MODULE 11

SOME SUCCESS STORIES

- Ralegan Siddhi
- Hivre Bazar village
- Andhra Pradesh Farmer Managed Groundwater System
- Rainwater harvesting in Chennai city
- System of Rice Intensification (SRI)

OBJECTIVE (S) OF THE MODULE

The trainer informs the following module objectives to participants:

- There are spectacular success stories coming from several parts of India. The common factor that runs through these stories like a golden thread is the initiative and active participation of local people. The success stories have proved that management of water resources by the end users themselves can lead to sustainable benefits.
- Trainer can read these stories to the participants and then organize an open session for them to share their views, questions and local success stories.

RALEGAN SIDDHI

In the late 1970s the people of Ralegan Siddhi undertook a pioneering initiative of participatory land-water-forest management. Ralegan Siddhi was a destitute village in the early 70s with high levels of distress migration and extreme poverty. Anna Hazare, who is now a well known environmental crusader, returned to his village from the army and slowly involved the villagers to start regenerating their environment. The outstanding transformation that subsequently took place in Ralegan Siddhi had started to become evident in a short span of just 10-15 years by Mid-80s.

METHODOLOGY AND RESULTS OF WATER HARVESTING STUDIES:

The first step was successful construction of nullah bunds to increase the water levels. The villagers rennovated tanks and recharged the groundwater by the tank water. Due to the steady percolation of water, the groundwater table began to rise. Ralegan Siddhi was divided into four watershed zones. In order to conserve soil and water by checking the run off, contour trenches and gully pluges were constructed along the hill slopes. This process was supplemented by afforestation, nullah bunds, underground check dams and cemented bandhras at strategic locations. Government social forestry schemes were utilised to plant 300,000 - 400,000 trees in and around the village.

The environmental model is capable of dealing with recurrent drought. Soon, water was available even in summer.

FINDINGS AND CONCLUSIONS, PRACTICAL BENEFITS, PEOPLE AFFECTED, ENVIRONMENTAL, ECOLOGICAL IMPACTS:

Because of the increased availability of irrigation water, land that was lying fallow came under cultivation and the total area under farming increased from 630 hectares to 950 hectares.

The average yields of millets, sorghum and onion increased substantially. Water conservation efforts resulted in increased availability of groundwater which in turn facilitated the development of community wells. Water is found all round the year in more than 100 wells. Water from these wells, supplied at a moderate price, enabled the farmers to grow two to three crops a year including fruits and crops, some of which are exported all the way to Dubai even today.

Irrigation facility was provided for 1100 acres; resulting in increased yield (five times its earlier quantity). Drinking water was available at every door step.

By Indian standards, Ralegan Siddhi is a rich village now. Over a quarter of the households earn over nearly half a million rupees a year. Ralegan Siddhi is, in fact, so rich that it has now even got a branch of a major bank in the village itself.

The total savings of Ralegan Siddhi villagers alone is reportedly Rs. 3 crore (Rs.30 million or about US$ 0.7 million).

An impressive system of decision making has been created in the village. Some 14 committees operate to ensure people's participation in all decision making. Other aspects of this project include controlling the top soil erosion, afforestation, earmarking and developing specific areas to be used for fodder and fuel, rationing water equitably, participatory decision making on type of crops to be grown, disciplined grazing and voluntary labour. In 1994, the village witnessed the creation of the first women's self-help group.

HIVRE BAZAR VILLAGE

Hivre Bazar village in Nagar taluka of Ahmednagar District (MS) has emerged as a role model. The recognition has spread far and wide - DRDA is extending financial assistance for the construction of training centre for the sarpanches. State got its first National Productivity Award due to the works done in Hivare Bazar.

An M Com with profound interest in cricket, Popat Pawar is the force behind all the changes that transformed Hivre Bazar since1989. 22 liquor shops and the bad habits of gambling and fighting eclipsed the village and its progress restricting the inhabitants. The direct adverse impact was visible in the form of migration of families to meet their basic survival needs. Agriculture and all the allied activities were unprofitable.

