Poverty alleviation has been the primary objective of the development planning of the Government ever since independence of the country. However, because of the very vast geographical area of the country with widely variant climatic conditions across its length and breadth and an enormous population to sustain, the magnitude and dimensions of the poverty problems of India have been equally big. Also they are not quite comparable with the poverty attributes of other countries in Asia or Africa.

Population growth increases demand for goods and services which in crowded rural areas exerts additional direct pressure on natural resources and consequently environmental degradation as more people, produce more waste and put additional stress on earth’s assimilative capacity. Alleviating poverty is both a moral imperative and a perquisite for environmental sustainability.

Prior to independence, the country had suffered time and again from droughts leading to famines and starvation. The poor suffered the most. Mainly failure of the monsoon or, inadequate rains leading to crop-failure and sometimes, excessive rains causing floods and destruction of standing crops caused these distresses. Naturally, the remedy was lying in developing the water resources of the country to provide assured irrigation to overcome the vagaries of the rains.

The Government has been a key player in the water resources development of the country since the inception of Planning in the country. There are many success stories of the role it played in the last fifty years. About 83 percent of the developed water resources of the country is presently used for irrigation that has contributed to the significant agricultural growth the country has witnessed since independence. The primary task of development is to remove poverty.

In the first half of the last century agricultural production in India grew at the rate of about 0.5 percent per annum. But, in the last fifty years the annual compound growth rate has increased to 2.5 percent. The Gross Irrigated Area of the country expanded by 224 percent from 22.6 m.ha in 1950-51 to 73.3 m.ha in 1996-97. This phenomenal expansion of irrigation along with an extension to barren and un-culturable land, culturable wasteland and fallow land has led to the increase in the gross cropped area from 131.9 m.ha in 1950-51 to 189.5 m. ha by 1996-97. Merely a 27 percent expansion of area under food production resulted in an increase in food grain production by 292 percent because of the increase in productivity witnessed during the period. The yield of food grains per hectare of land increased by over 200 percent from 522 Kg in 1950-51 to 1,637 Kg in 1999-00. Increase in coverage under irrigation from 18.1 percent in 1950-51 to 51.0 percent in 1996-97 and

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improvement in the irrigation intensity served as a major facilitator for absorbing the beneficial effects of the other inputs, particularly the high yielding varieties of seeds, chemical fertilizers, etc. Consequently, food security has been achieved in the country and we are able to stock food grains by way of food surplus. But, such food surplus ensuring security against non-availability or, shortage or, price instability is only a fragment of the fight against hunger and malnutrition that the poor of the country are exposed to. Food surpluses do co-exist here with hunger as FAO has observed:

“Hunger is not just a manifestation of poverty; it perpetuates poverty, and has been the major stumbling block to efforts aimed at eliminating poverty. Food security is therefore an essential factor for breaking the vicious circle of poverty and malnutrition. In order to eliminate hunger, concerted efforts are required to accelerate agriculture and rural development in countries where poverty and under-nutrition exist.”

A recent estimate indicates that more than 1.300 million people around the world are suffering from absolute poverty. Though the world is producing enough food to provide every person with more than 2,700 calories per day, there are still over 800 million people in the developing countries who suffer from chronic under-nutrition. This is because many people do not have the ability to buy the food they need. The pro-poor interventions need to address this problem in its totality.

Low public investment in irrigation coupled with poor maintenance of rural infrastructure, especially canals and roads are of serious concern for our agrarian economy base. The policy approach to agriculture particularly in the 1990s has been to secure increased production through subsidies in inputs such as power, water and fertilizers, and by increasing the minimum support price rather than through building new capital assets in irrigation, power and rural infrastructure. The subsidy stimulated boost in output is not sustainable as it is generally at the cost of infrastructural investment like roads, irrigation, maintenance of canals and roads, and power generation. This has resulted in the agricultural output showing the signs of slowing down.

Percentage cropped area covered under irrigation under the coarse cereals, which remain the crop for the difficult eco-systems with poor resource base, and of poor farmers, is the least. This is one of the major factors as to why productivity of coarse cereals is far less as compared to other major crops. While the industrial potential of maize and sorghum has been realized to a small extent, it is not so for the other coarse cereals although their nutrient composition is comparable to rice and wheat. Some coarse cereals are even nutritionally superior. Coarse cereals are, therefore, a group of dual purpose nutritive crops with low productivity, though crucial for the sustenance of resource-poor farmers whose livelihood is dependent on agricultural lands with deficit irrigation or where options are few. The water resources in drought-prone areas need to be taken up as subsistence irrigation projects.

