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WATER MANAGEMENT IN AGRICULTURE: ISSUES AND STRATEGIES IN INDIA

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ABSTRACT:

Water the important resource of agriculture, has not been well managed in India, despite the country being an agricultural powerhouse. It has some 195 MH of land under cultivation of which some 62 per cent is rain-fed and 37 per cent, irrigated. Agriculture uses 85 per cent of the water resources with low efficiency. The rain-fed space is that the important space of cultivation with the biggest concentration of rural impoverishment spanning many agro ecological regions. Water management is expounded to 3 necessary challenges within the agricultural front these days particularly raising productivity per unit of land, reducing impoverishment, and responding to food security needs. In the light of the new call to achieve "more crop per drop", this paper discusses pertinent issues related to irrigation in India and the strategies and arrangements to address water scarcity for irrigation. The study finds that issues square measure for the most part institutional, structural, and body. Overcoming them is crucial for agricultural development generally and water management particularly.

KEYWORDS: *Agriculture; India; Management; Pani Panchayats, Water.*

INTRODUCTION:

Irrigation is everything in India; water is even additional valuable than land", remarked Sir Charles Trevelyan decades past."If the monsoon fails, there'll be opposition in agricultural industry" remarked Wolff. Today the overall acceptance is that the matter isn't shortage of water however one in all its poor management, i.e. utilization, augmentation, and conservation. The country is blessed with with 183 million hectares of tillable land, 115.6 million farming families, 400 million of annual precipitation, and a conducive agro-climate for cultivating a variety crops. About common fraction of the country's population add agriculture and feed over one thousand million folks daily. Yet majority of farmers square measure below the clutches of impoverishment, debt and hunger (Hans, 2010).

Micro studies on impoverishment in rural areas cannot shut out irrigation as AN informative issue. For instance Gurunathan (2008), applying linear regression technique for estimating the strength of irrigation in determining rural poverty in the state of Tamil Nadu (for 37 years from 1964 to 2000) found that rural poverty can be reduced by 1.54 per cent through an increase of one hectare of groundwater irrigation for very thousand rural population. Study by Hans (2007) in Belthangadi and Mangalore taluks of Dakshina Kannada District, Karnataka using chi-square method revealed that as households move up from below poverty line to higher income levels they're in an exceedingly higher position to handiness and accessibility of irrigation infrastructure. In several cases, the typical financial gain per social unit virtually doubled once irrigation was utilized. Indian agriculture even now's heavily keen about the monsoons. Nearly 70 per cent of the net sown area is rain-dependent. Problems of

Indian agriculture are intricately linked to per-capita availability of water in a cost-effective manner. This reality should be viewed within the context of 2007 that was earmarked as "Water Year" by the govt., as conjointly the overall crisis and modern challenges in agricultural sector. Even a non-farm activity like insurance is penetrating the irrigation sector and we now have rainfall insurance and re-insurance in India.

Demand for food is increasing however overwhelming majority of season. lands stay fallow throughout This is therefore in additional than 1/2 the cultivatable land (Zaman 2009). Water drawback could be a triple drawback – drawback from provide facet, from side and from quality angle.By the year 2030, India needs to produce 60 per cent more rice with much fewer resources. To keep up the momentum of growth, a careful economic valuation of inputs including irrigation is of considerable importance (Kiran, et.al 2009).

The use of major resources of the planet like water should be guided by the principles of optimum and scientific utilization, both as individual commitment and international agreement (Hans and Jayasheela 2010; Singh 2010). Despite rapid strides in high-tech agriculture and commercial/corporate farming, sustainable agriculture and livelihood security will largely be decided on the natural resource – base, use and conservation.

OBJECTIVES OF THIS PAPER ARE:

- To gift the issues and challenges within the city district for Indian agriculture;
- To highlight areas that need to be addressed for better water management; and
- To examine some initiatives in India to save water

RESEARCH METHODOLOGY

The study is based secondary data for existing literature and data in websites, various publications of Central and State, especially State Level Bankers Committee, Bangalore and Institutional Finance Department and other sources like books, magazines, newspapers, reports, articles, seminar papers published by universities and research institutions.

EXTENT AND EFFECTS

Irrigated agriculture is limited only to 46 per cent of the cropped area in India, but it contributes nearly 56 per cent of the agricultural output, and about 60 per cent of food grains production comes from irrigated area (Nagdev, 2012). Efficiency or deficiency in farming is largely related to water – rainfall or irrigation. It is true for productivity enhancements through space growth furthermore as through combined inputs (irrigation, fertilizers, plant protection measures etc.).Even the entrepreneurial ability in farm operations is water linked. No doubt below fashionable farming irrigation is one in all the inputs in integrated farm management.

Total issue Productivity criterion of farm potency places adequate importance on irrigation to clarify variations in yields and technical efficiencies across crops and across farms. For instance, a study of paddy farmers in the state of Andhra Pradesh by Raju (2004) revealed that the non-availability of assured irrigation leads to low-level usage of fertilisers too and in turn, low yields.

