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Study the enhancing water productivity in Indo-ganetic basin

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Abstract
Developing water shortage and contending water requests are required to lessen preoccupation of water for horticulture in the future. Endeavors are expected to use the accessible restricted water assets productively and successfully. Different employments of water is unavoidable to create more with less water. Water assets ventures gives water to water system as well as additionally give water to a scope of other gainful uses, for example, home nurseries, domesticated animals, fishing and oceanic items, and miniature endeavors, for example, block making. In the Gangetic flood plain of Indian Territory of West Bengal, wetlands are utilized as numerous framework and impactsly affect occupations of the neighborhood individuals through the most significant advantage emerging from fisheries, trailed by wetland development and jute retting. Combination of auxiliary supply or little tank in the tubewell based water system framework has been shown at Patna, India as a powerful system to more readily manage water and furthermore improve water profitability by bringing fish up in the supply to produce extra pay and improve occupation. The innovation of various utilization of trench water was likewise shown at Bhubaneswar, India utilizing administration repository and gravity trickle water system and sprinkler water system, and incorporating fish culture in the lakes and raising agriculture on the lake dikes. Essentially, MUS ventures in Nepal have indicated that the utilization of miniature water system related to MUS is an intense blend. Rice-fish cultivating preliminaries led at Patna has been discovered to be valuable in gainful use of occasionally waterlogged grounds in trench orders. Makhana (Euryale ferox) cum fish culture in water groups of North Bihar, auxiliary repository for water reaping and gainful usage and so on are some different instances of numerous utilization of water in the IGB. This paper presents the aftereffects of various investigations led on numerous utilization of water in the eastern Indo-Gangetic fields.

Keywords: Enhancing water and Indo-ganetic basin

Introduction
Water is the most valuable regular asset and is irreplaceable for all financial and social turn of events, and finishing neediness and yearning. In any case, with ever-expanding populace, modern development, water contamination, and environmental change, the water accessibility per capita is contracting step by step. Inundated farming records for about 70% of complete water withdrawals around the world, however in Asia the flooded agribusiness represents 90% of absolute deliberation (Seckler *et al.* 1998) [8]. Developing water shortage and contending water requests regularly includes reallocation of assets from water system for city, mechanical and ecological utilizations (Molden *et al.* 2001) [5]. Subsequently, endeavors are to be made to use the accessible restricted water assets productively and adequately to ease water shortage and give food and healthful security, while guaranteeing different elements, including climate. The Multiple employments of water for example utilizing the accessible water hotspots for more than one uses/creation framework is inescapable to deliver more with less water. Various use frameworks, worked for homegrown use, crop creation, hydroponics, agroforestry and domesticated animals, can improve water efficiency and diminish neediness. In any case, escalation of different utilization of water in the catchment may influence downstream stream both as far as quality and quanity. There is a requirement for appropriate understanding and monetary assessment of non-water system utilizes (Meinzen-Dick and van der Hoek, 2001) [4] and to more prominent acknowledgment of the linkages between water the board exercises and oceanic environments (Bakker and Matsuno, 2001) [1].

It is very much perceived that individuals utilizes water for different purposes. This numerous utilization occurs at various levels: the family unit level, the water framework level, and the catchment or bowl scales. For instance, in numerous country and metropolitan zones, homegrown water flexibly networks are utilized for little scope profitable exercises. Likewise, water system plans supplies water for inundating field crops, but at the same time are utilized for domesticated animals or lawn water system too. The oceanic frameworks, for example, wetlands including rice-based frameworks give numerous basic profitable and biological system administrations like energizing groundwater, flushing impurities, and supporting untamed life. In this manner, various use frameworks can furnish the more weak clients with ease administrations for homegrown water, water for farming, home nurseries, domesticated animals, environments for fish and other amphibian assets and country miniature ventures, for example, block making. So as to get most extreme profit by the drained or redirected water and expand yield to build water profitability, the gainful or valuable intercessions of numerous nature of both non-immoderate and less water wasteful, for example, fisheries, sea-going harvests, oceanic assets, domesticated animals and so on might be incorporated into the current water system and water use frameworks/water foundations. Nonetheless, an improved comprehension of rivalry and complementarity of all water requests is basic for viable various use the board (Li *et al.* 2005) [3]. The profitable use of accessible water assets is instrumental in expanding neighborhood network versatility and danger the board that may result from climatic vulnerability.

