Environment

Water & Environmental Sanitation Network (WES-Net India)

Solution Exchange for WES-Net India Consolidated Reply

Query: Regenerating Traditional Irrigation Systems, from Kalpataru, Orissa (Experiences)

Compiled by Pankaj Kumar S., Resource Person and Ramya Gopalan, Research Associate
22 December 2006

From Sarbeswara Sahoo, Kalpataru, Angul, Orissa
Posted 21 November 2006

Kalpataru is an NGO working in central Orissa on common property resources, specifically sustainable water resources management.

In our work, we have found that with the advent of modern watershed management technologies, such as cement checkdams, diversion weirs, canals, etc., the state and the community has very often completely ignored local, less-water intensive, low cost traditional irrigation systems. However, we find that these systems are still relevant and may play an important role, if regenerated.

In the above context, I request members to please respond to the following:

- In what ways and in what context are indigenous irrigation methods better than modern watershed/irrigation technologies? What is the relevance of these traditional irrigation systems in today's world, where there are conflicting demands on water resources?
- What are the causes for decay of these traditional systems of irrigation and water management? What have also been the failures of these traditional systems? Since these technologies are available in all districts and regions, should we emphasize and revive them, or should we focus on modern systems of irrigation only?
- Members may also please send in their experiences and efforts at trying to regenerate/ modify/upgrade traditional irrigation systems in other parts of India.

Responses were received with thanks from

1. **Debadutta K. Panda, MP Associates, Bhubaneswar**
2. **K. Padmaja, APMAS, Hyderabad**
3. **Rahul Banerjee, Aarohini Trust, Indore (Response 1; Response 2)**

4. **R. Amarnath Babu, Action for Food Production (AFPRO), Hyderabad**
5. **Mrinalinee Vanarase, IORA for Environmental Solutions, Pune**
6. **Paul Deverill, UNICEF, New Delhi**
7. **K. A. S. Mani, APFAMGS, Hyderabad**
8. **Y. Narasimhaiah, Training and Development Centre, Hyderabad**
9. **R. K. Sood, Centre for Health Promotion, Palampur, Himachal Pradesh**
10. **V. Satya Bhupal Reddy, Research in Environment, Education and Development Society (REEDS), Hyderabad**
11. **N. Sanyasi Rao, Action in Rural Technology and Service (ARTS), Srikakulam, Andhra Pradesh**
12. **V. D. Sharma, VBS Purvanchal University, Jaunpur, Uttar Pradesh (Response 1; Response 2)**
13. **Sujit Choudhury, PAN Network Pvt. Ltd, Kolkata**

Further contributions are welcome!

Summary of Responses

Are traditional irrigation systems (TIS) better than modern watershed and irrigation systems? Should we revive them or should we focus on modern systems? Members analyzed the nuances involved in the relevance and regeneration of traditional irrigation systems, and the strengths and weaknesses of TIS vis-à-vis modern irrigation systems.

Listing their **major strengths,** respondents mentioned that the TIS are:

- Generally simple and cost less - leading to higher ownership, decision-making and maintenance by communities, and thereby greater resource sustainability.
- Evolved as a response to local conditions, and are therefore easier for local people to adapt as against modern systems, which are more complicated.
- Labour intensive, and support a multiplicity of livelihoods, thereby generating more employment opportunities compared to modern systems.
- Require the efforts of the whole community, thereby enhancing the community's cohesiveness.
- Rely on local language terminology and local measures, and thus engender greater transparency and keeping away middlemen.
- Most suited for Indian conditions as the low irrigation capacity of TIS make them most suitable for Indian conditions, as most landholdings in India are small.
- Are more sensitive to nature and conservationist in their impact compared to modern systems.

These strengths were visible in the various traditional irrigation systems members cited, such as the Pat systems of **Maharashtra**, which used gravity flows for irrigation, also induced community participation. Likewise, the Ahar-Pynes systems from **Jharkhand**-, which use the force of gravity to transport irrigation water over long distances- as well as the indigenous irrigation systems of **Orissa** require and induce community participation in their functioning.

As opposed to TIS, members underlined that implementation of modern technologies often requires little or no community participation, and that the technology is often alien to local communities. As a result, the community is reluctant to take ownership of these systems during exit of the implementing agency.

