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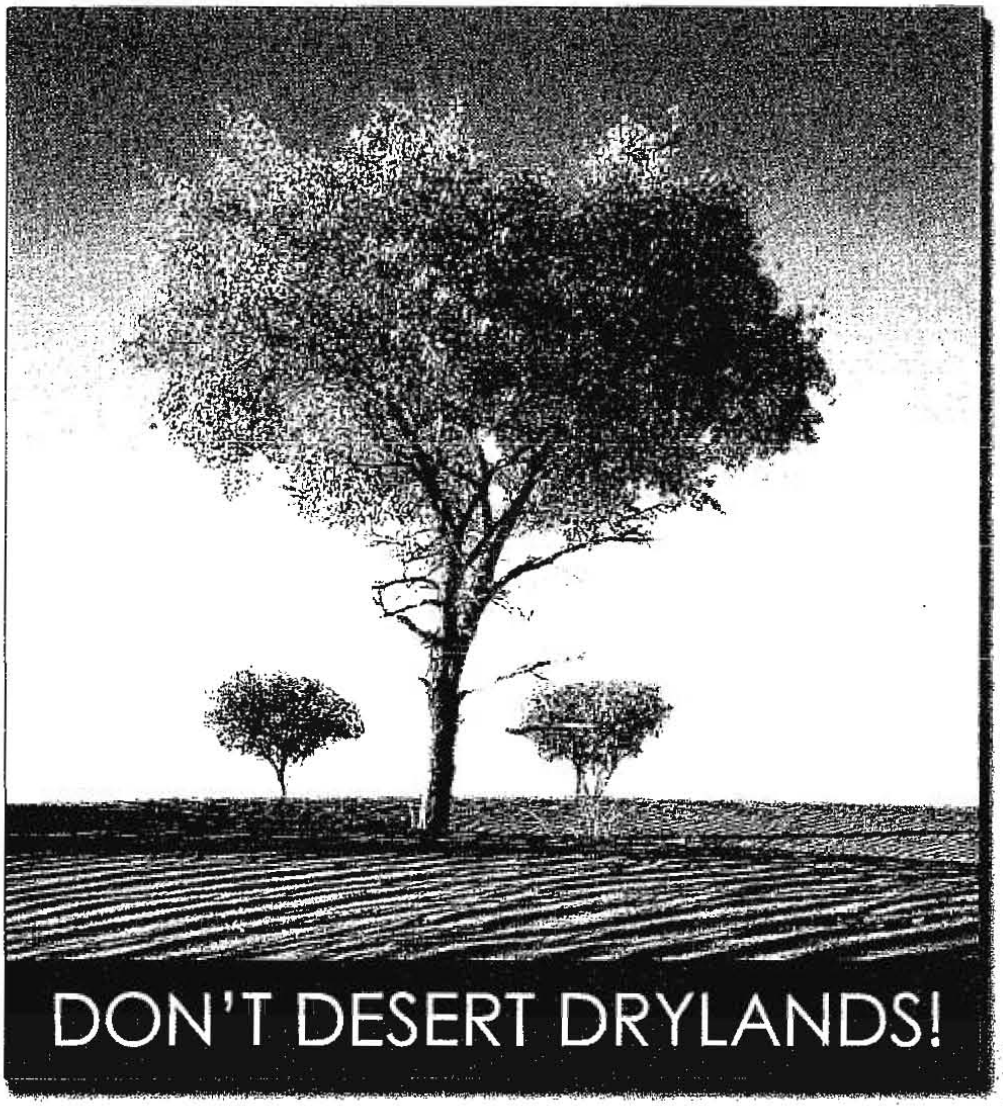

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Harnessing Gender Power and Collective Action through Integrated Watershed Management for Sustainable Development and Minimzing Land Degradation

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Abstract

Asia emerges as the hot spot for poverty, malnutrition and also for severe land degradation in the world. In India, the situation is similar as out of 852 million poor 221 million are in India and 108.6 Mha are degraded. There is an urgent need to break the unholy nexus between drought, land degradation and poverty using community watersheds to manage the natural resources such as water and land sustainably for improving livelihoods. Watershed approach is adopted by Government of India as a growth engine for development of rainfed areas. Although these programmes are silently revolutionalizing the drylands all is not well. There is need to address the issues of gender, equity to enhance participation and associated impact and sustainability of these programmes. Three selected watershed case studies in India were analyzed to study the impacts, the approaches adopted and most importantly gender analysis for identifying the strategies to harness the gender power for enhancing the collective action.