Coordinated water assets the board (IWRM) incorporates all parts of water assets advancement, the executives and use for managing contending water segments at the bowl or catchment scale. The Multiple Use Services (MUS) is a methodology for giving numerous utilizations administrations at frameworks level and downwards. Subsequently, receiving a coordinated, numerous utilization way to deal with water assets improvement and the executives is a chance to accomplish Millennium Development Goals (MDG) of killing outrageous neediness and hunger and guaranteeing natural manageability. Residence scale MUS is the best method of utilizing water to add to all Millennium Development Goals (Van Koppen *et al.* 2009). This paper tends to creative methodologies for overseeing accessible water assets however upscaling science based and field tried models for reasonable different use water gracefully framework for expanding water efficiency and maintainable rural advancement to take care of the developing populace in IGB. The paper additionally examines the aftereffects of various examinations led on numerous utilization of water in the eastern Indo-Gangetic fields.

Material and Method

Indo-Gangetic bowl, which alludes to the Indus and Ganges bowl, ranges Bangladesh, India, Nepal and Pakistan. It lies generally in the Indus-Ganga-Brahmaputra plain, which expands 3,200 km between the mouth of the Ganges River, toward the east, and that of the Indus, toward the west. The bowl among the world's biggest and most gainful bowls, shapes the floor underneath the "top of the world", the Himalayas. The streams incorporated are the Ganga, Indus, Beas, Yamuna, Gomti, Ravi, Chambal, Sutlej, and Chenab. The IGB gives the monetary base to farming, ranger service, fisheries, animals, including metropolitan and modern water prerequisites for around a billion people. Given the variety of agro-climatic, social and monetary conditions in the four riparian nations, the bowl is an investigation of differentiations and openings in all regards. The bowl is spread over a territory of 225.2 million ha and the net edited zone is 114 million ha. According to 2001 statistics the number of inhabitants in IGB is 747 million. Provincial populace in Bangladesh, India, Nepal and Pakistan is 79.9, 74.5, 86.0 and 68.0% individually of the complete populace. About 35% of the populace in the IGB is underneath neediness line. High populace development in these nations stays a reason for worry of water and food security, neediness lightening and asset preservation. In IGB about 91.4% of the yearly water use is for horticulture reason followed by 7.8% for homegrown use. Developing water shortage and contending water requests are required to lessen redirection of water for farming later on. The water profitability of yields and animals is low in IGB incompletely due to carelessness on crop-domesticated animals and water nexus and their effect on work. So as to improve in general water profitability of water system and water assets frameworks, the gainful mediations, for example, developing vegetables, natural products, animals, fisheries and other living oceanic frameworks should be coordinated into the current water system and water assets frameworks with the end goal that more food might be created out of accessible water assets.

Result and Discussion

In order to develop and demonstrate productive utilization of waterlogged areas, a research project was initiated at ICAR-RCER, Patna with various multiple use options. Three multiple water use based farming systems (Fig. 1), namely secondary reservoir fed by canal seepage, fish trenches-cum-raised bed and rice-fish culture using nylon pen under seasonally waterlogged lands adjoining Patna main canal were undertaken (Sikka *et al.* 2010). The different features, integration of different uses and future scope for productive utilization of waterlogged areas in enhancing water productivity and livelihoods are discussed below.

