RESEARCH ARTICLE

Contribution of water management in sustainable Agriculture development in Ahmednagar district, MS, India

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ABSTRACT

India is developing country and in India 64.72% people are depend on agriculture and Indian agriculture is depend on rainfall. Agriculture remains the backbone of the Indian economy through there is fast growth in various sectors. It is not an equal in every year and place. Even this is true though there are some reasons due to which agriculture is still not sustainable. Farmers are facing many difficulties in agriculture. Water management has very much importance in sustainable agricultural development. The effect, need and method are water management on sustainable development is studied in this research paper.

Keywords: Sustainable Development, Agriculture, Water Management.

INTRODUCTION

Sustainable development is one which exists for long time. Development in agriculture field which exist for long time is called as sustainable agriculture development. According to Braithland commission without compromising with the needs of generation fulfilling the needs of present generation is called integral development. This definition is stated by this commission. Integral development is flexible process and it consists of complete use of equipment, direction of investment, orientation of technical development, organic or statistical change and compatibility of all these things and fulfilling needs and demands.

Water management is an important medium for sustainable agricultural development, on the Earth usable water will be very few so need to developed watershed or drainage basin. A drainage basin or watershed is an extent or an area of land where surface water from rain, melting snow, or ice converges to a single point at a lower elevation, usually the exit of the basin, where the waters join another water body, such as river, lake, reservoir, estuary, wetland, sea or ocean.

Agriculture in the district depends mainly on the rainfall from south-west monsoon. The distribution of rainfall is most uneven. The major part of precipitation is experienced in western portions of Akola taluka, whereas rains in southern part of the district are most erratic. A major portion of the district lies in the zone of low rainfall ranging from 508 mm. to 635 mm. annually. The district can be divided into three zones according to rainfall at

taluka headquarters, *viz.,* the northern part comprising Kopargaon, Sangamner and Shrirampur talukas with a rainfall of about 500 mm. or less, the south-eastern part consisting of Shevgaon, Ahmadnagar, Pathardi and Jamkhed talukas with normal rainfall of 600 mm. and the third zonecomprising the remaining talukas with rainfall between 500 mm. and 600 mm. The rains usually start in the second week of June and last till the end of September. The intensity of rainfall is the highest in July. Sometimes thunder-showers in March and April are recorded. In the plain areas of the district the rains are erratic and mostly from the north-east monsoon.

Irrigational facilitiesin the district mainly included wellwatering or *motasthal* and small channel-watering or *patasthal.* The area of neither class was large. At the same time they want of a large enough supply of water and of land at a suitable level made the area of channel watered land much less than the area of well-watered land. Most of the dams or *bandharas* were built of mud and had to be repaired every year after the rains. Such *bandharas* were found throughout the district especially in Parner, Shrigonda, Karjat, Ahmadnagar, Kopargaon and Sangamner talukas, built across the many small early-dry streams which seam the country. Even now this practice is in vogue. Besides, wells were also used for irrigating all over the district. Day today ground water level decries and many irrigation problems incises, so water management is very important to agriculture development.

RESEARCH METHODOLOGY

In the relevant research paper researcher has used secondary data collection method. Topographical maps and survey of India sheets are used for physiographical study. For that purpose researcher has used agricultural related web sites, schemes magazines and government reports for data collection. The first step was successful construction of nullah bunds to increase the water levels. The villagers renovated tanks and recharged the groundwater by the tank water. Due to the steady percolation of water, the groundwater table began to rise. Ahmednagar was divided into four watershed zones. In order to conserve soil and water by checking the runoff, contour trenches and gully plugs were constructed along the hill slopes. This process was supplemented by a forestation, nullah bunds, underground check dams and cemented bandhras at strategic locations. Government social forestry schemes were utilised around the district. The environmental model is capable of dealing with recurrent drought. Soon, water was available even in summer.

SUSTAINABLE AGRICULTURAL DEVELOPMENT

The issues of sustainable development can be classified under three types of farming systems that are traditional production system, modern agriculture system and sustainable agriculture system. Further they can compare as three dimensions, ecological, economic and social sustainability. To increase the organic matter content of the soil, thus raising its ability to preserve and store water that falls as rain. Sustainable agriculture increases the diversity of crops produced and raising the diversity of insects and other animals and plants in and around the fields. Indiscriminate use of pesticides, improper storage etc. may lead to health problems.

Besides the small *bandharas* and irrigation wells, there were a few Government water works which mainly included the Bhatodi lake and the Ojhar and Lakh canals of the Pravara river water scheme. Table 1 gives Net area irrigated by various sources of water-supply in the district

In backbones of agriculture irrigation in ahmednagar are well and canals. Wells are used in all over the district. Canal are used in sangamner, Kopargoan, Shrirampur, Rahuri, Newasa and Shrigonda Tahsil. As well As private canal used in irrigation Akole, Sangamner, Newasa and Parner Tahsil. Tank irrigation will be used in Ahmednagar and Karjat Tahsil. The source of water Supply change in day by day.

