farm-level crop insurance.

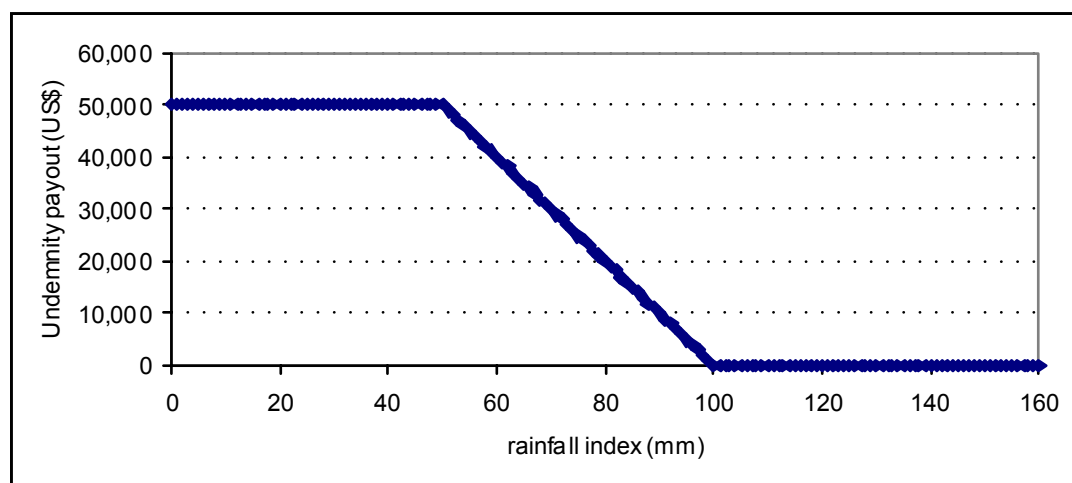
In order to successfully implement a weather index insurance program, the data used to design the underlying index must adhere to strict quality requirements, including reliable and trustworthy daily collection; integrity of recording procedure; consistence of observation techniques; daily quality control and cleaning; independent source of data for verification (e.g., nearby station); long clean historical record to allow for proper actuarial analysis of the weather risks (more than 25 years of data, less than 1% missing data, less than 5% outliers).

Publicly available weather estimates generally satisfy these properties. New innovations in technology, including the availability of low cost weather monitoring stations that can be placed in many locations and sophisticated satellite imagery, will expand the number of locations where weather variables can be measured, as well as the types of variables it is possible to measure. Measurement redundancy and automated instrument calibration further increase the credibility of an index.

Weather indices are frequently cumulative measures of precipitation and or temperature (over pre-determined growing periods of the crop). Agro-meteorological models as well as farmer's knowledge are used to identify and quantify the impact of weather on the crop production cycle. The critical growing phases are identified and the minimum and/or maximum water/temperature requirements during these successive phases are quantified. The weather index is then designed to ensure that any deviations from these minimum and/or maximum bounds will trigger an indemnity payment that will cover the farmer against crop yield losses, and particularly the excessive losses.

To illustrate this, consider a weather index insurance contract written to protect against deficient cumulative rainfall during a given growing phase. The writer of that contract (e.g., the insurer) may choose a payout rate for every 1 mm of rainfall below a minimum level (trigger), say US\$1 per rainfall millimeter below the trigger. If a farmer purchases a contract where the trigger is 100 mm of rain and the limit is 50 mm, the amount of payment will be equal to the difference between the trigger and the observed cumulative rainfall if positive, limited to 50, times the payout rate, times the liability. The figure below shows the hypothetical payout when the liability is US\$10,000.

Hypothetical weather index insurance payout schedule



Under this contract, a rainfall index of 110 mm will generate no insurance indemnity payment; an index of 80 mm will generate a US\$20,000 indemnity payment, and an index of 30 will generate a US\$50,000 indemnity payment.²

The Table below lists the main benefits and challenges of index-based insurance.

Table. Advantages and challenges of index-based insurance

Advantages of an Index	Challenges of an index
Less moral hazard	Basis risk (index payout may not exactly match individual crop yield losses)

² It is noteworthy that this payment schedule is similar to a call spread on financial markets, i.e., the combination of a long call option with a strike at 100 and short call option with a strike at 50.

