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An Analysis of Application Efficiency of Irrigation and its Implications for Farm Economy in Andhra Pradesh

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INTRODUCTION

Irrigation projects are viewed as the mechanisms providing opportunities for reducing poverty. It is well accepted that irrigation reduces poverty substantially. It is estimated that poverty in irrigated areas is about half of the incidence of poverty in non-irrigated areas. Moreover, the Integrated Water Resources Management – guiding and spearheading the reforms agenda in the state focuses on using irrigation as a pro-poor anti-poverty mechanism. In general irrigation is seen to be affecting poverty by increasing returns to the physical, human and social capital; integrating the poor with factor, product and information markets and improving the overall national growth rates. The range of reforms and the measures unfolding in AP in recent years incorporates this concern and aims to usher in targeted productivity improvement. Decentralization of irrigation – Participatory Irrigation Management (PIM), financial reforms, infusion of integrated and multi-departmental interventions, focusing on water use efficiency and the decision to initiate targeted agricultural productivity improvements in recent years have all been focused upon enhancing agricultural productivity.

Water Consumption in Indian Agriculture

India is one of the world's leading crop producers. Over the years, there has been an increase in water consumption in the agricultural sector. The volume of water used for irrigation in India is expected to increase by 68.5 Trillion (Tr) liters between 2000 and 2025. A number of demographic and economic factors are driving the use of water in agricultural production. The rise in demand in domestic and export market for food grains is one important factor. India's demand for food grain will grow from 178 MM mt in 2000 to 241 MM mt by 2050. Values of agricultural exports of India have tripled from $5.6 bn in 2000 to $18.1 bn in 2008. Change in consumption Pattern of agricultural products is also driving increase in water usage. Demand for agricultural products with high water footprint is projected to rise with increased disposable income and urbanization. Contribution of non-food grain (sugarcane, fruits and vegetables, etc.) and animal products in daily food intake for an individual is expected to grow from 35 percent in 2000 to 50 percent 2050. Rice, wheat and sugarcane together constitute nearly 90 percent of India's crop Production and are the most water-consuming crops. India has the highest water footprints among the top rice and wheat Producing countries (China, US, Indonesia, etc.). States with the highest Production of rice/wheat are expected to face groundwater depletion of up to 75% by 2050. Agriculture based industries such as textiles, sugar and fertilizers are among the top producers of wastewater. Thus, in totality water conservation and management in the agriculture sector hold the key to water security in India.

STATEMENT OF THE RESEARCH PROBLEM

According to the report "Charting our Water Future" by the 2030 International Water Resource Group (IWRG) released in 2009, in India the low agricultural water Productivity and efficiency, combined with aging supply infrastructure, would make severe supply-demand gaps likely in many basins with currently planned crop choices. India's aggregate water demand is expected to double from the current level of about 700 billion cubic metres to 1498 billion cubic meters by 2030. With an estimated supply of about 744 billion cubic meters by then, the water gap is estimated to be 50 per cent. This gap would be driven by a rapid increase in demand for water for agriculture, coupled with a limited water supply and storage infrastructure. One key uncertain factor that may affect the size of this gap is climate change. Its most direct effect is likely to be an accelerated melting of the Himalayan glaciers up on which several of India's river systems depend, particularly the western rivers such as the Indus, which relies on snowmelt for approximately 45 Percent of its flow. Though in the immediate future increased snowmelt should actually increase flow of these rivers, in the long run the impact is very likely be a decrease of flow between 30 to 50 Percent.

As the water crisis manifests itself in the form of depleting water tables and water related conflicts between states, it is high time that water use efficiency becomes a focal agenda in the irrigation management Policy of India. Proper management of existing irrigation systems is critical for the success of this agenda. It would also require integration and adoption of multidimensional approaches that can manage demand by increasing water use efficiency in agriculture. While the most obvious way to increase water use efficiency would be to increase crop Yields through development of high Yielding varieties and efficient use of farm inputs, revision of electricity pricing to farming sector and reuse of waste water in agriculture can be also looked upon.