THE IDEA THEN SNOWBALLED

The day dawned when a group of young people decided that things have to change for better. And, asked Popat Pawar to stand for the position of sarpanch, as he was not only literate but was also aware of the issues. Despite of the opposition from the family he fought and became the sarpanch for a year. During this period, he worked to improve the village's moral environment. Due to village's bad reputation the administration and deputed teachers for the village school considered as punishment posting - creating an environment not favouring learning. Soon in two months, school was locked by the villagers with the demand that the gates will reopen as district administration deputes good teachers for the village school. This was their first step in the right direction. Later in the following years, concrete steps were taken by the villagers consciously to improve the standards of education and environment in which it is being imparted.

In 1972, when the village's percolation tank was constructed under drought relief work, one of the village's wrestlers was given the task of supervision. In 1982 under the similar circumstances it was repaired.

Out of 217 households only 12 are landless. Total geographical area of the village is 976 ha (about 500 ha is arable) that is divided into three micro watersheds. Of this 70 ha is the forestland, which has been developed while working with close cooperation with the Forest Department. Presently, its entire management is villages' responsibility. The department has no guards appointed to protect the reserves. This relationship between the department and the villages was painfully developed. In 1992, the forest department rejected the request of the villagers, as the villagers due to free grazing ruined the departments' earlier works. However, the villager's persistence made the department reconsider in 1994, bringing Joint Forest Management (JFM) programme to the village and the results are evidently visible to everyone. Under JFM and EGS water and soil conservation work has been taken up in the upper reaches.

In 1995, the Adarsh Gaon Yojana was launched. Hirve Bazar was selected as the village that could be developed as the model village in the taluka. Under this program, about 52 earthen bunds, two percolation tanks, 33 loose stone bunds were constructed. About nine check dams have also been constructed in a series on the downstream nallah.

ANDHRA PRADESH FARMER MANAGED GROUNDWATER SYSTEM

Groundwater depletion is a serious issue in India. The government has approached the issue of declining groundwater levels largely through regulatory means. For the policy to be successful, it is crucial that users understand groundwater occurrence, cycle, and limited availability. Much effort has thus been placed on engaging farmers and communities. This case study demonstrates the importance to work with capacity building and social mobilization rather than physical solutions.

Groundwater depletion is a phenomenon that has been observed in large parts of India over the last three decade. The main cause for depletion undoubtedly is the overexploitation of the available groundwater resources.

Andhra Pradesh has adopted a novel approach to the problem of depletion of groundwater. The core concept of the Andhra Pradesh Farmer Managed Groundwater System Project (APFAMGS) is that sustainable management of groundwater is feasible only if users understand its occurrence, cycle, and limited availability.

To achieve this end, the project has engaged farmers in data collection and analysis, building their understanding of the dynamics and status of groundwater in the local aquifers.

The organizational component of the project is the groundwater management committee, a village-level community based institution comprising all groundwater users in a community. Data gathered through hydrological monitoring of rainfall and groundwater levels are used to estimate the crop water budget.

As part of Demand Side Groundwater Management farmers adopted various strategies for getting the same or greater benefits from pumping less water from the ground. The farmers have demonstrated in several villages that groundwater use can be reduced appreciably through relatively simple practices at the farm level and by adopting new water saving techniques.

ACHIEVEMENTS AND LESSONS LEARNED

The project has resulted in a closer alignment of water availability and water use, and reductions in groundwater use have been realized through crop diversification and water saving irrigation methods. Importantly, farmers have not sacrificed profitability to reduce water use.

The impact of the APFAMGS interventions has been brought to the notice of various government agencies in different states. Regular interactions with the Director of Andhra Pradesh State Groundwater Department (APSGWD) have led to APFAMGS conducting a training workshop and exposure visits to the officers of the department.

The training has helped the officers in designing their future work plan as well as increasing their ability to work with farmer communities in technical data collection and sustainable groundwater management.

This case study emphasis on participatory rather than passive information gathering, use of non-formal means of education, attention to capacity building and social mobilization rather than physical solutions. However, the improvements do not come from altruistic collective action but from the individual risk management and profit seeking decisions of thousand of farmers.

This makes the APFAMGS model robust and replicable, as no authoritative leadership is required for enforcement of compacts.