Introduction

Reduction in the producing capacity of land due to water and wind erosion of soil, loss of soil humus, depletion of soil nutrients, secondary salinization, diminution and deterioration of vegetation cover as well as loss of biodiversity is referred as land degradation. There is strong relationship between poverty, water scarcity and land degradation as most of the world's poor are in water scarce regions where land degradation is also severe. Most of 852 million hungry and malnourished people in the world are in Asia, particularly in India (221 million) and in China (142 million). In Asia 75% of the poor are in rural areas and they depend on agriculture for their livelihood. About half of the hungry live in smallholder farming households, while two-tenths are land-less. About 10% are pastoralists, fishfolk and forest users. Hungry people are highly vulnerable to crises and hazards. The crises may be caused by natural disasters, such as major droughts or floods (Sanchez *et al* 2005).

A global assessment of the extent and form of land degradation showed that 57% of the total area of drylands occurring in two major Asian countries namely China (178.9 m ha) and India (108.6 Mha) are degraded (UNEP 1997). Accelerated erosion resulting in loss of nutrient rich top fertile soil however, occurs nearly everywhere where agriculture is practiced particularly without suitable land, water, and nutrient management practices and is irreversible. The torrential character of the seasonal rains creates high risk for the cultivated lands. Of the estimated 173 million tonnes of sediment discharged into the oceans annually Asia region alone contributes nearly half of the load, even though the actual land area is just one-third. This is an eloquent testimony to the intensity of the process and the consequential damage to the producing ability of land. In India, erosion rates of 5 to 20 t/ha (up to 100 t/ha) are reported. In India, alone some 150 Mha are

affected by water erosion and 18 Mha by wind erosion. Thus, erosion leaves behind an impoverished soil on one hand resulting in low productivity, and siltation of reservoirs and tanks on the other. This degradation induced source of carbon emissions contribute also to far reaching global warming consequences. Recent on-farm participatory research by ICRISAT-led consortium in India revealed wide spread deficiency of zinc, boron, and sulphur along with nitrogen and phosphorus in 80 to 100% rainfed farmers' fields even with subsistence level of production largely due to mining of these nutrients over a longtime and no replenishments through farm yard manure or chemical fertilizers (Rego *et al* 2005). The current scenario of water availability indicates that Asia has the lowest water availability (2500 cubic meters per head per annum) in the world. Water security is directly related with the food and health security of the humankind. Asia turns out to be the hot spot not only for poverty and malnutrition but also for land degradation.

There is a strong nexus between the water scarcity during the crop growing period or drought, associated land degradation due to poor land cover and soil erosion (water and wind) accompanied by nutrient depletion and poverty (Figure 1).

