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Contents

Recent Technological Developments in the Water Sector and Prospects for Inclusive Growth

Kamta Prasad[1]

Abstract—*Irrigation is the key input for agricultural and economic development in the Country. It has been observed that in the First Five Year Plan the proportion of budgetary allocation on irrigation and agriculture was very high. Subsequently, the budgetary allocation has reduced in successive five Year Plans. As a consequence inclusive change in the economy has slightly reduced. We observed that during Green Revolution period more technological innovations led to more inclusion. However, due to administrative, managerial and low revenue generation in this area, the inclusion is still up to be optimized. The paper is trying to critically analyze the variables where government market and the community can together let the irrigation led development more inclusive.*

Key Words*: Irrigation, Technological Innovations, Efficiency, Inclusion*

The role of innovations leading to technological up gradation in accelerating economic progress has been recognized in economic theory for several decades. Literature in Economics is full of empirical studies showing a positive correlation between technological advancement and economic growth. Even elementary text books of economic theory show how technological advancement shifts the production possibility curve and puts a brake on the operation of the law of diminishing returns. There is no need to elaborate on the point that technological advancement has been a very important factor in the economic progress of the world at large including India. Given this background, it is worthwhile exploring the status of technological developments in the water sector in India in the recent past and examines their implications for the nationally accepted goal of inclusive growth.

THE INTRINSIC IMPORTANCE OF WATER

The importance of water for human wellbeing and progress is too obvious to require much elaboration. Water is the basic requirement for the biological survival of all types of lives, whether they are trees, animals or humans. One may be able to survive without food for several days, but it is not possible to survive without water for long. In addition, the quantity of water needed for the production, processing and cooking of food is several times more than the quantity that we drink. Water is, thus, the basis of food security. Water provides the basis for agriculture and forestry and, thus, affects the environment. It is used as a component of products in a large variety of industries, especially beverages.

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It is important for several industrial processes such as cooling, generating steam and cleaning. Water is used to generate electricity and acts as a medium for transportation. It is an essential ingredient of a clean and healthy life. Water, thus, cuts across all sectors: agriculture, industry, energy, domestic supplies, health, education, etc. The survival of humanity, as that of the entire eco-system, depends on water. Because of the highly uneven distribution of water, people as well as flora and fauna tend to congregate near places where water is available in requisite quantity. That is why most cities and commercial centers as well as rural settlements have grown in and around dependable sources of water. The scientists searching for life outside our planet first look for the availability of water to understand if there is potential for sustaining life. Water resources should, therefore, be regarded as a national heritage to be passed on to future generations in good condition so as to ensure the continued development of human civilization.

CONTEMPORARY WATER SCENARIO IN INDIA

Figures on availability and requirement of water in India give a clear indication of its increasing scarcity in future. By 2050, water requirement is estimated to increase to 1,447 Km^3 i.e., more than the availability of 1,123Km^3. The widening of gap between supply and demand of water is already reflected in visible decline in the availability of water in several parts of the country. Because of the highly uneven distribution of water in India, the overall picture has little significance. Water scarcity is specially felt in larger tracts of arid, semi-arid and drought prone areas. The increasing scarcity of water has led to over-exploitation of ground water affecting the sustainability of the resource.

A new development which is going to have major impact on water resources scenario in India in the coming decades is the much talked about climate change. People belonging to the poorer sections are expected to be affected much more adversely than others. And yet contemporary water scenario in India is characterized by wastage, inefficient delivery and deteriorating water quality. Poor people often lack access to safe water because the management system is not up to the mark. Further, there is a special problem due to persistence of the flood affected areas where a significant proportion of poor people reside and no special program for such people has been in operation so far. Given the above challenges which are quite formidable, what is needed is technological up gradation for increasing the availability of water, raising its efficiency and bringing about its more inclusive distribution. The purpose of this paper is to make a critical review of the technological developments during the past few decades and assess the extent to which these have been or would be useful in meeting the challenges posed above. Because of shortage of time, we concentrate mainly on physical technology and not management technology.

RAISING WATER USE EFFICIENCY

Efficiency in the use of water is an important parameter in determining the usefulness of irrigation projects. Lower efficiency amounts to wastage of water, while higher efficiency results in augmenting the effective supply of water, which can be utilized for more intensive irrigation and for irrigating new areas. It was estimated in the Ninth Plan that, with a 10 per cent increase in that period's level of water use efficiency, an additional area of 14 mha could be irrigated from the then existing irrigation system. The investment needed for this was moderate as compared to the investment that would be required for creating equivalent potential through new schemes.

Reliable data on water use efficiency in India is, however, hardly available. Rough estimates made from time to time indicate that canal water use efficiency has been quite low. As reported in the Ninth FYP, it was only 40 per cent. The situation was bleaker as per data presented in the Eleventh FYP, according to which there was 'low irrigation efficiency of about 25 per cent to 35 per cent in with irrigation systems with efficiency of 40 per cent to 45 per cent in a few exceptional cases'. The Twelfth FYP provides figures on water use efficiency of 30 completed M & MI projects as studied by CWC. This varies from 62 per cent for Koil Sagar project to 14 per cent for Yeleru project with an average of 38 per cent for all the 30 projects. This average figure is quite low. Moreover, 9 projects have a water use efficiency of less than 30 per cent, while 6 have more than 50 per cent. It is a matter of concern that low water use efficiency has persisted for quite some time despite the need for raising it as stressed by the authorities from time to time.

Technological remedies include lining of irrigation channels, and distribution of water on a volumetric basis. Lining of channels is, however, quite costly. It has been attempted in selected areas under World Bank assistance programme. Distribution on a volumetric basis, which raises efficiency, is not practicable as metered outlets are expensive, and even if installed, are liable to be tampered with. Hence the impact has been marginal.

MICRO-IRRIGATION

The recent introduction of micro-irrigation technology comprising of drip and sprinkler irrigation can be regarded as a major positive development in the water resources sector in India. According to the Eleventh Five Year Plan, drip irrigation saves 25–60 per cent water and increases yield up to 60 per cent, while sprinkler irrigation, which is specially suited for undulating land, can save 25–33 per cent water. Besides, it reduces labour cost, saves fertilizers and chemicals used in crops, reduce salt concentration in the root zone and reduce plant diseases. Micro-irrigation, however, requires high initial capital investment which may not be cost-effective and certainly not within the affordable capacity of poorer farmers, thereby necessitating subsidy by government. It also involves more Operation & Maintenance (O&M) cost for energy charges as compared to surface irrigation.

During the Eighth Plan, the Government of India introduced a programme to provide assistance to farmers. The assistance of up to 90 per cent was given on the capital cost per hectare or 25,000/- per hectare, whichever was less for SC/ ST, small/ marginal and women farmers, and 70 per cent of the cost for other categories of farmers. Supplemental efforts were made by some of the state governments, especially by Maharashtra. During the year 2005–06, a new scheme on micro-irrigation was launched. This was scaled up during the Eleventh Plan as National Mission on Micro-irrigation with a new scheme of subsidy according to which the government assistance has been 60 per cent of the cost of equipment for the maximum area of 5 ha per beneficiary for small and marginal farmers and 50 per cent for other category of farmers. In addition, assistance for the development of infrastructure (like construction of stilling tank, pump house and laying of conveyance pipes up to farmers' fields) is also provided by the Ministry of Water Resources.

But these measures have been grossly inadequate. Progress has been quite slow. The area under micro-irrigation increased from 1,500 ha in 1985 to only 3 lakh ha by 1999–2000 and to 12 lakh ha by the beginning of the Eleventh Plan. This constituted a very small proportion (only 2 percent) of the estimated potential of 690 lakh ha at that time. Much of the potential, especially for crops such as paddy, wheat pulses, oilseeds, etc. which dominate the agricultural scenario in India, is yet to be exploited. The real solution lies in further technological up gradation so that the cost of equipment and cost of operation come down substantially and become affordable by the farming community of India.

AUGMENTING WATER AVAILABILITY THROUGH INTER-BASIN TRANSFER OF WATER

The distribution of water resources in India is highly uneven in both space and time. This, along with variations in population density across different parts of the country, has led to very wide variations in per capita annual availability of water in different river basins. There are several areas and river basins, which fall into the category of 'scarcity conditions'. The rainfall-deficit areas have longer dry season because of which the scarcity condition becomes even more acute. Certain areas tend to be affected seriously at times by drought during which the local rivers do not have adequate water and often become dry. Same is the case with groundwater resources, especially as this source of water is getting depleted and becoming unavailable for additional requirement in drought prone or water-scarce areas. Hence, any diversion of water from river basins which have surplus water to water-deficit areas in other basins would be a potent source of helping the drought-affected people in fighting drought and alleviating poverty. It is in this context that a more equitable and just distribution of water resources among various basins and regions is called for to reduce regional imbalances and utilize the

water going into the sea for the benefit of those starving for water. Apart from meeting requirements of water for drinking and other domestic uses, such a strategy will provide a boost to irrigation which will bring with it prospects of higher agricultural yields, diversification, increased surplus and export of grain and other products. Other significant impacts would include recharging of depleting sub-soil water and saving it in use of electricity for pump sets. Hence, conceptually, the idea of inter-basin transfer of water is quite sound.

And yet, this need has been challenged on the ground that other supply augmentation measures like groundwater recharge through rain-water harvesting, development of watershed, tapping other local sources, and even intra-basin transfer would meet the needs of drought-prone areas in India. For example, one expert draws attention to the fact that 'there are several well-known examples of transformation that can be brought about through local rain-water harvesting and watershed development even in low rainfall areas. In brief, the primary answer to drought has to be local; it is only thereafter, and in some very unpromising places where rain-water harvesting may not be feasible or may yield meager results, that the bringing in of some external water may need to be considered'. The view that the primary answer to drought has to be local is, however, not based on any countrywide quantitative analysis and can at most be regarded as utopian. What is true in a few locations may not be so for all places in the country. This is the reflection of the well-established postulate in Economics that what is true at the micro-level may not be so at the macro-level. In a majority of cases, the overall contribution of such measures has been found to be quite small at the national level. Maintenance is another and a really big problem. These are the reasons why these alternatives have not developed on a large scale, despite their advocacy by several influential groups and despite the existence of government programmes for several decades.

This is not to suggest that local measures have no role in fighting drought. The role is considerable. But, the problem is with regard to the use of the word 'primary' for all areas. To the extent possible, one should examine the scope for harnessing the full potential of local or within the basin sources of water including rain-water harvesting and watershed development specially since diversion of water from one river to another is very costly, which, in some cases, might also have adverse social and environmental effects. Inter-basin transfer of water as well as local harvesting of water should be treated as supplementary to each other and not as competitive. It may be noted here that the Sixth Five Year Plan (FYP), which had underlined the need for inter-basin transfer of water, had also laid emphasis on 'the expeditious and efficient harnessing of the locally available water resources'. It was, therefore, stated that CWC studies should also include 'potential of harnessing further water available locally'. Similar viewpoint was expressed in the Seventh FYP. The above implies that the Planning Commission regarded interlinking of rivers as well as local harvesting of water as supplementary to each other and not as competitive.

The need for inter-basin transfer of water is also denied on the ground that water scarcity can be met by increasing effective water availability by reducing wastage of water and increasing efficiency of irrigation projects. Since irrigation uses over 80 per cent of available water, any significant saving achieved in irrigation would give impressive results. The irrigation practices used in the country are too old and highly wasteful. There are systems available in the world, whereby we can produce the same amount of crops by use of only about 20 per cent or even less of water of what we use today, thereby saving about 80 per cent of irrigation water. Reducing demand for irrigation water by a mere 10 per cent of the current levels has been estimated to release water to meet the domestic requirement of water of the entire nation. It would, however, be unrealistic to assume that such a measure alone would be able to take care of India's rising water needs. The systems which require only 20 per cent of water require investment and are quite costly and may not be economically viable for several parts of the country. As pointed out earlier, increase in efficiency has been talked about for several years, but it has not been easy to execute the measures needed for that purpose since India has been a 'soft' state for decades and continues to be so even now. The discipline needed for the purpose may not be administratively and politically feasible. Speedy completion of pending projects is another and a good viable option. But, it is important to realize that increased efficiency and completion of pending projects would be useful for areas already served by canals and not for unirrigated areas lying beyond and in other basins. Hence, the need to serve the interest of the hitherto unserved areas would remain. Inter-basin transfer of water serves this need. This is in the interest of inclusive growth.

THE INTERLINKING OF RIVER PROJECTS

Most of the inter-basin transfers of water that have taken place in India and abroad have been from one to another river situated in the neighbourhood. However, a very bold idea to transfer surplus water from the Ganga in the North to the Cauvery in the deep south was put forward in 1972 by Dr. K.L. Rao, the then Union Minister for Irrigation and Power. He suggested a 2,640 km long Ganga–Cauvery link by carrying water partly by gravity and partly by lift of 350 m, 1,680 cumecs of Ganga flood water near Patna for 150 days annually; and also a Brahamaputra–Ganga link to Patna of 3,090 cumecs with a lift of 12–15 m. The detailed examination of the proposal indicated the costs to be prohibitive and power needs for pumping excessively high (5–7 mKW). Hence, the proposal could not make any progress. A few years later, a more grandeur scheme, which received considerable media attention, was put forward by one Captain Dastur in 1977–78. His scheme, popularly known as the Garland Canal Scheme, envisaged a 4,200-km long Himalayan canal and a 9,300-km long Southern Garland canal, both to be linked by pipelines near Patna and Delhi. This plan was found to be not even technically feasible. Hence, it too could not make any progress.

INTER-BASIN TRANSFER OF WATER

But the idea of inter-basin transfer of water did not die down. It was taken upon by the government itself. The Central Water Commission (CWC) of Government of India took up exploratory studies on this aspect for several river basins. Thereafter, the then Ministry of Irrigation and CWC prepared the draft of a National Perspective plan (NPP) in 1980 based on the diversion of water from the surplus basins to the deficit ones by interlinking the concerned rivers. NPP had two components, namely the Himalayan river component and the peninsular river component. Fourteen inter-basin water transfer links under the Himalayan component and 16 links under the peninsular component were identified for the preparation of feasibility reports. Survey and investigations for these reports have been under progress since then. NPP envisaged the creation of irrigation potential for about 35 mha (25 mha from surface water and 10 mha from increased use of groundwater) and hydropower generation of about 34 MW. The contribution of the Himalayan component is irrigation of 22 mh and power of 30 MW, while that of the peninsular component is irrigation of 13 mh and power of 4 MV. Thereafter, in 1982, the Government of India established National Water Development Agency (NWDA) under the Union Ministry of Water Resources to frame concrete proposals. Accordingly, NWDA carried water balance studies and pre-feasibility studies of NPP proposals.

The Himalayan river components comprise the construction of storage reservoirs on the principal tributaries of the Ganga and the Brahmaputra rivers in India, Bhutan and Nepal so as to conserve the monsoon flow for flood control, hydropower generation and irrigation. An interlinked canal system is envisaged to transfer the surplus flows of the eastern tributaries of the river Ganga such as rivers Kosi, Gandak and Ghagra to the west. In addition, there is provision for Brahmaputra–Ganga link to augment dry weather flows in the Ganga. The envisaged benefits of this scheme include provision of irrigation to 22 mha in Haryana, Rajasthan, Punjab and Gujarat besides providing 1,120 cumecs (i.e. about 40,000 cusecs) to Calcutta Port and hydropower generation of 13,000 MW in Nepal and India. The scheme will also enable large parts of South Uttar Pradesh and South Bihar to obtain irrigation benefits from the Ganga with a moderate lift of less than 30 m. Besides, land in the terai area of Nepal would also get irrigation. The proposal also envisages linking Ganga with Mahanadi and augmentation of flow at Farakka.

The peninsular river components consist of four parts: (i) interlinking of Mahanadi–Godavari–Krishna–Pennar–Cauvery rivers to provide irrigation to drought-prone areas of Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu by successive exchanges, (ii) interlinking of west flowing rivers, north of Bombay and south of Tapi to provide water to Saurashtra and Kutch areas 370 Water in the Coming Decades of Gujarat, Mumbai city and coastal areas in Maharashtra, (iii) interlinking of Ken–Chembal rivers to provide irrigation in Madhya Pradesh, Uttar Pradesh and Rajasthan and (iv) diversion of other west flowing rivers, especially of

Kerala to the east for irrigating drought-prone areas of Tamil Nadu and Kerala. The additional area to be irrigated under all the four subcomponents of peninsular components has been estimated to be 13 mha.

The Draft Fifth FYP (1974–79), the first plan document favouring interbasin transfer of water, underscored the need for in-depth studies to find out the surpluses and shortages in various river basins and suggested that these studies would indicate 'some links for inter-regional, inter-basin and sub basin transfers, of water with a view to ensuring immunization of some of the critically drought-affected areas in the country'. Mitigation of drought was the topmost consideration behind this stand of the Planning Commission. The Sixth FYP (1980–85) also reiterated the necessity for inter-basin transfer of water to meet the needs of drought-prone and water-deficit areas in the country. Similar stand was taken by the Seventh Plan (1985–90), the Eighth Plan (1992–97), the Ninth Plan (1997–2002) and the Tenth Plan (2002–07). National Water Policies adopted by the Government of India in the years 1987 and 2002 also envisaged that water should be made available to water short areas by transfer from other areas including transfers from one river basin to another, based on a National Perspective, after taking into account the requirement of the donor areas/basins.

THE VERDICT BY THE HON'BLE SUPREME COURT AND THE FOLLOW-UP

The river-linking proposal remained alive in the work of NWDA, which, in May 2000, prepared a perspective plan for the implementation of inter-basin water transfer going up to the year 2035 in respect of Peninsular Link Project and to the year 2043 in respect of Himalayan Link Project. But, not even a single link proposal was put up for implementation. A dramatic change in the situation, however, took place in 2001 when one Shri N. Nandhivarman, General Secretary, Dravida Peravai, of Tamil Nadu filed a writ petition in the Hon'ble Supreme Court of India on this subject, requesting the Court to give direction to the authorities to initiate the implementation of the river link project within a time frame 3. This petition was taken up for hearing by the Court on 31 October 2002. The Hon'ble Court observed that while the notices had been given by the Court to the Government of India and all the state governments, an affidavit had been filed by the Union of India and by Tamil Nadu. Both of them were in Inter-basin Transfer of Water 371 favour of interlinking of rivers. No other state or Union Territory had filed any affidavit. The Hon'ble Supreme Court, therefore, presumed that there was a consensus among all the states about the need for interlinking of rivers in India. Developments since then, however, indicated that this presumption was not correct. The Union government in its affidavit had also indicated its intention to constitute a High-powered Task Force for expeditious implementation.

As against the then target of implementing the project within 43 years, the Court expected it to be done in 10 years, which was, however, quite unrealistic as

subsequent experience showed. The Court also felt that the time-taking process of negotiations and signing of agreements among states could be avoided if legislation under Entry 56 list 1 of the Constitution or any other legislation was made. The verdict of the Hon'ble Supreme Court had the good effect of accelerating a proposal, which had been moving at a slow pace for about two decades.

PROGRESS IN IMPLEMENTATION

Notwithstanding the judgement of the Hon'ble Supreme Court, the progress achieved has been rather slow. Feasibility reports of only 8 out of 31 linkages could be prepared by April 2004 against the target of preparing all by the end of 2006. By 2011, however, feasibility reports of 14 of the 16 peninsular links and 2 of the 14 Himalayan links (Indian Portion), namely (i) Ghagra–Yamuna and (ii) Sarda–Yamuna were completed. An agreement, the first under this proposal, was signed in August 2005 between the Centre, Uttar Pradesh and Madhya Pradesh governments for preparing a Detailed Project Report (DPR) on the linking of Ken and Betwa rivers. The Centre bore the entire cost for preparing DPR, which was completed by NWDA in December 2008. The project is estimated to cost `9,393 crores at 2008 prices. But, during the signing ceremony itself, the Uttar Pradesh Chief Minister had expressed apprehensions that the reduced availability of water at Paricha weir could affect irrigation in Jhansi, Jalaun and Hamirpur districts of Uttar Pradesh. He also sought compensation from Madhya Pradesh for any loss of power at downstream Rajghat and Matatila dams due to low availability of water. Madhya Pradesh too had some reservations. It was, therefore, mutually agreed in February 2010 that a revised DPR would be prepared in two phases. NWDA prepared DPR of Phase-I, in April 2010. Its benefit cost ratio was 1.56 and IRR 12 per cent.

Another agreement between Madhya Pradesh and Rajasthan has been in the offing for quite some time but without any final outcome till April 2014. This relates to the proposed Parvati, Kalisindh and Chambal rivers. A meeting between the two states held in Jaipur in August 2005 agreed in principle on the proposed river link. But, no agreement could be signed by 2011 due to persisting differences with regard to modalities as well as the quantum of available water and the location for storage. Maharashtra and Gujarat signed an agreement on May 4 2010 to prepare DPR of the Damanganga–Pingal link project and the Par-Tapi–Narmada link project. The first link will mainly benefit Maharashtra, while the second one would mainly benefit Gujarat.

Godavari (Polavaran)–Krishna (Vijayawada) link had been identified as the fifth priority link. The state government of Andhra Pradesh is implementing the link as per its own planning. It has formulated a `15,000 crore project to connect the Godavari and Krishna projects as independent of the national river link project. The state conceived the project as it is able to use less than one half of its allocation of 1,484 tmcft from the Godavari, which carries nearly 3,000 tmcft of water. The

project envisages diversion of water from the Godavari to the Krishna through two canals. The first canal (250 km long) will draw 80 tmcft of water from the proposed Polavaram across the Godavari and drop it into Krishna, a little upstream of the Prakasam Barrage at Vijayawada. The second canal (18-km long) will link Godavari to Krishna at Nagarjunasagar and lift 190 tmcft from the upcoming Dumnagudam dam using heavy pump sets. But, it is not clear how the state government will raise funds for this big project.

NWDA has also received 36 intra-state link proposals from various state governments. Prefeasibility report of 15 such links was completed by 2011. NWDA has also taken up preparation of DPR of Burhi–Gandak–Sone–Baya–Ganga link in Bihar. The Tamil Nadu government has also been planning since late 2007 to link rivers within the state to divert surplus water to drought prone regions. The proposal is to link the Cauvery river with the Vaigai river for mitigating flooding in the Cauvery basin and providing water to dry districts of Pudukottai, Sivaganga, Ramanathapuram and Virudhunagar.11 A very recent example of inter

A CRITICAL REVIEW OF ITS FEASIBILITY

Any scheme of inter-basin transfer of water, like any large scheme in the water sector, should be economically viable, socially acceptable and environmentally sustainable. But, not much is known on these crucial aspects of this project. The details provided so far by the Government are too sketchy to warrant even a serious examination, much less a view. The project is more complex than a normal reservoir project. It, therefore, requires more comprehensive information which is singularly missing. Economic analysis has not even been completed for most of the components of the project.

Even the estimated financial costs have been derived from inadequate data and questionable assumptions. NWDA had estimated that the total cost will be of the order of `3,30,000 crores at 1995–96 prices which would require an annual outlay of around `11,000 crores if these are to be implemented in about next 30 years or so. In early 2004, the Task Force estimated these costs at around `46,000 crores per annum over 12–15 years. As usual, further revisions of estimated costs may be made till DPRs of all the links are prepared. What is more important is that there are little indications as to how the massive funds would become available. The Action Plan II on interlinking of rivers submitted in early 2004 by the then Task Force (Chairman: Suresh Prabhu) had recommended imposition of water charges, levy of cess and duties on select goods of mass consumption, levy of cess on food grain procurement and raising agriculture *mandi* tax as some of the measures to recover costs. It recommended cess on water-deficit states benefiting from the project and linking the funding of the programme to the cost-recovery mechanisms. Charges be essentially recovered from the beneficiaries of the programme.

The state governments, which are responsible for levying such charges, have, however, expressed their unwillingness to provide any funding support for this project. This viewpoint was reported to have been expressed by the Secretary, Union Ministry of Water Resources as quoted in the report of the Parliamentary Standing Committee on Water Resources tabled in Parliament on 23 August 2004. The states would like the Central Government to provide the fund. In view of this, it would be better if the willingness of the states to contribute a portion of fund required is made a pre-requisite for launching such schemes. This will also provide an indication whether the states have any genuine need for it. The states, in turn, may raise the funds either fully or partially from the beneficiaries of the projects.