RAINWATER HARVESTING IN CHENNAI CITY

BACKGROUND

All over the world metropolitan water supply system managers have valued using more water per capita from increasingly distant sources, leading to crises. The inefficient design of systems unmindful of urban resources and constraints has aggravated drought-flood cycles. Harnessing rainwater and floodwater using urban space as a catchment is a striking example of environmentally sustainable service provision that is both a drought- proofing and flood- mitigation plan. Chennai, the fourth largest metropolis and capital of Tamil Nadu, covers 76 sq.km of extremely flat coastal plains and has an average annual rainfall of around 1250 mm, with more than 75 per cent falling during October-December. Averaged out, drinking-water sources consisted half of surface water and half of groundwater which in a normal monsoon year, 80 per cent came from surface-water reservoirs and 20 per cent from groundwater reserves.

The increasing drinking-water crisis in the growing city led to access water from rivers through canals or pipes running long distances that required interstate agreements. Increasing demand and ever-decreasing per capita availability led to excessive dependence on groundwater by enterprises, individuals, households and the civic authorities. As mining and selling water increased alarmingly, ground water aquifers became saline and depleted fresh-water aquifers. Recurring droughts, meant considering evacuation of urban areas.

The answer was tapping the potential of rainfall which the city received in a period of four months, invariably leading to inundation and floods, disrupting regular water supplies and sewerage systems. Drainage was impeded further throughout monsoons by rising tides and high sea levels.

INITIATIVE

In 2003, rainwater harvesting was made compulsory by law, throughout Tamil Nadu, in all buildings, not only new but also existing ones. The fulcrum of the Rain Water Harvesting (RWH) programme of the state was the political commitment shown by the Hon'ble Chief Minister Ms. J.Jayalalitha. In 2001, at the time of the elections in the party manifesto itself, the party committed to make Rain Water Harvesting mandatory and once in power it backed it by a strong political will. Efforts by the State for dissemination of information and promotion ensured sustainability both in monetary as well as environmental terms in the provision of drinking water.

In Chennai, the decentralized availability of drinking water saw the paradigm shift from a system wholly controlled by engineers and the Chennai Metropolitan Water Supply and Sewerage Board to a level of co-management. Households' accessing simple water supply systems was an innovative intervention in drinking water management, while authorities maintained large professionally controlled and formal water supply systems. The success of these measures depended on unrelated but concerted actions implementing the process 'in letter, spirit and functionality of the law'. The campaign was strengthened by a discreet but effective message that non-adoption was punishable. The design paradigm adopted by Chennai decentralized water supply systems for a more conservative, personalized water supply systems to suit the households and the community led to less wastage of water but also savings in energy otherwise needed for water and sewage treatment. Decentralized water collection and usage is more democratic as well as more ecologically sustainable than conventional centralized water supply systems.

Providing such services with people's participation is a model for all large urban cities to consider in the planning and managing of their drinking water. Chennai serves as a precedent and model for other similarly challenged cities. A city that was infamous for its acute scarcity of drinking water and exploitation of ground water started moving towards water security achieved by application of affordable and environmentally sustainable solutions created in situ and with social benefits.

IMPACT

The lessons for the other Indian cities are to shift the base for securitizing drinking water availability to citizens and households. Average rainfall in the other Metros is Delhi with 714 mm, Bengaluru with 978 mm, Mumbai with 2012 mm and Kolkata with 1800 mm and these are cities that could emulate Chennai to bring into force a decentralized water supply with the democratization of its management in an urban context. The most important lesson learnt from the Chennai experience is that Rain water is an important untapped resource for all water managers and can be collected and used personally for all uses and simultaneously diverted to ground for recharge depleting aquifers. RWH contributes sufficient quantity of water however; brief the spell of rain may be both for improved surface and ground water management. Urban built up areas serves as an excellent catchment as it can contribute to collection of good quality water not affected by run offs in fields and open spaces. RWH has the additional advantage of improving surface and ground water, and this in turn contributes to overall improvement of the urban space. It is necessary to make water security became a people's movement with involvement of engineers, builders, architects, planners, environment activists, scientists, hydrogeologists, politicians, administrators and households as stakeholders in a metropolitan city water supply system.

SYSTEM OF RICE INTENSIFICATION (SRI)

Rice is the only cereal that can stand water submergence. This explains the long and diversified linkages between rice and water, which, over hundreds of years, have affected rice ecosystems, primarily as a result of natural pressures such as drought, submergence, fooding as well as nutrient and biotic stresses.

Globally, rice is cultivated in 171m ha, of which about 55 percent is irrigated. Contrary to popular belief, rice is not an aquatic plant. Although it can survive in saturated soil, it grows best under anaerobic conditions.