CAUSES OF DEGRADATION OF WATER RESOURCES:

The major causes are:

1. Depleting forest and grass cover, particularly in catchments areas.
2. Neglect of traditional water harvesting and conservation techniques.
3. Increased pollution of both surface and ground water.
4. Improper water resources management.
5. Absence or improper functioning of industrial and municipal treatment

Plants are non-implementation of environment laws. Therefore substantial water resources development is the prime need of our Country.

Table 1: Net area irrigated by various sources of water-supply

Taluka	Year	Net area irrigated by					
		Government canals	Private canals	Tanks	Wells	Other Source	Total
Ahmadnagar	1961-62	--	463	1,814	33,880	--	36,157
	1965-66	--	--	699	24,339	--	25,038
Sangamner	1961-62	3,135	183	--	13,658	--	16,976
	1965-66	1,417	--	--	18,623	--	20,040
Akola	1961-62	--	1,297	--	1,504	--	2,801
	1965-66	189	1,093	--	1,469	189	2,940
Kopargaon	1961-62	47,765	--	--	28,794	--	75,559
	1965-66	63,612	--	--	23,341	--	86,953
Shrirampur	1961-62	36,542	--	--	25,922	--	62,464
	1965-66	45,186	--	--	26,975	--	72,161
Rahuri	1961-62	16,532	--	--	15,650	--	32,182
	1965-66	19,143	--	--	25,743	200	45,086
Nevasa	1961-62	1,817	315	--	12,145	--	14,277
	1965-66	1,810	--	--	13,544	--	15,354
Shevgaon	1961-62	--	--	--	11,474	--	11,474
	1965-66	--	--	--	13,573	--	13,573
Pathardi	1961-62	--	--	--	14,333	--	14,333
	1965-66	--	--	--	15,643	--	15,643
Parner	1961-62	--	1,540	--	19,536	--	21,076
	1965-66	--	230	--	20,846	--	21,076
Shrigonda	1961-62	13,164	--	--	25,032	--	38,196
	1965-66	14,362	--	--	20,311	--	34,673
Karjat	1961-62	--	--	899	20,523	1,424	21,422
	1965-66	--	--	4,713	20,878	1,100	26,691
Jamkhed	1961-62	--	--	--	13,096	--	13,096
	1965-66	--	--	--	17,664	--	17,664
District Total.	1961-62	1,18,955	3,798	2,713	2,35,547	--	3,61,013
	1965-66	1,45,719	1,323	5,412	2,42,949	1,489	3,96,892
	1967-68	1,31,900	800	900	2,20,200	--	3,53,800

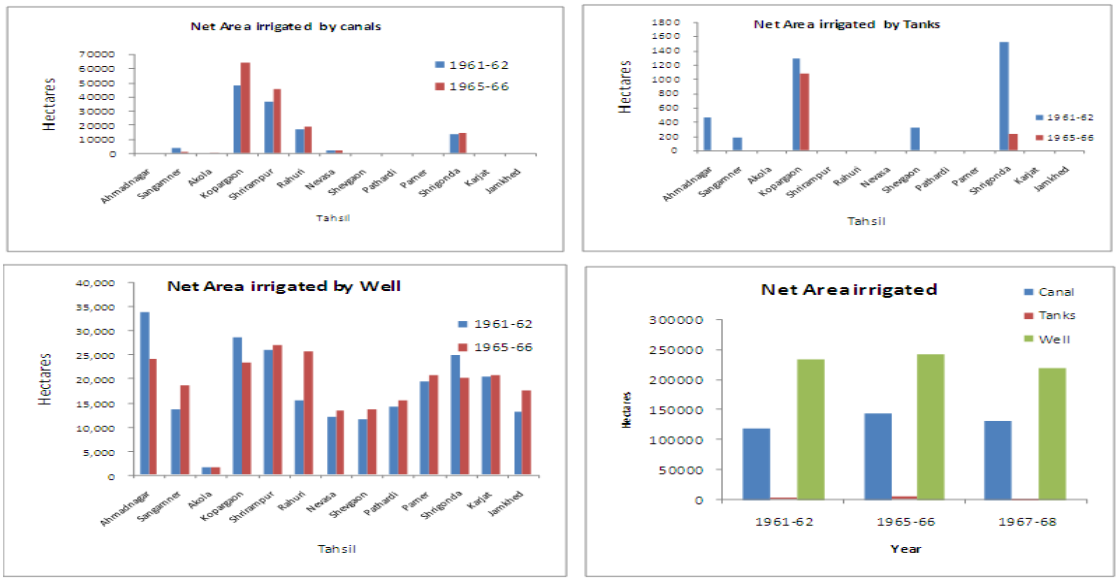

Fig. 1: graph show the increases irrigation source of water supply.