Less adverse selection	Sustainability of the index
Lower administrative costs (sales and loss adjustment)	Education and farmer acceptance
Standardized and transparent structure	Weather prediction
Availability to small farmers	
Reinsurance and financial structuring	

Since its first year of implementation in 2003, this weather-based insurance market has been growing. As of March 2006, more than 150,000 weather-based insurance policies, without any insurance subsidies, have been sold by four insurance companies. This number is expected to more than triple in 2006. The World Bank is currently working with the state-owned agriculture insurance company AICI to further develop this new line of insurance business.

Drought Adaptation Risk Financing

While this new insurance product offers considerable opportunities to increase crop insurance penetration among the India farmers, it should be noted that weather-based insurance can only protect farmers against the downside variability of rainfall. In particular, this means that farmers involved in agricultural business activities that are less and less economically viable because of the long-term downward rainfall trend cannot rely on weather-based insurance or any other insurance product to restore the viability of his business. In the short term, insurance can at best restore artificially the viability of their business, therefore delaying unavoidable shifts to more viable activities.

Innovative insurance products should not perpetuate the current situation of heavy farmers' dependency on rainfall. Helping farmers in drought-prone areas to maintain the "business as usual" for sometime will make the insurance product unviable and the transition harder in the longer term. It is critical to promote crop insurance in general, and weather-based insurance in particular, for crops that are drought-resistant and thus viable under climate change. However, such activities may generate dramatic changes in cropping pattern (e.g., shift from water intensive crops like rice to rain fed crops like maize) or in the farming system (e.g., livestock), thus requiring intensive agricultural extension services. They may also expose farmers to new/unknown risks, including weather risks, technology risks and commercial risks.

Drought Adaptation Risk Financing (DARF) instruments will aim to promote a permanent shift to more sustainable farming practices, such as less water-intensive crops (particularly high value cash crops), livestock or some agro-processing activities. Their objective is to facilitate the proactive “drought adaptation” process by providing farmers with safety-net mechanisms during the transition phase. Two lines of drought adaptation risk financing products are proposed to be investigated in this project:

- *Drought adaptation insurance* that would provide coverage against “transition” risks due to a shift to drought sustainable (agricultural and non-agricultural) business;
- *Drought adaptation credit* that would provide initial capital to shift to a long-term viable business, where repayments in principal and/or interest may be postponed or (partially) forgiven in the event of a loss resulting from the failure of the adaptation investment.

The project will first identify long-term sustainable crops in each selected village based on local expertise and scientific expertise. The drought risk assessment model developed under the World Bank study, *Drought in Andhra Pradesh: Long-term Impacts and Adaptation Strategies*, offers a powerful analytical tool to identify these sustainable crops. Other sustainable business activities, such as livestock, will also be identified with local stakeholders.

Drought adaptation risk financing instruments will then be developed to promote the adoption of long-term viable business among farmers.

Two pilot products are proposed to be investigated.

- *Drought adaptation credit for livestock* will be developed to help small and marginal farmers to purchase livestock.
- *Drought adaptation insurance* will be designed for drought-resistant crop to protect farmers against crop yield losses caused by excessive drought.

These products will be developed and tested in close collaboration with local financial institutions, including insurance companies (AICI, ICICI-Lombard, etc.) and rural banks (NABARD, BASIX, etc.).

Annex 5

Type of organizations at different levels

Level	Panchayat Raj Institution (PRI)	Community based organization (CBO)	Government departments
Village	<ul style="list-style-type: none"> • Gram Panchayat • Gram Sabha • Sub-committee of Gram Panchayat (?) 	<ul style="list-style-type: none"> • <u>Credit & thrift based CBOs</u> <ul style="list-style-type: none"> ○ SHG (women) ○ RMG (farmer) ○ V.O. (federation of SHGs) 	<ul style="list-style-type: none"> • Rural development • SERP
		<ul style="list-style-type: none"> • <u>Development oriented CBOs</u> <ul style="list-style-type: none"> ○ Watershed committee, Watershed Association / User group ○ Water Users Committee / Association ○ Joint Forest Management committee ○ Education committee 	<ul style="list-style-type: none"> • Rural development • Agriculture department • Irrigation department • Forest department • Rural development
Mandal	Mandal Praja Parishad	<ul style="list-style-type: none"> • MMS (Federation of SHGs) 	<ul style="list-style-type: none"> • Rural development

			department <ul style="list-style-type: none"> • SERP
District	Zilla Parishad	<ul style="list-style-type: none"> • Federation of SHGs 	<ul style="list-style-type: none"> • Rural development department • SERP