PRODUCTION

Given its history, it is not surprising that nearly 90 per cent of the world's rice is produced and consumed in Asia, where nine of the world's top 10 rice producing countries are located. At present, 114 countries are reported to be growing rice. Of these, China is the largest producer, followed by India and Indonesia.

Currently, the average yield from irrigated rice (paddy) production in India is about 3.1 t/ha (ranging 2.3 - 3.5 t/ha). However, much of India's total rice area is either un-irrigated or under-irrigated. In India, rainfed rice yields range between 0.5 and 1.6 t/ha, while the country's overall average is only about 2 t/ha. This means there is ample scope for gaining on the productivity front, instead of focusing only on augmenting irrigation for increasing yield.

RICE IN A THIRSTY WORLD

In India, the 'Green Revolution' has no doubt significantly boosted the productivity of both rice and wheat. The flip side is that this achievement has resulted in a situation where costs have been disproportionately rising primarily due to the increased use of resources, be it water, fertilizer or agrochemicals. In other words, the 'Revolution' has given way to technology that thirsts for enormous amounts of water.

AVERAGE WATER REQUIREMENT FOR IRRIGATED RICE

S. No.	Farm Operation / Process	Water Consumption (mm)
1	Land preparation	150-200
2	Evapo-transpiration	500-1200
3	Seepage and percolation	200-700
4	Mid-season drainage	50-100
	Total	**900 - 2,250**

Source: FAOSTAT, 2004

A significant increase in production of rice is constrained not only by scarcity of land for cultivation, but also by water shortages. Scarcity of water is more common in areas where the conventional water-intensive method of irrigated rice cultivation through inundation is followed.

If we compare the relative water requirements of the world's three main cereal staples viz. maize, rice and wheat, we find that global paddy crop needs approximately up to five times the irrigation withdrawals needed by the two other major cereals combined. This is true even before any pre-saturation requirements and distribution losses are accounted for. Another way of conceptualising this is that the water needed to grow one kilo of rice with standard irrigation methods is similar to one person's daily water requirements for as much as four months (according to the standards of per capita minimum water requirements designated by the World Bank).

RICE ECOSYSTEMS IN INDIA

In India, rice cultivation is irrigated and/or supplemented by rainfed production. Of the approximately 45 million hectares under rice cultivation in the country, around 22.5 million hectares are irrigated.

And about 17 (38%) million hectares of rice-growing areas are in rainfed shallow lowland and deep water areas. Less than 6 million hectares (about 12 per cent of rice-growing acreage in the country) are in upland unirrigated areas, with no access to irrigation. Depending upon the water regime, the area under rainfed rice is categorised as upland (unbunded without standing water), lowland and deep water (via 'green water').

DEEPENING WATER CRISIS

Experts have estimated that by 2025 the gap between supply of, and demand for, water for irrigation in India will be 21 billion cubic meters (BCM). In addition, several micro and macro level factors such as improper management of water resources, lopsided farm management, poor crop husbandry, ineffective infrastructure and unplanned capital development plague agriculture in India.

The situation is worsening in India (and elsewhere) due to political unwillingness to adopt demand-management approaches to water-resource limitation. Studies under way in Chhattisgarh have shown that the preferred asset building approach of expanding water supply directs additional withdrawals into under-productive uses, leaving even less for wise allocation throughout the water economy.

CONVENTIONAL RICE CULTIVATION METHOD

The conventional rice cultivation method under irrigated condition involves land levelling and construction of irrigation channels. During land preparation, rice seeds are soaked, ahead of planting. Seeding is mechanised in some developed countries. In most developing countries, including India and China, the process is manual, with the seeds sown either directly or into nursery beds for later transplantation. In the latter case, traditionally seedlings are transplanted in bunches from nursery beds into flooded paddies after 20-50 days of growth, although direct seeding, bypassing transplantation, is currently becoming more common. The average seed rates result in roughly 200-300 seedlings per square meter. The rice fields are inundated with water for about three months or so, and are drained only before the harvest.