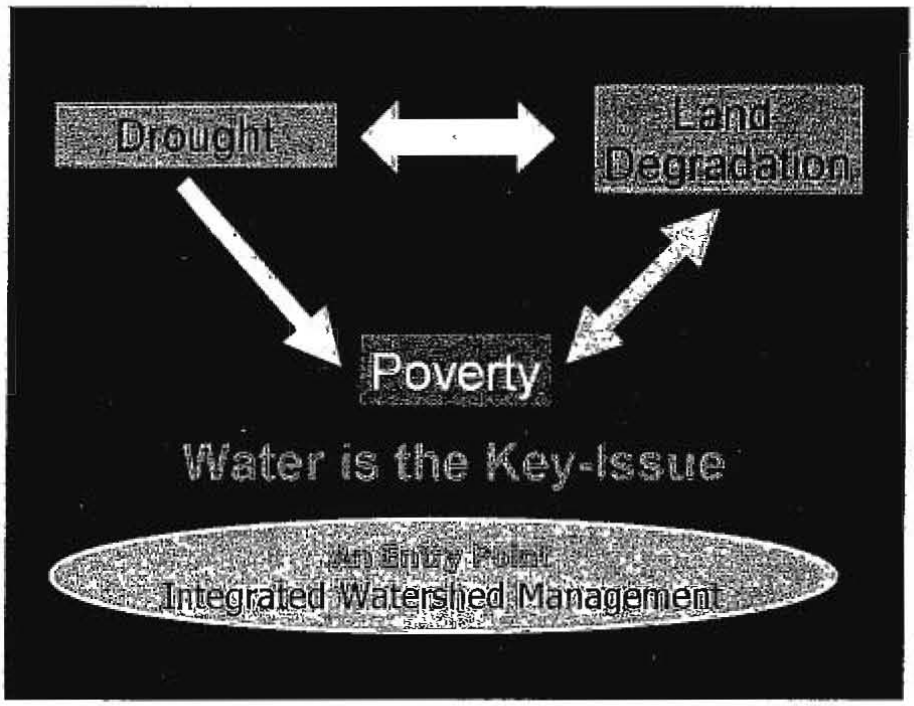


Figure 1. Nexus between drought, land degradation and poverty

This unholy nexus between the drought, land degradation and the poverty which leads to desertification has to be broken for improving the livelihoods of millions of rural poor residing in the fragile agroecosystems (Wani and Ramakrishna, 2005 and Wani *et al* 2004, 2005, 2006). In the hot arid and semiarid areas water scarcity and its inefficient use along with the nutrient limitations for crop production are the important constraints for enhancing productivity of the agricultural systems. Along with low productivity undeveloped markets, poor infrastructure and low investments in these areas contribute significantly to poverty in the region. Rainwater, the main source of water, need to be managed efficiently through its conservation and efficient use for reducing poverty and to arrest the process of desertification. Most suitable entry point to break this nexus is to manage water and land resources through community watersheds for improving the livelihoods (Wani *et al* 2006).

Watershed development in India is reckoned as the engine of growth and sustainable development in the rainfed and droughtprone areas. Hence, the watershed development program in general receives good policy support at the national and ,state levels. Several programs were launched to target watershed development with a focus to improve food security, alleviate poverty and sustain the quality of the natural resource base. In the watersheds women play a critical role in management and conservation of natural resources. They play a dual role as primary managers as most activities they undertake are dependent on natural resources; for example, fetching and use of water for daily needs, fuel wood collection, animal rearing, planting trees, and field operations. Men generally play the role of spokesperson, farm operations and decision-maker in the family. For several interventions in the watersheds, collective action, dedication, and awareness enhancement are very critical. For harnessing gender power there is a need to delicately balance the roles, responsibilities, and decision-making powers/process for both men and women for enhancing collective action and impact in the watershed.

Mainstreaming gender into poverty reduction policies and interventions

Discrimination based on sex, religion, race, ethnicity, class, and age remains at the core of social exclusion, poverty, and human misery. Women are poorer than men because they are often denied equal rights and opportunities, lack access to assets, and do not have the same entitlements as men. Gender mainstreaming means being deliberate in giving visibility and support to women's contributions rather than making the assumption that women will benefit equally from gender-neutral development interventions. The United Nations Development Programme (UNDP) advocates for participatory approaches to budgeting, creating strategies and targets aimed at reducing gender disparities, examining linkages between poverty reduction and women's empowerment, and improving national capacity for gender-desegregated monitoring and analyses. Training women on planning, articulation, public speaking, and management of accounting and conflict resolution helps in promoting the participation of women in different activities of integrated watershed management. The involvement of women is sought in the watershed program right from the planning stage as against the present practice of involving them only in implementation. Improved agricultural technologies suitable to a particular region should be introduced to reduce and balance the drudgery for both men and women.