Among the **weaknesses of traditional systems**, members listed factors such as the need for regular maintenance for long-term sustenance (e.g. frequent removal of soil and vegetation). Further, they can only cover small land areas, and are generally able to withstand only low levels of rainfall, causing them to break down in flashfloods.

The group also analyzed the **reasons for the decline of TIS** by pointing out that traditionally, TIS operated in social regimes where responsibility for their maintenance rested with the community. However, as in the case of Kuhls in **Himachal**, the transfer of ownership of TIS to state departments has caused a sharp decrease in the community's interest in maintaining them. Moreover, respondents stressed that decline of TIS was accentuated because catchments of most TIS have now deteriorated due to encroachment and/ or fragmentation, leading to decreased inflows. In this context, members cited the example of south India where catchments of tanks have degraded so much that any treatment of the same would now result in a decrease in inflows into the tanks.

Members further underlined that traditional irrigation systems dependent on gravity flow or water lifting had evolved in periods when the groundwater tables were higher. In recent times, due to excessive extraction of groundwater for irrigating water intensive crops, hydrological flows have reduced and groundwater tables have fallen drastically, making such systems irrelevant. Moreover, the primary function of most TIS has been flood control, as well as for providing fish, drinking water, and for religious rituals. With a change in these functions, these systems have gradually lost their relevance. However, respondents emphasized that although revival of TIS would take time, the benefits were worth the efforts and cited the attempts of Nirmal Ganga Abhiyan in regeneration of streams by initiating competitions for the "most conserved streams in two districts in **Maharashtra**.

Discussants contended that TIS would remain relevant if they were able to adapt to new roles. As an example, they mentioned that in some places, irrigation canals now carry sewage. However, such water needs to be treated before sending it out into the sewage line. In cases of reduced water availability, members underscored these techniques such as International Development Enterprise (IDE)'s low-cost drip irrigation systems were important, as well as less water intensive crops. They felt that there was a need to rise above the debate about whether traditional or modern irrigation systems are superior. More important, members stated, was to see how communities could use TIS in improving water management.

Even in modern systems of irrigation, respondents felt that there was ample scope for incorporating scientific vision in their implementation. For example, implementing agencies could further emphasize agronomic and vegetative measures in modern watershed programs, and conduct basic investigations such as identifying drainage systems to ensure adequate information.

In sum, while appreciating the conventional wisdom and adaptation that these systems represent, participants underlined the need to evaluate them for the role they can play in modern times, given the changed natural resource and socio-institutional conditions. Only such an honest analysis would make traditional irrigation systems germane to contemporary needs, they felt.

Comparative Experiences

From Rahul Banerjee, Aarohini Trust, Indore (response 1; response 2)

Madhya Pradesh

'Pat' System
The Bhil tribals of Jhabua district have a water harvesting system, eminently suitable to hilly terrains. This consists of constructing a temporary diversion weir of earth and stones on a hilly stream at the beginning of the kharif season and diverting the water into channels, going downstream. After about a kilometer, the canal is at a height from the streambed and irrigates the farm situated on the banks by gravity flow, thereby being economic in its usage. Read more

Jharkhand

Community Managed Gravity Systems
In addition to pats and kuhls, the ahar-pynes take advantage of the lie of the land to divert water from rivers and streams into channels called pynes. These pynes are sometimes as long as twenty kilometers ending up in tanks called ahars, embanked on three sides, the 'fourth' side being the natural gradient of the land itself. Ahar beds were used to grow winter crops after draining out the excess water that remained after summer cultivation

Orissa

Participatory Irrigation System in Tribal Area
The Khond tribals in present day Bolangir and Phulbani districts developed this irrigation system in the 16th century. A system of percolation tanks, diversion weirs and channels takes advantage of sloping terrains to conserve natural run off and utilize the flow of larger rivers such as the Mahanadi. This system required community participation to sustain it. Unfortunately, modern irrigation practices destroyed this system and this fertile area is now drought prone.

Participatory Watershed Projects *(from Debadutta K. Panda, MP Associates, Bhubaneswar)*
The evaluation of watershed projects implemented by the Government and NGOs revealed that people's participation in Govt. projects was not as forthcoming as in NGO projects. The use of highly technical water harvesting technologies makes it difficult for the community to take over management during the exit of implementing agency. This problem is absent in projects implemented by NGOs due to the customization of technologies to users' knowledge and needs.