IRRIGATION SCENARIO

India has irrigation potential of 139.89 hectares of that 108.3 m ha (i.e. about 77 per cent) has already been utilized (see Table 1).The average annual per-capita handiness of water is calculable to be concerning one,829 three-dimensional meters at the national level. This is expected to decline to about 1,341 CUM by the year 2025 and 1.140 CUM. by the year 2050, owing to the increase in population. The per-capita storage capacity in India is only about 207 CUM. as compared to 1,111 CUM in China. Out of the whole installation, the share of irrigation at the moment is concerning eighty per cent. This is likely to go down to 73 per cent by 2025.

Table 1. Water Resources of India

Geographical Area	328 m ha
Cultural Area	185 m ha
Rainfall	4000 cubic km
Utilizable Water Resources (including Resources 432 cubic km from Groundwater)	1122 cubic km
Ultimate irrigation potential	139.9 m ha

Source: S. M. Mendhekar and M. L. Chalakh, Technical Digest, issue 6

As water is important not just for increasing output of for assorted crops however additionally property employment and financial gain within the agricultural sector, correct coming up with and management of this resource is very essential. Creating applicable infrastructures and adopting appropriate management practices can facilitate augment the utilizable water resources and improve the potency of the facilities.

STRATEGIC ISSUES

There a world threat to water resource, not simply in terms of temperature change however additionally model of valuation and distribution. For instance, in Chile, water is not any longer a public smart it's become a capital good, left to the discretion of speculators and is separated from the land. The result? Water is sold as a market good at high prices. The small farmers square measure currently nearly a species in extinction, replaced by seasonal workers. These square measure a number of the visible effects of the crisis in rural Chile, fifty years once a reform that postulated that "the land is for people who work it." Now, so as to tackle the crisis, the grandchildren of the land reform – environmental and social activists – are proposing an alternative i.e. a new reform to reclaim water as a public smart, at a time once a persistent drought affects abundant of Chile.

The situation is so acute making it necessary to use tanker trucks to distribute water in some low-income neighborhoods in cities around the country. Commoditization and privatization of water led to the imbalance between human rights, environmental integrity and corporate profits. Now the folks square measure thirsting for structural reforms to bring new market rules and uphold human rights together with water access and sanitization (Milesi, 2017; Larrain, 2012). Such a situation has already arrived in India. Water deficiency is rampant, often resulting in crop failure, poverty, social conflicts and farmers' suicides (an average of 15,000 annually). India, being a signatory to the World Trade Organization (WTO), it is under pressure to open its market to the globalised economy. farmers will definitely would like help that is way over monetary. So, the impoverished across the dry land states of Gujarat and Rajasthan, social workers from the Sadguru Foundation created several village-level cooperatives that in turn setup a number of SHGs, lift irrigation groups, horticulture groups, mil vendors groups etc. These productive groups are asset and job-creating and at the same time work as social networks of civic associations known to confront poverty, resolve social disputes and provide opportunities for community development (Agoramoorthy and Hsu, 2015). Keeping in mind both utilization and conservation aspects of water 'efficiency' parameter is the key strategic factor. Inefficiency limits capability and reliability. While this is often a physical issue, we have some economic issues too.

The monetary manifestations of current investment and water evaluation policies have their harmful economic consequences on the assembly front.

A shortage of water, which may be seasonal, multi-annual or secular, is a threat to a wide range of economic activities – municipal water supply and water-based sewerage, water-intensive industries and agriculture, hospitals, mines, power stations, shale gas production, hotels, etc.

It is possible to make the Irrigation Departments autonomous and self-financing through increased water charges, improving collection rates and developing instruments to capture private sector investments in development and management (Dewangan, 2016). Subsidized water rates sap farmers' interest to opt for the tenets of water use efficiency and conservation. Millions of dollars spent

on irrigation subsidies, have led to more water use, not less. This has led to fall in water tables – ranging from 15 per cent to 75 per cent, say the scientists. Further, we have institutional issues like weak organization base and delivery mechanisms for water, allied inputs and extension services (Mendhekar and Chalakh, n.d; World Water Council, 2015; Nixon, 2013). India has been experiencing successive droughts in the past several years. Nine states – Andhra Pradesh, Telangana, Karnataka, Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha, Jharkhand and Uttar Pradesh – have declared a drought in the year 2015-16. All these point to the need for strategies in the short and long term to prevent droughts, mitigate the adverse effects of droughts, and ensure a better and more efficient management of water resources. Building a climate-resilient agriculture is that the would like of the hour. (Dev, 2016)

CHALLENGES AND OPPORTUNITIES

One of the foremost vital challenges each in city district and food front is that of global climate change.The term "global climate change" refers to the rising temperature of the earth due to an increased amount of carbon dioxide (CO2) and other greenhouse gases (GHGs).The development and presence of global climate change has created additional

intensity within the uncertainty of water availableness, creating it tough to optimise actions and their timings (OECD, 2014). Natural resources have become vulnerable.

