

FURTHERING CLIMATE CHANGE ADAPTATION  
IMPACT OF DFID RURAL PROGRAMMES IN INDIA

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# Furthering Climate Change Adaptation

IMPACT OF DFID RURAL PROGRAMMES IN INDIA

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## ABSTRACT

In developing countries, a large part of the livelihood portfolio comprises of natural resources and ecosystem services, and these are critical for sustainable livelihoods. It has been universally acknowledged that climate change enhances risks of those dependent on soil, water, forests and other natural resources for their livelihoods. With similar considerations in the Indian context, adaptation strategies have to take cognizance of, and integrate livelihood protection and enhancement as integral components. Poverty being both the condition as well as a determinant of vulnerability, poverty reduction is imperative for any resilience building exercise and a starting point for such an exercise is to understand assets and capabilities of the poor. With the poor being dependent on ecosystem goods and services for their livelihoods, Natural Resources Management enhances the quality and sustainability of ecosystem services as well as supports livelihoods generation. This in turn increases coping capacities and resilience of the vulnerable to extreme events and related stresses.

Although DFID's rural livelihoods programmes in India have varying approaches, they have a unifying goal of reduction of rural poverty through promotion of sustainable livelihoods. Though, not designed with climate change adaptation interventions, the Sustainable Livelihoods Framework with inherent considerations of the *Vulnerability Context* that have direct impact on people's assets as well as livelihood options are enhancing resilience of communities for coping with "shocks", "trends" and "seasonal shifts".

This paper is based on synthesis of findings of Impact Assessment of two of the DFIDs rural projects in India namely Western Orissa Rural Livelihoods Project and Madhya Pradesh Rural Livelihoods Project. The paper analyses the findings on enhancement of livelihood assets for enhanced ability for withstanding climate change vulnerabilities. Though inherently livelihoods protection and enhancement interventions, with the evidenced results, these rural interventions essentially are "win-win" adaptation options.

**Key words:** Climate change adaptation, Sustainable Livelihoods, India

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## CLIMATE CHANGE: A BRIEF INTRODUCTION

Throughout human history, societies have adapted to natural climate variability by altering settlement and agricultural patterns and other facets of their economies and lifestyles. Human-induced climate change however increases and lends a complex new dimension to this age-old challenge.

Extreme or prolonged stress due to climate variability and change can affect the quality, quantity and reliability of many of the services that natural resources provide. This in turn has a critical impact on food intake, health, and livelihoods of poor people. Climate variability can fundamentally drive processes of impoverishment through direct and indirect routes (IRI 2005):

- **Direct:** Severe or repeated climate shocks can push vulnerable households into a persistent poverty trap when their individual coping responses involve divestment of productive assets such as land or livestock.
- **Indirect:** Climate uncertainty causes inability to anticipate when climatic extremes will occur, which acts as a disincentive to investment, innovation, and development interventions.

Small changes in temperature and rainfall have significant effects on the quality of cereals, fruits, vegetables, as well as aromatic and medicinal plants. Pathogens and insect populations are also strongly dependent upon temperature and humidity and changes in these parameters may change their population dynamics. Other impacts on agricultural and related sectors include lower yields from dairy cattle and decline in fish breeding, migration and harvests. Coral reefs may decline owing to rise in sea surface temperatures. Biodiversity is also likely to be adversely impacted by climate change. These impacts on forests will have adverse socio-economic implications for forest dependent communities and the national economy. Changes in climate may alter the distribution of important vector species (for example, malarial mosquitoes) and may increase the spread of such diseases to new areas.

## MITIGATION vs. ADAPTATION

During the past few years lot of emphasis has been given to address mitigation however, recently adaptation is being given importance. Mitigation will have global benefits, whereas adaptation benefits are on the local to regional scale, and they offer immediate benefits as compared to mitigation. In responding to climate change, adaptation should complement emission mitigation efforts and provide a window of opportunity to adjust Natural Resource Management (NRM) practices and support the sustainability of agriculture. Such adjustments could better prepare the agrarian community to cope with climate change by increasing the resilience of human and natural systems.