Maharashtra

Nirmal Ganga Abhiyan *(from Mrinalinee Vanarase, IORA for Environmental Solutions, Pune)*
Proposed by Ecological Society who will organize a competition among villages for the 'most well managed stream' in rural areas. This is an attempt to reach out to people, encouraging them to restore perennial or non-perennial streams on their own initiative. The one-year activity will begin with a workshop for the participants in the competition with the purpose of creating awareness about the importance of stream rejuvenation and steps to achieve it. Read more

Himachal Pradesh

***"Kuhls"* in the Kangra valley** *(from R. K. Sood, Centre for Health Promotion, Palampur, Himachal Pradesh)*
Communities traditionally owned Kuhls and used them for irrigation, water supply and running watermills. The ownership has now been taken over by irrigation and public health departments resulting in enhanced water conflicts and dumping waste into kuhls, thus causing health hazards. Further, new hydel projects reduce and/or stop water supply into Kuhls. A Himalaya Niti Campaign is advocating for sustainable policy, to harmonize relating concerns.

Multiple States

Low-Cost Drip Irrigation *(from R. Amarnath Babu, Action for Food Production (AFPRO), Hyderabad)*
Drip irrigation represents less than 1% of irrigated acreage in spite of its relatively rapid adoption over past 10 years, mainly due to its high installation cost. To address this, IDE developed, tested, and initiated rural mass marketing of low cost drip irrigation systems starting at Rs. 180 for a home garden bucket kit. Irrigating crops (with 1m spacing) cost 9-10,000 Rs./acre compared to 23,000 Rs./acre for conventional drip systems. Read more

International

From Ramya Gopalan, Research Associate

Iran

'Kareze' System
This system of irrigation originated about 3,000 years ago and was devised to tap groundwater through gravity flow. A gently sloping tunnel conveys water from below the ground to the surface irrigating on average 10-20 hectares of land with the water flow varying seasonally. Specialists known as muqannis construct karezes usually on a communal basis. In spite of its utility, the transition to tubewells and dug wells was encouraged by irrigation surveys. Read more

Oman

'Aflaj' System
A system of tapping underground water led by fabricated subterranean channels to villages for irrigation and domestic purposes. The main structure consists of the mother well of depth 65-200 feet, the main channel, and the access shafts built every 50-60 meters along the channel. There are two types of Aflaj with average water flow of nine gallons/second. The system affected the organization and community development, particularly of early settlers. Read more

---

Related Resources

Recommended Organizations

Foundation of Ecological Security (FES), Gujarat *(from K. Padmaja, APMAS, Hyderabad)*
PB No.29, NDDB Campus Anand 388 001, Gujarat; Tel.: 91 2692 261303; Fax: 91 2692 262087/26
http://www.fes.org.in/includeAll.php?pId=Mi01LTI=

> *For experience on the river basin, approach and issues related to management of common resources and revival of traditional water management systems*

International Development Enterprises India (IDEI), New Delhi *(from R. Amarnath Babu, Action for Food Production (AFPRO), Hyderabad)*
C 5/43, Safdurjang Development Area (1st & 2nd Floor), New Delhi 110016; Tel.: 91 11 26969812, 26969813, 26964632; Fax: 91 11 26965313; mailbox@ide-india.org
http://www.ide-india.org/ide/drip.shtml

> *For details on IDE's Low Cost Drip Irrigation Program aimed at addressing irrigation problems of small and marginal farm families living in water scarce regions of India.*

Recommended Documentation

The Potential Contribution of Low Cost Drip Irrigation to the Improvement of Irrigation Productivity in India *(from R. Amarnath Babu, Action for Food Production (AFPRO), Hyderabad)*
Paul Polak and R. K. Sivanappan; IDE and Tamil Nadu Agricultural University
Click here to read PDF (Size: 115 KB)

> *Details IDE's experience in developing, field testing, and initiating rural mass marketing of very low cost drip irrigation systems*

Nirmal Ganga Abhiyan *(from Mrinalinee Vanarase, IORA for Environmental Solutions, Pune)*
Ecological Society, Pune
http://www.solutionexchange-un.net.in/environment/cr/res04120601.doc (Size: 51 KB)

> *Accounts Ecological Society's efforts at finding affordable alternatives to stream restoration which also protect streams' ecological values for people and for nature*