Impact of watershed development in three case study areas

Watershed development generates various types of benefits – tangible and non-tangible – some captured by individual farmers and some by the entire community or society as a whole. Watershed programs in India so far have typically focused on natural resource conservation through interventions such as soil and rainwater conservation and to some extent afforestation in the government forestlands. Most programmes being land-based activities vulnerable groups like landless people as well as women generally get excluded. In fact it was observed that watershed programmes increased the workload on women without the concomitant benefits in terms of social status, financial or decision making powers. The issues of gender equity, community participation, sustainability, and efficient use of conserved natural resources have not been addressed adequately.

Adarsha watershed

In Adarsha watershed, Kothapally, ICRISAT-led consortium adopted the farmer-centric, holistic, and participatory approach for developing the watershed to increase the agricultural productivity and income. Based on the meta analysis results and the interlocking constraints faced by farm households prompted ICRISAT to launch its learnings of 25 years of strategic and onfarm development research using CGIAR priorities as its guide. ICRISAT-led watershed espouses the Integrated Genetic Natural Resources Management (IGNRM) approach where activities are implemented at landscape level by the community (Wani *et al* 2003). Research and development (R&D) interventions at landscape level are conducted at benchmark sites representing the different SAT agroecoregions. The entire process revolves around the four E's (empowerment, equity, efficiency and environment), which are addressed by adopting specific strategies prescribed by the four C's (consortium, convergence, cooperation and capacity building). The consortium strategy brings together institutions from the scientific, non-government, government, and farmers group for knowledge management and sharing. Convergence allows integration and negotiation of ideas among actors (Figure 2) resulting in convergence of various programmes addressing the core issue of improving livelihood and protecting the natural resources. Cooperation enjoins all stakeholders to harness the power of collective action. Capacity building engages in empowerment of the communities for sustainability.

The important components of the new model, which are different from earlier models are:

- Collective action by farmers and initiating participation from the beginning through cooperative and collegiate mode in place of contractual mode.
- Integrated water resource management (IWRM) and holistic system approach through convergence for improving livelihoods as against traditional compartmental approach.
- A consortium of institutions for technical backstopping (Fig. 2).

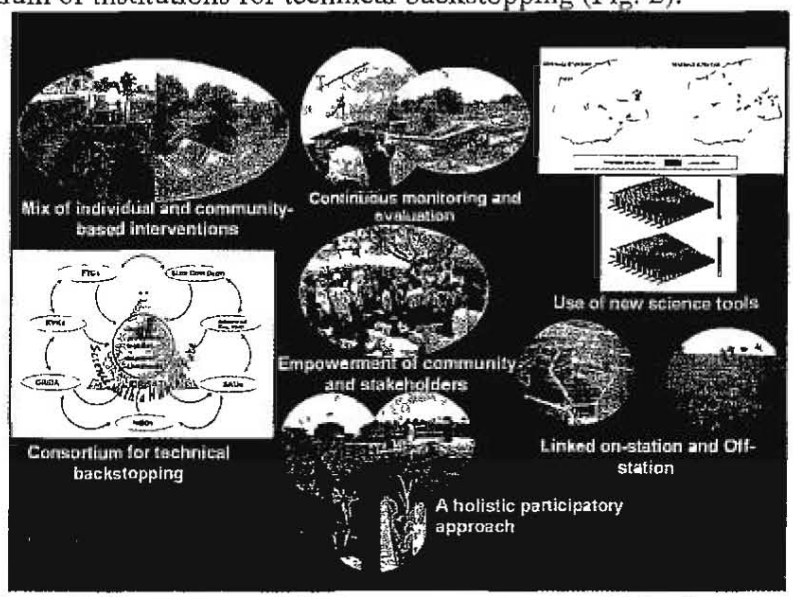


Figure 2. Farmers participatory consortium model for integrated watershed management.

- Knowledge-based entry point to build rapport with community and enhanced participation of farmers and landless people through empowerment.
- Tangible economic benefits to individuals through on-farm interventions enhancing efficiency of conserved soil and water resources.