## DFID'S SUSTAINABLE LIVELIHOODS APPROACH

In keeping with the above, the Department for International Development (DFID), United Kingdom has been promoting a sustainable livelihoods (SL) approach that focuses not just on the needs of the rural poor, but rather, builds on the existing assets of the poor, both, at the community and individual levels. DFID seeks to assist the rural poor to improve their lives and strengthen the sustainability of people centred approach, designed to be participatory and with an emphasis on sustainability. The approach is positive in that it first identifies what people have rather than focusing on what people do not have.

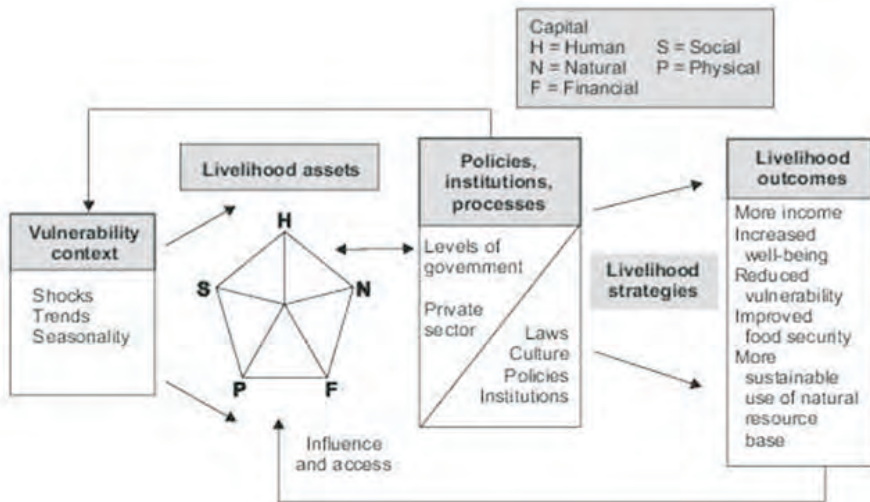
The key components of the sustainable livelihoods framework - for analysing the livelihoods of individuals and the community are their:

- capital assets,
- vulnerability context and the transforming structures (layers of organisations both in private and public sectors), and
- processes (laws, policies, incentives) which shape and influence the livelihood strategies which they adopt.

*'A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' (DFID, 1999).*

DFID distinguishes five categories of assets (or capital) – natural, social, human, physical and financial (Carney, 1998). The vulnerability context of the Sustainable Livelihoods Framework (Figure 1 below) outlines the trends, shocks and seasonality that have direct impacts on people's livelihoods. One way of managing the vulnerability context is to assist people to become more resilient and better able to capitalize on the positive aspects to build up their assets (Sustainable Livelihoods Guidance sheets, Section 2).

**Figure 1: DFID Sustainable Livelihood Framework**



(Source: Sustainable Livelihoods Guidance sheets, Section 2, downloaded from <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf> last accessed on 15th September 2009)

Sustainable Livelihoods framework is being increasingly used to analyse climate impacts and responses of affected rural communities. UK Climate Impacts Programme (UKCIP) defines win-win adaptation options as those that contribute to other desired outcomes (in this case sustainable livelihood outcomes), be they environmental, social or economic, while also improving one's ability to adapt to climate risks (Source: [http://www.ukcip.org.uk/images/stories/Tools\\_pdfs/ID\\_Adapt\\_options.pdf](http://www.ukcip.org.uk/images/stories/Tools_pdfs/ID_Adapt_options.pdf)). Hagen et al (2004) emphasize that integrated watershed management including sustainable livelihoods exert strong influence on adaptive capacities of communities. Bhandari et al (2007) has explored through case studies the adaptation and mitigation opportunities of watershed management programmes in India.

## IMPACT OF CLIMATE CHANGE IN INDIA

Being primarily an agrarian country, India has nearly 64% of its population dependent on rainfed agriculture that feeds a large and growing population, employs a sizeable labour force, and provides raw material to agro-based industries. 700 million of India's rural population are directly dependant on climate-sensitive sectors (agriculture, forests and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal zones, grasslands) for their subsistence and livelihoods (Sathaye et al, 2006). Although food grain production in India has increased from 50 million tons in 1959 to 212 million tons in 2002 (NATCOM I, 2004), India is still dependent on rainfall quantity and distribution, which shows high spatial and temporal variations. Recurring droughts coupled with limited options of alternative livelihoods threaten the livelihood security of millions of small and marginal farmers in the rainfed agriculture regions. Therefore, the rural Indian population, heavily dependent on natural resources and especially climate sensitive rainfed agriculture are likely to be the worst sufferers.