Irrigated agriculture has been a strategy for poverty reduction. In the areas irrigated by Indira Gandhi Nahar Project of Rajasthan, higher wage employment has become available on the farms. As a result, a study showed that employment per household in these irrigated areas was 640 man-days in a year against 580 man-days in nonirrigated areas. Particularly for irrigated areas, employment rose in crop farming and farm wage sector while it declined in
other activities. Certain States such as Orissa, Madhya Pradesh and the Northeastern States are lagging behind in water resources development, and are mainly dependent on rain for agriculture and suffer from very low production/productivity. For example, Orissa contributes about 2.9 percent, Assam 1.7 percent and Madhya Pradesh 9.8 percent to the total food production (1998-99) of the country. The yield per hectare of land in these States with respect to wheat and rice as well as the whole range of food grains is much lower than the all-India average yield, not to speak about that of the agriculturally developed States. The poorer productivity in agriculture in these States has a clear bearing on the standard of living of the people, particularly in the rural areas. The percentage of rural population below poverty line in the States of Assam, Orissa and Madhya Pradesh are 40 percent, 48 percent and 37.1 respectively as per 1999-00 status against the national average of 27.1 percent. The lack of irrigation facilities is the major impediment in these States to have a year-round cultivation and employment on field. The rural poverty incidence in the agriculturally developed States is much lower. For example, it is 6.35 percent in Punjab, 11.05 percent in Andhra Pradesh and 8.27 percent in Haryana.

To meet the growing food demand in the country a growth of 4 percent per annum in agricultural produce has been envisaged in our Agriculture Policy. This demand is likely to put tremendous pressure on all our natural resources which will have to be managed with great care and protected from overuse and degradation. Two options are available to meet this challenge: to intensify the production on area already in use or to expand into new areas. If more food could be grown on the same land, it would take care of the pressure to cultivate new areas and allow preservation of natural areas. The challenge before us is to balance intensive and extensive growth of agriculture so as to avoid the environmental damage and constraints on productivity that each can cause. Thus, the demand for irrigation water will multiply with increased crop intensity in future, but the escalating competition from industrial, power and domestic use will drastically reduce the availability of good quality water for agriculture from 83 percent at present to about 72 percent in 2025 A.D. and then to about 68 percent in 2050 A.D. Since irrigation has to play a key role in enhancing agricultural production, sustainability of irrigated agriculture and maximization of benefits from this sector through efficient and environment-friendly irrigation management assumes much greater significance now than ever in the past. Also, an effective liaison between the agriculture and irrigation departments needs to be established by developing most harmonious and effective working arrangements. Since application of irrigation water primarily depends upon the soil conditions and crop water requirements, it is necessary that operation of irrigation systems and the associated drainage should be supported on scientific lines with the interface of agriculture production. Essentially, the irrigation engineers, economists, agronomists, social scientists and extension services should have a much greater role in water management including delivery of water and maintenance of the system for sustenance of land and water resources.

Disjointed planning plus disaggregated and disorganized information are assumed to have caused many problems encountered in the water resources sector. In general, gaps and inconsistencies between planning and implementation, including lack of effective institutional mechanism for coordination among multiple agencies involved in water and related activities, lack of scientific management of resources, inadequate information systems, and conflicts in sharing of water between States are some of the critical areas which have not been given
due attention in the past. It must be stressed that these aspects have greater significance in the present context in view of the fact that the financial constraints, inter-sectoral claims and competing priorities will become more severe in future. Institutional restructuring has to get highest priority for effective resource management.