From Rahul Banerjee, Aarohini Trust, Indore (response 1)

The Unsilenced Valley
Down to Earth Magazine, Special Report; June 15, 1996
Click here to read

> *Reports the 'pat' system still being used by the Bhil Tribals because it is much cheaper than modern irrigation systems and is run entirely on community involvement*

Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System
Fourth Citizens' Report, Centre for Science and Environment (CSE); 1997 (paid publication)
Purchase details at: http://csestore.cse.org.in/store1.asp?sec_id=1

> *Book is a big effort to comprehensively document India's millennia-old wisdom in water management particularly accounting the 'Pat' system under the title 'Pat Answer'*

From Ramya Gopalan, Research Associate

A Traditional Water Source
"Balochistan Conservation Strategy" 2000, IUCN; Frontline Vol. 18, Issue 8; April 14-27, 2001
http://www.hinduonnet.com/fline/fl1808/18080680.htm

> *Brief on the traditional kareze system of irrigation originated about 3,000 years ago in northwestern Iran, which was replaced by tubewells and dugwells since the 1970s*

The Traditional Aflaj Irrigation System
Nizwa.net; Oman
http://www.nizwa.net/agr/falaj/

> *Details Aflaj, the main source of irrigation water in Oman beside wells, utilized in agriculture as well as for domestic use since ancient times*

Recommended Portal and Information Base

Rainwaterharvesting.org *(from Rahul Banerjee, Aarohini Trust, Indore; response 2)*
http://www.rainwaterharvesting.org/Rural/Traditional2.htm

> *Provides information on India's Traditional Rural Water Harvesting Structures such as the Tanka, Khadin, Bavadi, Bhanadaras, Phad, Kher, Zings and more*

Responses in Full

Debadutta K. Panda, MP Associates, Bhubaneswar

Indigenous Technologies are important to the beneficiaries because the users can better understand and manage these technologies. In Orissa, it is difficult to bring the participation of users in modern water harvesting and water management methods. I have evaluated two watershed projects implemented by Govt. of Orissa and many watershed projects implemented by Non-Government organizations. I found out that people's participation in Government projects was not as forthcoming as in NGO projects due to the use of highly technical and modern water harvesting technologies used. Also, in modern technologies, the exit of the implementing agency becomes problematic as the community is not able to easily take over the management of the technologies.

In case of projects implemented by NGOs- the methods, technologies and innovations have been customized to users' knowledge and needs. The water management and irrigation technologies are also differentiated based on the cost involved and the size of the user group. In my experience, indigenous technological knowledge generally incurs less cost and will be more suitable for small user groups but modern technologies involve more cost and address a larger population.

K. Padmaja, APMAS, Hyderabad

I completely agree with your statement that the community has completely ignored the traditional irrigation systems, which are relevant even today! One of the reasons that could be attributed to this is the way in which the new schemes are being planned and implemented with little or no community participation.

If we look at our traditional irrigation systems, the villages used to be self sufficient in terms of the meeting the local water demands. Various livelihoods of the village used to be dependent on irrigation sources like tanks (e.g. farmers for irrigation, water or livestock, water for washing clothes, etc.). If we can revive not just the resources but also the associated water management systems, then we could definitely address the issue of increased demand of water resource.

I would suggest that you look into the experience of Foundation of Ecological Security (FES) working in Chitoor District of Andhra Pradesh for about 20 years on river basin approach. They are also working on the issues of management of common resources and revival of traditional water management systems. I have seen the revived water ponds in the operational area of FES. The efforts required for achieving the same seems to be very time consuming, but worth pursuing.

Rahul Banerjee, Aarohini Trust, Indore *(response 1)*

The Bhil tribals of Jhabua district have a unique water harvesting system, which is eminently suitable to the hilly terrain. This consists of constructing a temporary diversion weir of earth and stones on a hilly stream at the beginning of the kharif season and diverting the water into channels, which also go downstream along the bank of the stream - but at a lesser gradient than the stream itself. So after about a kilometer or two, this canal is at a considerable height from the stream bed and can reach a farm situated on the bank of the stream to irrigate it. This system is called the "*pat*" system by the Bhils and is still being used by them because it is much cheaper than irrigation through both electric or diesel powered pumps.