- Low cost and environment friendly soil and water conservation measures through out the toposequence for more equitable benefits to larger number of farmers.
- Income generating activities for landless and women through allied sector activities and rehabilitation of waste lands for improved livelihoods and protecting the environment.

Integrated watershed management deals with conservation and efficient use of rainwater, groundwater, land and other natural resources for increasing agricultural productivity and improving livelihoods. Water management is used as an entry point to increase cropping intensity and productivity through enhanced water use efficiency it also aimes to rehabilitate degraded lands in the catchments for enhancing productivity, biodiversity and incomes and improving livelihoods. Such an approach demands integrated and holistic solutions from seed to final produce with involvement of various institutions and actors with divergent expertise varying from technical, social, financial, market, human resource development, and so on. Our program outputs are tuned to reduce poverty, minimize land degradation, increase productivity and production, building communities' resilience to shocks due to natural calamities such as drought and climate variability due to global warming.

Impacts

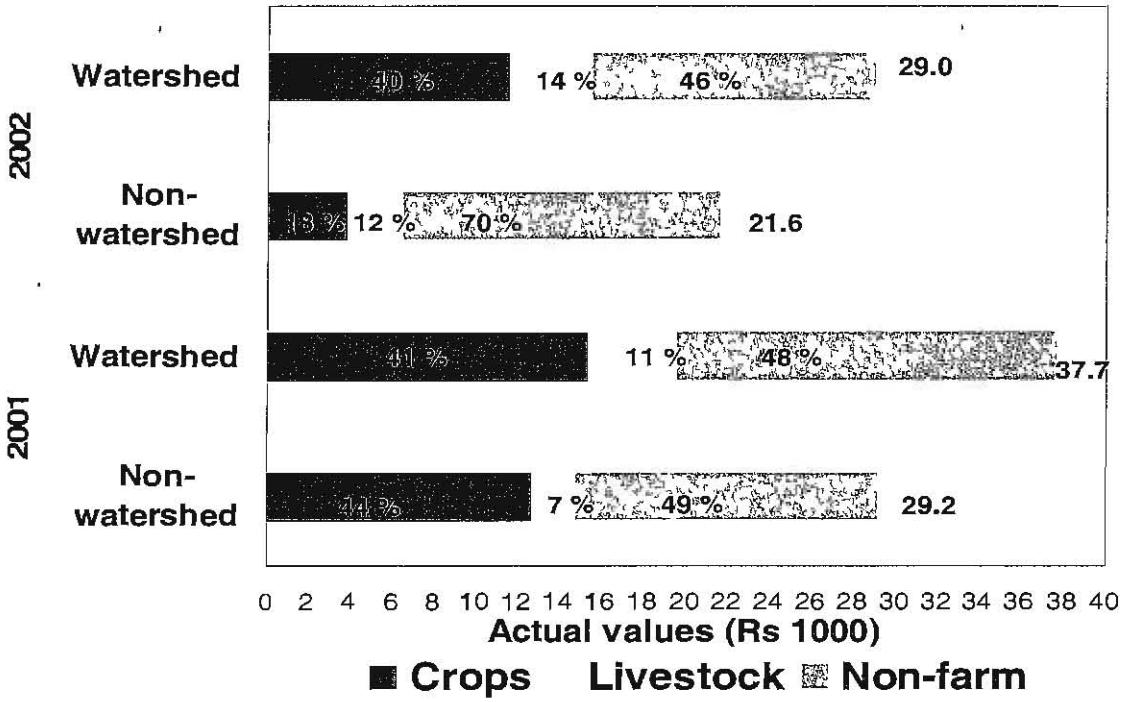
Through the use of new science tools (i.e. remote sensing, GIS, and simulation modeling) twinned with an understanding of the entire food production-utilization system (i.e. food quality and market) and genuine involvement of stakeholders, ICRISAT-led watersheds effected remarkable impacts to SAT resource-poor farm households.