Impact of climate change on various sectors will alter the distribution and quality of India's natural resources and adversely affect the livelihood of the people dependent on the respective resources. Studies by the Indian Agricultural Research Institute (IARI) and others indicate the possibility of a loss of 3% and 10% in annual wheat and rice production, respectively, for every 1°C rise in temperature, even after allowing for the gains from higher concentrations of carbon in the atmosphere (Aggarwal et al, 2004).

In the Indian context, climate change adaptation strategies need to integrate the components of livelihoods protection and enhancement. Natural Resources Management (NRM) enhances the quality and sustainability of ecosystem services and supports livelihoods generation at the same time.

## DFID'S INTERVENTIONS IN RURAL INDIA

Although DFID's rural livelihoods programmes in India have varying approaches, they have a unifying goal of reduction of rural poverty through promotion of sustainable livelihoods. Though, not designed with only climate change adaptation interventions, the Sustainable Livelihoods Framework with inherent considerations of the *Vulnerability Context* has direct impact on people's assets as well as livelihood options that enhance resilience of communities for coping with "shocks", "trends" and "seasonal shifts". The **Western Orissa Rural Livelihood Project (WORLP)** and **Madhya Pradesh Rural Livelihood Project (MPRLP)** are two of the flagship rural projects being supported by DFID in India. Both WORLP and MPRLP aim to support livelihoods enhancement activities through increasing livestock and crop productivity, soil and water conservation, improved management of key natural resources, promotion of rural enterprise, financial services (including savings, credit, insurance and money transfers) and institutional strengthening. Hence, they have a high probability of influencing the resilience of the communities and their coping capacity to shocks and stresses, as well as supporting the ecosystem services of the project areas

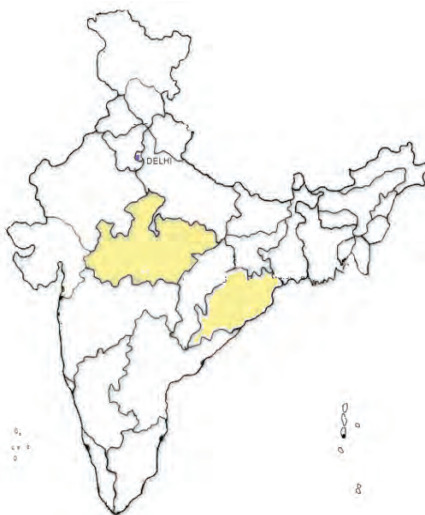
The impact analysis of these projects establishes that there is considerable improvement in all the constituent livelihood capitals incidental to the livelihood interventions. The increased capabilities in the projects are best reflected by the movement out of poverty of the target population; almost one-third of the target population in the studied projects has moved out of poverty. This is a direct indicator of resilience amongst communities for facing extreme events and shocks. The analyses also reflects that the enhancement in constituent livelihood capitals is not only able to better withstand and overcome present day vulnerabilities, but also ensures the asset building process ensures enhanced capacities

for future shocks and stresses. Though these are inherently livelihoods protection and enhancement interventions, the results and evidence classify these interventions as “win-win” adaptation options.

**The Western Orissa Rural Livelihoods Project (WORLP)** works in the East Indian state of Orissa (Figure 2 below) for protecting and strengthening livelihoods of the poorest in the four districts of **Bargarh, Bolangir, Kalahandi** and Nuapara. The project commenced in 2001 and is presently in its eighth implementation year. The project adopts a “Watershed-plus Approach” that uses micro-watershed as the basic developmental unit and **focuses** on building and working with people's existing strengths and resources. The approach is about informing, enabling, initiating and empowering appropriate choices for **long-term well being**. It involves all sections of rural society across caste, class, gender and other divides. At present, the project is being implemented in 290 watersheds across the four targeted districts of the state.