Table-1
Level of efficiencies from different types of irrigation

Factors	Sprinkler irrigation system	Drip irrigation	Surface irrigation
Overall irrigation efficiency	50-60%	80-90%	30-35%
Application efficiency	70-80%	90%	60-70%
Water saving	30%	60-70%	NA

Ministry of Rural Development 2006

From the table-1, it is understood that the application efficiency of drip irrigation is found to be the highest in relation with other methods. Hence, the present study is initiated in order to quantify the impact of drip irrigation on water saving and other crop related matters. In order to avoid duplication in research efforts, to identify the aspects covered in the earlier studies, and to identify the gaps if any, a modest attempt is made to review the earlier studies.

REVIEW OF THE EARLIER STUDIES

Michel Windfuhr1 (2005) has observed that the human rights approach alters the perspective on issues of access to land and water. The state has obligations, especially towards highly disadvantaged groups relating to both the short and long term provision of food and drinking water. The state is obligated to demonstrate that it doing all it can, and using all the resources available to it, to implement the right food and water as quickly as possible. The beneficiaries have the right to have

the state-instigated measures subjected legal scrutiny. The human rights approach does not prescribe to the state which instruments which have to be used, but direct attention to population groups with special needs, and demands a differential assessment of instruments, especially in terms of their effects on these groups. Generating and securing access to productive resources and drinking water are core elements of the right to food.

Victor Corral-Verdugo and others2 (2008) have opined that an approach to resources use and conservation based on the sustainability concept pays attention to both the physical and the social environment because it acknowledges the interdependence between the well-being of current and future generations and the current and future quality of ecosystems and, thus, promotes the rational use of natural resources. According to this perspective, most people would engage in pro environmental action not only because they think that the environment deserves to be preserved not per se but also because they acknowledge how humankind depends on nature for its current and future survival and enjoyment. This idea is more explicitly contained in the items of our proposed NHIP scale.

G. Paramasivan and D. Karthravan3 (2010) has observed that the enthusiasm of the state in executing large water projects through these groups is not matched even remotely by the concerned in practice to extend clean water supply to the poor on a sustainable basis. The need for water is continuous and the quantity required per capita per day is several times higher than that of food grains. Availability of clean water, transportation and storage over long distances and duration are difficult proposition to tackle in crisis situations. Instead of simply mentioning clean water as an input in food, the right of food campaign should strongly incorporate right to water in the struggle against hunger and starvation.

A.V.Ramanjaneyulu, T.L.Neelima, S.R.Kumar and V.Vasudeva Rao4 (2010) highlighted that a blend of indigenous knowledge of old and experienced persons, some of the beliefs and traditional practices and modern and efficient water management practices are the need of the hour in order to conserve and utilize the water resources in an efficient way in order to lead the life in a sustainable way.

Dr. Anju Bhatia and Shreya Vyas5(2010) have noted that the prevailing scenario in which water consumption is increasing and the ground water table is fast depleting brings forth the need for reviving old RWH structures. Modern

materials and technology can be used to give a facelift to old RWH structures. Although efforts have been initiated in this regard yet they require scaling up and sustainability. For revival of RWH structures, two aspects are crucial. First, the community requires to be sensitized and mass awareness needs to be created regarding the alarming situation of water and the need for, harvesting every drop of water even when the other sources of water are available in their village. Second, maintenance of community tanks should be under the gram Panchayat or other local community agencies. Government agencies, non-government-organizations, activists, media and academic institutions, especially institutes of technology need to Work together and create a synergy effect to march towards a common goal, which is to save our thousand years old heritage. Rainwater is considered as the purest form of water. However, when collected in RWH structures, its quality depends upon the care taken in cleaning and preparing the catchments area, the RWH structure as well as its maintenance.

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