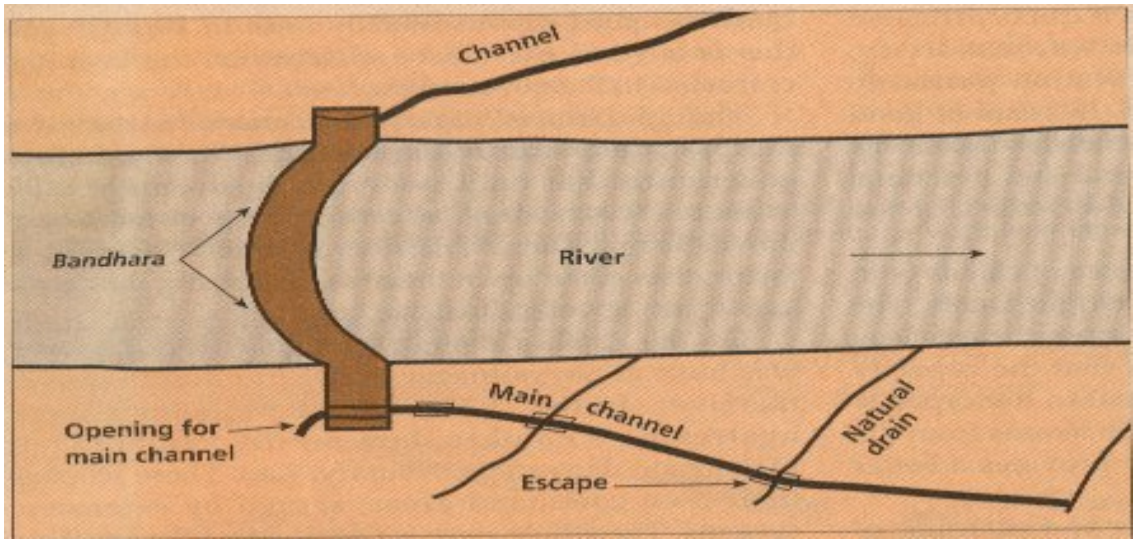
Ideal historical River Water use system- prevalent in India since more than one thousand years

Preadeep Bhalge

Ancient civilization developed along the banks of rivers and water bodies. The ancestors had a great wisdom to harness the gift of nature. History revels that the prosperity at that time depended depends upon well conceived water planning and wisdom in water management. Numerous documentary and field evidences are existent in different part of India. Phad irrigation system for river water use is one of the inspiring example the such types.

The community managed Phad irrigation system is prevalent in northwest Maharashtra i.e. part of Dhule and Nasik districts.The system is in operation in the three rivers basins. The rivers are Panjhra, Mosam,Kan and Aram. They originate from the Sahyadri hill ranges. In their first reach they travel towards the east. Then they meet the Tapti River. Tapti River is the major and west flowing river. Series of weir were well built across these rivers. These weirs are called as Bandharas. Weirs were constructed to divert the river water for agriculture use. Each independent Phad system comprises of a diversion weir, a canal on the bank and distributaries for irrigation.

The average rainfall in this area is 674 mm. Most of them receive in between June to September. The land is fertile. Surface irrigation is boon for this area. A Weir/Bandhara may be supplying supplies water to more than one village. The right to water has been fixed by tradition, which is strictly adhered to.



Working of the system :

Each system consists of one diversion weir, canals, distributaries, field channels, and the command area. The command area is divided in to four parts. Each part is called as Phad. Size of

the Phad is 10 to 200 ha. Te average size is 100-125 ha. The capital costs for construction of weirs were supported by King or Ruler. The distribution network is to be prepared by the irrigators. The maintenance works were the collective responsibility of the irrigators. And they had performed in such a way that the system has run for years. The wisdom in the management is very appreciable.

Diversion Weir: The strata in this region are percolating type. After the rainy season, the underground water gets accumulated in the river. Thus the rivers were having flow throughout the year. To take the benefits of this Geographic situation, there was a tradition to construct weirs across the perennially flowing rivers. The technique of construction of weirs and diverting the river water for irrigation were developed from Mourya's period (300 BC). Construction of the weir was the communal activity. In some cases the capital cost of these schemes was met by the king or rulers. But once completed, farmers operated them on their own.

