Water management for Micro-Watersheds in Orissa, India

GENERAL INFORMATION	
Sources of information of the practice	Sustainet, Sustainable Agriculture Information Networks, cooperative project of the German Council for Sustainable Development. Result of the workshop entitled **Evaluation of project experiences through local partners (self-evaluation) and assessment of each project's Scaling-up potential**, held in India
Relevant contacts	Project Secretariat, GTZ, Dag-Hammarskjöld-Weg 1-5, Postfach 5180 D, 65726 Eschborn, Germany Omprakash Rautaraya, Agragamee Email: omprakash1972@rediffmail.com
Useful links	Sustainet www.sustainet.org
INFORMATION ABOUT THE PROGRAMME OR PROJECT PROMOTING THE PRACTICE (IF APPLICABLE)	
Programme or project	Effective Water Management for Micro-Watersheds
Time frame	1999 - 2004
Donor	Government of the State of Orissa, Government of Germany
Implementer of the programme or project	Local NGO: Agragamee
LOCATION OF THE PRACTICE	
Region	Asia
Country	India
Province, Districts, Villages	Village of Mankadamundi, State of Orissa
Climatic zone	Sub-humid
Other descriptive information	-
INFORMATION ABOUT THE PRACTICE	
Practice category	Managing natural resources sustainably
Practice type	Technology for natural resource management Technology for improving farm productivity sustainably
Sector	Sustainable natural resources management
Institutions fostering the practice	Local NGO: Agragamee
Beneficiaries of the practice	Local farmers
Users of the practice	As above
Natural resource used or accessed (if applicable)	Water
BRIEF DESCRIPTION OF THE PRACTICE	
Background/problem statement	The village of Mankadamundi is in a very mountainous region with steep slopes and small valleys. The altitude ranges from 900-1,050 m. The village is a tribal (indigenous people) dominated village, comprising of 32 families with an average family size of five persons. The primary resource in the watershed is the rainfall received annually. The Monsoon is very intense and passes and leaves quickly. Rainfall is sometimes up to 75 mm in half an hour. The average rainfall per year is 1,300 mm. However, this rainfall occurs only over a period of 3 months; during the rest of the year the farmers face a long dry spell. Temperatures range from 19°C to 36°C in December (winter season) and from 21°C to 43°C in May (summer season).

	The main problem faced by the people of Mankadamundi was that about 80% of the monsoon rains were lost as runoff. The farmers practiced monocropping (either up-land rice or millet or maize) with little water for irrigation. The time of flowering and grain setting of up-land rice was particularly problematic with no water for a period of one week to 3 weeks, leading to up to 50-60% yield losses. Total crop losses also occurred when there was no rain at all during the critical period. Due to massive shifting cultivation,a steep slopes (30%), inadequate land use and intensive rainfall, soil erosion and degradation of arable land was also very high (80% of the arable land of the watershed is in the upland category). As a result of this poor on-farm situation, the work force (mainly men and youth) migrated to urban areas in order to seek employment. With the exception of the cropping season (June- November) sometimes more than half of the village population migrated to neighboring towns in search of work.
Approach followed	The leaders of the village Mankadamundi approached Agragamee, a local NGO that has worked on natural resource management on a watershed basis, in the state of Orissa for the last 20 years. Together with the local community they have worked to identify the problems and constraints through detailed mapping of the natural resources and transect walks. Existing local knowledge of the villagers was used to implement small-scale irrigation schemes and conservation activities. Traditionally the people from the village used the run-off from the hillsides to grow wetland rice in the valley bottomland. However, less than 10% of the cultivated land was used for irrigation in the traditional way. The techniques Agragamee implemented, together with the villagers, in the hilly area of the watershed were contour stone bunds and staggered trenches to harvest rainwater. The villagers planted cashews and Jafra in between the contour bunds to conserve the soil and have additional harvests. Arhar was also sometimes planted in between the bunds. Due to the high speed of rainwater that comes down the stream, the villagers additionally built a check dam mainly to reduce the speed of water and harvest it for the crop fields. Due to height difference (nearly 30 ft.) between the check dam in the stream and the land to be irrigated, a diesel pump is used to lift the water for the crop fields. The water is distributed through a graded channel with a gentle safe slope of 0.5% at highest possible contour to the uplands, medium lands allowing water to flow from field to field. As a result, a longer flow path was created for the runoff, increasing the time that the water takes to finally go out of the watershed. This means there is greater infiltration and subsequently better subsurface storage, surface water flow and distribution. This has ultimately resulted in raising the soil moisture in the field, both in up and medium lands, along with recharging dug wells and ponds in the lower ridge. The farmers managed to regulate the water distribution by using wooden planks. In case of an excess of water, it is allowed to flow down to the stream again. Now the farmers can irrigate their lands and are thus have a more productive and intensive cultivation and time to look after their lands.
Innovative elements	The overall investments made in the irrigation scheme were small because the techniques promoted were simple and based on indigenous knowledge.
Impacts on natural resource base	Actual: The land is now protected from drought with assured irrigation. Soil erosion was reduced. Shifting cultivation was stopped, thus the protection of the forested area increased. Dependence on the forest for timber and firewood was also reduced due to increased income from agriculture.
Impacts on livelihood of the practice users	Actual: The crop yields increased through the watershed activities leading to an improved nutrition status, especially for children. The farmers also have higher incomes and are thus able to improve their houses, buy bicycles, radios, clothing, and cooking utensils, as well as spend money for healthcare. Drinking water is now available in the wells during summer months.

Other impacts	Actual: Immigration was reduced;Larger farmers can now rent out the land to the landless for sharecropping (a tradition of the tribal population). Before the project the farmers could not rent out land due to low productivity and lack of irrigation facilities. After the project, 6 landless people had the opportunity to earn income within the village and do not have to migrate anymore. Crop diversification; The farmers are now growing vegetables for self consumption and sale both in rainy and winter seasons.
General success factors	One of the first and most important things that emerged out of Agragamee´s activities was the establishment of a Watershed Users´ Society (WUS) in the village, which governs the watershed development activities. The WUS is a self-governed, registered society. This type of institution is built upon the social structure and culture and it is a tried and trusted method of watershed governance. The watershed users´ society in Mankadamundi collects money from the beneficiaries who are using the pump and water, and put it into the maintenance fund. The amount of money to be paid depends upon the quantity of the crop harvested. During the project period Agragamee trained local “barefoot” engineers to maintain & repair the pump and the canals on a voluntarily basis.. In case of complex repair, WUS employs an external pump mechanic with payment from the watershed users´ society fund. However, WUS has a training centre in the village for training and capacity building of the watershed users, society members, women, and barefoot engineers for different watershed activities. The training centre was built by Agragamee during the project period and was handed over to the community after the project. The WUS electrified their village with the state Government support in 2005 by meeting the villages’ share (in the form of cash) from the WUS account.
Technology success factors	Address farmer needs, priorities and management Improve efficient utilization of scarce resources, increase the efficiency of input use Increase farm production and/or stabilizes it No adverse environment effects, preventing erosion and improving soil fertility
Institutional success factors	Farmer’s capacity for adoption of the technology
Problems remaining to be resolved	-
Keywords	Agricultural development, Agriculture, Basin irrigation, Crops, Drought strategies, Drought resistance, Environment, Environmental management, Erosion, Erosion control, Freshwater, Irrigation, Renewable resources, Resource conservation, Resource management, Soil conservation, Soil fertility, Technology transfer, Water conservation, Water management, Water resources, Water storage