Reducing rural poverty in the watershed communities is evident in the transformation of their economies. The ICRISAT model ensured improved productivity with the adoption of cost efficient water harvesting structures as an entry point for improving livelihoods. Crop intensification with high value crops and diversification of farming systems are leading examples that allowed households to achieve production of basic staples and surplus for modest incomes.

Enhanced participation of the vulnerable groups like women and the landless thru capacity building and networking was observed. The self help groups (SHGs) common in the watershed villages of India provided income and empowerment of women. The environmental clubs whose conceptualization is traced from Bundi watershed of Rajasthan inculcated environmental protection, sanitation and hygiene among children who are the important stakeholders in the sustainable development.

Building on social capital made a huge difference in addressing rural poverty in watershed communities. A case in point is Kothapally watershed. Today, it is a prosperous village on the path of long term sustainability and has become a beacon for science led rural development. In 2001, the average village income from agriculture, livestock and non-farming sources was Rs. 36500 compared with the neighbouring non-watershed village with Rs. 28600 (Fig. 3). The villagers proudly professed "*We did not face any difficulty for water even during the drought year of 2002. When surrounding villages had no drinking water, our wells had sufficient water*".

To date, the village prides itself with households owning 5 tractors, 7 lorries and 30 auto rickshaws. People from surrounding villages come to Kothapally for onfarm employment. There were evidences from other watersheds to suggest that with more training on livelihood and enterprise development reduced migration substantially. Between 2000 and 2003, investments in new livelihood enterprises such as seed oil mill, tree nursery, and worm composting increased average income by 77% in Powerguda, a tribal village in Andhra Pradesh.



In this model emphasis was laid on farm-based interventions as well as agriculture related allied income-generating activities for landless/women group members with the objective of increasing the income (Wani *et al* 2003; Sreedevi *et al* 2004) For empowerment of community members and technical backstopping, a consortium was formed comprising of research organizations, university, development workers, policy makers, and farmers.

The implementation of soil and water conservation interventions resulted reduction in runoff and rise in the groundwater level. The mean of 7 years data reveals that about 44 % of runoff and 69 % of soil loss were reduced in the treated sub-watershed compared to the untreated sub watershed. There is a significant reduction in peak runoff rate was observed in the treated sub watershed, which is responsible for the soil erosion (Table 1).

Table 1. Rainfall, runoff and soil loss from Adarsha Watershed, Kothapally, Ranga Reddy district, A. P., India, 1999-2004.

Year	Rainfall (mm)	Runoff (mm)		Peak runoff rate ($m^3/s/ha$)		Soil loss (t/ha)	
		Untreated	Treated	Untreated	Treated	Untreated	Treated
1999	584	16	*	0.013	*	*	*
2000	1161	118	65	0.235	0.230	4.17	1.46
2001	612	31	22	0.022	0.027	1.48	0.51
2002	464	13	Nil	0.011	Nil	0.18	Nil
2003	689	76	44	0.057	0.018	3.20	1.10
2004	667	126	39	0.072	0.014	3.53	0.53
2005	899	107	66	0.016	0.014	2.82	1.20

Crop	1998 Baseline	Yield (kg/ha)						
		1999	2000	2001	2002	2003	2004	2005
Sole maize	1500	3250	3750	3300	3480	3920	3420	3920
Intercropped maize	-	2700	2790	2800	3080	3130	2950	3360
(Traditional)		700	1600	1600	1800	1950	2025	2275
Intercropped pigeonpea	190	640	940	800	720	950	680	925
(Traditional)		200	180	-	-	-	-	-
Sole sorghum	1070	3050	3170	2600	2425	2290	2325	2250
Intercropped sorghum	-	1770	1940	2200	-	2110	1980	1960

* Not installed

Due to additional groundwater recharge, about 200 ha in kharif season and about 100 ha in rabi season are cultivated with different crops and cropping sequences. Adoption of improved practices like use of high-yielding cultivars and integrated nutrient and pest management by the farmers resulted in increased crop productivity and profitability. The productivity of maize increased 2 to 2.5 times under sole maize and four fold under maize/pigeonpea intercropping system (Table 2).