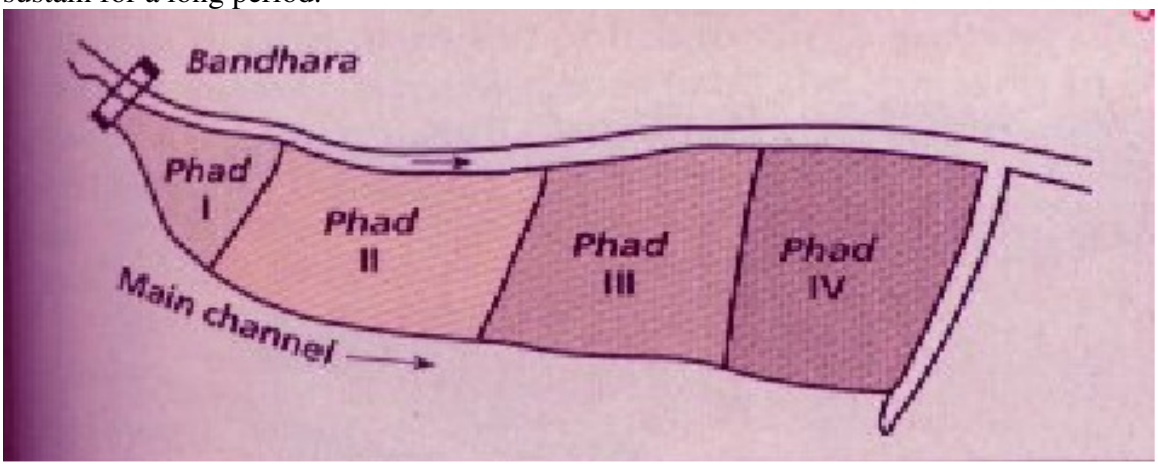
Diversion weirs were raised at different locations. The river water is diverted in to the canal. Diverted water is brought to the filed through canal and distributaries. Length of the canal varied from 2 -12 km. Each canal has a uniform discharge capacity of about 450 liters/second. Distributaries are built to feed water from canal to different area of Phad.

Field channels are built to carry water from distributaries to individual field. Escapes are provided along the canal and distributaries to drain away the excess water.

Crops: A good production of Sugarcane, Banana, Cotton and Rice are obtained from this area. This is due to adoption of Traditional and long lasting Phad irrigation system. The Phad irrigation system is said to be more than 600 years old. Some villagers have opined that it is more than 2000 years old.

Management of Irrigation:

The irrigation management of the available water in the weir is said as one of the best system of management. The water distribution practice and the management rules are so framed that they sustain for a long period.



The command area is divided in to four parts. Each part is called as Phad. The size of the Phad may vary from 10 to 200 ha. Each Phad has number of beneficiaries. But only one type of crop is grown in each Phad , in a season.

Wisdom in Phad management:

Each village has an effective system of management. A village level committee is formed by the irrigators. The members of the committee are elected mostly by consensus in the general body meeting. The elections are generally held once every two to four years. The general body also chose the chair person. The chair person may continue for several years. The number of committee members is not fixed. It varies from place to place to place and village to village.

Functions of Committee:

They have to Protect , Supervise and Administrator of the irrigation system.
They have to employ supervisors, Canal inspectors and water guards for irrigation.
They have to solve the dispute and impose fine to the offenders.
They have to decide the cropping pattern
They have to decide sequence of irrigation of the field in a phad.
They have to call a annual general body meeting. Generally this meeting is held on Akshy tritiya i.e. in the month of March/April.

Functions of Irrigators:

They have to elect the committee members and decide the chair person.
They have to maintain the field channels and distributaries.
They have to take part in collective annual maintenance of the irrigation canal.
The operations like tillage, sowing, removing weeds from the fields, applying fertilizers, applying pesticides and harvesting are to be done by the irrigators.
They have to sow that type of crop as decided by the committee.
They do not interfere in the working of the irrigation staff.
They are not allowed to decide the quantity of water for irrigation to be applied to their field.

Supervisor:

He has to supervise the work of canal inspectors and water guards.
Timely inform the farmers about the period of tilling, sowing, applying fertilizers and pesticides, removing weeds, and harvesting etc.
He has to maintain the contact with the farmers and inform them about the condition of the crops.
Inform the farmers about the cleaning of field channels and distributaries.

Functions of Canal inspectors:

He has to petrol and up keeps the canal.
He has to ensure timely supply of water.
He has to attend the minor repair of the canal.
He has to remove the grass and accumulated silt from the canal.
He has to inform the committee about the general condition of the canal, water flows and seepages to ensure speedy remedial actions.