**The Madhya Pradesh Rural Livelihoods Project (MPRLP)** is operational in nine predominantly tribal districts of the central Indian state of Madhya Pradesh (Figure 2 above).

The project aims at protecting and augmenting livelihoods of the poorest in these target districts. The first phase of the project was implemented in 822 villages of the eight selected districts namely Badwani, Dhar, Jhabua, Mandla, Dindori, Anuppur, Shahdol and Sheopur. The project focuses on the poor and vulnerable: tribal populations, scheduled castes, women, landless and displaced households, migrant and casual labourers. Recognizing the vulnerability of migrant labourers, a planned support programme concentrates on developing negotiation skills, technical expertise and disseminating information on rights at the village level. A key aspect of the project is the institutional mechanism where the implementations funds are directly transferred to the Gram Sabha that acts as the local level implementation agency, thereby strengthening the existing service delivery mechanism. The project provides an opportunity to test and identify best practices and approaches that can be incorporated in the wider Government system, thereby enhancing the effective investment of other available funds in the State. Presently the second phase of the project is operational in around 3000 villages across the nine districts.



## CLIMATE RISK SCREENING OF DFID PROJECTS

Climate risk screening of all the DFID projects in India was done in 2007 using the Opportunities and Risks of Climate Change and Disasters (ORCHID) methodology (Thomas et al, 2007). For both the projects, MPRLP and WORLP, climate risks were identified and adaptation options were explored. Summary of the risk screening of the two projects is given in Table 1 below.

**Table 1: Climate Risk Screening Summary of MPRLP and WORLP**

Identified Climate Risks	Climate Risk Management and Adaptation	
	Current Practices	Additional Opportunities (some are already underway)
<ul style="list-style-type: none"> <li>▪ Weather damage to agricultural and forest production</li> <li>▪ Extreme weather damage to assets, housing, and infrastructure</li> <li>▪ Health risks through changes in malaria and water-borne disease distribution</li> </ul>	<b>MPRLP</b> <ul style="list-style-type: none"> <li>▪ Water and soil conservation measures</li> <li>▪ Capacity-building of rural communities through vocational training</li> <li>▪ Support to development of agricultural technologies and livestock management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Locally appropriate climate-hardy cultivars and agroforestry practices</li> <li>▪ Bolster existing climate risk measures including land, water and soil conservation</li> <li>▪ Enhance non-structural measures including non-farm opportunities and social protection measures</li> <li>▪ Explore joint development/adaptation benefits of low carbon energy sources</li> </ul>
	<b>WORLP</b> <ul style="list-style-type: none"> <li>▪ Supporting climate-resilient livelihood opportunities</li> <li>▪ Soil and water conservation</li> <li>▪ Support towards development of climate-hardy agricultural practices and crop varieties</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replicate and scale up successful approaches to other areas</li> <li>▪ Investigate potential to tap into carbon market for adaptation and monetary benefits</li> <li>▪ Enhance water conservation and irrigation measures, focusing on small-scale and marginal farmers</li> <li>▪ Locally appropriate climate-hardy cultivars and agroforestry practices</li> <li>▪ Explore joint development/adaptation benefits of low carbon energy sources</li> </ul>

Source: *Tanner and Nair (2005)*

## ADAPTATION RESULTS

Independent third-party impact assessments of WORLP and MPRLP were carried out in 2008 and 2009. A statistically robust randomized design on a quasi-experimental platform was used. The impact assessment exercises of the two projects ascertained the outcomes and impacts of the project. The key results evidenced in the projects are synthesized with respect to the five constituent assets (capitals) of the SL framework. The same are presented in Table 2 below.