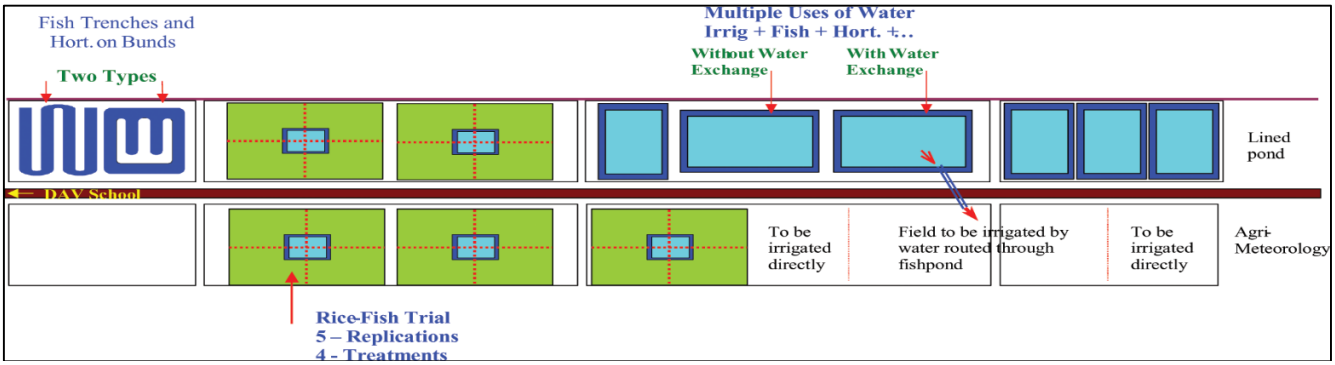

Fig. 1: Layout of various multiple use interventions in the Experimental

Medium deep waterlogged lands (0.5-1.0 m) can be modified in the form of a reservoir or pond that can be used for multiple uses. The excavated soil is spread around the periphery to form a bund with crest level at least 50 cm above the highest water level to ensure that water do not overflow the bunds. High value horticultural/vegetable production on bunds utilizing seepage water with little supplemental water can produce good profit from the land, which was otherwise poorly utilized. In conjunction, good fish production can be achieved with water quality management through water routing for irrigation purpose. Two options like routing of water with provision of water exchange and control reservoir without water exchange were tried. The routed water containing good amount of nutrients provide opportunity for applying water to the fields in correct amount and at appropriate time, which enhances yield and quality of agricultural produce. Ducks, poultry, piggery, etc. are other components that can be added to have complementary benefits.

Fish trench-cum-raised bed

Lands having water stagnation of more than 1.0 m are not much beneficial for rice-fish culture. Trenches in such areas can be excavated in such a way that excavated soil is filled in alternate strips to make bunds. Coconut growing farmers in the backwater areas of Kerala extensively follow such farming practice. In Mekong Delta in southern Vietnam, farmers employ trenches within their fruit orchards, usually surrounded by a lateral trench and a connection to the adjacent rice field. To evaluate this concept, two types of layout of the fish trenches, *viz.* 1) meandering type trenches simulating river condition; and 2) continuous trenches surrounding island of raised bed simulating pond type conditions was undertaken (Figure 2).

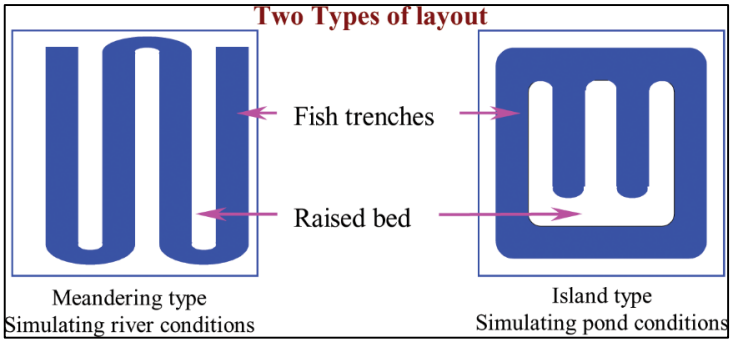

Fig. 2: Two types of layout of trenches

Returns from different multiple water use systems

Optional repository with cultivation on dykes gave most noteworthy gross salary just as overall gain followed by fish in auxiliary supply alone. Total compensation from fish in the optional supply with cultivation on dykes was INR. 132590 for every ha for each year (Table 1). Organic product crops contributed 56% to the overall gain followed by fish (27%) and vegetables (17 %). Total compensation picked up from fish alone in optional supply was INR 93550 for each ha for every year and the whole sum originated from fish creation (Table 2). Correspondingly, fish in depressed channels with cultivation on raised beds additionally gave equivalently great salary. Overall gain from this framework was INR 80951 for every ha for each time of which 54% was contributed by natural product crops. Vegetables contributed 22% and the staying 24 % was contributed by fish. Net gain from Rice-wheat framework with fish asylum in the middle was in the tune of INR 29694 for each ha for every year, out of which 11 percent was contributed by fish and 89% was contributed by rice and wheat. These frameworks were contrasted and customary rice-wheat framework where overall gain was INR 27965 for each ha for every year. Increment in overall gain was most noteworthy (374.13 percent) if there should arise an occurrence of fish in Burrow Lake and cultivation on dykes. Increment in net gain over rice wheat framework was 6.18% in rice-wheat framework with fish reject at the middle, 189.47 percent in fish in depressed channels with agriculture on raised beds, and 234.53 percent in fish in whole optional store. Water efficiency (return in rupees/cubic meter of water utilized) of optional store with water trade extended between 3.74 to 15.2 where as in Charge Lake without water trade it ran between 10.3-14.4 down and dirty water efficiency esteems ran between 1.5-6.51.