Functions of Water guards:

He has to irrigate the crops.
He has to ensure water flow from one field to other as per the schedule given by the committee.
He has to insure that all the area in the field gets sufficient irrigation to optimize the yield.
He has to guards the crop.
He has to inform the supervisor in case of any problems pertaining to water flow or field channel.

Payments to the staff:

The staffs engaged are paid in cash and kind. Wages are calculated on the basis of number of irrigators per unit area of land and by crop season. They also get share in the produce from each individual field. More the yield more will be their share. This type of incentive makes them to work hard and maximize the yield in every field.

Land owner ship:

The average land holding is about 0.22 hector. In olden days all the irrigators were having their land in all the four Phads. Thus they were equally interested in all the Phads.

Working of the system:

Irrigators have to pay maintenance charges as decided by the committee. The committee directs the staff regarding water distribution. Many times disputes occur. The committee has to settle the disputes. The committee may collect fine from the defaulter. The amount may range from Rs. 100 to 200 in a year. However fines are not the preferred way to maintain discipline. Special pressure is usually used against the offenders. The conflicts are few. The grass in the area of common interest is sold by the committee. The amount of the fines, selling of the grass and maintenance charges collected are to be put in front of the general body meeting. Every farmer is free to check the account at any time. Irrigators can not order or influence the staff except through the committee. The complaint both from the irrigators and the staff are entertained by

the committee. It meets once in two to three months to discuss the administrative problems like water distribution, enforcement of discipline, Water supply, Grazing by animals, and tapping of water by upstream villages.

A meeting of all the irrigators is called by the committee on Akshya Tritiya i.e. in March/April, once in a year. Announcement of the date for the annual farmer's assembly is made by beating the drums. Usually a major item of the agenda is to decide upon the crops to be grown, for which the availability of water in the next season is taken in to account.

Crop management in Phad: The command area of a diversion weir is divided in to four equal parts, called as Phad. Each Phad has to grow only one type of crop in a season. Cropping pattern is decided so wisely that a)It helps in utilizing the available water efficiently. b) Equality in water distribution is maintained. c) Productivity of land is maintained. d) No water logging though under long run irrigation. e) No salinity of the land. f) Easy to farmers. h) Sustainable use of land.

Crop rotation in Phad: The first Phad may have a perennial crop, Second may have a two seasonal crop, Third may have a one seasonal crop and forth may be follow or may have a crop if water is available. Each Phad has a provision to raise perennial crop in every four years. The crops in the Phad are kept rotating one after the other. The rotation of the crops is given in the table below.

Year(Rabi)	Phad no one	Phad no two	Phad no three	Phad no four
I	Wheat	Cotton	Gram	Fallow
II	Fallow	Wheat	cotton	Gram
II	Gram	Fallow	Wheat	Cotton
III	cotton	Gram	Fallow	Wheat

From the above table it is observed that every Phad has an opportunity to grow all types of crops by rotation.

Key characteristics of the Fad System:

The system is responsive to its changing social environment. For example, The composition of the committee increased or decreased according to the needs and dedication of he members. The number of irrigation staff may change as per need.

The system shows flexibility: The committee memberships are renewed regularly. The new members generally have dynamic relationship with the village power structure.

Equity: Irrigation operations are performed by the staff and farmers are not allowed to interfere.

Easy to farmers: The farmers need not worry about the irrigation and guarding the crops in their field. The irrigation staff does their best as they have to get share from the individual field produce.

Collective maintenance: Maintenance is a group function. Al farmers contribute equally both in labor and leadership. Discipline is strictly enforced.

Sustainability: The Phad system has continued to survive in spite of political changes taken places during the last three centuries. The system shows government influences is not necessary for making self management possible.

Effective participation: The Phad system shows that small farmers can organise themselves and can form a sustainable irrigation system.

Productivity of land: The crops are rotated from one Phad to another and frequently one Phad is kept allow by rotation. Because of frequent non irrigation and crop rotation the lands with not …..either in water logging or inmaking water saline. Thus fertility of the lands is maintained.

Conclusion:

The flexibility, equity, easy management operation fore the farmers and the collective maintenance etc in this system leads towards sustainability.

The system has continued to survive in spite of political changes taken places during the last three centuries. The system shows government influences is not necessary for making self management possible.

The system shows that small farers can organise themselves and can form a sustainable irrigation system with effective participation.

Because of frequent non irrigation and crop rotation the lands do not get water logged, nor saline and thus fertility of the lands is maintained
The water management techniques used in this traditional wisdom of Phad system can be a guiding principal to the water manager and water experts.

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