**Table 2: Results of adaptation strategies**

Assets	Adaptation strategy	Results	
		MPRLP	WORLP
Natural	Enhanced agricultural production	Approximately 56% of the households indicate increase in agricultural productivity, average percentage being 32.01%. Cropping intensity in the project area has increased by 10%. Almost 62% of the marginal farmers have reported increased agricultural productivity	There is an increase in productivity of paddy by almost 47% in project watersheds in comparison to 28% in control watersheds with the crop being grown in almost 75% of the cultivated area. Cropping intensity status shows an improvement to 1.26 in project watersheds, an increase of 20%.
	Improvement in drought coping capacity	Around 54% of marginal farmers have reported improved drought coping capacity.	Almost three-fifth of the marginal farmers in the project area has reported improvement in disaster coping capacity i.e. drought. Almost 44% of the marginal farmers attributed the improved capacity to increase in agriculture production.
Physical	Physical infrastructure for soil and water conservation	40% of the households developed physical infrastructure through soil and water conservation activities	54% of the households have undertaken soil and moisture conservation activities viz. field bunding, contour ditch, check dams in their field.
Financial	Access to financial services	41 % of the households have accessed credit services	More than 70% of the sampled households in project villages had access to financial services
	Capital accumulation	The average per capita savings for poor members of Self-Help Groups (SHG) is INR 3382	Not Assessed
	Household income	Of the poor households, almost one-third of the households have reported increased income in the range of 15-30%. Around 37%% of the households have reported increased income in the range of 30-50%.	More than 85% of households indicate increase in agricultural and non-agricultural income. Approximately 26% of households in project villages (24% of poor) exhibit an increase in agricultural income of more than 50%.
	Enterprise development	Sizeable number of households' i.e. 12%, which have a household member who has started generating income through micro-enterprise or have up scaled up their existing traditional enterprise or has become service provider.	Two-fifth of the 5035 SHGs have started micro-enterprises

<b>Social</b>	Inclusion in groups	Approximately 43% of the households (49% of the poor) indicate that their family members are members of community based organizations like SHGs and Livelihood Promotion Groups.	Almost 79% of the poorest households are part of SHGs or Common Interest Groups formed in the project areas and involved in specific activities mandated for the groups.
<b>Human</b>	Access to Information	There is improved access to information and services in the project villages with almost four-fifth of the households reporting access to livelihood related information and services in the project villages.	The project population shows significantly better access to information for the three parameters (i.e. agriculture, non-agriculture and government schemes) assessed. More than 50% of households report access to agriculture and non agriculture information.
	Access to livelihood related services	New models of service delivery (livelihood promoter) are enhancing access to livelihood related services	Community Link Worker and Community Livelihood Resource Centre are the new models enhancing access to livelihood related services
	Decrease in morbidity due to malaria and other water-borne diseases	Not Assessed	In the project villages, almost 73% of the respondents opined that there is reduction in days of illness due to Malaria. Similarly, approximately 53% of the households have reported decrease in days of illness for Acute Watery Diarrhea.
	Access to safe drinking water	Almost 63% respondents in the project villages reported having a permanent source within 100 meters. Almost 62% of the poor reported the same.	More than three-fourths of the households have access to safe drinking water within 100 meters compared with 66% households before project.

On the basis of the findings presented in Table 2, the adaptation results of the projects are discussed here with respect to the five constituent capitals of the SL framework. The discussion focuses on the results being “win-win” and low/no-regret options. Win-win options are often associated with those measures or activities that address climate impacts but which also contribute to mitigation or other social and environmental objectives.

### A. Natural Capital

In both MPRLP and WORLP, successful implementation of the soil and water conservation measures have resulted in an increase in agricultural productivity as well cropping intensity. Better water management at the farm level reduces the risk of recurring droughts and increases the resilience of the communities to better deal with climate variability, particularly during drought periods. The increase in productivity is attributed to the enhanced water availability as a result of water harvesting and technical interventions for water conservation and moisture retention. Community responses on their increased ability for drought proofing are indicative of awareness and experiences of previous droughts and their enhanced confidence of preparedness for such events.

The projects have also addressed the issue of access to safe drinking water. This outcome reduces the vulnerability of human beings to water and vector borne diseases and hence addresses health issues. This component is very crucial as India's National Communications on Climate Change lists Orissa and Madhya Pradesh as principal malaria-prone areas.

## **B. Physical Capital**

The integrated watershed management component of the projects has resulted in strengthening the resilience of the local communities as the focus has been on sustainable crop production, ground water recharge, drought proofing, and equity issues along with creation of alternative livelihoods. In view of changing climatic conditions and the associated uncertainties in the agricultural sector, the project has contributed to strengthening the physical capital resulting in enhanced coping capacities to a changed climate regime. Development of physical infrastructure for soil and water conservation is indicative of better water retention capacity in the involved watersheds and thus enhanced opportunities for alternate livelihoods and enterprise development.