Undoubtedly, water development has been a key to raising the living standards and it needs to be extended to one-fifth of the humanity who have largely missed-out on its benefits. However, in doing so for economic growth, food sufficiency and material wellbeing, we will have to respect the Mother Nature’s limits. The policies, laws and practices that shape water use today rarely promote the three basic tenets of sustainable water resource use, namely, efficiency, equity and ecological integrity. Taking heed of water’s limits together with land, and learning to live within them, amounts to a major transformation in our relationship to fresh water. Doing more with less is the first easiest step along the path towards sustainable water development. By using water more efficiently, we in effect create a new source of supply. Each liter conserved can help meet new water demands. With technologies and methods available today farmers could cut their water needs by 10-50 percent, industries by 40-90 percent and cities by a third with no sacrifice of economic output or quality of life. Recognizing ourselves as part of the life-support network we depend on, and learning to live within water’s limits are integral aspects of creating a society that is sustainable in all respects. Measures to conserve water and use it more efficiently are now the most economically and environmentally sound water supply option available for much of the world. The full resource value of water—economic, social, cultural and environmental, should be recognized in irrigation water management. The small and marginal farmers are the worst sufferers of the ill management of water leading to scarcity and inequality. In order to address equity issues, pricing mechanism such as rebates for better and efficient water use and subsidies targeted to benefit the poor farmers are required to be adopted. If availability of irrigation water was not ensured at reasonable rates as per crop requirement, technological transformation appear to be a costly proposition and yield instability in crop production would increase. Besides, sources of irrigation water, if not planned scientifically, completed in time, managed technically and utilized effectively would generate several problems such as uneven distribution of water in the case of canals among head reaches and tail enders, waterlogging, salinity and alkalinity, cultivation of high water-consuming crops at the cost of low water-demanding crops, ecological distortion and generation of environmental imbalances. Moreover, if access to irrigation water was confined to a group of farmers due to geographical, social, economic and/or political factors, inequalities in agrarian structure would get widened.

The construction work of irrigation projects taken on hand should be completed as early as possible. There should be quantitative improvement or increase in water-use efficiency. Posting technically competent staff to supervise the overall water distribution network, effective coordination among Agricultural Department, Irrigation Department and Command Area Development. There should be good interaction between government organizations and users of water.

The objective function, therefore, should be to optimize total agricultural output per unit of irrigation water rather than per unit of land. Small irrigation works (including minor surface water irrigation) which are less expensive, quick rewarding and easier to manage should be promoted in future.
The planning strategy should be directed towards improvement in soil-water combination and moisture retention capacity of soil in different agro-climatic regions. Keeping topography, natural drainage system of surface water and other characteristics of soil in view, ‘watershed’ in different agro-climatic zones needs to be identified and development plan should be prepared. An integrated development plan for each, ‘watershed’ can promote activities of afforestation, soil conservation and land reshaping, creation of ponds and other water (land moisture) conservation works appropriate to local area. Development work can include reforestation of the catchment areas, restoring the field channels to their original capacity, restoring and improving the tank bunds and other associated structures, construction of small wells, check dams, and other improvement in the system of collection/distribution of rainwater as per the local requirement. Preparation and execution of ‘watershed development plan’ demands peoples’ participation.

We, therefore, have to recognize a policy mix for targeting our interventions at the poor based on the following strategies:

i. Higher investment for reservoir backed irrigation projects and extending the irrigation facilities.

ii. Stepping up plan allocations for maintenance involving user groups in management and appropriate cross-subsidized pricing of water to cover O&M costs;

iii. Generation of skills among the stakeholders for maintenance of irrigation structures, watercourses and canals including pumps and tube wells for lifting groundwater;

iv. Supporting groundwater potential to augment surface water resources wherever ground water potential is abundant but comparatively less exploited;

v. Adopting employment-intensive construction, operation and maintenance practices;

vi. Equitable use and distribution of water, enabling greater access to water, particularly in the times of scarcity to the marginal and small farmers;

vii Empowering women through greater representation in Water User Associations;

viii Preservation of soil quality in agricultural areas;

ix Providing extension services in irrigated areas;

x Integrating micro water resources projects based on water sheds in areas where resourcing of water by other means is not economically viable or difficult due to topography and other constraints.

Irrigation systems that can bring workable and equitable water distribution in difficult and marginal areas, where the poorest live, are possible, but need much more attention of all concerned. The challenge will be to make the technology affordable and easy to maintain,
and ensure that irrigation systems can operate effectively and equitably under adverse hydrological regimes. Appropriate low-cost irrigation technology, including low-cost pumps, hose and drip systems and simplified drip systems, require further investigation and promotion.