I reported this in the Down to Earth Magazine where it was published under the title - "The Unsilenced Valley" on June 15 1996. Later an edited version of this article was also published in the 4th Citizen's Report - "Dying Wisdom", brought out by the Centre for Science and Environment, Delhi in 1997 under the title "*Pat* Answer" on page 172.

The important thing about this system is that it has to be put in place and maintained with the involvement of the whole community. In village Bhitada on the banks of the Narmada, the *pat* is taken to fields over four kilometers downstream from the place where the weir is constructed. Our organisation, Khedut Mazdoor Chetna Sangathan, has done its best to keep this system alive and one of our full time activists himself uses a *pat* to cultivate his own land.

R. Amarnath Babu, Action for Food Production (AFPRO), Hyderabad

I work as a Hydrologist in Action for Food Production at Hyderabad, Andhra Pradesh.

It gives me immense pleasure to share some of my experiences on the issue raised by you, based on nine years of adopting indigenous irrigation technologies in my projects.

FIRST ISSUE:
In the context of indigenous irrigation technologies, transparency can be obtained between the professionals and laymen. For example, in estimation of structures, professionals generally follow engineering estimates but keeping in mind the indigenous material and local languages, we can bring these engineering estimates closer to people's estimates as follows:

- Professional/Government estimate:
    - Preparation of estimate using standard specifications and standard schedule of rates.
    - Generally prepared using the standard units and English language.
- People's estimate:
    - Preparation of estimate using standard specifications and local market rates.
    - It is understandable to every one and prepared in the local language.
    - It is to be prepared in the local units.

Based on this difference, we can reduce conflicts to the maximum extent. I have found that understanding the language, units and materials is most important for the end user of any developmental project such as a farmer, agricultural labor, other beneficiary.

SECOND ISSUE:
Of course, a traditional system of irrigation and water management has got its own advantages and disadvantages, such as:

Advantages:

- Low cost of the structures
- Good quality of the works
- The feeling of responsibility is more among village people
- Ownership for the structures is enforced and better participation in decision making
- The committees/groups managing the structures are responsible to village people
- Greater transparency in utilization of funds/materials
- Generation of more employment days
- Low scope for making profit
- Elimination of the middle men

Disadvantages:

- Annual maintenance and management required
- Sustenance of the structure depends only on maintenance
- Benefits will be limited/confined
- Structures may survive only for low rainfall areas and not suitable for flashfloods
- Frequent removal of soil and other vegetative matter

However, it is highly recommended that new technology/methods have also got their own advantages and disadvantages, provided the community/people are able to make efforts to maintain and manage them. For this, orientation programmes, awareness, trainings and demonstration is necessary.

Mrinalinee Vanarase, IORA for Environmental Solutions, Pune

We very much agree with Mr. Sahoo's concerns. This is what we call as the difference between a Hydrological and a Hydraulic civilization. The Hydraulic type of management creates an artificial scarcity of water and then tries to manage it. As opposed to this, the hydrological type of water management relies on natural systems and works within the threshold of eco-processes.

We strongly feel that it is important to look at the issue of equal distribution of water in assessing present pattern of irrigation. Our experience in this field will be more enriched after completion of Nirmal Ganga Abhiyan, a campaign we are launching to protect and regenerate traditional springs.

For details on the Nirmal Ganga Abhiyan, please see link below: http://www.solutionexchange-un.net.in/environment/cr/res04120601.doc (Size: 51 KB)

Paul Deverill, UNICEF, New Delhi

One potential problem of regenerating traditional irrigation systems, including tanks in Tamil Nadu, concerns land ownership. Is it correct to say that what used to be collective or communal land has now been divided and subdivided to the extent that 'managing the catchment' becomes a very difficult proposition. Members may like to share their experience on managing the catchment in the context of regeneration of traditional irrigation systems.

K. A. S. Mani, APFAMGS, Hyderabad

Personally, I would not consider traditional technologies better or modern systems inferior. Evaluation needs to be based on current requirements while traditional requirements could have been different. That apart, traditional irrigation systems have been facing gradual extinction due to various reasons including land encroachment. Are all traditional systems relevant today? Probably not. Many irrigation systems had a primary flood function and secondary irrigation/fish culture/drinking water/temple water tank function.