'Sustainability' is the Central concept, which must address economic, social and environmental issues. Sustainable water resources Management means 'meeting the water requirements of the people, at the same time, conserving water resources for the benefits of future generations.' Technological cooperation and the growth of indigenous capacities at the grass root level and in the hierarchy of super structures are integral to that design and its implementation, particularly in the context of our country.

TIPS FOR WATER CONSERVATION

Each and every drop of water needs to be saved following the principle "No crop without a drop". A little thought and attention followed by an action from us can go a long way in conserving this precious natural resource.

- Encourage your family, community and local govt. to conserve water by providing water literacy.
- Water should not be wasted at any cost. Taps should be closed when not in use and leaky taps must be repaired without any delay.
- Rainwater should be harvested by using various rainwater harvesting techniques and can be used for various domestic, agricultural purposes and also for groundwater recharging.
- Water supply lines must be maintained properly and faulty and leaking pipes replaced. Plumbing should be done correctly, seeking advice from experts.
- Always install low volume flush toilets.
- Hand pumps should be well maintained to perform effectively and efficiently.
- HP matching in accordance with water demand is essential. High HP motors should not be used to draw water from the well (open or bore) when low HP pumps can perform the same function.
- Avoid installing ornamental water features unless the water is being recycled.
- Overhead storage tanks should be maintained in good condition, PVC tanks which are cheaper and lighter in weight and do not corrode or rust are preferable to metal tanks.
- Ensure that your swimming pools, fountains and ponds are equipped with reticulating pumps.
- Don't forget to weed your crop fields, lawns and gardens.
- Always irrigate plants during morning or evening to minimize evaporation losses.
- Desalting of canals, tanks, ponds, etc. must be done regularly during the summer months. People should be encouraged to revive the traditional practices of protecting trees around tanks, ponds or other water reservoirs.
- Deforestation of vegetation without compensatory a forestation is a short-sighted approach for solving immediate needs. A forestation of barren & hilly slopes should be carried out. Trees withstand drought better than crops. They check dust, replenish streams, provide fodder for cattle, shade to cattle &
- Watershed management i.e creation of small reservoirs and Percolation tanks to hold run-off water must be implemented and maintained.
- In hilly areas terrace cultivation should be practiced to prevent surface run off.
- Contour plugging and planting of grasses and trees in catchment area check run-off water and increase the soil's capacity to retain moisture.
- Sprinkler irrigation should be used for closely-spaced crops like wheat, millet, pulses, groundnuts, etc., as it conserves 30 to 40 per cent of the water as compared to surface method of irrigation.
- Drip irrigation is most suited for closely spaced row crops like vegetables, cotton, sugarcane. The efficiency of this system is around 25 to 30 per cent in conserving soil moisture.
- Pitcher irrigation can also be used for irrigating the plants. In this method holes are drilled in a mud pot and it is partially buried in the soil in proximity to the plant. The water in the pot oozes out slowly, ensuring that the soil is continuously moist and the plant gets a constant supply of water.
- Deep trenches can be dug adjacent to bunds to collect runoff water and soil especially in water deficient regions.
- Wastewater generated in industries should be treated carefully and should be recycled.

FACTS ABOUT WATER RESOURCES

1. Water is the most abundant single substance in the biosphere, 150,000,000 cubic kilometers in volume.
2. Our earth is covered with 71% water of which the oceans and seas hold 97% which is salty. Another 2% is locked up in the ice caps and snow and is thereby unusable. Only 1% is found in the rivers,

lakes and underground reservoirs and can be used by man.