## **C. Financial Capital**

Access to formal financial resources is one of the most crucial adaptation strategies to build the resilience of rural communities. Due to lack of access to formal financial resources, the communities approach informal financial providers, for example local money lenders. Increase in financial capital in the form of increased access to financial services along with decrease in proportion of credit from money lenders are indicative of functioning formal institutions and are widely recognized adaptation measures. Availability of credit can be a key adaptive element to deal with climate change impacts. Increased income is an indicator of increased coping capacity and preparedness for extreme events.

## **D. Human and Social Capital**

Better human and social capital indicated by improved access to information and services is extremely important for adapting to climate related impacts. Climate related impacts, although being experienced in many ways, are not yet fully comprehended at the farm level and hence information and services catering to changes in agriculture practices, cropping schedule, improved and more resistant seeds, modified irrigation systems, weather forecasts, early warnings, all contribute towards increasing resilience of the communities and maintaining productivity in a changed climate regime.

Social capital accumulation is crucial for overcoming periods of stress or facing an extreme event. Formal institutions and an enabling environment result in quicker and concerted efforts during any extreme event and also for soliciting participation and transparent functioning. Regularity in these institutions result in better informed and participatory meetings, high level of awareness about project activities, transparency in decision-making and financial transparency, understanding of various financial norms as well as regular documentation. Formal institutional mechanisms ensure sustainability.

People with highly variable endowments of different capitals in the developing and the least developed countries are most vulnerable to climate change induced stress due to their lesser adaptive capacity. Adaptive capacity on the other hand is determined by factors such as wealth, access to technology, education, awareness, services and infrastructure, access to resources. Asset level improvement is a key factor that contributes towards increasing resilience of the communities to climate change vulnerabilities. With this as the basic premise, there is considerable improvement in all the constituent capitals in both the projects. The increased capabilities are best reflected by movement out of poverty in the projects.

The project area of MPRLP had approximately 1,25,650 households with 61,567 households being classified as poor. It has been estimated that that almost 24380 households or 1.22 lakh men and women have moved out of poverty. Similarly, in WORLP almost 360,000 women and men have moved out of poverty.

This is directly indicative of more resilience amongst communities for facing extreme events and shocks that are likely to be more frequent in the coming years. The impacts recorded are also indicative of better ecosystem services on which the rural population are vastly dependent. Improvement in human and social capital has a strong influence in developing a better informed community that can adapt to changing climate and related stress. Thus, although MPRLP and WORLP are rural sustainable livelihood programmes, they are best termed as “win-win adaptation options” as they have successfully increased the resilience of vulnerable communities and ecosystems to climate related shocks and stresses.

## **CONCLUSION**

There is growing recognition of the role that effective management of natural resources can play in supporting adaptation - through increasing resilience and decreasing vulnerability of people and their livelihoods to the impacts of climate change. This is of critical significance in geographies where majority of the livelihood portfolio comprises of natural resource-based livelihoods. Well-managed natural resources are of considerable potential to adapt to climate change, resist and recover more easily from extreme weather events, and provide an array of benefits to the populations depending on them. And therefore livelihood protection and diversification (non-farm IGA) initiatives that centre around these natural resources have significant role in climate change adaptation.

Climate change increases risk, particularly for those who rely on weather patterns, soils, water, and other natural resources for their livelihoods—including more than one billion of the world's poor. The magnitude, timing, and location of these climate impacts are inherently unpredictable. The threats are not likely to be new; however, in most cases, would be magnifications of existing threats. In this context, adaptation strategies should be based on interventions that will yield benefits regardless of specific, climate-related events or the win-win and low/no-regrets alternatives. Examples of such win-win strategies include rehabilitation and enhancement of natural resources, developing more diverse crop strains tolerant of a variety of different conditions (heat, drought, salt, etc.); bolstering social capital and resilience; increasing storage capacity for fresh water by building reservoirs or recharging aquifers; diversifying the livelihood portfolios by providing alternative livelihoods, creating early warning systems and preparedness plans. These strategies will be valuable regardless of the exact impacts of climate change at a particular time or location. This would not only enhance the resilience of people for the present, but also ensure enhanced ability to cope in future scenarios as the mainstay of the interventions is on 'assets'.