A really serious problem lies in identifying rivers or states with surplus water and in securing the agreement of the surplus states to allow transfer to states with deficit water. About 80–90 per cent of the annual flows in the rivers are concentrated in 3–4 months of the south-west monsoon, whereas requirements of water have their own and different patterns depending upon uses. Hence, it may be difficult to determine whether the river basin is water surplus on an annual basis. Moreover, while a river may have high flows, even causing floods in its adjacent flood plains, there may be certain parts in the same basin or the adjoining basin where drought conditions may prevail. Secondly, the situation of water being surplus has to be assessed not only on the basis of the existing state of development but also keeping in view the feasible future developments. Hence, identification of water surplus and water-deficit rivers/ basins 'can be hardly objective due to the absence of reliable data and well-established procedure'. A further dimension is added by the fact that rivers also serve ecological and other purposes which require a continuance of a minimal flow. Hence the assumptions, criteria and data used for determining surplus in a river need to be spelled out clearly. With regard to deficit, 'it will be necessary to examine whether a projected deficit is in fact the result of bad water management and unsustainable demands. If it is, the deficit will disappear with better water management'.

The fact of the matter is that the so-called surplus states have been hesitant to declare their surplus. Such an attitude goes against a basic presumption of the project that surplus flows in some basins can be diverted to deficit basins without much difficulty. It is, therefore, not surprising that the scheme has been mainly welcomed and supported enthusiastically by the water-deficit states such as Tamil Nadu which would be the beneficiary and not by surplus states such as Kerala which would be releasing water. Kerala has declared that there is no question of the state allowing diversion of waters from its rivers.

Some apprehension is expressed with respect to physical transfer of water from one basin to another, even though there are several examples of interbasin transfer of water in this country as well as elsewhere. Inter-basin transfers executed so far in India are for small projects covering limited adjacent areas, whereas the present interlinking of river projects is much larger in scope, involving the transfer of water

over much longer distances and, in some cases, with insurmountable ridges between basins. It is the second aspect which is a matter of special concern. The insurmountable ridges in some cases would require energy intensive heavy lift of water as well as cross-drainage works at the crossing points of several natural drainages. Both these aspects may be having adverse ecological and environmental effects. Hence, a cautious approach is needed in such cases. But, such concerns can be taken care of when the projects go through the Environmental Impact Assessment (EIA) process which is needed before any project is cleared for execution. In that process, some of the links may have to be dropped, while a few others may be modified. Hence, there is not much basis for such apprehensions. Rejecting the option without a thorough analysis of its advantages and disadvantages, gains and risks, is not prudent.

In addition, there is an international dimension to the interlinking plan. Bangladesh regards it as catastrophic for its interests and has been opposing it in every fora. In its opinion, the project involves unilateral withdrawal of water from a transboundary river, namely Brahmaputra. India tried to allay Bangladesh's fears by informing that there was no proposal to take up any Himalayan link as of now and that the concerns of the neighboring countries would be kept in view as and when such a link would be undertaken. This viewpoint was presented by the Indian Minister for Water Resources during the thirty-sixth meeting of the Joint Rivers Commission (JRC) held in Dhaka from 19–21 September 2005.3 Bangladesh, however, has continued to express its strong opposition and moved even the United Nations. This could have been avoided if the Ganga–Brahmaputra basin had been excluded at least for the time being.

The idea of inter-basin transfer of water is quite sound. It is needed for meeting the future requirements of water. There are several examples of such transfers in both India and abroad. But, its usefulness should be judged in the context of specific locations through a holistic analysis of relevant data, covering economic, financial, social and environmental aspects apart from the technical one.

On the basis of the existing database, which is quite inadequate, the interlinking of river projects can neither be accepted nor rejected. It has potential and may turn out to be good for certain areas but not so for other areas. Hence, it is a good issue for further study and exploration from all relevant angles, namely engineering, social, economic and environmental.

TECHNOLOGY FOR DEVELOPMENT OF AREAS REMAINING UNPROTECTED FROM FLOODS

Flood is a serious problem specially in Eastern part of the country where several flood protection measures (mainly construction of embankments) have been taken. But it is now well realized throughout the world that providing complete immunity

against severe floods may not be viable in some areas through technologies practiced so far. Hence, people in such areas have to live with floods. But people inhabitating such areas suffer from extreme poverty. How to improve their economy is a real challenge.

Crop damages due to floods constitute over 60 per cent of the total damages suffered by people in India. Such damages can be reduced if farmers adopt a flood-escaping and flood-tolerant cropping pattern and crop varieties. Sugarcane and jute are good examples. Mixed cropping is another option. If two or three mutually tolerant crops, but having different water needs and harvesting times, are grown on the same plot of land, then one may survive if there is flood and the other may survive if there is no flood. Such a combination with rice and *moong* or rice and til has been evolved and being followed by farmers in certain flood-prone pockets of Bihar. Another example of flood-escaping crop is provided by short duration crops that are harvested before the flood season such as quicker maturing varieties of Ahu and Aus paddy (in Assam and West Bengal), maize, oilseeds, sweet potato, spices, etc. A further possibility is the harvesting of pre-matured crops like maize, which can be used as fodder.

Technological research has shown that damages may also be reduced by growing water-tolerant varieties of trees, medicinal plants and horticultural crops like non-edible banana (to be used for making rafts for transportation during floods), eucalyptus, acacia, etc. (which have the additional advantage of providing bio-drainage in low-lying areas). Losses can also be reduced through alternate land uses. Very low-lying areas including village tanks may be used for aquaculture and fish culture which are less susceptible to flood damages. Probable escape of fishes with flood water may be prevented by adopting either the technology of pen culture through net or raising boundary of the pond.

But the main task is how to raise the level of increasing agricultural productivity which has been low in flood-prone areas. This can be done by focusing on the flood-free months, which have a long stretch of about nine months. Flood-free months, however, are also dry months because of which the high-soil-moisture regime does not last long. Hence, there is need for irrigation, which had also been stressed by a study team constituted by India's Planning Commission as far back as in 1985. Provision of irrigation would more than compensate farmers for the potential loss of not growing crops during flood months or growing lower yielding flood escaping varieties of crops.

Irrigation through canals in flood-prone areas has, however, been considered uneconomical since floods damage canal structures and cause higher rate of siltation. Groundwater irrigation, however, has no such problem. It provides considerable scope because of adequate availability of sub-soil water at low depths. Damage to tubewell structures due to flood can be taken care of by portable structures which can be removed before the occurrence of floods. Because of their poverty and tiny pieces of land holdings (the average being less than a hectare per

household), it is not economically viable for farmers in flood-prone areas to have tubewells of the standard sizes (usually 5 hp). Hence, farmers should either form tubewell cooperatives, the management of which may not be easy, or purchase water from others, provided such water markets exist nearby.

A cheap technology of extracting groundwater suitable for tiny holdings in flood plains (where water is available at very low depths) has been developed in recent years. Known as treadle pump**,** this technology has spread rapidly in Bangladesh. It is within the financial capability of even the poorer farmers. It can be operated manually by men, women and even grown-up children. It can irrigate half an acre of vegetables or even paddy. As Tushar Shah points out, "the treadle pump is an outstanding example of how access to groundwater irrigation can significantly improve the livelihoods of the ultra-poor" 3. 'For a marginal farmer…, there could hardly be a better investment than a treadle pump, which has a benefit cost ratio of 5, an IRR of 100 per cent and a payback period of a year.'

Efforts should also be made to raise productivity of aquaculture crops such as *Makhana* (euryale ferox) and *Singhara*, which are especially suitable to be grown in flood-prone areas. A recent study of *Makhana*, a typical aquaculture crop grown in the flood-prone areas of Bihar and an important source of cash to the poor farmers has thrown light on the absence of any technological innovation in this respect. The Indian Council of Agricultural Research (ICAR) has, however, taken up this task in recent years. Let us hope some technological breakthrough takes place in near future.

QUALITY OF DRINKING WATER

There has been fast deterioration in quality of drinking water in India. Much technological progress has taken place in measuring the quality. Developments have also taken place in improving the quality of water by setting up water purification plants for supply of bottled water and equipments for purifying water for domestic use. But these measures are quite costly and are being availed by the better off sections only. These are not the instruments of inclusive growth. The need for further technological research in this area remains.

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Augmenting Social Science Knowledge in Developing Economies: Challenges and Alternatives

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Abstract—*The present paper focuses on contemporary discourse on social science epistemology with special focus on India and other developing nations. Some of the socioeconomic problems are crime, violence, exclusion, perceptions, unemployment, poverty, governance and ethical erosion. In this context a few key ways to tackle by social sciences are consensual theoretical and applied deliberations, innovations, multidisciplinary activities, improvements in teaching, research and evaluation, normative exposures and perspective vision. These have been critically described in different sections in the paper in order to overcome the emerging problems. A section in the end has also been given for future directional approaches and strengthening the social science discourse.*

Key Words: *Knowledge, Social Sciences, Theoretical Update, Less Developed Economies*

INTRODUCTION

The social sciences comprise a wide range of disciplines, drawn from the mainstream disciplines and its various branches of history, geography, political science, economics, anthropology and sociology. The identification and orderly organization of content of studies in a meaningful social science courses and curriculum enable to develop a critical understanding of society and hence it is a very challenging task. The more challenging is its evaluation because of conflicting arguments and scope of subjectivity. Therefore, innovative contributions to research and to ongoing teachings on ethics, values, critical theory, cognition, ideology, development policy, organizational behavior, economic dynamics, environmental problems, gender studies, patenting in science and technology, cultural inclusion, equity, drive to economic maturity including high mass consumption and the nature of theory itself are crucial for decent nation building. In this context the broad theoretical augmentation in social sciences data can be broadly classified in the following analysis.

KNOWLEDGE GENERATION IN SOCIAL SCIENCES

BLANK SLATE THEORY

The blank slate theory is proposed by British philosopher John Locke. Virtually, human minds start off empty, i.e. blank slates, and grow by personal experiences.

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According to Locke, thoughts begin by absorbing sensation and become denser through reflection on thoughts. Thus "blank slate" means writing on a neat and clean slate sheet with any piece of chalk or marker. This is used as the name of an epistemological theory. All persons are born with vacuum in brain. However, they acquire knowledge through experience. Generally, a proponent of the blank slate (in Latin tabula rasa) theory favors the learning part of the structure of one's personality, social and emotional, and intellectual. The intellect develops from the material intellect that potentials can gain knowledge in conjunction with the electronic and print sources of knowledge

In Locke's philosophy, the mind is a "blank slate" at birth unable to process any data. This is added up through sense organs. The human brain is born blank. It also emphasized the freedom of individuals to author their own opinions. People are free to analyze the content of an object. However, the basic features of the human species cannot be altered. Thus self made mind leads to the doctrine of "natural" rights. Thus Locke's idea of tabula rasa is often viewed similar to Thomas Hobbes's arguments of human nature, in which human being is endowed with inherent mental content—especially selfishness. Ahead of it Freud depicted personality traits as being formed by generational fluctuations. People lack freedom. Genetic influences on personality are quite low. In Freudian psychoanalysis, individuals` attributes are also largely determined by prevalent environment.

The tabula rasa notion became extremely known in social science disciplines during the twentieth century. During early days intellect was related to social class. These ideas were declined. In the fourth century B.C., in his work "De Anima," Aristotle makes a similar proposition. Locke's essay, however, was widely read and had a great influence. The "Educationalists" believed that children were born as "blank slate", beginning their lives ethically unbiased. From this point of view, infants are neither inherently good nor bad. By the late 20th century John Money forwarded the idea that identity is socially built, and not genes based.

EMPIRICIST THEORY

Empiricist believes that work experience is of primary importance in giving us knowledge. People learn through their perceptions. Perfection in knowledge without experience is hardly possible. However gene factors may be also exceptionally considered as a stock of knowledge. There are three types of empiricists. Classical empiricists reject the value of knowledge by birth. John Locke wrote that the mind remains a tabula rasa, a “blank slate”, when individuals are born. At birth new born babies know nothing. The mind in post birth period grows with data and reasoning by experience. Those who are radical empiricists maintain that knowledge is sense derived. It is impossible for us to talk about something which we have not sensed. Statements that are not tagged to our experiences are really meaningless. Radical empiricists further prevent religious, spiritual and

ethical discourse and belief. Moderate empiricists however allow that there may be some cases in which the senses do not ground our knowledge, but hold that these are exceptions to a general rule. Facts that there are no three-sided square or 10^3 = 1000 or 5 + 5 = 10 are well proved facts and hence are no knowledge. Unknown knowledge basically comes to us through experience. Sources of knowledge are books, media, and experienced younger or older people. To gather information we must know method of reading. To learn these things eventually requires additional knowledge.

PARADIGMATIC THEORY

Kuhn did not maintain the concept of paradigm as appropriate for the social sciences. He distinguished the social sciences from the natural sciences. He observed that social scientists are hardly in agreement on certain theories or concepts. Paradigm is a typical word which shows an example that serves as a pattern or model for something, especially one that forms the basis of a methodology or theory. Kuhn accepted that there were none, nor can there be one or some, paradigms in the social sciences. Dogan in his paper "Paradigms in the Social Sciences," also agreed with Kuhn that there were no paradigms in social sciences since the concepts are having multi meaning. Dogan also narrated many examples of the non-existence of paradigms in the several social sciences like sociology, political science and political anthropology. It is absolutely correct to say that broad classifications in the social sciences are usually not based on paradigm. The allied sub-disciplines and areas may still be picked up by a conventional research. Handa introduced the idea of "social paradigm" in the context of social sciences. He identified the basic components of a social paradigm. Like Kuhn, he put thrust on the point of flexible paradigm termed as "paradigm shift". He highlighted social circumstances that follow such a shift. This broad shift in the social areas change the way the individual feels reality.

Inventions often bring numerous modes of collaboration between social scientists. Open-source applications of knowledge are likely to play a crucial role in the development of research capability in social sciences. Initiatives aiming at developing new digital tools for research, collaborative memorandum and networking in the social sciences will be of critical importance. It is wisely recommended that several government agencies, research councils, and universities keep archives for the deposit and dissemination of social science studies. It is essential to encourage multilingualism among social scientists because of use of several languages in writing literature. One goal is that everyone should be able to work and collaborate in their own language while understanding other languages. Translation, data analysis, and collaborative strategies again require specific development. International agencies and organizations may consider helping translation policies in social sciences. For example, studies addressing Indian

challenges from a regional perspective should be translated for enhancing the horizon of public debate. The growth of research potentials requires that governments, international institutions and aid agencies grant to support research institution as well as individual training. The levels of capacity require awareness in societies. Funding is indeed needed to produce results. Different schemes enhancing the circulation of ideas among social scientists should be promoted to reduce the negative aspects of brain drain. There are disparities between regions, countries and institutions in terms of access to knowledge. Governments, councils, foundations and donor agencies may provide universities and research institutions with sufficient money to support equal access to national and international publications in social sciences.

INTERDISCIPLINARITY WITH INNOVATION

Social sciences issues normally agree on the necessity of collaboration among them, and hence require interdisciplinary modes. Several writers make genuine proposals for interdisciplinary collaborations (World Social Science Report, UNESCO, 2010), and most of their analyses agree that burning issues require some degree of interdisciplinary analysis. There is a growing conviction among social scientists today that more attention needs to be given in multiple manners. This is explicitly expanded in two ways. Firstly, the realization that culture forms these contexts. Worldviews, beliefs, institutions, and historical perceptions shape the way different people perceive and react to a phenomenon. This seems realistic, but the implications of cultural lags appear with more clarity than ever in the face of the current Indian challenges. In the case of poverty, for instance, unitary definitions ('those who live on less than US$2/ day') and proposed solutions were supposed to be concluded as ineffective. The meaning of poverty has not supported the proposed solutions. We also feel that no matter how central beliefs and global views are, culture itself does not indicate the last sense on many issues (NMP Verma and Asha Srivastava: 2012, World Bank, 1990). The sum total of factors like economic, social, gender, ethnic, institutional, political, technological, environmental and cultural changes describe regional case studies. Understanding these trends, and developing methodologies for clarity are pre conditions for the development of responses. Even academicians who often argue for new theories on social issues assert that they pay close attention to the ways in which people interpret their realities. There are no content-waived responses to socioeconomic challenges that are similarly applicable everywhere. Only content-specific theories and models are hardly valid. This requires correct thinking. Inequality, as well as, other variables such as ageing, marginalization and urbanization are strategic economic spaces in the world economy are observed everywhere but in different forms according to local situations. The academicians` deliberations on socioeconomic issues such as gender issues, public health concerns, security, food crisis, migrations, diversity and integration, and issues of cross country integration and dynamics could be very

useful agenda. These issues reflect the priorities identified in the United Nations Millennium Summit in 2000 and also the Copenhagen Conference on Sustainable Development in 2000. Today's challenges and trends in human societies are also challenges for their disciplines, and are forcing them to adjust. Developing the innovative instruments and categories of observation is a precondition for the assessment of contemporary developments. Results can be amazing. Inequality shows very different pictures of the evolution of Asian inequality. Social science provides methods that are non-hypothetical for developing the societies can critically observe their development. We recognize the conviction that today's challenges in developing nations do require revisiting former methodologies and approaches, and even the development of new ones altogether. This is the most striking feature. Innovation thus becomes a key word, and it is largely innovation in terms of interdisciplinary. All social scientists will have to come closer one day on emerging challenges. Even if the conventional subject specific boundaries stay in their domain and the topics, vocabulary and literature are discipline-bound, the channels for innovation need more refinements and scientific presentation. Innovative thoughts can be thus very helpful for the social scientists.

TEACHING, RESEARCH AND EVALUATION

There is a qualititative difference in teaching and research at every step. This needs to be standardized. So should be evaluation process of examination materials and systems. It is important to reinstate the significance of the social sciences by not only highlighting its increasing relevance for a job in the rapidly expanding subsectors, but by pointing to its necessity in laying the foundations for an analytical and creative mindset. It is often presumed that only natural and physical phenomena lend themselves to scientific inquiry, and that knowledge pertaining to the social sciences cannot be, by their very structure so "scientific". But it is necessary to understand that the social sciences stick to scientific inquiry just as much as the natural and physical sciences do. The methods employed by social sciences are analytical and unique to those of the natural and physical sciences (NMP Verma, Asha Srivastava, 2009). The social sciences carry a normative responsibility to create and widen the popular base for human values, namely freedom, trust, mutual respect, respect for diversity, etc. Thus, social science teaching basically should be aimed at investing in a student a moral and mental energy so as to provide her with the ability to think independently and deal with the social forces that threaten these values, without losing her individuality. Social Sciences teaching can achieve this by promoting student's ability to take initiative to critically reflect on social issues that have a bearing on the creative coexistence between individual good and collective good. Critical reflection pre-supposes an exhaustive curriculum in which learners–both teachers and children–participate in generating knowledge without any latent and manifest forces of coercion. It is through this non-coercive and participatory mode that children and teachers stand

the best chance of making teaching and learning interesting as well as enjoyable. All the diverse disciplines of social science have distinct methodologies that often justify the preservation of boundaries. The boundaries of disciplines need to be well thought and a plurality of approaches may be applied in order to understand a given phenomenon (NCERT, 2006). While updating curriculum, certain themes that facilitate consensual thinking are required for dissemination. Further because of subjectivity common evaluation should be methodologically evolved. Near uniformity at teaching, research and evaluation may bring qualitative improvements among these disciplines. Also social sciences should maintain interface with other disciplines for better outcomes (UNESCO, 2010). On certain crucial national occasions social sciences may mix with non social science disciplines for policy research.

TRANSFORMING PERCEPTIONS AND CONVENTIONS

There is enough peoples` perception that social sciences carry little value. As a consequence, during the classroom-transaction, both faculties and students feel uninterested to comprehend its social relevance. From the initial stages of education, people brief students that the technical education, economics, management and key basic science subjects are superior to the social sciences, and are the major field of meritorious students. Therefore, there is need to highlight that the social sciences are essential to provide social, cultural, developmental and analytical skills required to adjust to an increasingly integrating economy and to handle political and economic realities. Science hardly transmits information which is required to be memorized for examinations. The textbooks are considered to be unconnected to daily socioeconomic values. In addition, social science is believed to provide irrelevant details. It is also felt that the examination rewards varies largely with evaluation by different teachers. There is a perception that not many desirable job options are open to students specializing in the social sciences. Job potentiality of social science disciplines in corporate sector has not gone up. Any effort to address the information burden the social sciences will have to review the contemporary evaluation system. Additionally, it is largely felt that the social sciences are deprived of the 'skills' required to function in the real world. This gives the impression that the subject is redundant. It is important to enhance the importance of the social sciences by not only highlighting their increasing relevance for jobs in the rapidly expanding sectors, but also by pointing to their indispensability in laying the foundations of an analytical and creative mind relating to employment, distribution of asset and wealth, governance and safety. This is urgently required in the growing capitalist environment and ethical erosion. This may further improve employability for the students and scholars of other disciplines.

NORMATIVE EXPOSURE

The social sciences deal with a normative responsibility in order to create and widen the popular base for human values. It suggests what should happen in the society. Given these, social science teachings should aim at inculcating a critical moral and mental strength to make the society aware to the social factors that destroys these values. These are possible through the discussion on these numerous indicators. There is a widespread belief that social interdisciplinary textbook should stimulate the child's thought process and creativity. The disciplines that make up the social sciences have often justified the ranges. The limitations of several disciplines need to be opened up. For useful curriculum, certain themes that facilitate interdisciplinary thinking are urgently required. These themes should be conceptually introduced assuming the age factor of the students. There is also a need to choose subthemes where different disciplinary focuses can facilitate an in-depth and multiple understanding. Here consensual deliberations and consequent conclusions are essential.

EDUCATIONAL INCLUSION

Recently the debate has cantered on the appropriate balance between the public and private contributions to the financing of higher social science education. One of the criticisms of state financing of higher education has been that it exacerbates inequality within society in temporal and spatial manner because students in higher education come from the most socially disadvantaged backgrounds. Although no single model of financing higher education is appropriate still India has to balance the challenges of higher education access with higher education funding. The balance in the division between state and private funding is also related to other important dimensions within each society. These dimensions include the proportion of students seeking higher education and the social background of students as well as scholars; the resource and taxation structures; the drivers of disparities; the fiscal policy of the government; the nature of students` educational loan facilities; and the externalities in higher education. In the context of an emerging national focus on quality in education, providing high quality teacher education is seen as the most important single parameter for meeting out the challenges and wider access to teacher education (NCERT, 2006). Because of the competition created by private providers, there is need for a regulatory framework with the advent of multiple providers and the potential of public-private partnerships in teacher education. UNESCO recommendation on the Status of Scientific Researchers which emphasized 'the need to apply science and technology in a great variety of specific fields of wider than national concern: namely such vast and complex problems as the preservation of international peace and the elimination of want'. Presently, the social sciences bring greater clarity to our understanding of how human populations interact with one another, and, by extension, with the environment. The ideas and information

they generate can therefore make a precious contribution to the formulation of effective policies to shape our world for the greater good. Yet, social scientific knowledge is at risk in developing nations. The huge disparities in research capacities across Indian states and the qualitative heterogeneity in knowledge creation hamper the capacity of social sciences to respond to the challenges of today and tomorrow. While we may be building a' rational and transparent knowledge society', it is one that looks very different depending on one's regional perspective. Social scientists produce work of outstanding quality and tremendous practical value, but, social scientific knowledge is often the least developed in those parts of the world where it is most keenly needed. Such educational divides reproduce themselves in each generation, in our institutions and in our methods of creating and using knowledge. Such knowledge hiatus also influence all indicators of human development, hampering the accumulation, transmission and use of knowledge in our societies, to the detriment of equitable development. Consider about 50 crores poorest who live on less than US$1.25 per day in developing nations. There is a consensus that their upbringing should urgently be improved. We may, perhaps, need better intentions; we certainly need better and more accessible knowledge that can provide policies with the evidence that they need to make a difference. Social scientific endeavour is also poorer for its bias towards English and English-speaking developed states. This is a missed opportunity to explore perspectives and directions that are integrated in other cultural and linguistic traditions. A more culturally and linguistically diverse approach by the social sciences would be of tremendous value to organizations such as ICSSR, ICHR, ICPR and others to promote mutual understanding and intergroup deliberations. All such findings are definitely challenging – they emphasize that without conscious and coordinated efforts. The global social science structure is fractured and lacks pluralism (Shapere, D. 1964). Clearly, institutions matter hugely for research performance. But their strength can hardly be taken for granted in today's economic circumstances. The production of rigorous, relevant and pluralistic social science knowledge requires international coordination, a long-term vision and a stable funding environment. Of course for this financial inclusion is equally important.

Inclusion means providing access to various services to the entire people. It has gained importance in the past as a policy objective for national policymakers, multilateral institutions and others in the development field. It has also become a buzzword in developing nations. The United Nations designated 2005 the International Year of microcredit, adopting the objective of building inclusive systems. Educational inclusion may be defined as the process of ensuring access to value education needed by vulnerable groups such as weaker sections and low income groups at an affordable cost. While the significance of educational inclusion has been broadly accepted, much fewer is known about how inclusive the financial systems are and subsequently who has access to which educational services. The literature on inclusion lacks a comprehensive measure that can be used to indicate

the extent of financial inclusion across countries. Though indicators of educational sectors are widely available, there is less information available about the degree of inclusiveness. Educational exclusion is characterized not simply by a lack of affordability. The respective ministries may plan preparation of an index to ascertain inclusion on a six monthly basis to integrate a larger section of the population with the formal financial markets. The index will determine the extent of access to financial services to households, looking primarily at their commitment with financial intermediaries. The index will help judge the state of financial inclusion and relative improvement and the banking regulator Reserve Bank of India (RBI) to take timely and area specific measures to drive financial inclusion better.

