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COMPREHENSIVE ASSESSMENT OF WATER MANAGEMENT IN AGRICULTURE

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INTRODUCTION:

Agriculture remains the mainstay of Indian economy; contributing 14 per cent of Gross Domestic Product (GDP) and with its allied sectors like forestry and fisheries employing 50 per cent of the country's workforce. India's demand for food grains will be at 240 million tons by the end of the XII Five Year Plan (2012-2017). Enhanced agricultural production will require increased use of water for irrigation. In India, some of the major challenges in agriculture water management relates to aging infrastructure and low water efficiency. Climatic changes will impact water availability and will pose a threat in times to come. Attaining efficiency in irrigation, developing ways to minimize losses and use of technology that uses less water to produce more per unit of land will be critical is meeting the increasing food demand simultaneously reducing the impact on environment. The report Sustainable Agriculture Water Management highlights some of the best practices adopted by the industry in minimizing freshwater intake and enhancing food production.

The case studies included in the publication demonstrate the efforts of Indian companies (namely Coca Cola India, Pepsico India, Monsanto India, Jain Irrigation and ITC Limited) who have undertaken large scale measures to reduce the freshwater intake in agricultural production. The water conservation measures adopted by companies range from direct seeding of rice, use of drip and sprinkler irrigation, rainwater harvesting and watershed management. The development of low cost technologies and its use for better irrigation scheduling is an important area of work which is receiving major attention. In addition to significant amount of water savings, the above interventions have also yielded savings on electricity, reduced manual labour to irrigate fields and enhanced the productivity ensuring better economic returns to the farmers.

The report's authors forecast that the need for water would double within 50 years, due to global population rise, more people choosing to eat a diet of meat and vegetables rather than primarily consuming cereals, and climate change. Generally, about one litre of liquid water gets converted to water vapour to produce one calorie of food. We each consume between 2,000 and 5,000 liters of water every day, depending on our diet and how the food is produced. This is far more than the two to five litres we drink every day. A heavy meat diet requires much more than a vegetarian diet, because water is used to grow food for the animals as well as being used directly to support the livestock. Economic growth fuels changes in diets; for example, per capita meat demand in China has quadrupled over the last 30 years, and milk and egg products are becoming increasingly popular in India. Growing cities, expanding industry and biofuels are increasingly competing with agriculture for water.

HOW FEEDING THE FUTURE WORLD WILL BE POSSIBLE

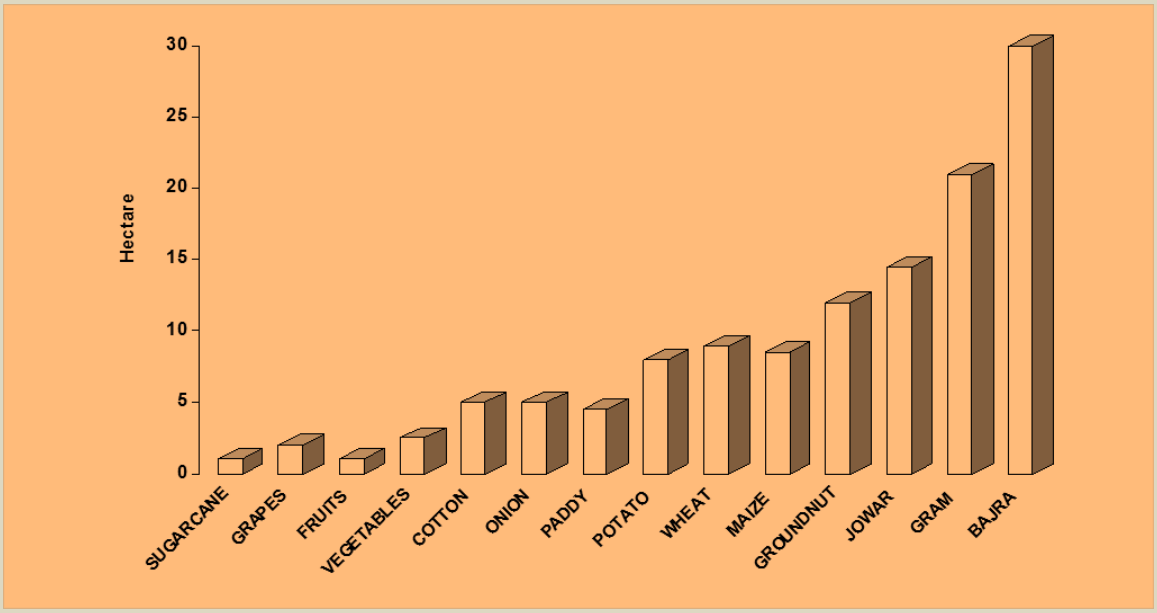
The conclusion made by the report's authors was that only by changing the way we use water within agriculture would we be able to meet the acute water, environment and poverty challenges