In the current scenario if the catchment areas have been well treated through watershed programmes, then the inflow is likely to be substantially reduced (except during flash floods) and water availability in these structures shall be very limited. An empty/half empty tank is always an opportunity for land mafia to encroach.

In many situations (Urban and peri-urban) the irrigation systems today serve the role of storing domestic sewage. This is a need of the day. Can we do something to ensure that the sewage is treated (using simple technologies) and sent into the water bodies for secondary use? So traditional systems can thus come to play new role and also become relevant, thus ensuring upkeep and maintenance.

Y. Narasimhaiah, Training and Development Centre, Hyderabad

One of the major problems in revival of traditional irrigation systems is the change in the amount of water use and the groundwater table. For example, some traditional irrigation systems comprised of conveyance of water by gravitational force from tank systems and ponds. Other systems relied on lifting water from dug wells using animals. This was possible because water table in wells and ponds were sufficiently high making lifting or water conveyance easy. Also, the requirements in earlier times were low.

Today, there is an increase in demand due to faulty irrigation water management (e.g. by flood irrigation) and due to an increase in water intensive crops. There is a heavy withdrawal of groundwater in short duration using electric motors, partly because of erratic electric supply. Now the water table has gone so deep that in a majority of the areas, these traditional irrigation systems are not able to work. Similarly, the system tanks (consisting of irrigation tanks) are facing problems of loss of collections, or due to an encroachment of tanks by housing colonies, etc. Wherever irrigation tanks are available they are dry as the catchment has been used either for agriculture or housing. Thus, the revival of traditional irrigation systems can be feasible in areas where the problems can be overcome.

Looking at possible solutions, the immediate task before us is to find low cost, community manufactured and maintained drip systems so that we can save a lot of water and money for the community. A good example is the International Development Enterprises, New Delhi, which has developed very low cost drip systems. Research has to be done on developing crops that require less water and supported by affordable drip systems. Our approach should be towards better water management systems rather than reviving traditional irrigation systems alone.

R. K. Sood, Centre for Health Promotion, Palampur, Himachal Pradesh

The article sent by Rahul Banerjee - "The Unsilenced Valley" reminds me of the neighbourhood "Kuhls" (gravity-based irrigation canals) in the Kangra valley of Himachal Pradesh. These kuhls were built by the kings for irrigation and water supply in ancient times. Watermills were also run on these, used by the community to grind flour. These kuhls were community-owned and maintained by people themselves. Now the irrigation and public health departments have taken over these khuls and repairs are now done by contractors. The community now have little ownership and they now fight for diverting water to their farms. People are also dumping their waste and garbage into these water bodies and the polluted water is being used downstream as a drinking water source- hence it has become a public health hazard.

The future of these kuhls is now threatened as hydel projects coming up in the area ignore the community concerns to release water into these lifelines of the villages, causing a reduced/ stopped water supply into the Kuhls.

A Himalaya Niti Campaign is advocating for a sustainable policy, which harmonises development and ecological concerns.

V. Satya Bhupal Reddy, Research in Environment, Education and Development Society (REEDS), Hyderabad

REEDS is working on traditional irrigation systems and its renovation, rejuvenation and repairs of minor irrigation tanks in Mahbubnagar district. REEDS has also implemented a successful people's watershed in Ranga Reddy district of A.P. For further details, please contact us.

Rahul Banerjee, Aarohini Trust, Indore *(response 2)*

A number of community managed gravity systems were traditionally used in India in addition to *Pats* and *Kuhls*. In Jharkhand, there are the ahar-pynes which take advantage of the lie of the land to divert water from rivers and streams into channels called pynes, which are sometimes as long as twenty kilometers ending up in tanks called ahars.

See http://www.rainwaterharvesting.org/Rural/Traditional2.htm

This site also has descriptions of a host of other traditional systems. The most interesting example I have come across is in Orissa of the Khond tribals in present day Bolangir and Phulbani districts, who developed a unique irrigation system in the 16th century AD. A system of percolation tanks, diversion weirs and channels were used to take advantage of the slopy terrain to conserve natural run off and also utilize the flow of the larger rivers such as the Mahanadi. This system required the participation of the entire community to keep it in good shape. Unfortunately modern irrigation practices have led to this system being destroyed and consequently this once fertile area has now become drought prone (Chhotroy, P.K., "Traditional Irrigation System of a Tribal Area - A Case Study of the Ex-state of Sonepur"). The interesting thing is that whether it is the pat, kuhl, ahar-pyne or the Orissa example, these are all inventions of adivasis and involved community participation. These systems are sensitive to nature and therefore conservationist in essence, as opposed to modern systems of irrigation which are exploitative and so destructive of water resources.