PERSPECTIVE VISION

Educational information and related knowledge have supported faster transformation of developing economies. The inventions in several disciplines and their applications have further led the economy to a new platform of production and distribution. Innovations are quite essential so that newly created and invented things can be applied in different areas for bringing allocative efficiency and productivity with quality. Inclusion may be forthcoming when the process of ensuring access to goods and services generated through various scientific and technological policies needed by vulnerable groups such as weaker sections and low income groups at an affordable cost. In practice, increasing access to all segments of the population require that strategies framed on science and technological issues in different five year plans are turned into effective policy measures. This requires that adequate attention is focused on innovations and inclusion. In 12th Plan document of Government of India there is a focus on inclusive growth in each sector of the economy. This will enhance overall sectoral development. Second, by escalating the economic opportunities of poor and low-income people, it will help make socio-economic development itself more inclusive. Third, more inclusive development will mean more rapid progress, as more widespread and sustained growth of the income of lower-income households will translate into additional growth of the national markets and economies. In addition, balanced and sustained economic growth helps support sustainability as well as economic progress (Lakatos, I, 1978, Alamelu, 2012). This requires economic cooperation in many areas. In our view, it will require policies aimed that fully consist of poor and low income households in development and that provide for inclusiveness in key sectors. Exclusion which is the antonym of inclusion is characterized not just by a lack of affordability but by having no access to various developments in key areas to the beneficiaries.. While the relevance of inclusion has been broadly accepted, much fewer is known about how inclusive the science and technological educational systems are and who has access to educational services. The literature on inclusion lacks a comprehensive measure that can be used to indicate the extent of inclusion

across economies. Though indicators of the department of agriculture, energy, environment, health and numerous other subsectors are widely available, there is less information available about the degree of inclusiveness in a temporal and spatial manner. Governments and donors have played a catalytic role when supporting the innovative approaches of alternative educational institutions. These scientific and technological institutions functions in quickly changing environments. They meet the social, economic and political challenges in their economies while serving the needs of those traditionally denied access to financial services. Most countries have a number of these institutions and in some cases all of them are present. State economies are now recovering from the global financial crisis, due to the effective economic stimulus measures that the various state governments have implemented to sustain domestic demand, restore market confidence and stabilize financial markets. As a result, the Indian economy grew by 6.5% in 2009 and grew further by 5.6 % in 2010-11 and likewise in other subsequent years. The tasks for Indian states are to sustain the economic recovery by implementing appropriate monetary and fiscal policies. It has been recognized that educational inclusion is a thrust area for holistic development.

CONCLUSION AND POLICY OPTIONS

In this paper we have confined our discussions around some important socioeconomic parameters for knowledge augmentation with reference to social sciences. Social sciences can play a crucial role for a decent nation building and its qualitative change. Single discipline is handicapped to address numerous problems. Single discipline focuses on specializations. It is important to encourage interdisciplinary research and to institutionalize it. It has been suggested that interdisciplinary research thoughts should be created to improve understanding of the social aspects of major tasks such as poverty, exclusion, disparity, cultural transformation, governance crisis, discrimination and environmental change. Here researchers from different disciplines could cooperate, and research with more than one disciplinary background. World digital databases are essential tools for overcoming knowledge divides between different areas of the world. Well known groups should be set up to identify what is feasible in the relatively short term, and to identify other issues which should be dealt with at the national level in the long run. The importance of social sciences in contemporary world is widely accepted, yet their overall influence remains limited because of huge disparities in research capacities across developing countries and the fractured knowledge. Much remains to be done, but on the national level the academicians make a number of suggestions on how to address these divides at the level of teaching, research, evaluation of students and faculty performances, weakness of administration, qualitative and quantitative gaps and communication skills. ICSSR, ICHR, ICPR and other councils may strengthen the present areas of activities on every vital problem and explore many other ways to plug in these gaps in Indian economy and society. But the

constraint is of funding of social science institution which is comparatively very low to science and technology disciplines. As generation of refined knowledge is experienced based people`s participation in such activities needs to be productively augmented. Lastly science social science interface may be community oriented and mass friendly.

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Effective Inclusion in Irrigation Management: Reforming Policy Initiatives

Mukesh Kumar Sinha[1]

Abstract—*Irrigation is vital for achieving food security for the nation and better livelihood for the farmers through increased land and water productivity. However, in India, irrigation sector has less productivity and low water use efficiency (≈38%) which compares poorly with 45 % in Malaysia and Morocco and 50–60 % in Israel, Japan, China and Taiwan. The main factors contributing towards low agricultural productivity and water use efficiency are poor maintenance of canal and distribution network, lack of awareness among farmers, lack of regulation of water distribution on volumetric basis, absence of or ineffective regulatory mechanism especially for water charges, ineffective Participatory Irrigation Management, lack of agronomical logistics and modern agricultural tools, etc. The current institutional and legal structures that deal with water in our country need reforms. The planning, development and management of water resources has to keep pace with changing times. There is a need to restructure departments / organizations at Centre / State Governments levels to achieve inclusive development. Taking note of these factors, the National Water Policy (2012) and the Twelfth Five Year Plan (2012–17) Document have suggested various policy initiatives, such as, appropriate institutional and legal framework, preparation of river basin master plan on Integrated Water Resources Management principle, promotion of micro-irrigation techniques, alignment of cropping pattern with the availability of water, greater involvement and empowerment of Water Users Association in the irrigation management, rationalization of water charges through regulatory mechanism, incentivizing States for water sector reforms through setting up of National Irrigation Management Fund, launching massive awareness and skill development programmes, etc. This paper outlines these policy initiatives to usher in improved irrigation management in our country.*

Key Words: *Irrigation Management, Policy Initiatives, Water Sector Reforms, Water use Efficiency, Participatory Irrigation, Irrigation Management Fund*

INTRODUCTION

Though the share of agriculture and allied sector in Gross Domestic Product (GDP) has declined to 15.2 per cent during the Eleventh Plan and further to 13.9 per cent in 2013–14, it still accounts for about 54.6 per cent of total employment (Economic Survey, 2013–14). In addition to providing livelihood to more than half of the population, agriculture sector holds the key to food security needing 450 Million

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tonnes (MT) of food grains to feed estimated 1.7 billion people by 2050. Given the present level of food grains production to be about 265 MT only and limitations in expanding agricultural land, the only option available is through increasing productivity. Irrigation is most important input for improving crop productivity, but mere irrigation will not provide the required solution. The constraints in availability of water resources coupled with competing demands from other sectors, such as, drinking water, industries, energy, etc., and the fact that more water necessarily does not mean more yield and may result in lesser yield due to water logging, salinity, etc., make efficient irrigation management a must for India.

Irrigation management in India, to a great extent, is characterized by poor maintenance of canal and distribution network, lack of awareness among farmers, lack of regulation of water distribution on volumetric basis, absence of or ineffective regulatory mechanism especially for water charges, ineffective Participatory Irrigation Management, lack of agronomical logistics and modern agricultural tools, etc. The current institutional and legal structures that deal with water in our country need reforms. The planning, development and management of water resources has to keep pace with changing times. The departments/ organizations at Centre/ State Governments levels should be restructured to achieve inclusive development. Recognizing the need for reforms in irrigation management, the National Water Policy (2012), adopted by National Water Resources Council, and the Twelfth Five Year Plan (2012–17) Document, approved by National Development Council, have suggested several policy initiatives. Both these Councils comprise Chief Ministers of all States, Chief Administrators of all Union Territories and related Union Ministers. As such, the policy initiatives and reform measures convey the general commitment of both Centre and the States for better irrigation management in the country. An attempt has been made to briefly present these policy initiatives in succeeding paragraphs.

FACTORS LIMITING IRRIGATION EFFECTIVENESS

Before we describe policy initiatives, it would be appropriate to identify factors limiting irrigation effectiveness. At the time of drafting National Water Policy (NWP, 2012), a series of consultation meetings with different stakeholders were held, which inter-alia gave an insight into actual irrigation management in the country. Following consultation meetings were held prior to drafting NWP, 2012:

1. With Hon'ble Members of Parliamentary Standing Committee on Water Resources, Consultative Committee for Ministry of Water Resources and Parliamentary Forum on Water Conservation and Management on 28th July, 2010.
2. With Academia, Experts and Professionals on 26th October, 2010.
3. With Non-Governmental Organizations on 11th & 12th January, 2011.

4. With representatives of the Corporate Sector on 21st March, 2011.
5. With representatives of Panchayati Raj Institutions on 16th June, 2011 at Hyderabad, on 30th June, 2011 at Shillong, on 14th July, 2011 at Jaipur and on 2nd November, 2011 at Pune.

The draft NWP, 2012 was circulated amongst all State Governments/ Union Territories and related Union Ministries and was also placed on the website of Ministry of Water Resources for comments. The National Water Board, comprising representatives of all State Governments and related Union Ministries, and the Consultative Committee of Parliament attached to the Ministry of Water Resources also deliberated the Draft NWP, 2012 before its adoption by the National Water Resources Council. These deliberations brought to fore several factors limiting irrigation effectiveness in our country, the most important ones are:

1. ***Fragmented and Isolated Approach***: The irrigation projects are often planned and executed in isolation without considering its inter-relations with other developmental and ecological needs in the river basin leave aside their impacts on upstream and downstream projects. This is primarily due to absence of river basin master plan based on the principles of integrated water resources management or integrated river basin management.
2. ***Engineering Centric Approach***: Irrigation departments at Centre and States often adopt engineering centric approach without realizing that irrigation management involves socio-politico enviro-economic issues as well. Without integrating socio-politico enviro-economic issues and agronomy logistics into irrigation engineering, inclusive growth would remain elusive and we would be dealing with peripheral issues only.
3. ***Poor Operation and Maintenance of Irrigation Infrastructure***: Like any other infrastructure, irrigation infrastructure also requires proper operation and maintenance without which growth of weeds and vegetation within them, siltation of canals, damage of lining in lined canals, distortion of canal sections due to siltation or collapse of slopes, leakages in gates and shutters, etc., occur. Non-provision or damaged lining in canals, field channels and water courses has resulted in high seepage losses. Often there are no regulation gates on head regulators of minors, which lead to uneven distribution of water. Cases of over-irrigation due to non-availability of control structures in the distribution system have also been reported. These all results in improper and inadequate irrigation facilities in the fields. Lack of operation and maintenance fund due to low water charges and their collection coupled with corruption are prime reasons for this.

4. ***Excessive Irrigation***: Due to no or poor understanding of crop water requirement, low water charges, inadequate drainage, etc., excessive irrigation results in causing poor land and water productivity in spite of irrigation. On the other hand, problems of water logging, salinity, etc., arise, which may result in permanent loss of productivity unless and until costly reclamation efforts are taken up.
5. ***Lack of Participatory Irrigation***: Participatory irrigation fosters spirit of ownership and cooperation amongst water users ensuring proper upkeep of irrigation infrastructure and optimum utilization of available water. Many States have enacted Participatory Irrigation Management Acts in one form or another, but true participation in planning and implementation is still elusive, as a result of which level of satisfaction amongst farmers remains low.
6. ***Absence of Regulatory Mechanism***: Irrigation, by virtue of its socio-economic dimensions, is more a political issue resulting into decisions, such as, allocation of priority, funding; fixation of water charges and their collection, etc., getting dictated by political considerations. Though some States have established some sort of regulatory mechanism, but still most of the States have not established independent statutory regulatory mechanism to ensure participatory, transparent and professional decisions for optimum irrigation development along with other developmental and ecological needs.
7. ***Missing Climate Change Adaptation***: Climate change is evident and expected to be more pronounced in agriculture, but no efforts on mitigation and/or adaptation are seen on the ground. Irrigation projects are designed considering past thirty years of hydrologic data even though these are constructed for the future and the principle of statistical continuity no longer holds good because of land use and climate change.
8. ***Limited Availability of Technical, Financial and Managerial Resources***: Most of the farmers have small holding with limited technical, financial and managerial resources. Though the State Governments construct irrigation projects but do not create enabling environment for easy availability of scientific information, such as, soil health card, technological advancements in seeds, fertilizers, agricultural tools, etc., cooperative movement, capacity building, specific guidance, etc.

In addition to above, there are some local factors also resulting into poor irrigation management.

POLICY INITIATIVES FOR REFORMS

The National Water Policy (2012) and the Twelfth Five Year Plan (2012–17) Document address the above factors limiting irrigation effectiveness through several policy interventions. The important ones are;

INTEGRATED AND MULTI-DISCIPLINARY APPROACH

The National Water Policy (NWP, 2012) has made following policy recommendations for adoption of integrated and multi-disciplinary approach:

a. Planning, development and management of water resources need to be governed by common integrated perspective considering local, regional, State and national context, having an environmentally sound basis, keeping in view the human, social and economic needs. (para 1.3(i) of NWP, 2012).

b. Being inter-disciplinary in nature, water resources projects should be planned considering social and environmental aspects also in addition to techno-economic considerations in consultation with project affected and beneficiary families. The integrated water resources management with emphasis on finding reasonable and generally acceptable solutions for most of the stakeholders should be followed for planning and management of water resources projects. (para 9.2 of NWP, 2012).

c. All water resources projects, including hydro power projects, should be planned to the extent feasible as multi-purpose projects with provision of storage to derive maximum benefit from available topography and water resources. (para 9.7 of NWP, 2012).

d. Integrated Water Resources Management (IWRM) taking river basin/ sub-basin as a unit should be the main principle for planning, development and management of water resources. The departments/ organizations at Centre/ State Governments levels should be restructured and made multi-disciplinary accordingly. (para 12.4 of NWP, 2012).

A draft River Basin Management Bill, with provision of preparation of River Basin Master Plan, has been got prepared through an Expert Committee under the chairmanship of Justice (Retd.) T.S. Daobia. The draft Bill has been placed before the National Forum of Water Resources and Irrigation Ministers of States and also circulated amongst all State Governments/ Union Territories and related Union Ministries. Ministry of Water Resources, River Development & Ganga Rejuvenation has also constituted a Committee to review the Guidelines for preparation of Detailed Project Report for Water Resources Projects, which would inter-alia provide for adopting integrated approach for irrigation projects.

The Accelerated Irrigation Benefit programme and Command Area Development & Water Management programme have been amalgamated to ensure pari-passu completion of command area works so that benefits from irrigation projects start accruing and the gap between irrigation potential created and that utilized is reduced. Similarly, the scheme for Repair, Renovation and Restoration (RRR) of

Water bodies emphasizes development of catchment area, de-siltation and command area development in respect of water bodies. The RRR scheme in rural areas is proposed to be implemented in convergence with the Integrated Watershed Management Programme so that the catchment areas of the water body selected are located either in treated micro/ mini watershed or those selected for treatment during the next year or two. Such measures emphasize integrated approach.

ADEQUATE PROVISIONING FOR OPERATION & MAINTENANCE COSTS

Para 8.7 of NWP, 2012 stipulates that the water resources infrastructure should be maintained properly to continue to get the intended benefits. A suitable percentage of the costs of infrastructure development may be set aside along with collected water charges, for repair and maintenance. Contract for construction of projects should have inbuilt provision for longer periods of proper maintenance and handing over back the infrastructure in good condition.

It is expected that apportioning a part of cost of infrastructure development would ensure availability of budget for operation & maintenance. Similarly, in-built provision of maintenance for a longer period as part of contract document would make contractor not to compromise with the quality at the time of construction. It is envisaged that review of the Guidelines for preparation of Detailed Project Reports would incorporate these recommendations.

CLIMATE CHANGE ADAPTATION

The National Water Policy (NWP, 2012) has made following policy recommendations for facilitating adaptation to climate change:

a. The adaptation strategies could also include better demand management, particularly, through adoption of compatible agricultural strategies and cropping patterns and improved water application methods, such as land leveling and/ or drip/ sprinkler irrigation as they enhance the water use efficiency, as also, the capability for dealing with increased variability because of climate change. (para 4.3 of NWP, 2012).

b. Planning and management of water resources structures, such as, dams, flood embankments, tidal embankments, etc., should incorporate coping strategies for possible climate changes. The acceptability criteria in regard to new water resources projects need to be re-worked in view of the likely climate changes. (para 4.5 of NWP, 2012).

Irrigation management should be compatible with the local climatic conditions to make maximum use of available rainfall. Further, the projects should be designed keeping in view likely hydrological scenario in the future rather than past thirty years' data or so, since the principle of statistical continuity no longer holds good in

view of changing land-use and climatic conditions. Climate change is likely to aggravate water stress conditions, and therefore, there is a need to review the acceptability criteria for water resources projects on case to case basis. So far 75% dependability yield is considered for irrigation planning, but recently Krishna Water Disputes Tribunal has adopted 65% dependability and Cauvery Water Disputes Tribunal has adopted 50% dependability as basis for water allocation and irrigation planning. It is envisaged that review of the Guidelines for preparation of Detailed Project Reports would address this aspect also.

PARTICIPATORY MANAGEMENT

The National Water Policy (NWP, 2012) has laid emphasis on participatory management. Some of policy recommendations in this regard are:

a. Meaningful intensive participation, transparency and accountability should guide decision making and regulation of water resources. (para 1.3(iii) of NWP, 2012).

b. Community based water management should be institutionalized and strengthened. (para 3.6 of NWP, 2012).

c. Stakeholder participation in land-soil-water management with scientific inputs from local research and academic institutions for evolving different agricultural strategies, reducing soil erosion and improving soil fertility should be promoted. (para 4.4 of NWP, 2012).

d. Water Users Associations (WUAs) should be given statutory powers to collect and retain a portion of water charges, manage the volumetric quantum of water allotted to them and maintain the distribution system in their jurisdiction. WUAs should be given the freedom to fix rates subject to floor rates determined by WRAs. (para 7.5 of NWP, 2012).

e. Local governing bodies like Panchayats, Municipalities, Corporations, etc., and Water Users Associations, wherever applicable, should be involved in planning of the projects. The unique needs and aspirations of the Scheduled caste and Scheduled Tribes, women and other weaker sections of the society should be given due consideration. (para 9.6 of NWP, 2012).

f. There should be a forum at the national level to deliberate upon issues relating to water and evolve consensus, co-operation and reconciliation amongst party States. A similar mechanism should be established within each State to amicably resolve differences in competing demands for water amongst different users of water, as also between different parts of the State. (Para 12.1 of NWP, 2012).

g. Water resources projects and services should be managed with community participation. For improved service delivery on sustainable basis, the State Governments/ urban local bodies may associate private sector in public private partnership mode with penalties for failure, under regulatory control on prices charged and service standards with full accountability to democratically elected local bodies. (para 12.3 of NWP, 2012).

A National Forum of Water Resources and Irrigation Ministers of States has been constituted for sharing ideas, facilitating support to new and innovative ideas and evolving consensus for better water governance in the country. It will be a permanent forum with the provision that half of its Members would retire after every two years and would be replaced by the Ministers from States/ Union Territories from similar regions in the country.

The Guidelines (December, 2013) on Command Area Development & Water Management Programme, which has been amalgamated with the Accelerated Irrigation Benefit Programme, inter-alia envisage formation of a multi-disciplinary Committee at State Level called State Level Monitoring Committee (SLMC) with a representative from Panchayati Raj Institutions (PRIs) to plan various activities, fixing priority of works, monitor their implementation, provide guidance to District Level Implementation Monitoring Committee (DLIMC) & Block Level Implementation Monitoring Committee (BLIMC)/ Cascade Association (CA)/ Water Users Association (WUA) and ensure coordination amongst all concerned departments/ agencies at the state level. At the level of village command of the project, the scheme is to be implemented by the Government agency involving the WUAs consisting members of elected local Panchayat. Each Command Area Development Authority is to ensure that in each project, at least 3 WUAs in head, middle and tail reach are formed and developed like a model to be replicated by others.

Similarly, the scheme for Repair, Renovation and Restoration (RRR) of Water bodies envisages preparation of the Detailed Project Reports and implementation of the works on water bodies by Water User Association (WUA)/ local panchayat/ a Government Agency identified by District Level Implementing Agency (DLIA). The implementation plan of the project will be placed before the Gram Sabha and its cooperation will be solicited for timely completion of the project. The WUA would also earn revenues by charging for its services from its members and build up a corpus for maintaining and managing the water bodies over time.

REGULATORY AUTHORITY

The National Water Policy (NWP, 2012) stipulates that pricing of water should ensure its efficient use and reward conservation. Equitable access to water for all and its fair pricing, for drinking and other uses such as sanitation, agricultural and

industrial, should be arrived at through independent statutory Water Regulatory Authority, set up by each State, after wide ranging consultation with all stakeholders (para 7.1 of NWP, 2012). It also envisages that in order to meet equity, efficiency and economic principles, the water charges should preferably/ as a rule be determined on volumetric basis. Such charges should be reviewed periodically (para 7.2 of NWP, 2012).

The Twelfth Five Year Plan (2012–17) Document emphasizes transparent and participatory process of determination of entitlements and prices; and recommends regulatory authority to ensure sustainability, meet environmental needs and to ensure accountability by providing the 'normative' or 'political' framework for the techno-economic regulatory decisions.

The Thirteenth Finance Commission had noted that injudicious inter-sectoral and intra-sectoral distribution of water amongst various categories of water users, low water use efficiency, fragmented approach to water resources planning and development, low water user charges and meager recovery are some of the major problems associated with the management of water resources in the country. It recommended a statutory autonomous institution at the state level to address these issues and for specification of a minimum level of recovery of water charges. The proposed regulatory authority may be given the following functions:

1. To fix and regulate the water tariff system and charges for surface and sub-surface water used for domestic, agriculture, industrial and other purposes.
2. To determine and regulate the distribution of entitlement for various categories of uses as well as within each category of use.
3. To periodically review and monitor the water sector costs and revenues.

The States of Arunachal Pradesh, Andhra Pradesh (erstwhile), Gujarat, Jammu & Kashmir, Kerala, Madhya Pradesh, Maharashtra and Uttar Pradesh have set up Water regulatory Authorities so far and other States are in process.

SCIENTIFIC IRRIGATION MANAGEMENT AND CAPACITY BUILDING

The National Water Policy (NWP, 2012) has made following policy recommendations for scientific irrigation management and capacity building of farmers:

a. Land, soil, energy and water management with scientific inputs from local, research and scientific institutions should be used to evolve different agricultural strategies and improve soil and water productivity to manage droughts. Integrated farming systems and non-agricultural developments may also be considered for livelihood support and poverty alleviation. (para 10.2 of NWP, 2012).

b. Continuing research and advancement in technology shall be promoted to address issues in the water sector in a scientific manner. Innovations in water resources sector should be encouraged, recognized and awarded. (para 15.1 of NWP, 2012).

c. It needs to be recognized that the field practices in the water sector in advanced countries have been revolutionized by advances in information technology and analytical capabilities. A re-training and quality improvement programme for water planners and managers at all levels in India, both in private and public sectors, needs to be undertaken.(para 15.3 of NWP, 2012).

d. To meet the need of the skilled manpower in the water sector, regular training and academic courses in water management should be promoted. These training and academic institutions should be regularly updated by developing infrastructure and promoting applied research, which would help to improve the current procedures of analysis and informed decision making in the line departments and by the community. A national campaign for water literacy needs to be started for capacity building of different stakeholders in the water sector. (para 15.5 of NWP, 2012).

Applied research for irrigation management and capacity building activities are on-going efforts of Central/State Government, Non-Governmental Organisations and research/academic institutions. The NWP, 2012 and plan schemes re-affirms the commitment of the Government for the same.

INCREASING WATER USE EFFICIENCY

The National Water Policy (NWP, 2012) stipulates development of a system to evolve benchmarks for water uses for different purposes, i.e., water footprints, and water auditing to promote and incentivize efficient use of water. The 'project' and the 'basin' water use efficiencies need to be improved through continuous water balance and water accounting studies. An institutional arrangement for promotion, regulation and evolving mechanisms for efficient use of water at basin/sub-basin level will be established for this purpose at the national level (para 6.1 of NWP, 2012). It also states that project financing should be structured to incentivize efficient & economic use of water and facilitate early completion of ongoing projects (para 6.4 of NWP, 2012). Considering the existing water stress conditions in India and the likelihood of further worsening situation due to climate change and other factors, water resources projects should be planned as per the efficiency benchmarks to be prescribed for various situations (para 9.1 of NWP, 2012).