Table 2. Crop yields in Adarsha watershed Kothapally during 1999-2005.

The area under maize/pigeonpea and maize-chickpea has increased more than three-fold and two-fold, respectively. Farmers could gain about Rs 16,506 and Rs 19,457 from these two systems, respectively. The average household net income has increased to Rs 15,400 within watershed as compared to Rs 12,700 outside the watershed area. Farmer incomes from crop production have doubled in 2001 compared to the 1998 levels. Many women have adopted vermicomposting as a microenterprise and have become earning members of the family.

Demand driven selection of the watershed, more participation by the farmers, integrated approach, team effort and collective action by the stakeholders, social vigilance and transparency in financial dealings, increased confidence of the farmers, low cost water harvesting structures which provided benefits to several farmers, tangible economic benefits to a large number of small farm holders, good local leadership, and concerted local capacity building efforts were some of the drivers of higher impact.

Powerguda watershed

In Powerguda, though the approach adopted was similar to the Adarsha watershed, it was distinct as the women SHGs implemented the watershed program and being a tribal area the community had access to the forest resources. The SHGs with the watershed programs had six-fold higher savings than those without such programs in Adilabad district. The introduction of improved land management practices such as broad-bed and furrow and bullock drawn tropicultor, along with high yielding cultivars increased agricultural productivity by 20 to 350%. Powerguda farmers, particularly many women, learned new techniques in planting, land preparation, and intercropping. Many of them grew vegetables for the first time. Over three years, there was a remarkable change in cropping patterns shifting from cotton to soybean and vegetables (D'Silva *et al* 2004)

A women SHG managed an oil extracting machine [worth Rs 375,000 provided by Integrated Tribal Development Agency (ITDA)] to support income generating activities in the community. Seeds of *Pongamia*, neem, and other trees are crushed in this machine to extract oil that is sold in the market. The oil mill has become an important source of income to Powerguda. The women SHG planted about 8,500 *Pongamia* trees in 2002 and 2003 and 10,000 in 2004 to augment the oilseeds supply in future. Since October 2003, Powerguda has discovered a new income generating activity through nurseries. The community decided to invest in a *Pongamia* nursery Rs 30,000 received from the World Bank as part of environmental service payment. For the first time, 147 tonnes of carbon dioxide was sold from India to the World Bank (D'Silva *et al* 2004)

Average family income increased by 77% in three years from Rs 15,677 in 1999-2000 before the government invested in watershed development to Rs 27,821 in 2002–03. Seasonal migration from villages has ended totally, or is negligible. Watershed and agricultural development, complemented by other investments, have provided sufficient employment and income opportunities for the rural people to escape poverty and to stay in the village.

Since 1999, Powerguda has charted a new path of development using watershed management as the growth engine, women SHGs as institutional anchor, and a total ban on the consumption of alcohol in the village as a social platform. These steps have enabled Powerguda to march ahead of the old village and other neighboring hamlets. The people, specially the women leaders, are very proud that they have been able to outperform other villages in social, financial, institutional, and environmental development. Powerguda is distinguished from other hamlets due to the strong leadership provided by women through SHGs. Three of the four SHGs are run by women who dominate most of the development activities in the village. Trust, social cohesion, a sound local leadership and democratic functioning of local institutions are among the features of social capital in Powerguda.

In Powerguda, it is the women who pay men for the work done. Men are paid the same wage as women, except for a few specialized tasks in which men excel. Men have accepted the role reversal. They admit women are better managers of money, more transparent in financial dealings, and more successful in getting new work for the village. So long as there is sufficient work, and they are paid a decent wage, men are unlikely to complain.

Powerguda is unique in that the women SHGs are the dominant institutions in the village. These SHGs have gone farther than thrift. They now deliver some of the services

which previously were the responsibility of government agencies. For example, the village runs a *Pongamia* nursery with an annual capacity for 20,000 saplings. Also, the SHGs have replaced private contractors in implementing some of the public works. Local residents under the management of SHGs have built all the watershed structures in the village. These activities have helped to build the confidence of the SHG leadership while also increasing the coffers of the group. In the watershed contracts, there is an opportunity to save between 18% and 25% of the cost of the structures.