N. Sanyasi Rao, Action in Rural Technology and Service (ARTS), Srikakulam, Andhra Pradesh

Greetings from ARTS. There is a need to stress the use of traditional irrigation systems, which sustain the rural economy and ecology through a participatory approach by providing irrigation, fish, water to cattle, water to washer men and other rural poor. ARTS has initiated a participatory water resource management in Srikakulam district through participatory approaches for tank and other traditional water harvesting systems in the area.

V. D. Sharma, VBS Purvanchal University, Jaunpur, Uttar Pradesh *(response 1)*

Dear friend Sarbeshwar,

I am happy to know that you are making sincere efforts in the right direction to regenerate traditional irrigation systems.

In my opinion, traditional systems of irrigation have been sustainable for innumerable years without creating any type of problem, whether of water pollution or of acute shortage of drinking water. The so called western model of development, including watering/irrigation, has created a

lot of problems. We will need to go back if we want to survive. We have to recognize the actual price of water in a real sense and honor the knowledge of the common people.

V. D. Sharma, VBS Purvanchal University, Jaunpur, Uttar Pradesh *(response 2)*

Sahoo's organisation, Kalpataru is doing an appreciable job long required in the Indian context. In our country, the average land holdings are small, about half to one hectare. This much land can be irrigated with traditional systems, which need very low or negligible cost and allows sustainability of the resource, i. e. water essential for survival of ecosystems.

Sujit Choudhury, PAN Network Pvt. Ltd, Kolkata

The basic question asked by Mr. Sahoo is very important in the context of our present day watershed management conceptualization and its practices. Sustainable watershed management requires a scientific vision with a strong understanding about various components of the watershed. These components could range from geology, geomorphology, soil, vegetation, agriculture, climate to social practices, etc. The so-called modern practices as well as traditional practices both may fail in certain areas and I give below some points for members' consideration:

- Some modern practices have a tremendous tendency to generalize, particularly for grassroots work, without making basic investigation and understanding the real requirements. For example, in very few watershed cases drainage analysis takes place, although assume that this will be done.
- India is extremely diverse in terms of basic human geography, geology, agroclimatic condition etc. This is why the traditional water harvesting practices of Rajasthan, with different types of soils need not be successful in Sambalpur, Koraput or Mahanadhi delta in Orissa, without required improvisations for that region.
- Various issues like water harvesting, groundwater recharge, soil conservation, livelihoods, and aspirations of various stakeholders need to be addressed in a watershed program.
- In many cases, we found traditional water harvesting structures to be very successful, but the success was not because it is traditional but because it was evolved in the region and as it addressed local situations.
- Lastly, it has been proved that in watershed management, agronomic and vegetative measures are far more important than structural measures like building check dams, irrigation tank, etc. Unfortunately, the first two measures require time and major extension works with very little money and therefore do not get covered very much. I do not mean that structural measures are not important, but that it must take place in tandem with agronomic and vegetative measures, in order to prevent otherwise the benefits of the structures will not last for long periods.

My personal view is we need to thoroughly understand the geographical area being covered and only then evolve the most suitable practice on the basis of experience of village people after detailed discussions.

Many thanks to all who contributed to this query!

If you have further information to share on this topic, please send it to Solution Exchange for WES-Net at se-wes@solutionexchange-un.net.in with the subject heading 'Re: [se-wes] Query:

Regenerating Traditional Irrigation Systems, from Kalpataru, Orissa (Experiences). Additional Reply.'

Disclaimer: *In posting messages or incorporating these messages into synthesized responses, the UN accepts no responsibility for their veracity or authenticity. Members intending to use or transmit the information contained in these messages should be aware that they are relying on their own judgment.*

Copyrighted under Creative Commons License 'Attribution-NonCommercial-ShareAlike 2.5'. Re-us source Solution Exchange as well as the item's recommender, if relevant, and must share any der Community.

Solution Exchange is a UN initiative for development practitioners in India. For more informat un.net.in