The Government of India has launched National Water Mission with one of the goal as increasing water use efficiency by 20%. The On Farm Water Management (OFWM) component of National Mission for Sustainable Agriculture focuses on

enhancing water use efficiency by promoting appropriate technological interventions like drip & sprinkler technologies, efficient water application & distribution system, secondary storage and drainage development. The Accelerated Irrigation Benefit Programme envisages at least 10% of the command area to be brought under micro-irrigation.

INCENTIVIZING STATES TO UNDERTAKE REFORMS

Irrigation is primarily a State subject and therefore, proactive efforts by State Governments are very essential for reforms in irrigation management. The National Water Policy (2012) inter-alia recommends that States should be encouraged and incentivized to undertake reforms and progressive measures for innovations, conservation and efficient utilization of water resources (para 12.7 of NWP, 2012). Thirteenth Finance Commission Report, National Water Mission Document, National Water Policy (2012), Twelfth Five Year Plan (2012–17) Document and draft National Water Framework Law propose a number of reforms in water sector. These are in terms of policy/ governance issues, achieving water use efficiency, financial management, capacity building/ training, participatory (community) management and convergence between various schemes/ programmes at Panchayat/ Municipality level.

The Planning Commission Steering Committee on Water Resources and Sanitation and the Thirteenth Finance Commission had recommended that the central assistance should be linked to outcomes in terms of water sector performance and impacts. There is a need to have substantial fund to incentivize States in taking up an aggressive administrative, financial reform agenda. The Finance Commission formula of allocating the incentive grants in proportion to Gross Receipts recovered and Irrigation Potential Utilised of different States may appear to be narrow in perspective and may not address much needed reforms in water resources sector. The States need to make substantial investment in operation & maintenance of infrastructure, because it is very much desirable to fully renovate the systems before handing them over to the local bodies such as Water Users' Associations or the Panchayati Raj Institutions.

Therefore, the Twelfth Five Year Plan Document, approved by the National Development Council, has recommended setting up of "Irrigation Management Fund". It is envisaged to incentivize States in taking up an aggressive administrative and financial reform agenda in the water resources sector, some of which could be as follows:

a. Improving water use efficiency from current level.

b. Reducing the gap between Irrigation Potential Created (IPC) and Irrigation Potential Utilized (IPU) through CAD and micro irrigation systems etc.

c. Deployment of adequate Operation & Maintenance fund for full utilization of water resources infrastructure.

d. Establishment of Regulatory Mechanism and rationalization of water user charges

e. Comprehensive capacity building for project management personnel including field workers/farmers, representatives of Water Users Associations/Panchayati Raj Institutions/Local Governing Bodies, etc.

f. Empowering Water Users Associations to collect and retain a part of water charges and maintain the field distribution system.

g. Promoting volumetric water supply to ensure optimum and efficient use of water resources.

h. Sustainable ground water management with active participation of communities.

i. Planning, development and management of water resources adopting principles of Integrated Water Resources Management with river basin/sub-basin as units

j. Establishment of River Regulation Zoning Mechanism, etc.

The Guidelines for Accelerated Irrigation Benefit Programme for Twelfth Five Year Plan (2012–17) stipulates enhancement of Central Assistance from 25% to 50% as incentive for new projects subject to the condition that the States actually carry out water sector reforms as per the reform benchmarks to be laid down by the Ministry of Water Resources in due course. Till finalization of reform benchmarks, following measures are being considered as water reforms 1) Measurement on volumetric basis, 2) participatory Irrigation Management, 3) Active working of Water User Association, 4) Micro Irrigation, 5) Collection at water cess by Water User Association, and 6) Maintenance by Water User Association. With implementation of any three of the above, the State Government will become eligible for enhanced funding.

CONCLUSION

Irrigation uses about 80% of total water usage in the country. Any further improvement in irrigation management would substantially unlock utilizable water, which could then gainfully be used for industries and ecological purposes. Therefore, reforms in irrigation management are very essential. The Finance Commission Report, National Water Mission Document, National Water Policy (2012), Twelfth Five Year Plan (2012–17) Document and draft National Water Framework Law have suggested various policy initiatives. Many States have started implementing these policy initiatives reaping benefits. Hopefully more and more

States would take advantage of these policy initiatives for improving irrigation management and ultimately the well being of their people and the country at large.

DISCLAIMER

The Information, facts or opinions expressed in this article are those of the Author and/ or compiled by him. Information, facts or opinions shared by the Author do not reflect the views of Ministry of Water Resources, River Development and Ganga Rejuvenation and/ or Government of India and they are not responsible or liable for the same in whatsoever manner.

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Potato: A Wholesome Food, Social Issues and Health Concern

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Abstract—*Potato is one of the major food crops in the world and it is not only the king of vegetables but also has a strong bearing on the agricultural economy of the country. Potato is, thus far superior to wheat, rice and maize in food value because of its other quality attributes like high digestibility, ready acceptability and a wide range of uses (value addition). Hence, potato can be accepted as a major part of our daily diet. The biological value of potato protein is high though it is somewhat deficient in sulphur containing amino acid. It is very low phytic acid content and so most of the calcium in potato becomes available to the body. Potato also contains a variety of phyto-nutrients that have antioxidant activity. Among these important health-promoting compounds are carotenoids, flavonoids, and caffeic acid as well as unique high quality tuber storage proteins such as patatin rich in essential amino acids, which exhibit activity against free radicals. Potato is inevitable in food item for social and environmental issues due to solver of the problem of under nutrition, hunger, malnutrition and poverty alleviation in an effective and efficient way. The historical background also enhances its value as a food of crisis and food for sustainability. Time and again potato has proved to possess the potentiality to feed the nations in emergency. Today, potato is predominantly an integral part of both vegetarian and non-vegetarian societies. It is still one of the important crop grown by the North-eastern tribes of India as shifting/Jhoom cultivation and it constitutes the major part of their diets. The health, safety and welfare of farmers, entrepreneurs and consumers are vital assets for the sustainable development of the potato subsector and agriculture throughout the world. Thus, creating awareness of food safety, social and environmental issues should be part of potato production and consumption in rural and peri-urban areas for livelihood. Therefore, being outstanding virtues of potato there is no doubt; it is a wholesome food as well as food for future.*

INTRODUCTION

India is the world's second largest producer of Potato. It is not only the king of vegetables but also has a strong bearing on the agricultural economy of the country. Although, it occupies 19.9 m ha of the net cropped area with a total production of 453.4 MT (National Horticulture Board 2013). Over the four decades the area under the crop has increased by 278%, production by 816% and the yield

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by 142%. It has been established as an important food crop in Europe and America. But in India due to our traditional food habits we continued to depend upon the cereals-primarily rice and wheat as our staple food. There is a paradigm shift both in area and production of potato from developed country to developing one during the last five decades due to technological advances like development of improved varieties, modern agro-techniques for storage and seed production, post harvest management, value addition and its utilization. Being it is used as a vegetable tuber in its mouth-watering delicacies. The historical background also enhances its value as a food of crisis and food for sustainability. Our forefather used to eat its tubers and lived for a longer life. Today, potato is predominantly an integral part of both vegetarian and non-vegetarian societies. It is consumed in one or the other ways throughout the world (Pandey, 2010).

Most of the potato produced in India is consumed within the country. Among other vegetables and fruits, potato is still the only vegetable which is easily cultivable and available round the year to all people. Beside this, in order to the people of different ages, sections and strata of society there are number of processed/ value added products are available, although potato processing industry is still in its infancy. Per capita potato processing in India just about 365 g (89.7 % potato chips or crisps, 9.3 % potato powder/ flakes and 1.03 % French fries) (Rana, 2010). Although, we are increasing towards potato production day by day but still the problem of warehousing of potato existed.

POTATO FOOD: AT PAR WITH THE CEREAL CROPS (WHEAT, RICE AND MAIZE)

Potato is very efficient food crop and produces more dry matter, protein and minerals per unit area and time in comparison to other major crops such as wheat, rice and maize (Table 1).

Table 1: Comparison of Potato Flour as Compared to Cereals, per 100 g (Dry Weight Basis)

Flours	Constituents					
	Water	Protein	Fat	Carbohydrates	Ash	Calories
Potato flour	7	8.5	0.4	81.7	4.1	349
Wheat (medium)	12	12.8	2.4	73.7	1.7	334
Rice (milled)	13	6.7	0.7	79.3	0.7	360
Maize	11.1	6.8	2.8	78.7	0.6	1528

From the nutritional point of view potato is one of the most important and versatile food materials. It is a good source of complex carbohydrate, mainly starch; dietary fibres (Table 2). Potato also contains a variety of phytonutrients that have antioxidant activity. Among these important health promoting compound as carotenoids, flavonoids & caffeic acid, as well as unique and high quality tuber storage proteins, such as patatin, rich in essential amino acids, which exhibit activity against free radicals. Potato is a substantial source of ascorbic acid, thiamine, niacin and pentothenic acid (Vitamin B_5) and riboflavin. Fat content of

potato is very low. If we take fried potatoes, the medium in which they are fried would contribute its fat too, thus increasing the fat content of the fried potatoes. It is therefore, best to consume potato in its boiled and mashed forms. Potato is a low energy food. However, potato becomes rich in energy when it is fried e.g. 200g of boiled potato provide about 138 kcal of energy, whereas fried form of it, as French Fries provides about 597 kcal. A packet of 50g of potato chips provides approximately 239 kcal energy. Potato is good for weight conscious persons when it is consumed without frying. Calorific value of potato is lowest as compared to other staples. Potatoes when boiled or used in preparation of vegetable curry have low calorific value, therefore, good for health of the people (Singh and Malhotra, 2011; Kalia and Gupta, 2013).

Table 2: Constituents of Potato

Constituents	Quantity
Water	77.4 g/100g
Total Solids	17.4 g/100g
Protein	2.7 g/100g
Fat	0.1 g/100g
Carbohydrates	17.4 g/100g
Crude fibres	0.6 g/100g
Ash	0.9 g/100g
Iron	0.8 mg/100g
Calcium	14.7 mg/100g
Phosphorus	89.0 mg/100g

Source: CPCRI, ICAR, Shimla

Chipsona varieties have high dry matter when processed gives higher recovery of processed products with lesser absorption of oil and thus are ideal for processing.

IMPROVED POTATO VARIETIES FOR PROCESSING

Today, major varietal improvement has been done in terms of yield, nutritional quality and resistant to insect-pest which made possible the availability of different varieties according to different regional climatic conditions. Most of the area in north Indian plains and plateau regions is suitable for growing early potato varieties (Table 3). Such varieties can escape vagaries of frost, virus and late blight diseases. Early harvesting also provides comparatively better price to farmer (Kumar *et al.,* 2003; Bhatnagar, 2012). Not only this there is also the requirement of proper storage of potatoes for their availability for processing industry. Potatoes meant for processing are stored at intermediate temperatures of 10-12 degree Celsius with sprout suppressant (isopropyl N-3-chloro phenylcarbamate, CIPC) treatment, because low temperature storage leads to excessive accumulation of reducing sugar which reacts with free amino acids during high temperature frying resulting in brown coloured and bitter tasting products because of 'Maillard reaction'. CPRI has developed different varieties for making chips and French fries but due to

non-availability of quality raw material, these varieties are being used for both the purposes. The selection of a suitable variety for any potato operation is essential for long term success. Several table or ware purpose varieties are available to Indian farmers, but only few varieties are ruling the fields. For processing varieties also, quality at harvest alone does not complete the story; the maintenance of quality during long term storage is equally important. As compared to cold storage potato (2–4 degree Celsius) and stored at 10–12 degree Celsius these varieties contains relatively less quantity of reducing sugar (Kaul, 1999). Such potatoes don't taste sweet and they fetch higher price as "sugar free potato". Although, there is nothing like sugar free potatoes, all potatoes contain sugars and the only difference is in their concentration. All processing varieties of potato are high in dry matter and low sugars i.e. Kufri Chipsona 1, Kufri Chipsona 2, Kufri Chipsona 3, Kufri Chipsona 4, Kufri Frysona and Kufri Himsona, Kufri Chandramukhi and Kufri Lauvkar (Ram, 1993; Singh, 2011).

Table 3: Improved Processing Varieties of Potato Developed by Central Potato Research Institute, Kufri, Shimla

Processing Varieties	Characteristics
Kufri Chandramukhi	Early maturing (80–90 days)
Kufri Lauvkar	Early maturing (75–80 days)
Kufri Jawahar	Early maturing (80–90 days)
Kufri Ashoka	Early maturing (70–80 days)
Kufri Cipsona, Kufri Chipsona 2, Kufri Chipsona 3, Kufri Chipsona 1, Kufri Chipsona 5	High dry matter content
Kufri frysona	Early maturing
Kufri Surya	Early maturing (70–80 days), heat tolerant
Kufri Khyati	Early maturing (70–80 days)
Kufri Jyoti	Medium maturing (90–100 days), resistant to early blight, immune to wart
Kufri Bahar	Medium maturing (90–100 days)
Kufri Lalima	Medium maturing (90–100 days), resistant to early blight, PVY
Kufri Sutlej	Medium maturing (90–100 days), resistant to late blight
Kufri Pukhraj	Early-medium, resistant to early blight and late blight
Kufri Anand	Medium maturing (90–100 days), resistant to late blight, frost
Kufri Arun	Medium maturing (90–100 days), resistant to late blight, frost
Kufri Pushkar	Medium maturing (90–100 days), resistant to early, late blight and phoma
Kufri Sadabahar	Medium maturing (90–100 days), resistant to late blight, tolerance to frost
Kufri Sindhuri	Late maturing (100–110 days), resistant to early blight, tolerant to PLRY
Kufri Badshah	Late maturing (100–110 days), resistant to late and early blight and potato virus X

VALUE ADDITION (ADDED) FOOD PRODUCTS

Organized Indian processing industry consumes less than 2% of the total produce in the country compare to 30–67 % in developed countries. Potato can be processed into mouth watering value added fried and non-fried products having longer

shelf-life the market for such processed is currently blooming in India. To meet the burgeoning demand potato processing is emerging as a fast growing industry (Singh *et al*., 2008). Among non fried products such as potato soup mix and potato flakes, potato jam, potato sweet buttons/ murabba, sweet and sour potato lachha, potato éclairs, potato sweet pier, potato hajmola candy, potato custuard powder, potato soup mix etc., provides low calories, have good taste long shelf life. Potato biscuits and cakes are new bakery items which has immediate consumer acceptance. Fried products are: Aloo-Shakarpara, fresh fried potato lachha, potato sago papad, potato chocolates, potato pickles, potato lollypops, dehydrated chips, dehydrated potato sticks, potato waris etc. Dehydrated potato sticks and chips contain low fat and have a longer shelf life in comparison to fresh fried chips. These are particularly suited for people who are calorie conscious or obese (Marwaha and Sandhu, 2003). The potato processing industry in the country has gone a sea change in the last decade. Now due to availability of quality raw material round the year and awareness about processed potato products other than chips, the processing industry is growing up.

Potatoes with high dry matter and low reducing sugars are good for processing. Such potatoes on frying produce white/ light colour in processed products, mostly chips, French fries, varieties ideal for processing are: Kufri Chipsona 1, Kufri Chipsona 2, Kufri Chipsona 3, Kufri Chipsona 4, Kufri Frysona and Kufri Himsona. The performance of these varieties are found at par with the world's leading in French fries varieties; McCain. Taking into consideration the upcoming varieties, it seems that the demand of these varieties will be increased tremendously in the coming years (Singh, 2011). Atlantic and FTL-1533 are other excellent varieties for processing but they are susceptible to late blight.

SOLVER OF UNDER NUTRITION, MALNUTRITION AND POVERTY ALLEVIATION

The potato contains all the major nutrients like protein, vitamin, calcium, phosphorus and is a treasure house of carbohydrates which are essential for body building. The problem of under nutrition, malnutrition and poverty alleviation can be largely solved if potato is accepted as major food like Europe and America and not merely as a vegetable in our country. The average consumption of potato in many countries of the world is from 50–175 kg of tubers per annum both in fresh as well as processed forms, but it is less than 7 kg per capita per annum in India. Our diet consists of over 97 percent of cereals and only 2.6 percent of potatoes, where several industrially advanced countries of Europe and America more than 50-64 percent of the daily diet of the people is derived from potato.

With the development of a new transgenic potato variety, in which AmA-1 gene from amaranthus was successfully introduced in potato to improve the nutritional value of potato by enhancing the synthesis of essential amino acids and proteins. AmA-1 gene encoding storage protein, rich in essential amino acids, had been cloned

from *Amaranthus hypochondria.* This group has shown that in addition to increase in tuber size and yield there is 4-8 fold increase in essential amino acids in AmA-1 transgenics of potato dihaploid A-16. Eighty-eight AmA-1 transgenic lines of 9 Indian potato cultivars, viz. Kufri Badshah, Kufri Bahar, Kufri Chipsona 1, Kufri Chipsona 2, Kufri Jyoti, Kufri Lauvkar, Kufri Pukhraj, Kufri Sindhuri and Kufri Sutlej were developed. Expression of AmA-1 protein has been confirmed in tubers of 48 transgenic lines. This new transgenic variety now eliminates the problem of protein deficiency along with carbohydrate. This has been a major breakthrough in the nutritional quality of potato as a source of protein which makes it wholesome (Chakrabarti *et al.,* 2003).

SOCIAL AND ENVIRONMENTAL ISSUES

Potato cultivation has also significant impact on solving many social and environmental issues like eliminating hunger, under-nutrition and malnutrition due to macronutrients, poverty alleviation by entrepreneurship in cultivation and processing etc. potato cultivation is a high risk and high returns venture. It provides 2–3 times higher average net returns in the long term compared to less risky annual food crops.

POTATO: FOOD FOR CRISIS AND HUNGER

Potato is not only fulfils the nutritional requirement but also proved to posses the potentiality to feed the nations in emergency. It saved Europe during the Bohemain war, first and second world wars, and in recent years potato contributed substantially to the food supplies for our armed forces. It is, therefore, hardly surprising that potato in this country is still regarded as vegetable, often a costly luxury only for the urban people to enjoy. This situation needs immediate rectification to give potato the place it deserves as "Poor Man's Food" (Rao, 1977).

Apart of being a source of nutritive food, potato has certain other outstanding virtues, which makes it valuable article of diet during crisis. These are:

a. It is easy to cook, boil or bake, whole or mashed, dried or fried and is equally palatable.

b. In its fresh state, it has a good storage life, which can be extended over a long period by its conversion into dry products.

c. It blends very well with almost all food stuffs of vegetable or animal origin.

d. Combine with cereals flour or in mashed state with some other vegetables, it not only imparts taste but improves quality, flavour and acceptability of the product viz chokha aloo dum.

It is still one of the important crops grown by the North-eastern tribes of India as shifting/ Jhoom cultivation and it constitutes the major part of their diet. Now, not only this, today potato cultivation further moves to ushers the economic prosperity among the tribes. Emergence of commercial aptitude is directly reflected in their produce like potatoes. Tribals have developed new potato varieties to cope with the rising demand of industrial and urban centres in their neighbourhood viz., ranchi, Bokaro, Rourkela, etc. tribals of Bero near Ranchi who have developed a rainy season potato to earn money from eastern India (Vidarthio and Lal, 1977).

ENTREPRENEURSHIP THROUGH CONTRACT FARMING IN POTATO

All mjor potato processors have undertaken contract farming operation in India. This technology infusion through contract farming has been adopted on the model of PepsiCo India (previously known as Pepsi Foods Ltd.). The salient features of this model has been the supply of quality seed-poato, addured technical support, monitoring of crop health, facilitation of farm credit and crop insurance to the contracted farmers. The role of contract farming of potato in Indian rural economy is becoming more and more important, as organised farming is catching up consistently (Singh *et al.* 2011).

Although, tribes have been gaining the benefit of potato cultivation but their pattern of cultivation i.e. shifting/ Jhoom cultivation, pulls attention of environmentalists towards environmental health concern in general and soil fertility loss in particular in some areas of different region like Maharashtra, North-East and western Himalayas etc. Potato is a very good crop in a sense which provides the ample opportunity for multiple cropping systems because of its short growing season. Potato finds its place in a variety of cropping system followed in different parts of country. It has a potential to produce more per unit area in a per unit time, which not only make it more remunerative for the farmers but also improves environmental condition through land saving, besides elevating the economic status of farmers. Development of improved production technology with suitable potato-based crop sequence commensurate with agro climatic condition plays a vital role in getting maximum monetary return without impairing soil health. For example Rice-Potato-Wheat system has a tremendous potential to increase crop production, improved profitability and livelihood of farmers. Similarly, Rice-Onion is widely practised cropping system and in this cropping system, potato could be introduces to make the system more remunerative and diversified (Singh and Lal, 2003). The setting of 4 Agri Export Zones (AEZs) on each in Punjab, Uttar Pradesh, west Bengal and Madhya Pradesh for potato is a very significant step in potato development. Streamlining the efforts in augumenting country's exports and improving the quality and productivity of potatoes through improvement in seed availability and pre-harvesting techniques, the AEZs are an effort in strengthening and creating infrastructure for the supply chain management and aggressive marketing.

HINDRANCE IN RELEASE OF GENETICALLY MODIFIED POTATO

By experiencing and gaining the benefit of potato cultivation and processing in different dimensions, it raises the great concern among scientific community toward its genetic improvement and modification. This results in the development of transgenic potatoes but it raises another problem for environmental concern. Although, many countries had allowed the transgenic potato cultivation but, still there is a vast disagreement and confliction among the scientific community, environmentalist, politicians and social activists towards exploring the benefit of transgenic potato so far.

Potato: Future Thrust

There is a need to increase our vegetable production according to our increasing population. The potential yield of potato is more than 100 t/ha vis-a-vis of 40 tonnes of yield potential of the modern high yielding varieties. It provides ample opportunity to further enhance potato yield by developing still higher yielding varieties:

- These varieties further need to be strengthened with desirable resistance to major viruses and late blight disease and also to make country self sufficient in absolute-free seed production by developing and perfecting cheaper and effective diagnostic tools thus helping both farmers and seed industry.
- To help the country in exporting potatoes both for seed and table purpose to not only our neighbouring countries but to many of the developed countries.
- There should be a solution for the problem of cold sweetening of potatoes in cold stores by silencing the gene responsible for the same and thus making available large quantity of good quality potato for consumption during lean months (Pandey 2010).
- To solve the conflict on transgenic potato crops for their release and to make available this protein rich variety for consumption of common peoples.
- To emphasise the hi-tech potato cultivation to increase its production and productivity along with sufficient capacity of ware houses.

CONCLUSION

Efforts are under way at the Central Potato Research Institute (CPRI), kufri, Shimla (HP) to breed new varieties with still better nutritive value and an ample measure of success has been achieved in this direction. Work on the development of the improved potato varieties for Indian conditions is done only at CPRI, Shimla (Gopal and Kumar, 2002). With the development of advance technology in potato cultivation like seed plot technique, to produce disease free seeds, true potato seed

production, hydroponics, aeroponics, CIPC technology (to prevent sprouting of potatoes in storage), crop modelling and decision support system for the betterment of potato crop in India, it seems that the lag phase of potato cultivation jumps into an another phase of increased production and productivity with multidimensional objectives and availability of quality potato round the year on reasonable rate to the users, especially-lower and middle class famalies. Hence, after a pause, due to the concerted efforts made by various scientists for the improvement potato in terms of production and quality it is not only emerging as a wholesome food but also as a livelihood for future. Keeping in view the potential of potato in the food security and health concern of the all sections of the society of developing nations.

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Understanding Need for Inclusive Political Development through Economic Reforms in India

Khyati Srivastava[1]

Abstract—*The article is an effort to understand the political development in India since independence and the corresponding impact on the economic policies thereby. India being one of the most resourceful country and also being world's most vibrant and largest democracy, the political power and economic power are definitely the two key dices of the whole game. The idea of politics in India should be articulated well with the understanding of economics of India. The need for delivery of political rationale to its people is necessary for sustainable and equitable development of the nation. After all, in democracies the government you get is what you deserve and eventually the economic reforms you see is dependent on the same. Hence, need for inclusive political development is required for a healthy democracy.*

Key Words*: Indian Politics, Economic Models, Indian Economy, Political Leadership, Public Policy & Governance, Political Economy*

INTRODUCTION

India is a land of vast diversity and long history. The world's oldest civilisation flourished on this land. Hence the people have inherited their intrinsic values since ages immemorial. However, the present democratic structure of the nation is merely 64 years old. When India got independence after a long tussle in 1947, the Indian economy was a gloomy picture backed by massive poverty, unemployment, widespread diseases, illiteracy and underdevelopment. The Supreme law of the land was framed and enforced as the Indian Constitution in 1950. India is defined as '*socialist secular sovereign democratic republic'.* So far in these years after independence, no doubt the Indian growth story is worth applauding and India has walked miles ahead the gloomy state it was at the time of independence. It is the world's fastest growing economy now, 3rd in GDP (on PPP basis).[i]

However, the inequalities of income and wealth, poverty still remains a deep concern. The rift between India and Indians is still wide and static. There has been quest for economic development, while social development is in process even before independence. One very important process that has apparently contributed in this is 'Political Development'. For it determines the policy background and framework of that period.