facing us over the next 50 years. They suggested that with wise policies and investments in irrigation, upgrading rain fed agriculture, and trade it would be possible to limit future growth in water withdrawals to 13% and the expansion of cultivated land to 9%. However, the effects of climate change and the increased use of biofuels would complicate matters, making actions necessary to address these. The Assessment found the greatest potential lay in rain fed areas of the world housing the highest number of poor people. Upgrading these rain fed lands through better water management held the greatest potential to increase productivity and decrease poverty. The technology would not necessarily need to be complex; simple measures such as catching water in huge tubular plastic bags and storing roof and road run-off could double or even triple food production in sub-Saharan Africa and south-east Asia, effectively increasing productivity from each raindrop by that amount.

Water is a vital component of agricultural production. It is essential to maximise both yield and quality. Water has to be applied in the right amounts at the right time in order to achieve the right crop result. At the same time, the application of water should avoid waste of a valuable resource and be in sympathy with the environment as a whole. Understanding, measuring and assessing how water flows around the farm, and recognising how farming practices affect flows, will help farmers to manage water efficiently and reduce pollution risks. Economic, environmental and social considerations are playing an increasing role in agricultural production. Careful and effective water management will form part of these considerations, as well as helping the farmer to continue producing profitable production. Farmers aim to guarantee that the safety and quality of the water which they use will satisfy the highest expectations of the food industry and consumers. In addition, on-farm practices should ensure that water management is produced under sustainable economic, social, environmental conditions. To that aim, this document provides a set of principles and practices for sustainable water management for the mainstream market in all regions of the world and some crop specific ones. It is meant to be revised regularly on the basis of practical experience. Furthermore, it is meant to be completed with specific guidelines and practical tools based on local innovations and adapted to local prevailing conditions (according to the region and its climates, ecological variables, farming systems, cultures etc) as well as respecting national laws and regulations.

This document on water management in agriculture at farm level aims to address the key aspects of water and irrigation management at an environmental, economic and social level. Emphasis is given to correct management of water, both in terms of quantity and quality.

Chart No:- 1
Water needs of different crops



The Basic framework looks as follows:

1. Item. An item refers to an object of management.
2. Principles identify the objective(s) of what should be accomplished with regard to an item.
3. Recommended Practices provide a set of identified non-exclusive tools and measures that can be implemented to achieve the objective(s) of a principle.

It is important to note that good management of a farming system constitutes the grassroots of the system's economic, environmental and social sustainability. Therefore, it first pays attention to planning and managing well the overall farm system itself. This document's scope of management action is limited to what farmers or groups of farmers themselves can achieve.
Farmers shall have taken into consideration applying the principles and practices to the whole farm system within a philosophy of continuous improvement. The following headings and bullets summaries the sections and objectives when applied to a whole farm system. Sections of the document contain greater detail on specific practices.