Table 1: Relative returns from different multiple water use systems

Water use system	Gross income (INR/ha/yr)	Cost of cultivation (INR/ha/yr)	Net income (INR/ha/yr)	% Increase over rice-wheat system	Benifit-cost ratio
Rice and wheat	54965	27000	27965	0.00	2.04
Rice and wheat with fish refuge in the centre	56342	26648	29694	6.18	2.11
Fish in sunken trenches, horticulture on raised beds	142010	61059	80951	189.47	2.33
Fish in secondary reservoir and horticulture on dykes	234289	101699	132590	374.13	2.30
Fish alone in dug out secondary reservoir	168750	75200	93550	234.53	2.24

Table 2: Contribution of various components (%) to net income in different water use systems

Water use System	Rice and wheat	Fish	Fruit	Vegetables
Rice and wheat	100.00	0.00	0.00	0.00
Rice and wheat with fish refuge in the center	88.88	11.12	0.00	0.00
Fish in sunken trenches, horticulture on raised beds	0.00	24.01	53.87	22.11
Fish in dug out pond and horticulture on dykes	0.00	26.66	55.92	17.42
Fish in dug out secondary reservoir	0.00	100.00	0.00	0.00

Feedback of farmers revealed that fish in trenches- cum-horticulture in waterlogged area is the most preferred option (37%) followed by fish pond cum secondary reservoir (19%) and rice- cum- fish cultivation (19%). Only 15 % farmers were reluctant to adopt any fish production technology. This is mainly due to lack of irrigation facility and local security of the fish ponds. In general, majority of the farmers were of the view that small farmers can easily adopt the technologies and there is more income from less investment.

Conclusion

Various employments of water are discovered to be useful to upgrade generally speaking profitability of water assets. It gives assortment of food materials, for example fish, organic products, vegetables, eggs, and so forth separated from grains and different yields. It additionally helps in guaranteeing the nourishing security to the provincial populace as they are denied of such variety in food under winning rice-wheat editing framework. Results from various investigations uncovered that hydroponics is regular in all most all the frameworks and the most valuable part of numerous utilization framework as it is a no consumptive utilization of water bringing about the most gainful utilization of water. Effective reconciliation of fish with makhana likewise offers different employments of water prompting more noteworthy productivity in asset use and age of extra food and salary to the makhana-cum-fish cultivators. Extra pay was produced by developing plant/vegetable harvests on the bunds needed to encourage hydroponics and using the put away water. In spite of the fact that there is colossal capability of various water use framework in all water areas, there are a few imperatives (for example social obstacles, poaching and robbery, nearby clashes and water rights, pereniality of water, absence of capital venture and assets in building up the framework, arrangement of air circulation uncommonly for asset poor and socially disadvantageous clients) for its scaling up for more extensive appropriation that should be tended to through concentrated exploration endeavors, social assembly and institutional help. As strengthening of various utilization of water in the catchment may influence downstream stream, outlining water rights might be a convoluted cycle in numerous water use frameworks and need endeavors in advancing multifaceted way to deal with guarantee interest of all the pertinent stakeholders in the dealings over any water reallocation issues.

References

1. Bakker M, Matsuno Y. A framework for valuing ecological services of irrigation water. Irrigation and Drainage Systems 2001;15:99-115.
2. Fontein M, James W, Paul T. Multiple-use water supply systems: do the claims stack up? Evidence from Bangladesh. Waterlines, Practical Action Publishing 2010;29(1):52-72.
3. Li Q, Gowing JW, Mayilswami C. Multiple use management in a large irrigation system: an assessment of technical constraints to integrating aquaculture within irrigation canals. Irrigation and Drainage 2005; 54:31-42.
4. Meinzen-dick R, Van der hoek W. Multiple uses of water in irrigated areas. Irrigation and Drainage Systems 2001;15:93-98.
5. Molden D, Rijsberman F, Matsuno Y, Amarasinghe U. Increasing the productivity of water: a requirement for food and environmental security. Dialogue Working Paper 1, Colombo, Sri Lanka, International Water Management Institute 2001.
6. Mukherjee S. Economic valuation of a wetland in West Bengal, India 2008. http://mpra.ub.uni-muenchen.de/14365/
7. Renault D. <>, in:Butterworth J, Keijzer M, Smout I. and Hagos F. (eds.). Multiple-Use Water Service, Proceeding of the International Symposium on Multiple Use Services: from Practice to Policy, 4-6 Nov 2008, Addis Ababa, Ethiopia 2008, 107-117.
8. Seckler D, Amarasinghe U, Molden D, De Silva R, Barker R. World water demand and supply, 1990-2025: scenarios and issues. Research Report 19, Colombo, Sri Lanka, International Water Management Institute 1998.