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POLITICAL DEVELOPMENT AND INDIA

Political Development is an interactive, public decision making and learning process, within or between government and civil society and is based on power creation and dispersion. This process leads to increasing individuals' and group autonomy from below, and builds more responsiveness from above. If the Political development story in India is explored, it is considered the world's oldest and started primarily from the rig vedic period. The basic principles of politics, economy, society and people defined in the holy Vedas, kautilya's arthshastra, the epics of Ramayana, Mahabhartha and the administration policies of Akbar, etc have been applauded by the world. Even during the independence struggle the political development spirit was visibly alive in people. The individuals, groups and leaders were well connected. The present political fabric contains the essence from all these historical episodes of the past. But presently Indian people have lost their fervour in politics. It has become a mere source to express their outrage of joblessness, poverty, underdevelopment etc. This lack of active political development in India gave way to filthy politics of identity, appeasement and opportunity in India. Had these not find their place in the Indian growth story the rift between the haves and have-nots would have been bridged. The systems would not have deceived people or got corrupt, while ethics and morals would have been kept intact. And the Indian growth story would have retained with the icon of golden bird for India. There is a strong need for 'an active, recognized and percolating' political development in the country.

POLITICAL DEVELOPMENT PROCESS: CONCEPT

Political development is the state of the polity which facilitates economic growth, as political and social conditions facilitate advancement in per capita income. The term 'political development' was utilized in the 1960s to describe the so-called process of political modernization of recent independent states after decolonization. There has been lack of consensus on defining this concept among scholars. For instance S. Huntington considers a country's level of political stability is an indicator of its degree of political development, but Nelson suggests that level of political participation is an important element of this process.[ii] Let us understand the conceptual process of political development:

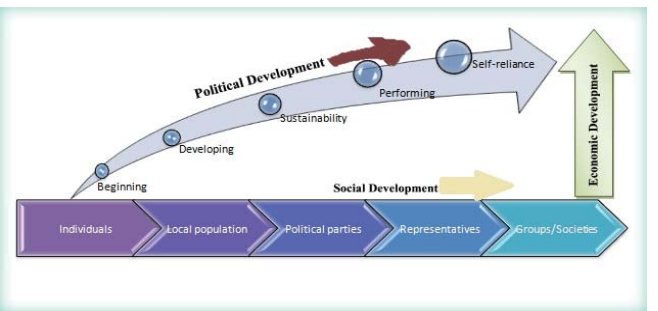

Fig. 1: Political Development Conceptual Process

The above diagram depicts the conceptual process of Political Development. It shows the relevance of Political Development for sustainable and equitable development, along with Social and Economic development. Involvement of people, political bodies/ representatives and groups/ societies from the beginning to end of attainment of self-reliance is the basic essence of Political Development.

As political development catches heights, it leads to more social development and yield more economic development as well.

The scenario at the time of recognizing this process must also be quoted here: Political development theory (in the north) was first formulated by American political scientists after the World War II. This theory deals with certain political phenomenon such as socio-economic and political change. To deal with the problems that time, *'the proposed remedy was to strengthen centralized political institutions that might more effectively manage and direct the course of change. A related problem was that the masses lacked the proper attitudes, beliefs, and values needed to support democracy and capitalism. The proposed remedy lay in appropriate forms of socialization and education. All of this suggests social and political engineering on a very grand scale."* (Muhammad, Bahaaddin 2011)

POLITICS AND ECONOMIC REFORMS IN INDIA

After the Second World War, several nations got independence, and so did India in 1947. But unlike India, many got under dictatorship or one-party rule. India was an exceptional case to establish itself as a democratic nation. Since then if the journey is rewinded, the *nature of political development in India can be defined as 'apparent'*. Though India primarily adopted British Parliamentary form of government where prime minister holds utmost importance, till date the structure has underwent several adaptations. Most prominently two issues can be easily highlighted. First, the patrimonial system of Nehru dynasty-predominantly till Rajiv Gandhi's assassination in 1991, and second, the politics of 'personal ambition/ conflict and opportunism during the instable coalition period. Politics in India is more regionalised than in any other federal polity. Thus, reflecting the unrivalled cultural diversity of the country along with the system of more unitary features than most federal systems in the world.[iii]

Due to the process of apparent political development in India, there have been fluctuations and instability. The political leadership determines the trends of the political economy. In order to understand the economic models/ plans that operated in the past and block by block have built our today, let us read the Indian Political Economy phase wise:

NEHRUVIAN PERIOD (1947–64)

India adopted centralised planned development under the Nehruvian period. He started with socialist measures and also rapid industrialisation. Nehru was very much inspired by *P.C. Mahalanobis Economic Development Model.* The model focuses

on expanding the productive capacity of the economy. It also involves import substitution, higher role of Public Sector undertakings in significant areas of the economy and create vibrant small scale sector for consumer goods production and producing more entrepreneurs. In an economy with a vast market, plenty natural resources of all kinds available and vast reserves of unskilled and skilled manpower, the building up of a strong and diversified capital goods base was a necessity of that age. If today we can boast of a large measure of self-reliance, it is because considerable capacity that has been created in the metallurgical, mechanical, chemical, power and transport sectors at that time. The growth story picked from here. Though it is criticized on the grounds that it created imbalances between the heavy industries and the others. *The trickle-down effect assumed in the strategy didn't find real existence*. Nehru's courage to establish India as democracy with adult franchise and giving power to vote to all, and his ability to constantly synthesize the left and right, the ends of conservatism and progressivism, etc to maintain the democracy is commendable. He was truly a true democrat. He was popular among people but also contained the essence of being an elite-leader. *After, Mahatma Gandhi's death, disconnect between leaders and people paved its way. The policy background since then is facing issues of absence of bottom-up approach, mass appeal and mass impact, and implementation.*

INDIRA GANDHI PERIOD (1966–84)

After Nehru's death, Lal Bahadur Shashtri took charge and advocated liberalisation. He died and Smt Indira Gandhi became the Prime Minister of India in 1966. When she took over, India was facing heavy Balance of Payments crisis due to large droughts faced in 1965-66 and the Indo-Pak war of 1965. Under community pressure of Foreign Donors, especially from United States and Bretton Woods institutions, Smt Gandhi had to devalue the Indian currency and partially liberalise the strict industrial licensing in India.[iv] Hence, initially her take on the economic policy was to continue with liberalization started by Shashtri. Then the intra-party clashes within the congress party gradually forced Smt Gandhi to revert the liberalization policy introduced lately in the Indian economy. *With the advent of political instability at the power-centre and introduction of 'personality politics' in India, the economic activities again were under the State-control.* When her opponents called for '*Indira hatao',* she firmly called for '*Gareebi hatao!*' And from here marks the start of the grand populist measures to sustain power. The economic policy was under heavy State-control. Though Smt Gandhi was a visionary leader of strong mettle. She nationalised the Indian Banks, the first step taken in India towards financial inclusion. Under her rule India prospered and reaped the benefits of green revolution. She had understood that growth alone cannot cater to needs of all when India has vast inequalities. The call for '*gareebi hatao'* won hearts of poor-needy-deprived sections of the society. She was applauded for this political will. But still her visions could not meet the purpose. The reason we believe is that

she got tangled in politics to sustain power. Like the green revolution that was also characterised by preventing from effectively taxing the agriculturalists. The economic policy of India featured populist measures which were pro-rural India and poor. The plans extended rural credit and generated subsidies for farmers. Also, prominent among these were import licensing and tariffs and industrial licensing. Smt Gandhi tightened trade protection and import licensing, and new sources of finance were under direct government's control. The result, on the 1980 return of Smt Gandhi, after the instable rule of Janta Party, she had to take a huge loan from IMF. And eventually, in order to mitigate the political damage of depending on IMF, her government unravelled the 6th Plan (1980–85) that essentially promised to undertake a series of measures to improve economy's competitiveness. The Indian economic policy again made way towards liberalised state-control. However, the politics to sustain power under Indira Gandhi deteriorated the policy backdrop in India. The essence of true democracy and long-term policy approach for the people was buried. The emergency row, rise of Bhindranwale and Operation Blue Star and finally her brutal assassination were the major black-spots of her time.

RAJIV GANDHI PERIOD (1984–91)

After, his mother's brutal death, he came to power with majority, and hence he was a man of action. His youthful, modern outlook and innovative approach towards developmental impediments, built a new way towards the 21st century. He started with evolving new liberalized economic policies for faster growth. He liberalized industrial licensing policy, especially wrt the defined *'sunrise industries'.* The 1987 budget, which he himself presented he even hinted the Public Sector Undertakings to improve their performance and learn to operate in a competitive environment[v]. He took various steps to revitalize the economy, including reduction in excessive industrial licensing, encourage growth of industries, strictly curbing monopolies and restrictive trade practices. He made reforms in the direct tax system and a major liberalization in import of capital goods and components for manufacturing under phased manufacturing programme. His approach was to diversify the savings channel from banks to the Indian capital market. These efforts were fruitful and private investment in India shot up by 40 percent in 1985–86 with more strengthening of the Indian capital market. As a result, GNP grew at 5.5 percent per annum with accelerated industrial growth and exports growth as well. Perhaps, facing the bofors scandal occupied more of his energies in the later part of his tenure. This also hampered his liberalization steps, especially in context to foreign private investment. *By the end of the 1980s Indian aggregate labour productivity was one-third higher than a simple extrapolation of the pre-1980 trend would have predicted.* All credit goes to Rajiv Gandhi. However, he could not control the political turmoil in the country. The political instability that crept the Indian politics at the time of Smt Gandhi was not combated. There was the need to understand the necessity for 'active political development processes. Due to lack of real and

watchful control on the political development process, India underwent long period of political instability. Rajeev Gandhi lost elections on account of the bofors scandal to VP Singh in 1989. From 1989 to 1991, India had two Prime Ministers, VP Singh and Chandra Shekhar Singh and both didn't add any major economic reforms. However, this short period marked the most important turning point in Indian politics as *identity politics* took shape after the *Mandal* issue, followed by the *Kamandal* issue. The long ignored vigilance about pattern of politics was paying badly in return. One main reason-sustaining power at any cost! And one big price paid-debilitated society, inconsistent policies! Politics on caste, religion, region, etc found existence that was not checked by the leadership coming to power.

RAO-MANMOHAN PERIOD (1991–98)

The Rao-Manmohan period marked the turning point of India. After another brutal assassination of Prime Minster of India, Rajiv Gandhi, Congress again came back to power. The Rao government took the steps that the Rajiv Gandhi's government has proposed in order to encourage foreign investment. Till 1991, India still had a fixed exchange rate system. India started having Balance of Payments adversity since 1985, and by the end of 1990, it was in a serious economic crisis. The government was close to default and the central bank was left with merely 3-weeks forex and 7-days Gold reserves. Central Bank had refused new credit. Most of the economic reforms were forced upon India as a part of the IMF bailout**.** Moreover, back-to-back brutal assassination of Indian Prime Ministers shook the foreign trust in India. Hence, capital market faced dearth of foreign investment. The government has to launch the New Economic Policy that focused on liberalisation, privatisation and globalisation, and New Industrial Policy that supported it. These free-market economic reforms launched in 1991, shifted India from a bankrupt nation hobbled by socialist policies into a regional economic power. India made a shift from centralized planning to market based model of growth. By the mid-1990s total foreign trade-imports plus exports-amounted to more than 20percent of GDP. Foreign direct investment was encouraged, and grew from effectively zero in the 1980s to $5 billion a year by the mid-1990s.[vi] The economic benefit India reaped and is reaping till now is the outcome of these reforms.

However, Rao's government could not reap benefits from these reforms for long, and political instability in India continued. The Delhi seat was heated due to Punjab separatist movement and the Babri mosque demolition. Then in 1993, Rao's government faced no-confidence motion which it resolved. But the opposition alleged Rao for bribing the MPs to vote in favour. The hue-and-cry on this, made him lose 1996 elections to Bharatiya Janta Party, which ruled for only 13-days. Further, Deve Gowda and then Inder Kumar Gujral were Prime Ministers of India under the United Front till 1998. During this politically unstable governance, no more major economic reforms came up to contribute to the 1991 reforms. Then the 1997 *Asian financial crisis* added to the economic stagnation.

This shows that political instability is so harmful for development. When in democratic countries like India, it is so difficult to have political consensus and hence obviously there are more probabilities of political instability, the need for *'active, recognised and diffused'* political development process becomes a must! It will converge the diversities and establish a stable power-centre for accelerated development.

STABLE COALITION PERIOD: NDA-I AND UPA RULE (1998–2004)

The 1998 elections, marked the foundation year for the beginning of defined 'stable' coalition politics.[vii] Atal Bihari Vajpayee as the new prime minister of India surprised many by continuing the reforms of 1991. He welcomed change and gave way to speed up economic progress. Moreover, he resolved several outstanding problems with the west related to cold war, thereby opening gate for Foreign Direct Investment. In few years western nations were fascinated by India's brainpower. IT and BPO sectors started heading towards India. The Nation witnessed steady economic growth under Vajpayee with progress due to reforms and the bold steps taken towards infrastructure building. The Golden Quadrilateral project built India's road towards prosperity! The efforts of the NDA-I government yielded a high growth rate 6percent per year for overall real GDP and of 3.5-4 per cent per year for labour productivity.[viii] India became the world's fastest growing economy behind only China.

With these positive outcomes, BJP campaigned as *India Shining* in 2004, but lost to Congress. Of course, Congress had learnt from past mistakes. It structured its organisation, defined its leadership. And most importantly, it convinced people by its 'secular' and 'sacrificing' image, and the 'conservatism' of the incumbents. The BJP lost its appeal here. *Again, absence of political literacy due to absence of vigilant political development can be seen.* After, winning the elections also Congress intelligently caught the nerve and offered to continue the reforms for faster economic growth by making the man of 1991 reforms the Prime Minister of India. Dr. Manmohan Singh became the 14th Prime Minister of India heading Congress led UPA government. With this reforms continued in India and the foreign stakeholders' trust strengthened. The framework made by Vajpayee was further strengthened by UPA under Manmohan Singh and was ready to welcome more FDI in India. India became the 2nd most likely destination for FDI after China, leaving behind US on the 3rd step in 2005. This was great achievement when some years back India was at 15th position.[ix]

The Political Economy of India underwent continuous changes to foster the growth process. UPA came up with initial reforms like forming Special Economic Zones (SEZs), Bharat Nirman (for building infrastructure) to National Rural Employment Guarantee Act (NREGA), Right to Information Act (RTI, 2005), Right to Education Act (RTE, 2008) and Indo-US civilian nuclear agreement (2008). The

country reaped accelerated benefits in the UPA-1 regime. India was at its peak of economic boom period. After 2008, the Indian growth story started coming down. The global economic recession of 2008 can be major factor behind. However, the country showed great resilience to the global economic recession. And, Congress led UPA under Dr. Manmohan Singh ruled India for a decade. It won the 2009 elections as well. The farmers' loans were waived off.

The public spending has been pushed in this period, but not checked in time, and then uncontrolled inflation struck the economy. This is where the UPA failed. The public debt kept on rising. The government failed to come up with effective institutional mechanisms in face of high growth. Growth generated wealth and more wealth generated corruption, which further debilitated the Nation. There were series of scams reported during this period. Inspite of the UPA's inclusive policy its numerous economic benefits and welfare promised could not reach the people. Infact people lost their trust on the government.

Eventually, UPA lost shamefully to BJP led NDA in 2014 elections inspite of populist schemes introduced in form of Food Security Bill and Land Acquisition Bill. Thanks to the political participation called in India. The recent introduction to 'Active Political Development' was the major factor behind the landmark election-results of 2014. Narendra Modi emerged as a development icon and people voted for development. He became the 15th Prime Minister of India. The 2014'General Elections have created a history in India and have become a turning point in Indian Democracy and political development. Firstly, *after a long time Indian Democracy has brought great majority to a single party.* Secondly, and most importantly, it is for the first time in India that *an opposition party has come to power with huge majority.* The Indian politics is '*breaking deemed prejudices*', proving that Indian leaders can come from any society, any background. It could be seen as a beginning of new era in Indian politics and Indian political economy.

THREATS OF ABSENCE OF ACTIVE POLITICAL DEVELOPMENT

There is no system in this world that experiences complete absence of political development. Like the human body develops naturally, political development will also take place naturally, and like it is important to check the development of human body, similarly for healthy development, it is significant to check the political development process for apt national development. Keeping in mind the journey of Indian economy discussed above, it can be said that *the apparent political development will not cater to the needs of a diverse land like India.*

When there is absence of active political development, there is vast probability of policy paralysis! The plans lack long-term vision, and the monitoring structure is subtle. India obviously needs an angle of bottom-up approach in policies along with the top-down approach in order to cater needs of all as one and bridge the vast

inequalities. For instance, had the 1991 economic policy come up more strategically, not merely to meet the economic crisis of that time but also to establish the model for sustainable-equitable growth model, India would not have been facing the recent economic doom, and productivity concerns of labour, poverty and low per capita income.

PROSPECTS

Several civil society groups, associations and leaders/ individuals have been kindling the lamp of political development since years in order to strengthen the Democratic structure of India. The effort has been to deliver relevant political rationale to the people to have better leaders representing them in the House. However, most of them have been issue-based. The political development initiatives were prevalent in India since independence. Recently, India has seen massive sudden inclusive political development. There has been political awareness coming through campaigns and now leaders are also coming up to make people politically vigilant.

It started in 2011 when Anna Hazare and few more activists allied to fight back corruption against the central government. The mass movement stirred the spirits of thousands and lacs of Indians. *It was for the first time after independence that Indians at large were actively participating (not merely talking) to bring about a change.* (NOTE: The 1980s movement was ridden only by section and hence resulted in political instability.)

Thereafter, a series of active participation started coming up in India, from Anti-rape laws and juvenile-crime age agitation after the N*irbhaya* case to hue & cry on criminals in politics hue when ordinance on People's Representative Act was passed. *Judicial activism* in India has also played a vital role in jerking the ignorant masses on several issues. Then with entry of activist, Arvind Kejriwal into active politics with formation of Aam Admi Party (AAP) public participation in politics in India was tremendous. The Delhi state assembly elections 2013 are remarkable to prove the power of democracy. Eventually, the General Elections of 2014 marked mass recognition to development politics in Indian Democracy. India voted the highest ever since after independence. Thanks to the active political development movement undertaken by various civil society associations, groups, political parties, leaders and individuals as well.

But the civil society and media efforts are not sufficient. Sometimes they are biased too. Hence Indian education system needs an overhauling. The democratic essence of India must be inculcated since childhood. Civics should not merely stay as just another boring subject in the curriculum. Moreover, the higher education never looks back at these subjects. The idea of '*politics is filth*' keeps most of the youngsters away from politics and even unfortunately it keeps them away from political understanding. Also**,** the need to develop a healthy base for nurturing

democratic think-tanks in India is a must. Think tanks provide significant inputs to both government and public. The important aspect of political participation in political development can be catered if policy making moves from dependence on loyalists of the ruling political party to such think tanks. India has only 268 think-tanks, while China has 426 and US alone has 1828.[x] But the question of '*diffused*' *political development is still in dark.* At local levels the idea of political development is still clutched by issues of identity or self-interest. Merely giving voting rights is not sufficient. Political understanding has to be delivered. Development of the last-man isn't possible in a democracy, until political development percolates in real sense.

CONCLUSION

The process of political development must be well-knitted along with social development and economic development models. India still has to walk long, for ignorance in people towards the system and the *chalta hai* attitude has got its roots deep. While there is a large segment that still toils for the *roti, kapda aur makaan* basics only. People have to understand the essence of India and strength of democracy with their roles and responsibilities towards it. *After all, the government you get is what you deserve!*

Once Indians build a political rationale, the systems will work in their favour with least hindrances and the policy process will cater to the mass needs. India is world's largest democracy. It is the land of vast diversities. Therefore, this nation with apparent political development cannot succeed holistically when government is '*by the people, for the people and from the people!*' India needs to overcome from the debilitation due to identity politics, the loss out of policy paralysis, corruption, etc. in order to bridge the gap between India and Indians. Hence, there is a strong need for a *recognised* '*active, percolating and diffused*' political development process along with social and economic development. The responsibility of recognising it is vested upon the power-centre, intellectuals, thinkers, and other stakeholders of the society to ensure sustainable and equitable development of the nation.

In vibrant democracies like India, in order to reap better results out of plans and polices it is a must that the political system understands and corresponds to the needs of economy. Viable economic reforms will come only when the authority running the bureaucracy has potential to relate to the economic needs of the country including each and all. Hence for this delivery of political rationale to common people becomes essential. No doubt economic needs at micro-level can be different from macro-level. But when individuals in community participate in democracy with this orientation and not on the basis of current orientations of identity or appeasement, we can make ways for a better political system that can bring relevant economic reforms. Therefore, Indian democracy for feasible economic reforms needs, one, 'active' political development process and second, 'inclusive' political development model.

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Innovations and Exclusion in Agriculture: Are Small Farmers Benefitting from Agricultural Innovation and Growth in India?

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Abstract—*Innovation leads to economic growth and development. But due to lack of continued innovation in the field of agricultural technology, most of these countries, being primarily agrarian fall short of adequate supply of food grains leading to increase in prices of food grains, political unrest and increase in the industrial cost structure. Nevertheless, with the process of economic development, several attempts of adoption of new technology have taken place leading to substantial increase in production and productivity of agricultural commodities. Green Revolution witnessed in Indian economy during early sixties and changed the scenario of agriculture economy in terms of raising yield growth. The early stage of the adoption of new technology, however, was limited to few crops and region and it is only during 1980s that its real impact seen. Number of studies confirmed that small and marginal farmers did not avail much of the benefits of Green Revolution. However, today, in the age of new liberal policy regime, there are number of challenges in the field of innovations in agricultural sector and exclusion there in. The innovation of today calls for developing technology that have only negligible impact on environment degradation. There is need of using scarce land resources at its best without compromising on quality and quantity of the product. More importantly, innovation requires in achieving a sustainable agriculture without causing harm to the environment. The process must take an inclusive approach where all the small and marginal farmers would enjoy the benefits of innovation on long term basis. With the above background, the present paper using secondary data analyses different aspects of innovation in the context of Indian agriculture and suggested ways to make it more inclusive. It has been found that any attempt of innovation in agriculture have excluded the small and marginal farmers from enjoying the benefits of innovation and growth. The paper focuses more on the local aspects of innovation which are more employment intensive and environmentally supportive.*

Key Words: *Innovation, Technology, Environment, Inclusion*

Innovation, specially in the field of science and technology is essential for an economy to grow and develop. This is more relevant in case of a developing country where agriculture happens to be the prime occupation for majority of population. Due to lack of innovation in the field of agricultural technology, most of these country fall short of adequate supply of food grain which leads to increase in their prices bringing hardship to the poor, political unrest and lead to an increase in the industrial cost structure. India's agrarian economy during the early phase of economic development was characterized by low productivity due to inadequate

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use of inputs and the traditional nature of agricultural production. The country had to depend on import to feed the growing population. There was a dire need to shift agricultural production frontier to cater the need of supplying food grain for increased population. Several attempts however, have been made by the public authorities after independence in the field of innovation and research in agriculture in order to increase in production and productivity of agricultural commodities. The emergence of Green Revolution in the Indian agrarian economy is one of the greatest break troughs on the path of raising productivity. The adoption of new technology have taken place leading to substantial increase in food grain production. It witnessed in Indian economy during early sixties and changed the scenario of agriculture economy through raising growth in productivity. This increase in productivity of food grain have been made possible due to innovation in the field of agricultural science and technology.

The early stage of the adoption of new technology, however, was limited to few crops and regions and it was only during 1980s that its real impact seen. Number of studies confirmed that small and marginal farmers did not avail much of the benefits of Green Revolution. Therefore exclusion of some sections of the farming community reported with the process of innovation and research and consequential agricultural growth. However, today, in the age of neo liberal policy regime, there are number of challenges in the field of innovations in agricultural sector and exclusion there in. The innovation of today calls for developing technology that have only negligible impact on environment degradation. There is need of using scarce land resources at its best without compromising on quality and quantity of the product. More importantly, innovation requires in achieving a sustainable agriculture without causing harm to the environment. The process must take an inclusive approach where all the small and marginal farmers would enjoy the benefits of innovation on long term basis.