SUSTAINABLE FARMING SYSTEMS

Agriculture is considered to be a significant contributor of water pollution by non point sources. Diffuse pollution can arise from a range of activities on the farm, such as the leaching of fertilisers or soil erosion, which are spread out over a wide area and therefore harder to pinpoint and control. Many of the substances used in agriculture can cause water pollution (fertilisers, pesticides, manure and slurry, even the soil itself) are essential elements of farming. This section provides recommended farming practices for tackling diffuse water pollution. Sustainable Farming System as a whole farm approach provides a framework for implementing the list of suggestions. It covers farm selection and management, integrated crop and pesticide management, soil protection and yards.

ECONOMIC SUSTAINABILITY

A good management of water resources will help farmers to cut costs while maintaining or improving the productivity of the land and reduce the risk of pollution. This section provides some practices to ensure safety, quality and transparency, financial stability, accountability, innovation and risk management from an economic perspective.

SOCIAL SUSTAINABILITY

Achieving success in water conservation requires various levels of engagement and collaboration throughout the entire food sector and its stakeholders. Throughout this collaboration, it appears that several solutions exist to improve the water use at the farm level, including good practices. From a social perspective this section focuses on working conditions, capacity building and community engagement and recommends some practices to ensure an adequate water management at a farm level.

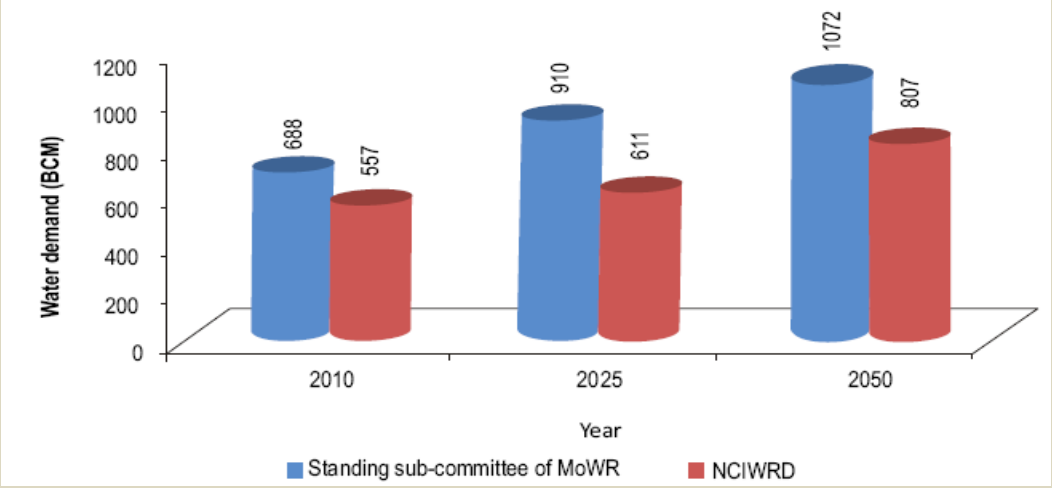
ENVIRONMENTAL SUSTAINABILITY

Wise stewardship of water resources can help ensure to diminish the effect on agriculture practices on quality and availability of water resources. This section draws together various aspects of environmental water sustainability looking at irrigation, leaks, pesticides management, water quality, water conservation practices and the establishing a comprehensive water management at a farm level. The recommended practices presented in this section aim delivering real benefits for farmers and the environment and at the same time minimising the effects on the environment.

WATER USE FOR SPECIFIC CROPS

This section provides a set of principles and practice s for sustainable water management for some specific agriculture production (Coffee, dairy & livestock; and vegetables & fruits).

Chart No:- 2
Water demand for irrigation



A study by the Water Resources Group has predicted that in 2030, the gap between demand and availability in India will be 50 per cent, with the demand touching 1,498 33 billion m and availability at mere 744 billion metre . It also states a 58 per cent rise in demand from 2005 baseline in 2030, with demand almost doubling for the three sectors of agriculture, domestic and industry. The report cautions that the impact of the water crisis will be severe in the water rich basins and measures for water security will have to factor impacts of climate change into any planning for future. In case of agriculture, water demand is projected to rise from 656 Billion Cubic Meters (BCM) in 2005 to 979 8 BCM in 2020 and 1,195 BCM in 2030

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