Janampeth watershed

The Janampeth watershed village is a step further than the Powerguda and Adarsha watersheds. With the supporting policies from the government, the SHGs at the village, mandal, and district levels are federated to increase their bargaining power as also financial and political leverage. The women SHGs federation provides a forum for women to discuss common problems. The SHG members consider the unity and solidarity among women to be one of the most important benefits of SHG membership. At the *mandal*-level federation meetings, women of different castes and class come together. This solidarity enables them to share their problems and seek help. Also by standing guarantees for SHGs, the federations help the SHGs to borrow money from financial institutions at lower interest rates. These loans are particularly useful for value-added services such as running a highway restaurant and other microenterprises. The federation takes care of book keeping and training functions of SHGs. The *Mahila Samayka darsha* (Women Welfare Society) is a federation of women SHGs and Janampeth SHGs are the members of the federation. The impact in terms of increasing the family incomes, building the social capital as well as trust amongst the women members from Janampeth is superior than the Powerguda or Adarsha watersheds.

Gender analysis of the case study watersheds

The results from the studies in all the case study villages over the period and through focused group discussions revealed that the IWMP approach adopted differed from the traditional watershed approach (Table 3).

able 3. Gender analysis of three watershed case studies in Andhra Pradesh.

Sl.No	Description	Powerguda	Janampet	Kothapally
1	**Rights**			
	Property	Men	Men/Women	Men
	Financial resources of the family	Men	Women	Men
	Employment	Men/Women	Men/Women	Women
	Education	Men	Men	Men
	Social status of women	Medium	Good	Medium
	Awareness among women	Leader fully aware	Very good	Not to the mark
	Agricultural decision making	M/W	M/W	M/W
	Resistance by men	Nil	Initial	Nil
2	**Workload on women**	+	+++	++
	Wages (Rs/day)			
	Men	50	50	50
	Women	30	30	30
	Load of invisible work	Same	Same	Same
	Work load on men	No	No	Yes
	Time spent on economic work by women	+	+++	++
	Time on social/ community work	High	High	Medium
	Marketing of agriculture produce by women	-	Yes	-
3	**Access to Assets**			
	Access to community assets	Men/Women	Men/Women	Men/Women
	Access to credit	Women	Women	Women
	Access to income	-	Women	-
	Access to information	Yes	Yes	Yes
	Access to service	Nil	Yes	Yes
4	Control on financial resources	Low	High	Low
5	Self-confidence	Slowly building-up	High	Low
6	Opportunities for exploration	Minimum	Very high	High
7	Understanding on health	Medium	High	Medium
8	Distressed Migration	0	0	0
9	Driver identified	Leader	*Mahila samakhya* (Federation of women)	Improved water availability

Based on the three watershed case studies (Table 3) for achieving gender equity for women through integrated watershed management approach, the following issues need to be addressed. Efforts must be undertaken to achieve higher functional literacy for women. Enhanced awareness of women's rights through deliberate efforts is critical for sustainable development of watersheds by harnessing the women power equitably. There is a need to involve the younger generation of girls in building up the social capital. The

educational and nutritional needs of girls should consciously be addressed to promote a more equitable society. Considering the basic rule of collective action that under stress people cooperate better and that greed for higher personal benefits affects the collective action, there is need to harness the gender power through harmony in the watersheds at all the levels starting from the family to watershed. Most important learning from these case studies is that targeted activities for women as well as also for other vulnerable groups are very much needed as component activities in the watershed programmes. Secondly, functional literacy through empowerment and training could enable the women to lead their groups well and the social capital development further enhanced the sustainability as well as the impact of the programmes. Moreover, enhanced incomes for the women also resulted in decision making powers as well as provided them the necessary freedom to reduce the workload and drudgery. Income-generating activities in the watershed programmes and continued interactions amongst the SHG members not only brought the sustainability for the institutions but also benefited the members through their experiences and learning from the other SHGs.

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