With the above background, the present paper using secondary data seeks to examine different aspects of innovation in the context of Indian agriculture and suggested ways to make it more inclusive. It has been found that any attempt of innovation in agriculture and its consequence on growth have excluded the small and marginal farmers from enjoying the benefits. The paper focuses on the local aspects of innovation which are more employment intensive and environmentally supportive. The plan of the paper is as follows. Section I examines the meaning and scope of innovation especially in the field of agricultural science and technology. Section II analyses innovation in agricultural science and technology in India. Section III examines exclusion in the process of innovation and growth in agricultural sector in India. Section IV examines some of the emerging areas of innovation in the field of agriculture and the final section presents concluding remarks.

MEANING AND SCOPE OF INNOVATION IN AGRICULTURE

Innovation usually defined as new ideas, new processes that are applied for the benefit of the society. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society (www.wikipedia.org). In economics and other management sciences, innovation is generally considered to be a process that brings together various noble ideas in a way that they have an impact on society. Innovation differs from improvement in that innovation refers to the notion of doing something different rather than doing the same thing better.

In pure economic sciences, innovation is considered as catalyst to growth. According to Joseph Schumpeter(1939), who contributed greatly to the study of innovation, argued that industries must incessantly revolutionize the economic structure from within, that is innovate with better or more effective processes and products. The causative factor in change, according to Professor Schumpeter, is "innovation," which is defined as "doing things differently in the realm of economic life." Innovation is the activity or function of a particular set of individuals called entrepreneurs. The entrepreneurs continuously look for better ways to satisfy their consumer base with improved quality, durability, service, and price which come to fruition in innovation with advanced technologies and organizational strategies.

Several scholars and policy analysts have explicitly used the innovation systems framework to analyse positive cases of innovation in developing country agriculture (Hall *et al*. 1998, Biggs and Matsaert 2004). They identified the collective wisdom and interactions among several actors in different institutional contexts, which results in innovation and leads to development outcomes for the masses.

Innovation also has something to do with new product, new design especially in the product group to attract customers in the regime of market. In the context of an individual entrepreneurship, it involves identifying consumer needs, conducting research in those directions, producing the product and making them available to consumers. The role of both public sector as well as private sector with respect to innovation in agriculture has been very well emphasised in the economic literature. The theory on innovation and development in agriculture emphasised that the advances in agricultural science and technology represent a necessary condition for releasing the constraints on agricultural production imposed by inelastic factor supplies. According to Hicks (1932) changes or differences in the relative prices of factors of production could influence the direction of inventions or innovations. Therefore, the competitive firms allocate funds to develop a technology which facilitates the substitution of increasingly less expensive factors for more expensive factors. Hayami and Ruttan (1971) regard technical change as any change in production coefficients resulting from the purposeful resource using activity directed to the development of new knowledge embodied in designs, materials, or

organisations. Using this definition Amhed (1966) has shown that the Hicksian theory of market induced innovation can be defended with rather a reasonable assumption on the possiblilty of alternative innovations. The entrepreneur perceive though vaguely, a few alternative innovation possibilities for a given research and development expenditures through consultation with staff scientists and engineers or through the suggestions of inventors.

Ruttan and Hayami (1971) model is structurally similar to that of Hicks and that of Ahmed. But the induced innovation model proposed by Ruttan and Hayami is essentially a public sector phenomenon. They extended the idea of induced innovation to include the process by which the public sector investment in research in the adaptation and diffusion of technology and in the institutional infrastructure that is supportive of agricultural development. It has been hypothesised that farmers are induced by shift in relative prices to search for technical alternative which save the increasingly scarce factor of production. They press the public research institutions to develop the new technology and also demand that agricultural supply firm modern technological inputs which substitute for the more scarce factors.

In the organizational context, innovation may be linked to positive changes in efficiency, productivity, quality, competitiveness, and market share. In other words, innovation in an organization lead to an increase in the efficiency of the employees improves productivity and enhances profits of the organization. Peter Drucker (1985) viewed innovation as the tool or instrument used by entrepreneurs to exploit change as an opportunity. It is the means by which the entrepreneur either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth. He argued that innovation, as a discipline, is capable of being learned, as well as practiced. In fact, all organisations, sectors such as industry or agriculture, institutions including health, education, finance, insurance etc can innovate with a view to produce more.

Innovation is thus key to growth and development of a country. It saves the increasing cost of the relatively scarce factor. While both the public sector and private sector research organization play key role in innovation, the entrepreneurs act as a major player in executing the innovation by doing something new. In the realm of agricultural sector, innovation plays equally an important role in saving the nation's scarce factor, enhancing productivity and producing something new. Green Revolution was adopted in most of the developing countries in their agriculture and was capable to accelerate the pace of food grain production. India was not an exception. The government of India laid adequate emphasis on research and development, and agricultural infrastructure of the country. The new technology was also adopted leading to a faster increase in agricultural production. However, there was uneven progress of agriculture during the period of Green Revolution. The interregional and interpersonal difference was clearly visible. The small and

marginal farmers due to lack of adequate resources and non-availability of farm credit could not avail the benefits of new technology. These groups of farming communities were therefore excluded from the benefits of growth and innovation in Indian agriculture.

INNOVATION IN AGRICULTURAL SCIENCE AND TECHNOLOGY IN INDIA

Since Independence, India has been able to achieve a significant growth in agricultural production through green revolution (food grain), yellow revolution (oilseeds), white revolution (milk), blue revolution (fish), and so on. All these have been made possible due to innovation in science and technology in the agricultural sector. The government of India did lay sufficient emphasis to agricultural sector by investing heavily on agricultural research and extension system and other areas of agricultural infrastructure such as farm credit, irrigation, power, road, transport etc. The National Agricultural Research System (NARS), mainly comprises of the public sector components of the research system. The Indian Council of Agricultural Research (ICAR), an apex organization for conducting and co-ordinating agricultural research. These institutions have been the forerunner to lead these agricultural revolutions making the country self-sufficient in the production of food grain. Department of Agricultural Research and Education (DARE) is the nodal department for all related scientific and development activities and bilateral scientific collaborations with other countries.

The new agricultural strategy was adopted in India during the early 1960s. It bagan with launching the Intensive Agricultural District Programme in 1961. It was a package programme consists of new High Yielding Varieties of Seeds, use of chemical fertilizer, manures, pesticides, improved implements, proper soil and water management, training and education to the farmers to be introduced in the selected area. All those measures led to a significant increase in production of food grain in the country. Thus the evolution of agricultural science and technology led by the Indian Council of Agricultural Research has helped adequate food stock in the country and increase in agricultural exports. It is to be noted that The government of India adopted the Green Revolution when the US Government threatened to cut the PL 480 shipment of food to India (Subramaniam, 1972; Sivaraman, 1991; Swaminathan, 1993). The council so far has developed and released a number of high-yielding varieties and hybrids of field crops for their cultivation. The food grain varieties particularly that of wheat and rice, have been instrumental in ushering in Green Revolution in mid- 60s and sustaining the momentum of productivity enhancement in post Green Revolution period. The development of short duration varieties of different crops also led to multiple cropping systems and helped in enhancing cropping intensity. The incidence of drought and famines also declined significantly with the adoption of new technology. It gave rise to commercialisation of agriculture leading to the cropping pattern changed in favour of the commercial crops.

The adverse impact of the adoption of new technology such as its impact on environment and inter-regional inequality was quickly realized. Number of measures have been taken to reduce the adverse impact. The National Conservation Strategy and Policy on Environment and Development was adopted by the government in 1992. It lays down strategies and actions for integration of environmental consideration for achieving sustainable development. Several steps were also taken to promote soil and water conservation. To have a holistic and sustainable development of rainfed areas and to ensure long term food security, bridging regional disparities and providing employment opportunities, A National Watershed Development Project for Rainfed Areas was implemented.

EXCLUSION IN THE PROCESS OF INNOVATION AND GROWTH IN AGRICULTURE

With the advent of Green Revolution, there has been a significant increase in agricultural productivity in the country. In some pockets of the country, agriculture was commercialized. The incidence of drought also reduced to a great extent. However, the major beneficiaries of the adoption of new technology were the large farmers who, with larger land holdings and irrigation facilities, are better positioned to take advantage of economies of scale, new technologies and multiple cropping. Majority of small and marginal farmers and landless agricultural labourers have been left out to enjoy the benefits of Green Revolution. The main reasons behind this was that the small farmers had a small piece of land and with lack of adequate resources, little knowledge and access to innovations and technology. They had also no capital and access to institutional credit. For obtaining credit these categories of farmers had to rely on village moneylenders and the middleman. The problem of viability of formal credit institutions though continues even today. The adoption of new technology thus breeded interpersonal disparity (Bhalla, 2007). It has been argued that the new technology was not access neutral. Therefore these categories of small and marginal farmers are grossly excluded from innovation in agriculture or the adoption of new technology. The adoption of new technology was also adverse to crops and regions apart from interpersonal disparity. The new technology was limited to only a few pockets in the country. It also caused a shift in crop pattern leading to monoculture and bringing down bio-diversity (Shivaraman, 1991).

The technological change has also led to the negative externalities as far as the environment is concerns. Some of the important negative impacts are (a) excessive use of fertilizer leading to imbalance of nutrient content in the soil and reduction in soil fertility (b) decrease in bio-mass availability in terms of fodder and organic manure (c) water logging and salination (d) depletion of groundwater table (e) imbalances in nutrient availability due to changes in cropping pattern and so on. These problems obviously could affect the sustainable growth in agriculture. It is therefore quite essential that the new technology must be environmental friendly

and cater the needs of small and marginal farmers. Even after the Green Revolution, numbers of initiatives have been taken by the Indian agricultural research system, but due to several constraints the small and marginal farmers have not been able to get the benefits of innovation and growth in agriculture.

India, with a well equipped research system no doubt, achieved self sufficiency in food grain production. The post Green Revolution period i.e., during 1980s proved to be milestones in India's agricultural development. After a setback in late 1990s and early 2000s, the growth in agriculture improved further. However, nearly 40 percent households in the rural areas are still living below the poverty line. There has been increasing marginalisation of land holding. Today 90 percent of the total land holding are small and marginal. They are proving to be non-economical due further to the increasing cost of cultivation (Acharya and Jogi, 2007). More worrying is the fact that nearly 55 percent of population still are depending on agriculture either as an owner cultivator or as agricultural labour. This is true in the event of falling share of agriculture in Gross Domestic Product which declined from 50 per cent at the time of independence to only 13 per cent in the recent period. This falling share of GDP and continued dependence of population reflect increasing poverty and inequality among the rural masses.

The small and marginal farmers are also handicapped from availing institutional farm credit. In the backward parts of the country specially in Eastern part, the small and marginal farmers had to rely heavily on informal sources (Bhaduri, 1973; Sarap, 1991). These farming communities have small marketable surplus and are in greater need of funds for investment in their agriculture. The government of India has been taking necessary steps to ensure that institutional credit reaches to the needy. Multiagency approach comprising of cooperative banks, commercial banks and the regional rural bank has been adopted in the country. Despite all these efforts, the flow of credit to the agricultural sector failed to exhibit any appreciable improvement due mainly to the fact that commercial banks were not tuned to the needs and requirements of the small and marginal farmers, while the co-operatives, on the other hand, lacked resources to meet the expected demand. As a result of which, the farmers borrowing from the informal source especially the moneylenders have not declined.

Table 1: Sources of Farm Credit 1971 to 2002

Sources of Credit	1971	1981	1991	2002
Non-Institutional of which	68.3	36.8	30.6	38.9
Moneylenders	36.1	16.1	17.5	26.8
Institutional of which	31.7	63.2	66.3	61.1
Cooperative societies/Banks	22.0	29.8	23.6	30.2
Commercial Banks	2.4	28.8	35.2	26.3
Unspecified	-	-	3.1	-
Total	100	100	100	100

Source: All India Debt and Investment Survey and NSSO (Various Issues)

Table 1 above clearly reflects that during the period 2002, the proportion of non-institutional source of the total farm credit which was 30.6% in 1991 increased to 38.9 percent in 2002. The share of money lenders has taken an increasing trend since 1981. It is the perception and of course the experience of the small and marginal farmers that the informal sources of finance is quite easy to access despite the rate of interest is number of times higher that the formal sources. However, the problem with this kind of informal arrangement is that the moneylender exploits the tenants and other small farmers by charging high rate of interest. Sometimes the exploitation extends to other markets such as land, labour and commodity, which has been termed as interlocking of factor markets (Bhaduri, 1973). In such a regime of interlinkage, the socially and economically upper sections in the rural villages exctract surplus from the tenants and the small farmers.

There has been a lack of linkages in the knowledge generation and dissemination i.e. research and extension of the innovation system. This has also been accompanied by poor access to technology by the small and marginal farmers. The Situation Assessment Survey of the National Sample Survey Organisation reveals a very interesting finding in those directions. It reveals that television, radio, news paper, input dealers and other progressive farmers happen to be the major source of accessing modern agricultural technology. Nearly 60 percent farmers did not access any information on modern technology from any source. The SAS further reveals that majority of farmers reported dissatisfaction with their profession. Most of the farmers are unaware of the institutions like WTO, MSP etc., which are very important for their future.

The Situation Assessment Survey of the NSSO brings important findings in respect of use of specific resources such as fertilizer, manures, improved seeds, vaternary services etc., for farming by the farmer households. It also brings out the use of several farm implements and machineries in cultivation. This has been depicted in Table 2 and Table 3.

Table 2: Percentage of Farmer Households using Specific Resources for Farming

Seasons	Fertilizer	Manure	Improved Seeds	Pesticides	Veterinary Services
Kharif	75.7	56.0	46.3	46.4	30.3
Rabi	54.2	37.5	34.3	30.8	22.3

Source: Situation Assessment Survey, NSSO, 2003

Table 3 above suggests that even today more than 50 percent farmers do not use improved seeds in their agriculture. Only 20 to 30 percent farmers use veterinary services. This clearly reflects the fact that the use of technology by the farmers has been quite low. Similarly, as far as use of implements and machineries is concerned, the farming households are lagging far behind. Table 3 suggests the proportion of households reporting the use of diesel and animal for ploughing. It is quite surprising to know that 52 percent of the farming households reported the use of

animal for ploughing. The data across the states reveals that 98 percent of farmer households in Jharkhand followed by Assam 97 percent and then in Chhatisgarh 90 percent use animals while ploughing. Nearly 40 percent of households harvest crops using animals. At the all India level, there appears to be only 3 tractors for 100 households.

Table 3: Proportion of Households Reporting Use of Diesel and Animal for Ploughing

Percentage of Farmer Households Ploughing Land Using		
States	**Diesel**	**Animals**
Andhra Pradesh	38	61
Assam	3	97
Bihar	64	35
Chhatishgarh	10	90
Gujarat	52	47
Haryana	89	11
J&K	37	62
Jharkhand	2	98
Karnataka	14	85
Kerala	72	27
M.P.	34	65
Maharastra	21	78
Odisha	12	88
Punjab	96	3
Rajasthan	70	29
Tamil Nadu	68	30
U.P	81	18
West Bengal	53	47
All India	47	52

Source: Same as Table 2.

The findings above reveals that the farmers, specially the small farmers don't have access to modern technology and they lag far behind in the use of modern inputs including fertilizers, pesticides, veterinary services and so on. As a result of which these small and marginal farmers are excluded from the innovations in the field of modern technology including the implements and machineries.

The role of agricultural research and extension to cater to the policy goal of inclusive development was introduced in the Eleventh Five Year Plan. It has been noted that technology has become a crucial constraint on growth of agriculture. The plan identified two aspects of the constraints of adopting and using new technology one; development of new technologies and the other is the gaps in the application of existing technologies. The extension services can serve as a critical tool in closing this gap. Therefore, the extension system has to be made more active and alert. The present system of research and innovation do little on the aspects of environment. In not doing so it has put a check on sustainable agriculture. Therefore, innovation must be in the direction of environmental friendly and supportive to small and marginal farmers.

Apart from all the above, it may be pointed out that the poor working condition of the agricultural labour is itself an indication of exclusion. In a dualistic setting such as ours, 93 percent of workforce belongs to informal sector. The agricultural sector except plantation fall under the purview of informal sector. There is no social security of the worker, nor do they have any union for a meaningful bargaining. The minimum wage is not adhered. There is a significant wage gap between man and women. Majority of these agricultural labourers are illiterate and poor. These poor and illiterate workers, due to several social and economic constraints do not challenge the non-availability of appropriate wages. Further due to the practice of corruption and leakages they could not avail the benefits of many government sponsored anti-poverty programme. In all respect, therefore, these categories of small farmers, marginal farmers and agricultural laborers excluded from innovation and growth in agricultural sector.

NEED OF INNOVATION IN THE FIELD OF AGRICULTURE TO MAKE IT INCLUSIVE

The above discussion made it clear that there is a dire need of a system of innovation in the context of Indian agriculture that could take care of all sections of farming community specially to the small and marginal farmers. This is because the small and marginal farmers are the most vulnerable sections of the farming community in the event of any economic change.

Innovation in the areas may be desired to produce food and other agricultural commodities which are environmentally sustainable. We must produce safe food which secures the health of the takers of food. We must develop technology that reduces the use of pesticides and fertilizers to make them environmentally sustainable. In India we find nearly 60 percent of the gross cropped areas are rain fed. Therefore, there is a great scope for enhancing irrigation potential to accelerate growth in agriculture. Minor irrigation that is labour intensive and environmentally safe may be practiced. Rainwater harvesting could be promoted by developing appropriate rural technology.

Diversification in agriculture has been very less achieved in the country. It is quite important that apart from diversification in crop sector we should move towards non-crop sector such as dairy, bee keeping, fisheries, horticulture etc. Mention may be made that the local component of the product should be developed through adequate market, credit and technical support. For instance; bee keeping, medicinal plants growing are the emerging areas that have huge market and therefore technology could be developed in those directions. The manufacturing and use of local manures is essential. Necessary steps to be taken to optimally utilize the small piece of land like allocating them some valuable crops like medicinal plants and other commercial crops. Innovation may be initiated to grow both crops and livestock on the same piece of land. It is important to grow indigenous crops suitable to local resources and environment to enhance farmer's income specially the small and marginal farmers.

The research organization, government and the farmers are considered to be the main players in the process of innovations. The most important component is however, the farmers who are supposed to use the new technology. Therefore, educating small and marginal farmers on technical skills, methods of costing and pricing and using technology must take the top priority. Further the extension services, the delivery mechanism could be strengthened. The issue of governance is also equally important. The government agencies must cooperate themselves to produce research and make them available to the farming community.

Precision farming which optimizes the use of inputs and significantly enhances output may be practiced at a large scale. This technique focuses on utilizing resources optimally to improve the quality and quantity of crops while lowering the cost of production. It also makes farming profitable. However, to what extent precision farming is desirable in our country is remains to be seen. It may be difficult for Indian farmers to adopt precision farming because of the high cost of technology and because the land holding is largely fragmented. Nevertheless it has been practiced in some parts of the country most importantly in the southern regions.

CONCLUSION

The government of India have been laying sufficient emphasis on agricultural sector by investing heavily on agricultural research and extension system and other areas of agricultural infrastructure such as farm credit, irrigation, power, road, transport etc. The Indian Council of Agricultural Research (ICAR), an apex organization for conducting and co-ordinating agricultural research. The institution has been the forerunner to lead these agricultural revolutions making the country self-sufficient in the production of food grain. Burgeoning food stocks in the public warehouses, self-sufficiency for all are all marks of success in agriculture attributed directly to agricultural Science and Technology. However, the major benefits of the agricultural innovation and food grain production went in favor of the developed regions and the large farmers. The small farmers due to lack of resources and adequate support have been excluded from getting the benefits of growth.

Today Nearly 40 per cent households in the rural areas are still living below the poverty line. Almost all of them directly or indirectly dependent on agriculture to earn their livelihood. The falling share of agriculture in the total GDP and continued dependence of population reflect increasing poverty and inequality among the rural masses. The small and marginal farmers are also handicapped from availing institutional farm credit. The borrowing from the informal source especially the moneylenders by these groups of farmers have not declined. The Situation Assessment Survey reveals that nearly 60 per cent farmers did not access any information on modern technology from any source. The SAS further reveals that majority of farmers reported dissatisfaction with their profession. Most of the

farmers are unaware of the institutions like WTO, MSP etc., which are very important for their future. It is quite surprising to know that 52 per cent of the farming households reported the use of animal for ploughing. The data across the states reveals that 98 per cent of farmer households in Jharkhand followed by Assam 97 per cent used animal for ploughing. All the above finding point towards the fact that the small and marginal farmers, the tribals population, rural women have been excluded from the innovations in the field of modern technology including the implements and machineries.

It may be pointed out that the poor working condition of the agricultural labour is itself an indication of exclusion. Majority of these agricultural labourers are illiterate and poor. These poor and illiterate workers, due to several social and economic constraints do not challenge the non-availability of appropriate wages. Therefore, these categories of small farmers, marginal farmers and agricultural laborers excluded from innovation and growth in agricultural sector. To make available adequate employment opportunities, creation of non-farm employment is also important especially in the less irrigated regions.

Therefore, there is a dire need of a system of innovation in the context of Indian agriculture that could take care of all sections of farming community especially to the small and marginal farmers. It is quite important that apart from diversification in crop sector we should move towards non-crop sector such as dairy, bee keeping, fisheries, horticulture etc. Mention may be made that the local component of the product should be developed through adequate market, credit and technical support. Necessary steps to be taken to optimally utilize the small piece of land like allocating them some valuable crops like medicinal plants and other commercial crops. Innovation may be initiated to grow both crops and livestock on the same piece of land. It is important to grow indigenous crops suitable to local resources and environment to enhance farmer's income specially the small and marginal farmers. Educating small and marginal farmers on technical skills, methods of costing and pricing and using technology must take the top priority. Innovation in the areas may be desired to produce food and other agricultural commodities which are environmentally sustainable. We must produce safe food which secures the health of the takers of food. We must develop technology that reduces the use of pesticides and fertilizers to make them environmentally sustainable. The scientific research for agricultural development in the country must be directed for ensuring of food security for all most importantly the poor and marginal groups.

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Education and Economic Growth in India

Priyanka Dey[1]

Abstract—*The educational attainment helps in economic growth. Educational attainment levels are determined by quality and quantity of education. It helps in formation of human capital of a nation. This study shows formal education as a necessary variable for improving production capacity of a nation. India is aggressively expanding in industrial sector, however, with poor rate of employment. This is due to unequal distribution of education amongst population. The research also shows how different levels of educational attainment have shared employment in primary, secondary and tertiary segments. The unique socio economic demographics of India cause development of diversified skill requirements. The historical process of consecutive learning has been replaced by specialized skill requirements. Conclusively, the research describes education to be most significant contributor of economic growth and development when it is high quality and skill oriented.*

INTRODUCTION

The economic future of any country is explained by its endowment of physical and human capital. The former has been traditionally given importance in research. Human capital is a rather unexplored tertiary of economic growth. But factors affecting enhancement of skills and talents are increasingly gathering momentum amongst researcher of social science and behavioural science. Policy recommendation towards promotion of private physical capital rather than human capital can be argued on basis of efficiency and long run impact on labour. In general human capital is seen as the investment people make on themselves to increase their productivity. The combination of education and development policies is known as human capital theory. According to research works of Schultz (1971), Sakamota and Powers (1995) and Psacharopoulos and Woodhall (1997) formal education is instrumental in human capital theory and necessary to improve production capacity of a population. Ambiguity regarding 'formal' aspect of education causes unacceptability of these researches in present scenario. Human capital theorists argue educated population as productive population. The investment in human beings provides magnification of innate abilities. This causes increase of productivity and efficiency in workers. The process of learning also helps in curving out talent of human being. Each individual possesses special talents, which if used at required positions help in optimal usage of human stock. The World Bank (1993) report also mentions significance of education in East Asia's economic growth. For example large investments in education by Hong Kong, Korea, Singapore and Taiwan have resulted in high economic growth rates. Empirical testing by Garba

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(2002) shows cross country positive correlation between educational attainment and economic growth and development. Odekunle (2001) shows positive effects between investment in human capital and entrepreneurial activity.

The traditional Solow (1956) theory of economic growth does not explicitly measure the role of human capital. Researchers have developed augmented Solow models, which contain human capital as an explanatory variable of GDP growth later. According to Solow, increase of capital explains 12.5 percent of the change in gross output per man-hour while technical change explains the 'residual' 87.5 percent. It is argued that much of this residual might be due to human capital. Some versions of augmented models are found in Romer (1990), Barro and Sala-i-Martin (1995), Knight, Loayza, and Villanueva (1993), Benhabib and Spiegel (1994) and Lucas (2002) but none have been able to find out magnitude of human capital's effect on economic growth. Even, Barro and Lee (1994, 1996) or Caselli, Esquivel and Lefort (1996) through their unique estimation methods could not find any unique importance of the human capital variable.