3. India is one of the wettest countries in the world. Its average annual rainfall is 1,170 mm. India gets about 400 million hectare-metres (mham) of precipitation annually, in the form of rain and snow.
4. 1,683 million cubic meters of water flow through Indian rivers every year.
5. 85-90% of the rain water flows into the sea.
6. If we don't stop constructing dams, there will be hardly any free-flowing rivers left in the country.
7. 71% of water is lost from unlined canals, due to seepage.
8. Deforestation and destruction of wetland areas are the causes of increased sediments in water.
9. Irrigation accounts for 92% of the water consumed and the remaining 8% is used for domestic and industrial needs.
10. 450 km3 of waste water enters the world's rivers. 600 km3 of water is needed to transport this waste away and dilute it.
11. About 70% of India's surface waters are polluted: Out of some 3,119 towns and cities, only 217 have partial or complete sewage treatment facilities.
12. Many lakes and reservoirs are becoming atrophied (enrichment of organic nutrients) and their ability to support aquatic life is being cost.
13. Excessive deforestation results in silting of the rivers, thereby reducing their water holding capacity, which in turn, results in the spilling over the flooding of adjacent areas.
14. Water-borne diseases such as typhoid, jaundice, cholera, diarrhea and dysentery account for 66% of all illnesses in India.
15. With 70% of available drinking water being polluted, two-thirds of all diseases in India are water borne. As a result, we lose 73 million work days annually together with production worth Rs. 600 corers.
16. Industrial wastes, drained into waterways, have created the nightmare of paralysis and other crippling diseases caused by slow pollution due to mercury and other metals which creep up the food chain into fish as well as cow's milk.
17. India's groundwater resources are about 10 times its annual rainfall. But this water is declining in many areas due to the increasing number of tube wells.
18. Wetlands which act as a buffer for floods, purifiers of wastewater and nurseries for fish and wildlife, are being drained with no regards to their economic values.
19. The biggest problem with India's water resources is that it varies greatly over both time and space. Nearly three-quarters of India's rain comes pouring down during the four monsoon months from June to September. For the rest of the year, the country remains relatively dry.

WHAT SHOULD A COMMON MAN DO TO SAVE OUR WETLANDS?

Public can help for protection and preservation of wetlands and other vital ecosystems only if they know about their significance. We should:

1. Be aware and make others aware about the values, functions, uses and attributes of such ecosystems.
2. Create local database for information on wetlands, wildlife, natural resources and endangered, rare and vulnerable species. Particularly learn about local species.
3. Avoid unnecessary environmental damage.
4. Create and support local conservation groups and discourage poaching activities. Joining conservation groups would help you learn more about local, regional and global wetlands issues.
5. Enhance public consciousness by carrying environmental conservation messages amongst colleagues, friends, neighbors and relatives.
6. Take care of the plants and plant more trees & shrubs. Protect wildlife habitats.
7. Learn about man and biosphere relations, role of man for environmental management. Also learn about ecosystems and sustainability.
8. Reduce pressure on natural sources of water by suitably recycling and reusing waste waters.
9. Monitor local water systems to ensure they are not misused, polluted and used as sinks for waste.
10. Keep vigilant for new projects in your area and ask about possible pollution of the environment. Also enquire about protective measures. This will help in preserving the sensitive habitats.
11. Understand and make others to understand the threats, visible or invisible, direct or indirect, manmade or natural that may lead to the degradation and loss of such habitats.
12. Teach others what you know about natural ecosystems.
13. Take time to visit and explore the functions and the contribution of wetlands towards human well being.

14. Ask yourself and others about the significance of wetlands for humans and other living beings and what benefits you/they have been and are deriving from the resource.
15. Try to learn about the birds including migratory waterfowl that have been inhabiting the areas a couple of decades ago and are seen now. Explore the reasons for change.
16. Learn about the source of water, status of biological resources, etc. in the area.
17. Resolve to find out ways and means and to involve one and all for conservation, protection and improvement of the habitat for you and other living beings including migratory waterfowl.
18. Do not throw hazardous chemicals and solid wastes into water bodies. This may endanger sensitive flora, fauna and even the human populations dependant on the water body.
19. Do not litter and defecate along water courses. Major population of Punjab and adjoining states is dependent on surface water sources for drinking water.
20. Do not burn agro wastes- this could cause acid rains that may then cause irreparable and unaccountable loss and damage to the terrestrial as well as aquatic flora and fauna.
21. Learn and make others to learn about our environmental obligations for securing safe and enjoyable surroundings for our descendants.

CONCLUSION

The physical landscape of the region is marked by the mountain and hill ranges, reiver plains and undulating topography of plateaus in the study area. Sahyadri ranges are well defined by the watershed and available water in various dams. About 70% Population depend directly upon land middle and eastern part of the Ahmednagar district. In India is mainly use of the agricultural land and converted into residential and other uses for the growth and development of the facilities. Farmers have adopt modern technology i.e. fruits and vegetables drip irrigation facilities, variety seeds material, increasing use by composting biomass, improved planting technology and micro irrigation systems, crop loans, good network of transports and markets, agricultural advisory centers and also available facilities in the study area.

Therefore, recently cropping pattern is change and day to day positive increased but eastern part of the study area is concentrate in the rice crop because of these areas situated in the hilly and heavy rainfall. Normally, groundwater and surface water are used for irrigation and when water available in these sources is taken away artificially by flowing it for supplying water in required quantity to crops, it is called irrigation. In general, the goal is to supply the entire field uniformly with water, so that each plant has the amount of water it needs, neither too much nor too little.

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