Agriculture in Asian country is during a peculiar scenario of growth with vulnerability. A significant a part of the annual variation in India's GDP growth over the past century is because of yearly variations in rain. Rise in the sea level and depletion of potable water as well irrigation potential are serious concerns. Estimates predict that with increase in temperature by 2080-2100 the probable loss in crop production is 10-40 per cent (Hans, 2011; Hans 2012). Green House Effect is a challenge to green revolution today.

In many coastal areas of the country a brand new downside is rising. Sand mining is causing the water table has gone down and due to this farmers have been increasing the horse-power of their motors, again with repercussions on cost and economic performance of irrigation and cultivation (Selvakumar et.al, 2008). Substantial progress in irrigation has been made through programmes and policies such as Command Area Development Programme (1974-75), Accelerated Irrigation Benefits Programme (1996-97), National Water Policy (2002) and so on. Yet the major problem in irrigation continues to be the under-utilisation of potential, particularly of major and medium irrigation projects. The outlays on major and medium irrigation rose from Rs376 crore in the First Five Year Plan to more than Rs1,65,000 crore in the Eleventh Plan, which was cumulatively Rs3,51,000 crore (GoI 2012). A study of 210 major and medium irrigation projects by a Delhi non-governmental organisation (NGO) that used data from the Ministry of Agriculture showed that after investing Rs1,30,000 crore, between 1990-91 and 2006- 07, these projects were irrigating 2.4 million hectares (ha) less than before. The Twelfth set up unit indicated that there had been huge time and price overruns (Dev, 2016). Added to this is the sensitive issue of user-charges. Lack of thorough data of scarcity-value of water to its user is AN obstacle in its economical use. Political interferences, shortages of electricity etc. are also affecting the working of Water (pani) Panchayats.

CONCLUSION

Apathy and administrative constraints are making agriculture weary. A multi-pronged strategy is required to boost water-management system. and apply in Asian country each farmer and farm-based organizations ought to implement this.

Central Government as well as the state governments should ensure and enhance incentives to invest in adaptation of new methods of water saving, harvesting etc. particularly to meet uncertainties of weather and global climate changes. Even the innovative "participatory public delivery system" should be encouraged for water management in general and underground water in particular. The underlying principle should be one of "least cost" according to the objectives of effectiveness, economic efficiency and equity. As stated by the then President of India, His Excellency Shri Pranab Mukherjee,

"Strategic partnerships for adoption of best practices and to maximize benefits through technology transfer have become more important today.

India, which had witnessed a Green Revolution in the Sixties, is now moving towards an "Evergreen Revolution", recognizing the positive role that information technology can play as powerful catalyst for sustainable agricultural development. India's strategy centres on the Action Plan for Information and Communication Technology (ICT) for Agriculture, which has been operational since 1995."1 People associated with agriculture and allied activities should be recognized as resource management communities with awareness and positive attitude towards an "integrated approach to the utilization of natural resources" – soil, water and bio-diversity. This approach should not be an adhoc one, but a strategic collaboration for sustainable ecosystems, rural livelihoods and food security (Bunning, n.d.). Moreover, it has to be strong in its quantitative and qualitative dimensions. Irrigation has to be developed in terms of area coverage as well as conservation. Dissemination of time-tested technical know-how regarding water use, reuse and replenishment as well about drought and disaster management should be made available eve to small and marginal farmers. Research in labs should be dovetailed with field experiments to cater to felt needs of farmers and to enrich the experiences. Knowledge sharing is going to be another important sub-sector in this scheme of things in the coming days. The Central Water Ministry has – in this connection – called for active participation of all stakeholders. Participatory Irrigation Management (PIM) – along with the Water Users Associations (WUAs) – has been conceived as the thrust area in the effective irrigation management by involving and associating the farmers in planning, operation and maintenance of the irrigation system in India. So too the Irrigation Management Transfers (IMT) Programmes which states are keen about (Mahapatra, 2006). Progressive involvement of farmers in water management has yielded desirable results in terms of equity, efficiency and economy. It has already sounded on a research programme of farmers' participatory action in 5000 villages to promote "more crop and income per drop" of water, training of water-masters in each Pani Panchayat2 and wider dissemination of know-how to the user-level through electronic and print media. Pani Panchayats that in 1972 came to save many famers during the severe drought in Maharashtra and also became very popular Water-saving and water-use efficiency schemes and strategies such as Awareness campaigns on Water, Sanitation and Hygiene (WASH), Training programmes on Sustainable Agriculture (SA) and Water Use Efficiency (WUE), and rainwater harvesting, water recycling etc. which are already functional must be become "best practices" of all water users. It is heartening to note that citizens' initiates are also forthcoming in a positive way. For instance, the "Next drop" started by Anu Sridharan as a platform between citizens and the government has helped solve the water problems of the residents in Hubli, a town in Karnataka.1 Similar case is that of Uddhav Kedkar of Shivni village (Maharashtra). These eco-saviours, fighting like warriors are the change-makers, the Global Indians who have acted locally

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