Formal education is seen as productive investment in human capital. Babalola (2003) rationales investment in human capital in three arguments, firstly new generation must be given the accumulated knowledge of the previous generation so as to keep the pace of development and growth positive. Secondly, not only the knowledge transfer but also skill transfer between generations is required. This will ensure productivity smoothening between generations. Thirdly, engorgement to move beyond what is already accumulated should be provided to next generation. The knowledge base should always be enriched with innovations. This eliminates the debate of innovation vs. imitation. Education helps in economic growth and development by increasing productivity of an existing labour force. According to human capitalist theory imitation is not a growth path and will not lead to steady state growth rate. As per Fagerlind and Saha (1997), human capital theory provides justification for expenditure on education. The economic return of investment in education caused rapid economic growth for society. Psacharopoulos and Wood hall (1997) agree that human capital describes the wealth of nation. Physical capital and natural resources being passive factors of production, human efficiency determines the outcome of production.

Robert (1991) developed a model to participate in human capital theory formulation which shows education and human capital formulation explains disparity in labour productivity and levels of technology. Education is considered as an investment in human capital. Education helps the individual as well as the community. The positive externality spreads effects of education amongst other individuals. Smith (1976) and Van-Den-Berg (2001) proponents of classical economics theory argues strongly for governments active support of education on the grounds of positive externalities that society gains from more educated labour force. Human capital is also considered as an input for innovation. The standard of

education provided to human ensures innovative ideas for next generation. The human capital formulation is an ongoing process where education works at every step to create something new. Education is seen as an input required for creating new ideas. The innovations cause technological changes and new products. The most innovative nations are also ones who have most educated populations (Van-Den-Berg, 2001).

Education is a consumption commodity as well as capital good because it provides utility to consumer and also serves as an inflow of knowledge in production process. It is a capital good as accumulation of knowledge provides gains in future. Education serves as an input in the production process of other goods and services. Consideration of education as capital goods relates to human capital theory. The improvement of skills is important for producing better goods and services. As a capital good, education is used to provide knowledge for human resources and enrich the process of economic and social transformation. Education also causes appraisal of human ethics, standard of living and social responsibility. Hence, positive social change is associated with educational attainment. Substantial faith in education as a medium of change has attracted heavy investment. Generally it is on the belief that expanding education promotes economic growth. However, Indian education investments have not been able to provide returns even after introduction of several policies. This paradox is explained in this paper. A general increase in literacy causes improved communication in reference to social mobility Bronchi (2003). The educated people is more adaptable to varied situational needs. He also argues that education is the most durable form of investment. The returns from education should be calculated for several generations. As education also transfers resource into more productive outcomes it is also a production process. The serving of personal needs to gain knowledge and individual preference explains education as consumption good. Raising the level of education in a society can increase inequalities in income distribution. Thus the government expenditure in education is vital to deflate unequal distribution of education.

Fagerlind and Shah (1997) says government can only plan educational plans with specific developmental goals but can only partially ascertain the outcome of policies. The more political and socially stringent country shows after country transfer of education smoothness. Thus, education in general and only schooling will not be able to achieve long term goals. Accompanied structural reforms will ensure implementation and diversification of educational policies.

I argue that human capital which is source of knowledge gathering and is also responsible for technological changes do not have the limitation of diminishing returns to investment unlike physical capital and labour. In fact human capital promotes growth through spill over externalities. Amalgamation of private player is very important to diffuse inventions and innovations. Other players in the segment will benefit from the advanced technology by further invention or imitation. But in

both the cases technological advancement is ensured. There is a lack of literature to establish transmission mechanism of human capital on regional growth. Douglas North (1970) points out "such theories neither describe the process of growth in America nor explain the causes of growth". We will not pursue the issue of interregional transmission of growth through the "growth poles" of Perroux (1970), whether it is balanced growth as given by Ragnar Nurkse's (1953) or the unbalanced growth of Hirschman's (1958) variety but rather how Indian states have achieved to show advancements in education.

ECONOMIC DEVELOPMENT

In literature economic development have been measured differently by various investigators. Variables like growth in per capita income, change in wealth, change in employment, change in both population and employment and growth in business are often used to comment about economic development. There is a lack of precise meaning of economic development. The several medium of evaluation also creates comparison issues between two nations. If accumulation of wealth is considered economic development such a process will not be a sustainable growth. By knowledge creation growth of future generation is also ensured. In regards to innovations expenditure in research and development is usually considered as a parameter of evaluation. But expenditure in research does not necessarily ensure innovation. The number of patents filled from the region will also not provide clear idea about human capital formulation. Rather the overall growth of education and the socio economic changes will describe level of human capital creation. The development of society is more important that increase in production alone. In labour market, economic development requires continuous displacement of equilibrium employment. But increase of employable labour does not signify efficiency in labour market. Rather the labour hours required to complete a production process will be able to define labour market standards. Thus economic development of a nation will contain several parameters rather than a single variable analysis.

HUMAN CAPITAL THEORY

The endogenous growth theory considers for growth in employment and per capita income, saving and investment in human resources is essential. It assures accumulation of human capital. Human capital is an accumulated stock of skills and talents. It is usually measured by availability of educated and skilled workforce in the region or person-years of education. The stock of human capital formulation occurs through formal and informal education and/or on-the-job training of labour. Human capital is an essential input in creation of human stock of a region. States with educational backwardness face deficiency of input in human capital creation. The modern theory is built on ideas of Theodore Schultz (1961) and later by Gary

Becker (1964). Becker primarily focuses on firms and workers behaviour regarding the investment in human capital and on estimation of return rates of human capital. Schultz discusses U.S. economic growth in light of Solow's residual growth theory. The modern growth theorists, like Lucas (1988) and Romer (1990b, 1990c), have taken up Schultz's attempt of explaining Solow's residual later on. In the advanced theories of Lucas (1988) and Romer (1990c) human capital enters as a distinct variable in the production function along with capital and labour (unskilled).

In neoclassical theory of economic growth, Solow (1956) advances aggregate output of a region or a country is a function of labour, capital and exogenously given technology. Technology in Solow growth model is described by the ration of labour and capital input. The constant returns to scale and diminishing returns to variable in neo classical theory ensure the passage of economic growth through technological advancement. The steady state of poor and advanced economy differs in situation of technology only. But it is argued that the poor state will have greater growth rate than the developed nations. Polser (1992) states "The theory provides no framework for understanding the economic forces and policies that influence the most important source of growth" hence lacks utility in policy formulation.

INDIA'S HUMAN CAPITAL FORMULATION

India being a diverse country is characterized by low human capital standard but high potential of capital accumulation. The demographic dividend of Indian economy helps in this optimistic thought. When the major player of multinational trade is facing shortage of youth, India is a youth abundant nation and will remain so in the near future. Development in fertility rate and decrease of infant mortality issues have helped the nation to accumulate human capital in the past decade. However, the situation of education and training is very poor in the country. Due to high inequality in between economic class and educational attainment levels in country from a very long time the efforts of government to ensure education for all have not provided the perceived effects. The pro poor growth of Indian economy (Martin Ravallion& Gaurav Datt, 2001) have left lower segment unaltered. Many developmentalists argue India's growth transition is cause of further divergence between poor and rich.

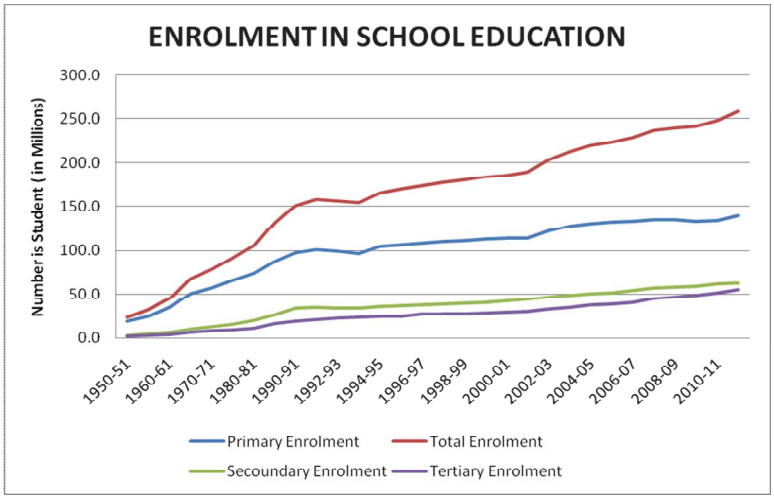

Fig. 1: Enrolment in School Education

**Data Source*: Planning Commission, Computed

Enrolment in primary education is better than the overall increment in educational enrolment. The rate of growth of enrolment in primary education is also higher than rate at which over all enrolments have increased in India. The continuous effort to increase educational levels in country shows a positive impact. From 1950–51 to 2011–2012 enrolment in education have been a positive steady increase. The continuity of educational accumulation also provides optimistic future in India. The divergence between total and primary rates of enrolment since 1950–51 has increased ever since. The secondary and tertiary education enrolment has not seen much change. The initial focus on primary education has not shift towards secondary or tertiary enrolments. Tertiary education level shows the least changes.

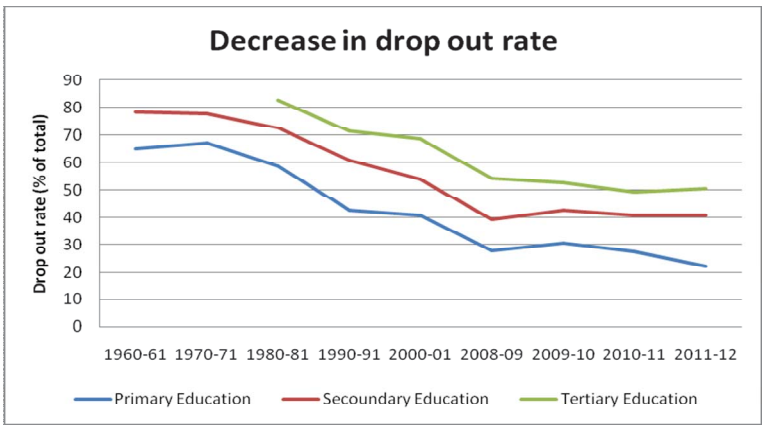

Fig. 2: Dropout Rates Educational Standard Wise

**Data Source*: Planning Commission, Computed

Tertiary education shows least growth in enrolment rates and highest dropout rates. Although dropout rates have decreased remarkably for all the sectors tertiary education remains the highest. Primary education shows low dropout rates followed by secondary education. Overall increase in enrolment and decrease in drop out expresses the positive growth in human capital formulation.

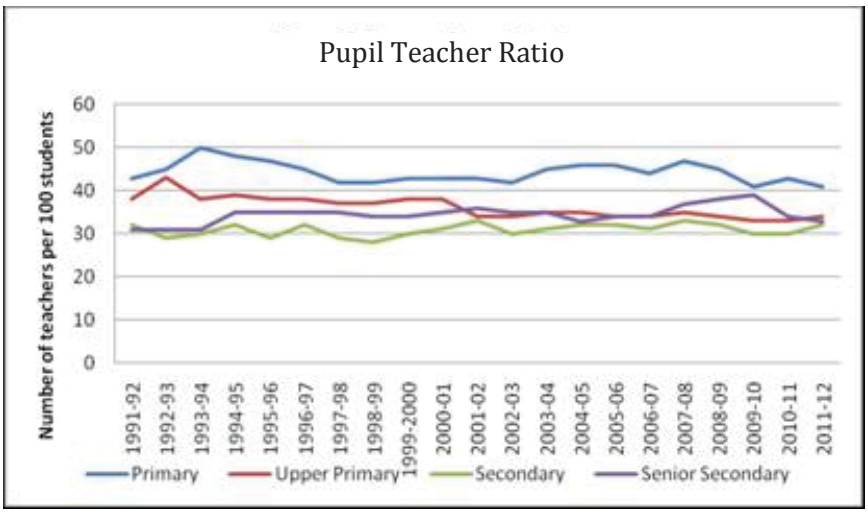

Fig. 3: Pupil Teacher Ratio as per Different Educational Levels

**Data Source*: Planning Commission, Computed

Primary education has maximum density of teachers. The lowest number of teacher is found in secondary education. Although senior secondary shows better pupil teacher ratio, high dropout ratio cannot be over looked.

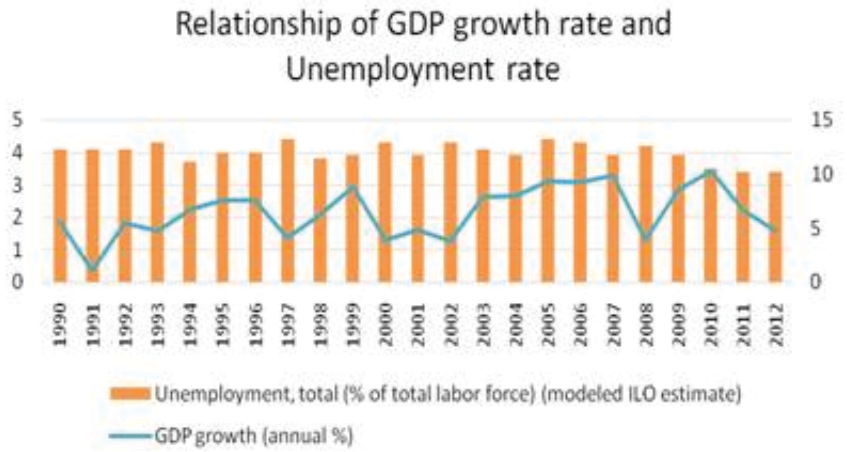

Fig. 4: Relationship of Gross Domestic Product growth Rate and Unemployment Rate

**Data Source*: Planning Commission, Computed

The GDP growth rate of Indian economy shows an overall positive increase. Unemployment shows no substantial fall throughout 1990–2012. Relationship between economic growth measured by GDP growth rate and unemployment cannot be clear from this analysis. Unemployment rate is almost similar through out the years only showing decrease with significant GDP growth. The financial crisis also do not impact unemployment rate. Due to a huge base of unemployed workers and continuous joining of new individuals in labour force, unemployed labours do not decrease significantly. The secondary and tertiary sectors have gained momentum in last decade. A huge decrease in unemployment rate was expected due to industrialization and liberalization. But due to demographic dividend Indian population consists majorly youth. Individuals with retirement age are lesser than employable people. The unique characteristics of Indian economy have kept labour supply populated. Also due to rapid technological advancement in India, production processes have become more capital intensive than labour intensive.

Table 1: Correlation Coefficients of Enrolment in Educational with GDP growth Rate and Unemployment Rate

Correlation Coefficient	Primary Education	Secondary Education	Tertiary Education
GDP growth rate	0.466934	0.326919018	0.213092185
Unemployment rate (total %)	-0.34863	-0.51806373	-0.59659891

**Data Source*: Planning Commission and World Bank, Computed

Economic growth shows positive correlation with all three divisions of educational enrolment rates. Thus increase in enrolment at primary, secondary and tertiary education will positively affect GDP growth rate. Primary education shows best positive correlation with GDP growth rate. Unemployment and education have negative relationship. Primary (-0.34), secondary (-0.51) and tertiary (-0.59) education causes decrease of unemployment rate. Primary education is helpful in GDP growth as most of India's production is agricultural. The lack of industry causes lack of educational requirement and low educational attainment closes doors for individuals to shift in other sector or advanced technology. A low educational level of agricultural workers ensures stagnancy of technology in primary sector. It is a product of cyclical causation that India is in a growth trap. Whereas secondary and tertiary sectors required higher education and higher skills. Due to lack of manufacturing industry demand for skilled workers are low. Thus most of the labour force is occupied in low technical primary activities. Lack of skilled labour has been a concern for foreign and domestic investors in manufacturing. The gap in between primary and tertiary sector has caused an increase of unequal distribution of education. In past ten years India's most growing sector has been tertiary sector. The advancement in services has created demand of highly educated and technically super skilled labour. The impact of enrolment in tertiary education shows greatest effect in reducing unemployment. This helps us in identifying tertiary education as most important for job creation. Rapid growth in service industry ensures employability of skilled labour.

INTER-STATE ANALYSIS

According to Lucas model, human capital has internal productivity effect as well as external productivity effect. An individual increase of knowledge will help in increasing productivity of co-workers. Due to externality effect, the growth rate will be higher in those regions that invest more to accumulate human capital. Spill over effects also create disincentives to economic agents as the cost of human capital accumulation is not born by all who take advantages from externality effect. Therefore, a region will face slower growth in the absence of policy intervention to restore the incentives. According to Romer (1990b, c) the externality is the stock of knowledge unlike in Lucas's model where productive effect is from flow of knowledge. Economic growth depends on the initial stock of knowledge. Thus, even if all states in India have access to same base of knowledge regions with greater human capital will get higher returns to investment than less endowed states. Endogenous knowledge accumulation increases productivity of capital through time and sustained investment in human capital.

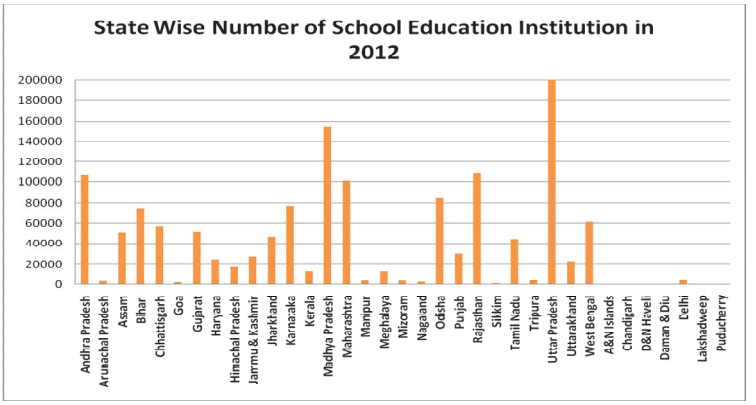

Fig. 5: State Wise Number of School Education Institution in 2012

**Data Source*: National Sample Survey Organization, Computed

In figure 5, north east states of India and backward states who contribute very less to GDP have lesser numbers of educational institutions. Uttar Pradesh has highest number of educational institutes. The availability of institutional facility encourages enrolment and increases participation. Society works in a chain format where one enrolment initiates further interest of participation. If there is lack of institute it is regardless of anything else those states will show low educational levels. The economically stronger states have more number of institutes.

Further analysis of enrolment rates in each state will help us understand disparities in between the states. Figure 6, Uttar Pradesh shows 19.13% of contribution in national enrolment from pre-primary to XII. Daman and Diu, D&N Haveli and Andaman and Nicobar Island have lowest enrolment rates. The

fluctuations amongst 35 states and union territories is concerning. Only few major states like West Bengal, Uttar Pradesh, Tamil Nadu, Rajasthan, Maharashtra, Madhya Pradesh, Bihar and Andhra Pradesh shows active contribution in school enrolment.

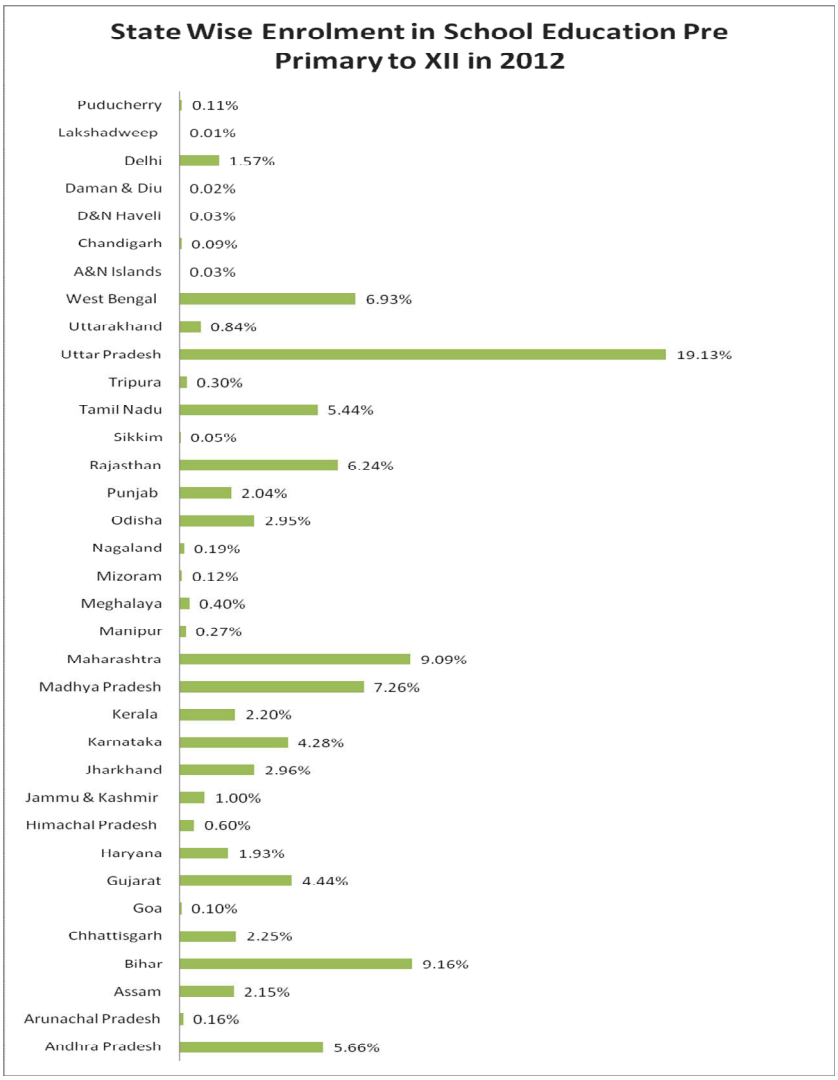

Fig. 7: State wise Enrolment in School Education pre Primary to XII in 2012

The state wise distribution of trained teacher in 2012 shows a similar share of primary, upper primary, secondary and senior secondary in all of the states (Figure 7). Although number of teachers is fluctuating in each state, it can be due to dissimilarity in geographical area. The north eastern sates show lowest numbers of trained teachers. Teaching job is potential for people in north eastern states. Local people should be encourage to accumulated knowledge and help in

teaching at state educational institutes. Providing privileges to north eastern citizen will not ensure educational development in the region. The state should ensure that brain drain do not occurs. Beneficiaries of privilege should be brought back to their original state and work under favourable condition to promote economic and social growth. The number of total trained teachers appointed in primary, upper primary, secondary and senior secondary education is almost same in India. Thus trained teachers are appointed unilaterally in all segments.

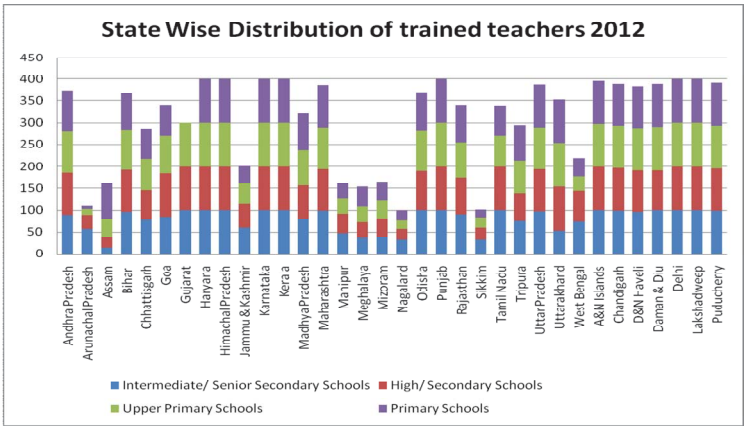

Fig. 8: State wise Distribution of Trained Teacher 2012

**Source*: Planning Commission of India, Computed

Puducherry, Tamil Nadu, Goa, Andhra Pradesh, Tripura, Rajasthan, Sikkim, Odisha and Madhya Pradesh show great disparities in enrolment rates between genders as per figure 8. Kerala, Tamil Nadu and Puducherry show more enrolments of girls than boys. The gender disparity issues are not described in this paper. But the question of economic loss due to low participation rate by female gender cannot be over looked. Economic growth is also effected due to exclusion of a productive resource from the production process. A large amount of human capital is unattended. Haryana, Odisha, Madhya Pradesh and Rajasthan show remarkable difference in girl and boy enrolment. These two states show larger enrolments of boys' indicating gender discrimination of society.

Diverse social features of states in India range from extreme male biased society in areas of Haryana, Odisha, Madhya Pradesh and Rajasthan to states of Goa, Kerala, Punjab, Sikkim and Tamil Nadu where girls have enrolled in educational institutes more than boys. Also in terms of economic growth states of Kerala, Gujarat and Maharashtra have shown greater results and have accomplished in attracting major industries from foreign. State policies shows impact more than central policies. Thus it can be understood India needs specialized and customer made policies for desired results. Labour in several parts of India are specialized in different skills. The bodo weavers of north east are famous for unique textile, south Indians are known for their physical tenacities and western state is endowed with more business minded

people. So special policies by state as well as central government should be formulated to enhance the human capital endowments. Human capital accumulation should be differentiated based on already existing local knowledge. This will maximize returns from investment in knowledge accumulation.