Win-win policies and programmes can be thus be designed that would protect the communities from climate risks and enhance livelihoods as well. For example, an initiative to reduce soil erosion and water harvesting can facilitate multiple outcomes like reclamation of degraded land, enhance water availability, enhancing agricultural production and therefore food production; and also providing employment to the poor. Where people depend on natural resources in particular and ecosystem goods and services in general; mitigation and adaptation capacities are incidental to resilience of these natural resources. These win-win adaptation strategies would be of critical

importance in strengthening the resilience of communities affected by climate change in such areas as agriculture, forests, water; each with its own challenges and multiplicity of actors.

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## CLIMATE CHANGE ADAPTATION: THREATS AND OPPORTUNITIES FOR RURAL LIVELIHOODS PROGRAMMES

Climate change is increasingly important as a policy issue for both the international community and for India. It is likely to impact on rural India in two ways:

- Changes in temperature, rainfall regime, more variable weather and increased frequency and severity of natural disasters will affect the livelihood strategies of rural people;
- The market for carbon offsets may create new opportunities for resource flows to poor rural communities.



Climate change poses a new challenge to rural livelihoods in India. Programmes need to identify the increased risks resulting from climate change and assess their significance for design and implementation.

Our rural livelihoods programmes emphasize sustainable management of natural resources and diversification of livelihood opportunities and are operating in areas where seasonal and inter-annual variability are key determinants of production and income. The rural livelihoods approach promoted by DFID is consistent with adapting to climate change. We plan to examine the extent to which our existing programmes address adaptation and to assess if any measures need to be added or strengthened in response to mounting evidence of the magnitude of climate change impacts.

### COMMUNITY BASED DROUGHT RESPONSE PROGRAMME IN ORISSA(CBDRP):

Experience over the past two decades suggests that vulnerability to extreme weather events has increased markedly. Reflecting in part the pattern of development itself, loss of life, displacement, and damage and destruction of natural, social and physical capital have all increased, and the losses are relatively greater for the poor.

The purpose of the programme was to create and strengthen community institutions in building community level emergency coping mechanism. A number of 'drought proofing' measures were undertaken, including restoration of common property resources.

Specific features include:

- Participatory drought impact assessments
- Selection of Food for work (FFW) projects and identification of FFW beneficiaries.
- Formulation of vulnerability mitigation programme with the community
- Drought mitigation plan for each village based on participatory micro level planning

Subsequent evaluation demonstrated that this combination of measures was significant in building the resilience of communities to withstand the harmful impacts of drought

International recognition of climate change as a global problem has resulted in the creation of a market for carbon offsets, through which carbon credits can be created, either by avoided emissions of greenhouse gases (GHGs) or by sequestering carbon in vegetation or soils. To date almost all of the benefits of the carbon market have been captured by medium and large scale industry and very few have flowed to the poor. However as custodians of natural resources that can be used to either reduce or increase carbon dioxide emissions, the rural poor could potentially earn significant revenue from the sale of carbon credits provided the current barriers to the carbon market can be addressed.

### Water storage for drought mitigation



Such barriers include a currently limited methodological framework for appraising projects on avoided deforestation, compensated conservation or land use change and the high transaction costs associated with large numbers of small projects. The voluntary carbon market offers a partial solution to these constraints but this is less well developed and usually commands a lower carbon price than the formal Clean Development Mechanism approved under the Kyoto Protocol.

Madhya Pradesh Rural Livelihood Programme (MPRLP) has recently initiated a scoping study of how carbon markets can be used to support rural livelihoods in Madhya Pradesh, and DFID is also supporting training in the preparation of carbon offset projects in both Madhya Pradesh and Orissa. We are also designing a Climate Change Innovation Programme with the Ministry of Environment and Forests that will focus on helping the poor adapt to climate change and benefit from any opportunities offered by the carbon market. We are hopeful that a post-Kyoto agreement on climate change will deepen and widen the continuation the carbon market, unlocking new opportunities for the rural poor to participate.

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