INITIATIVE

SRI - THE SYSTEM OF RICE INTENSIFICATION

The System of Rice Intensification (SRI) is a methodology aimed at increasing the yield of rice produced in farming. It was developed in 1983 by the French Jesuit Father Henri de Laulanié in Madagascar. SRI has eight basic principles:

- Preparing high-quality land
- Developing nutrient-rich and un-flooded nurseries
- Using young seedlings for early transplantation
- Transplanting the seedlings singly
- Ensuring wider spacing between seedlings
- Preferring compost or farmyard manure to synthetic fertilizers
- Managing water carefully so that the plants' root zones moisten, but are not continuously saturated
- Weeding frequently

COST-EFFECTIVE IN EVERY WAY

The System of Rice Intensification improves yields with less water, less seed, and less chemical inputs than most conventional methods of rice cultivation. This means that the returns on inputs are higher, making the method potentially more profitable than most of the traditional methods. Initially it does require significantly more labour - mainly for preparing land and weeding. Most SRI farmers have found that as they get to know the methods better and gain confidence in them, their pace of work speeds up, and SRI actually becomes labour-saving.

HIGHER YIELDS

SRI improves the productivity of land, labour, water and capital used in rice cultivation. Implementation of SRI has helped improve the yield of local varieties by between 6 and 8 tonnes per hectare. With improved management, hybrid varieties have yielded between 10 and 12 tonnes per hectare under SRI. Often a 20 to 40% increase in yield compared to that under conventional methods is observed in SRI. However, the actual yield increases depend on how well farmers practice SRI.

SUCCESS STORIES FROM FIELD

- A study of 110 farms in Purulia district of West Bengal found that the SRI method improved paddy yields by an average of 32 per cent in two rainfed villages, one of which had been hard-hit by drought.
- In Balrampur block, which was not drought-affected, the average paddy output from SRI farms was 6.3 tonnes/ha, compared to 4.2 tonnes/ha from farms using conventional methods 49.8 per cent higher). Seed requirements for SRI farms were only 2.87 kg per acre, compared to 27.17 kg per acre in the case of

conventional farms.

- In Gujarat, studies by Anand Agricultural University found that while conventional methods of rice cultivation yielded 5.840 tonnes/ha of grain, the SRI method yielded 5.813 tonnes/ha, but with 46 per cent less water usage.
- Tripura, which introduced SRI in 2001, today has about 14,000 ha of the total paddy area under the method. One can find large contiguous areas of 30-50 ha under SRI method covering groups of 20-50 farmers. Many farmers have reported higher yields. Some high yielding varieties yielded 5 to 8 tonnes per hectare under SRI method, compared to 3 to 5 tonnes/ha under conventional methods. Even the local scented and non-scented varieties showed improvements from 1.5 - 2.0 to 3.1 - 3.4 and 2.0 - 3.0 to 3.8 - 4.3 t/ha respectively.
- In Orissa, the experience of PRADAN, an NGO, is very encouraging. In Kharif 2006, of the total 1,100 SRI farmers about 67 per cent got yields of more than 6 t/ha, with the average under conventional methods being 2.5 t/ha.
- A study by the Acharya N G Ranga Agricultural University (ANGRAU), Hyderabad, covering 22 districts of Andhra Pradesh in 2003-06, found that on farms using the SRI method, seed reduction was 90 per cent, about 50 per cent less water was used, and yield improved on average by two tonnes per hectare.

SRI increases yields of traditional varieties too!

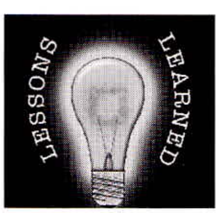
In 2006, Kishan Rao, an enthusiastic SRI Farmer from Khammam district of Andhra Pradesh, tried SRI method to grow rakthasaali, an indigenous variety of rice common in Puri district of Orissa. The variety is so named because the grains are red in colour, and locally it is believed that regular consumption of the grains would enrich blood quality.

Cultivated for hundreds of years, it had remained untouched by modern-day breeders. About 400 grams of pre-germinated seed was sown on a piece of land measuring 685 sq. m. Only well-composted manure was liberally applied one month after transplantation. The crop grew vigorously and reached a height of 5 feet 9 inches.

Activity

The trainer can discuss other success stories too, depending on the region and interest of the participants.

LESSONS LEARNED



How community initiated and owned grassroot level initiatives have brought about a miraculous result towards water conservation and management.

NOTES

The trainer can note down important notes below and discuss them towards the end of the training programme.

NOTES