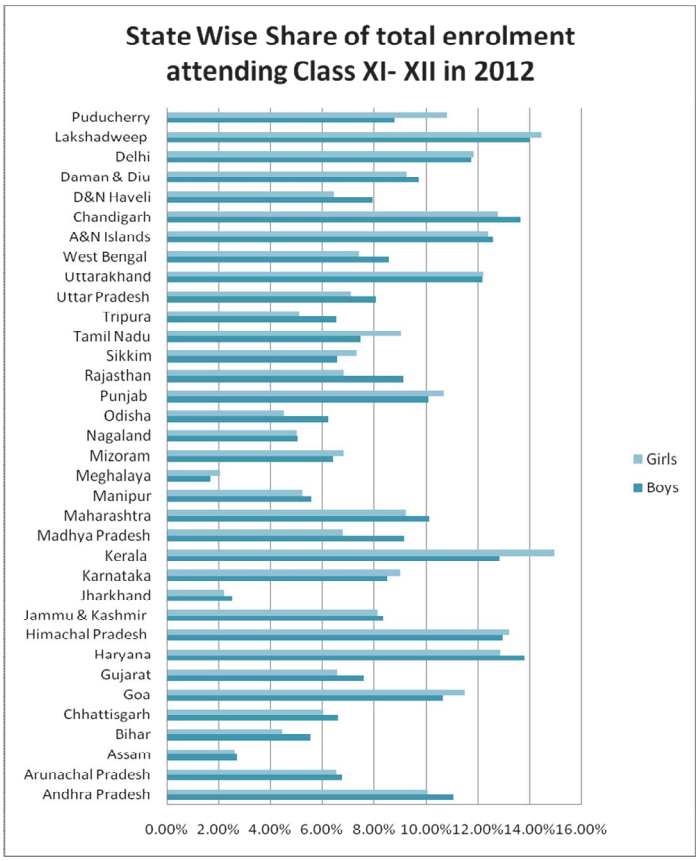

Fig. 8: State wise Share of Total Enrolment Attending Class XI-XII in 2012

Source: Planning Commission of India, Computed

As per finding of Labour Bureau of Ministry of Labour and Employment majority of the youth are employed under the Code 1 classification of NIC 2008 i.e. in agriculture, forestry and fishing activities based on usual principal status approach (Figure 9). The age group of 15 to 29 is considered as youth. It is an established fact that youth of a nation shows the future. The major occupation of India's youth in primary sector is a concern. Construction & manufacturing sectors also provides job to a significant number of persons based on the survey results under the usual principal status approach. Low levels of education in the youth constraints movement to secondary or tertiary sector. Thus, creating bottle neck for economic development.

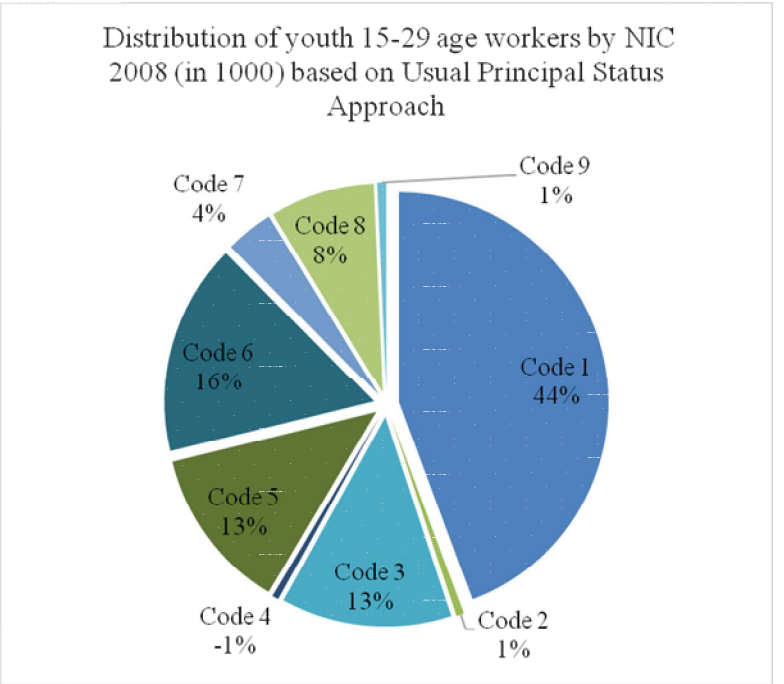

Fig. 9: Distribution of youth 15–29 Age Workers by NIC 2008 (in 1000) based on Usual Principal Status Approach

Source: Government of India, Ministry of Labour and Employment, Computed

CONCLUSION

As Indian labour market has been shared mostly by unskilled and semi-skilled category of persons, Government expenditure to enhance employment opportunities have been based on infrastructural works like road building, irrigation and maintenance sector. The twin incentives are developing infrastructure and providing employment at minimum wages. The development of educational levels has decreased attractiveness of these manual labour programmes which are devoid of any skill creation. It is seen that as the education level is increasing, the unemployment rate is also increasing. Job creation is an alarming concern for India. The demand for skills will be sufficient to cause interest in accumulation of those values. The educational attainment should be rewarded with economic growth. This will ensure further increase in enrolment rates. The benefits of education should not be only argued as social benefits rather social development should be effect of education.

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Development Dilemma: The Paradoxes of Scientific Advancement and Ingrained Social Accountability

Manish Kumar Verma[1]

Abstract—*Due to incessant scientific advancement, the era of globalization has attained a new degree of developmental height wherein the governance is vying for inclusive growth. But behind this much admired development achievements lies the grave for the underdevelopment of millions of marginal across globe whose land is utilized for the sake of attaining national goal. The paper argues, through the empirical evidences of development induced displacement collected across globe, that scientific knowledge is continuously being hegemonized and harnessed by the powerful minority for their own benefits. This brings under sharper purview the politics of governance which lacks social accountability. The powerful controls not only the political power but they control scientific power as well. Thus, by virtue of claim of inclusive development of the masses, the powerful excludes the marginal from its ambit and hence negates the chance of a sustainable development of the nation. On the micro level, India's tryst with development is critically appraised through the portrayal of national resettlement and rehabilitation act which is still under finalization even after the passage of more than six decades of independence, which shows the apathetic approach of the governance towards the masses.*

Key Words: *Development, Scientific Advancement, Involuntary Displacement, Impoverishment, Governance, Social Accountability*

The era of globalization has visualized a new phase in the history of humankind. Due to incessant scientific advancement and innovations in technology, the scientific world is profoundly taming the natural environment to augment development endeavours in order to turn life comfortable. The era of globalization also converges with the detonation in communication medium and thus turning the world into 'global village', to use the words of Marshal McLuhan. But in analogous to it, another demeaning phenomenon is also shaping up, which is a continuous source of challenge to our development planners. "The gigantic urge of development activities saw man reaching to such a threshold where their endless craving has not only resulted into the environmental squalor but also led to the exclusion and underdevelopment of their fellow brothers." (Verma 2012: 237) Most ironically, at such a moment, when the contemporary global society has entered into 'information age' and known as 'knowledge society' having 'reflex characteristics' (Giddens 1990) in terms of transparency, dissemination of information, awareness and overall social accountability; a large number of socially marginalized and economically deprived populace, involuntarily displaced worldwide due to development projects,

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is forced to live in a communication vacuum having no information at all about their present and future destiny and thus gets exposed to greater 'impoverishment risks.' (Cernea 1996).

Involuntary displacement, ecological alteration and environmental degradation have always been a companion of development. "Every developmental project requires large chunk of land which is not easily available in the densely populated urban areas occupied by intellectually, economically and politically empowered populace." (Verma, Manish Kumar: 2004) As such, the planners generally fall back to the remotest rural and tribal regions inhabited by illiterate, unaware, poor and underprivileged natives. Consequently, as an offshoot of scientific advancement, on the name of industrial development and attaining national goal, a large number of marginal overtly lose their dwelling and livelihood and covertly their culture, civilization and bonding with the natal place. Forced displacement brings with hardship, trauma, un-certainties and becomes responsible for the breakdown of traditional socio-cultural and economic network of the locals who reside and draw livelihood from the same land since generations. "The condition becomes more pathetic when the project affected persons (PAPs) are not even consulted before, during or after the whole process. Ironically they remain ignorant and unaware about their future and oscillate between hope and despair." (Verma, Manish Kumar: 2004.) At times, with great amount of expectations, they dream hefty package from the rehabilitation agencies and on un-accomplishment of wishes and desires, they show intense resentment. Though the overall objective of the governance to attain scientific advancement and developmental goals apparently seems achieved by the construction of mega projects but at the same time, on the micro level, it has deep embedded ironical phenomena of development induced displacement which relegate social objective and accountability to the background. By "impoverishing" (Cernea, Michael M.) the large masses of displaced people, the construction of these mega projects has aggravated the already complex problem of poverty alleviation especially in developing country like India. It has also become a major source of deprivation of basic human rights and underlying social justice. While focusing on the Indian condition, "alarmingly, the sheer magnitude of the problem is staggering –according to an estimate some 60 million people have been displaced in India since independence (Dubey 2008: XV), "most of whom have never been properly resettled" (Mathur, Harimohan 2008: 3).

On a much wider level, globally the experience of resettlement does not have much different scenario than what is happening in India and such other developing countries. "Worldwide experience with resettlement has shown that people who are displaced do not easily recover, much less improve, their previous standard of living. Resettlement studies have vividly documented the devastating consequences of failed resettlement projects, which create new pockets of poverty where none existed before. The fact is that for those affected development has been too often experienced

not as an opportunity, but as disruption and impoverishment. Such displacement not only puts affected people to grave impoverishment risks, but also cause a setback to the entire poverty reduction effort." (Mathur, Harimohan 2008: 3-4)

This swiftly brings our sharp attention towards the politics which govern the planning of such development projects wherein the powerful garner benefits and deprive the marginal to the extent of extinction. While analyzing the discourse of such developments, a central issue which crops up here is that of "relationship between knowledge and power." (Pieterse, Jan Nederveen 2001: 8) In today's world, knowledge is power and vice-versa. In a way, the person who controls the power invariably gets it operational through control over knowledge, science and technology and subsequently governs the society to meet his/her own specific interests. From this perspective, "development thinking performs a role of representation, of articulation and privileging particular political and class interests and cultural preferences." (Pieterse, Jan Nederveen 2001: 8) Such repeated instances of development induced displacement affecting global sustainability opens up the endless debate about the morality of development and raise the most fundamental question-'Development for whom' and 'development for what purpose'? Thus, keeping in praxis the over position, "modernity no longer seems so attractive in view of ecological problems, the consequences of technological change and many other problem"….. and hence it would be more realistic to "acknowledge crisis and to argue that crisis is intrinsic to development, that development knowledge is crisis knowledge." (Pieterse, Jan Nederveen, 2001: 1)

The tribulation of involuntary displacement is making prey to the natives of not only the developing and underdeveloped countries, but it is impressing upon the citizens of the developed countries as well on equal footing. The above mentioned fact can be verified by the accounts of involuntary displacement world-wide. Few glaring instances are mentioned in the following passage.

DEVELOPMENT INDUCED DISPLACEMENT: GLOBAL OVERVIEW

At present, no precise data is available on the exact figure of persons affected by development projects worldwide mostly due to unawareness, negligence and apathetic attitude of the policy planners towards such a vicious problem adversely affecting millions of innocent and marginalized people. Unlike for refugees and internally displaced persons, there are no institutions or publications dedicated to tracking overall development induced displacement, either on the global or national level. To derive an idea of its magnitude, most scholars, policy-makers and activists rely on the estimates of the World Bank Environment Department which indicates that roughly 10 million people are displaced worldwide every year due to dam construction, urban development and transportation and infrastructure programs. This number is shockingly high, but still fails to account for large numbers of the displaced. It happens mostly due to the fact that displacement tallies almost always

refer only to persons physically ousted from legally acquired land in order to make way for the planned projects. It generally ignores the account of those living in the vicinity of or, downstream from projects, whose livelihood and socio-economic milieu might be adversely affected by the project. A detailed enumeration that considers this wider conception of development induced displacement would be much higher than the estimates of the World Bank Environment Department. Nevertheless, the existing figure available with the policy planners also does not portray any rosy picture. It can well be subsumed in the analysis of various continents across the globe.

ASIA AND PACIFIC

The predicament of involuntary displacement is not new to the world. It dates back to history. It is rightly said that, "Displacement became a serious issue in the colonial age, intensified after independence, and caused bigger problem in the context of globalization today." (Fernandes 2008: 89) While the plethora of development induced displacement occurs throughout the world, two countries in particular–China and India–are responsible for a large portion of such displacements just to cater the developmental requirement of a booming population. According to Fuggle *et al*. (2000), the National Research Centre for resettlement in China has calculated that over 45 million people were displaced by development projects in that country between 1950 and 2000. Taneja and Thakkar (2000) points out that estimates on displacement in India from dam projects alone range from 21 million to 40 million. The Narmada Sardar Sarovar Dam Project in India, which displaced more than 1, 27,000 people, has perhaps been the most widely researched and discussed project involving forced displacement in the history of mankind. Dreze, Samson and Singh (1997), in their study elucidate a comprehensive picture of displacement and resettlement in the Narmada project.

The Three Gorges Dam Project of China has also been widely discussed and written about as it displaced more than 1.2 million people. The edited book Yangize! Yangize! by Quing (1994), is credited for being the first manuscript published from within China for having critical overview of the project affecting such a large number of locals. Cernea (1993) discussed the displacement of 40,000-50,000 people in Indonesia to make way for a Jabotabek urban development project, which involved the widening and upgrading of roads in Jakarta and nearby cities. He also accounted for the modernization of Shanghai's sewerage system, which displaced 15,000 urban dwellers in the city.

While focusing specifically in the instances of displacement caused by development projects, a world-wide comparative study doesn't give different picture than India. In a multi country comparative empirical analysis of the state of displacement in the developed countries like China and France with developing countries such as Bangladesh, Pakistan and Zambia, the result suggest similar pathological experiences. "The study on China tracks several extended families

that were relocated mainly from the Yunyang and Yanzhou districts situated at the head of the three Georges Dam and resettled to the Shanghai region. The research highlighted the issue of forced migration in China and the challenges that lie ahead of the dislodged rural populace. The apprehensive evidences of the study cautioned that the frustration of these settlers, an army of unemployed marginalized group, can be explosive and could unbalance the harmonious social equation. People are 'sacrificed' for the sake of biodiversity and wildlife, and development, is not only unacceptable from the social and human rights perspective, but also from the ecological and economic point of view, because the resultant impoverishment undermines the original intention of poverty reduction and conservation." (Modi, 2009: 272-73).

AFRICA

Cernea (1997) in his paper, African Involuntary Resettlement in a Global Context notes that, while countries like China and India lead the world in the number of persons displaced by development projects, the proportion of population and territory affected by even the largest of projects in these countries is much lower than in some projects in African countries. For example, the Akosombo Dam in Ghana displaced 80,000 people, which is approximately 1 per cent of country's population. The reservoir of the Akosombo Dam flooded 3.5 percent of Ghana's land, while that of the Narmada Sardar Sarovar Dam covers only 0.01 percent of India's territory.

Colson's (1971) detailed study of the impacts of the Kariba resettlement scheme on the Gwemba Tonga is a classical work, not just from the point of view of the literature on displacement but also from the perspective of anthropology. Kariba Dam project in Zambia displaced approximately 57,000 people. Fahim (1981) offers an in-depth look at the Aswan High Dam Project in Egypt, which displaced close to 1, 00,000 people in Egypt and Sudan.

Ghana's Akosombo Dam Project on the Volta River displaced more than 80,000 people, has also been closely examined and discussed by a number of researchers. [Chambers (1970), Obusu-Mensah (1996), Hart (1980)]. Amarteifio, Butcher and Whitham (1966) analyzed the displacement and resettlement on Ghanaian village beginning in 1952 in order to make room for the construction of a new port and harbour. The study was completed and published prior to the completion of the Volta River resettlement operations in the hope that its findings could be of use to resettlement planners.

LATIN AMERICA AND THE CARIBBEAN

While overall displacement in Latin America and the Caribbean is not as high as in Asia, nevertheless, the region has seen a number of large and controversial resettlement operations. La Rovere and Mendes (2000) provides a detailed account of Brazil's Tucuri Dam Project, Phase I, which was built between 1975 and 1984 and

displaced 25,000–35,000 people, despite a pre-project prediction of displacement affecting only 1,750 families in the region. It shows large scale negligence and ignorance on part of the policy planners towards the land oustees. Guatemala's Chixoy Dam Project is famous for the impunity with which resettlement was carried out. The project involved the resettlement of 2,500 Maya Achi Indians. It began in 1979 and lasted for over a decade and blamed for the massacre of 369 displacees whom local civil patrols and the Guatemalan Armed Forces believed to be 'guerrillas.' Barbaras and Bartolome (1973) enumerate the displacement and resettlement in Mexico's Miguel Aleman Dam Project, which displaced about 20,000–25,000 Mazatec Indians. Guggenheim (1993) narrates the instance of resettlement in the Mexico Hydroelectric Project, which took place in the early 1990s and included two separate dam projects, displaced a total of 3,500 people.

EUROPE, THE UNITED STATES AND CANADA

Large scale development induced displacement and resettlement in industrial countries of Europe and in North America is not much in vogue today. However, history is replete with examples of displacement-inducing projects in these countries, particularly in North America, even if the detailed literature is not available related to it. Scudder (1996) examined the trend in livelihood displacement and political mobilization amongst the Cree in Canada's James Bay Power Project. The World Commission on Dams case study report by Ortolano *et al*. (2000) offers a detailed examination of the Grand Coulee Dam Project in the United States–a project that extended over some forty years between 1933 and 1975 and displaced approximately 5,100 to 6,350 people in the region. It also affected adversely the indigenous population residing north of the border of Canada without payment of compensation. Berman (1988) provides a critical discussion of the displacement and resettlement of 300 indigenous families from land protected by treaty to make way for the Garrison dam in the United States in the 1950s.

Thus, it is clear from above discussion that development induced displacement is most commonly known phenomena across the globe, which is adversely affecting millions of people annually. Most of those getting affected generally hail from illiterate, deprived and marginalized communities living in remote locations become prone to multifold impoverishment risks (Cernea, 1996). Most importantly, large scale unawareness, negligence and ignorance on part of the affected communities towards the issues pertaining to involuntary displacement forms the root cause of the problem. Couple with it, the apathetic attitude of the policy planner's act as catalyst to further aggravates the problem beyond proportion. The pattern of tribulations is similar in cases of underdeveloped, developing and industrialized developed countries. The only difference which is perceived through the analysis across globe lies in the magnitude of the problem. Whereas, the developing countries like India and China is displacing more people annually, in comparison the European and American countries are producing far less number.

Now coming down to the micro level and focusing on the Indian experiences of scientific advancement in terms of development induced displacement, we find a certain glocal interlink.

DEVELOPMENT INDUCED DISPLACEMENT: AN OVERVIEW IN INDIA

The outburst in development induced displacement is one of the most serious issue plaguing development planners causing widespread concern and demanding immediate attention. "The sheer magnitude of the problem is staggering–some 60 million people have been displaced since independence, according to one estimate. This is likely to grow exponentially in the future because of the insatiable demand for land due to liberalization and globalization." (Dubey, 2008: xv). The phenomenon of project-induced displacement has compounded many of the problems of social development. It has relegated social objective to the background, which government was committed to until recently, of ensuring land rights and carrying out land reforms and land distribution. By impoverishing the large masses of displaced people, it has aggravated the already complex problem of alleviating poverty. It has also become a major source of the deprivation of basic human rights in the society.

In the mistaken priority to accelerate growth, mainly through mega projects undertaken by private companies, the government has generally taken the side of the companies at the cost of displaced persons. Relocation has seldom been regarded as human problem involving fundamental rights, but considered a simple law and order problem with oustees always been on the wrong side of the law. As a result, any reluctance to part with land has been regarded as violation of law and protests against displacement have been ruthlessly crushed as in case of dam construction in Narmada and Tehri involving more than one states; power projects like NTPC; mining industries in the form of CIL or more recently, Nandigram and Singur in West Bengal and in Kashipur in Orissa. An ominous social polarization in the affected areas has emerged, between the government, company, and the beneficiary middlemen on the one side and the project displaced persons and civil society organizations supporting them, on the other side. Thus, with the growing urge of development, growth in population and consequent increase in its density, every industrial activity is going to trigger socially blind irreversible chain of multiple displacements. Upendra Baxi has rightly remarked about the whole issue, "'No development without displacement' is the mantra of the developers everywhere." (Baxi, 2008: 17).

If we peep into the history of development induced displacement, we find that earlier displacement caused largely due to multipurpose river valley projects like dams and mining activities. "There are signs suggesting displacement from the age of the Gupta dynasty. In the middle ages projects such as the Jai Samand Lake built near Udaipur in the eighteenth century affected many families. However, displacement did not disrupt people's lives completely because the population was

then small and land was abundant. The displaced families could resettle themselves not far from their original habitat. Displacement caused in the colonial age in the pursuit of raw material for the Industrial Revolution in England. "Right from the nineteenth century, the colonialists in pursuit of this goal opened coal mines in Raniganj, tea garden in Assam, coffee plantations in Karnataka etc." (Fernandes, 2008: 89). Displacement became a serious issue in the colonial age, intensified after independence, and caused bigger problem in the context of globalization today." (Fernandes, 2008: 89) "Now human population are being uprooted by numerous other development activities-industrialization; infrastructure building including construction of highways, ports, airports, power stations; relocation of slums and the more recent entry, the Special Economic Zones (SEZs). Now the land is being acquired for private companies for building factories, malls, parks, swimming pools, hotels, and night clubs." (Dubey, 2008: xv).

A world-wide comparative study of displacement doesn't give different picture than India. People are 'sacrificed' for the sake of biodiversity and wildlife, and development, is not only unacceptable from the social and human rights perspective, but also from the ecological and economic point of view, because the resultant impoverishment undermines the original intention of poverty reduction and conservation." (Modi, 2009: 272–73).

"Worldwide experience with resettlement has shown that people who are displaced do not easily recover, much less improve, their previous standard of living. Resettlement studies have vividly documented the devastating consequences of failed resettlement projects, which create new pockets of poverty where none existed before. The fact is that for those affected development has been too often experienced not as an opportunity, but as disruption and impoverishment. Such displacement not only puts affected people to grave impoverishment risks, but also causes a setback to the entire poverty reduction effort. As one observer puts it, 'Truly, development is a very contradictory affair if it reinforces the very poverty that it aims of eliminate.'" (Mathur, 2008: 3-4).

RESETTLEMENT AND REHABILITATION POLICY IN INDIA

Beginning of the 1980s observed sensitization towards the ever growing and all pervasive problems of Resettlement and Rehabilitation. Opinion of the donor agencies as well as national and international organizations concerned with the social cause shifted towards protection of human rights. As a result, there were lots of hue and cry favoring for enactment of a sound National Resettlement and Rehabilitation Policy (GOI 1995–96) in India, ingenious enough to solve the problems of the oustees. As such, efforts were constantly paving toward the composition of a national policy.

Till now, there are very few states that have enacted state-wise R&R policies. "Till 2003 Maharastra, Madhya Pradesh and Karnataka had rehabilitation laws for

irrigation displaced persons. Rajasthan and Orissa had promulgated policies between 1994 and 1998." (Fernandes 2005: 123). Apart from that, some other states issued Government Orders/ Resolutions. The Government of Maharashtra developed a progressive policy to deal with people not successfully rehabilitated under previous water projects. There are also company-wise and sector specific policies, such as those developed by the National Thermal Power Corporation (NTPC, 1993), Coal India Ltd. (CIL 1994) and more recently by some other private and government infrastructure companies.

The attention of the NGO (Non-Government Organization) movement, particularly those concerned with tribal rights, as well as that of some donor agencies have been drawn to the issue surrounding displacement due to increasing interest in matters of sustainability and human rights. These focused around the *Sardar Sarovar* Project during early 1990s.

There was pressure from World Bank, other major donor agencies as well as national and international organizations concerned with the rights of the displaced. They expressed the need for a national policy. As a consequence, Government of India initiated formulation of a sustainable policy on R&R. Thus, draft of a national resettlement policy has been the subject of widespread consultation amongst state governments and within the NGO community in many parts of the country. In 1989, a National Working Group on Displacement was formed through an NGO initiative which involved government officials also. Draft National Policy on Developmental Resettlement of Project Affected Persons was prepared. Since then, many more drafts have been prepared encompassing an ever-widening group of people - from 'oustees' of 'river valley projects,' to 'persons affected by reservoir projects,' and now to the 'rehabilitation of persons displaced as a consequence of acquisition of land'.

Ministry of Rural Development prepared the draft of a 'National Policy for Rehabilitation of persons displaced as a consequence of land acquisition'. Responsibility for the progress of government discussions lies with the Ministry of Rural Areas and Employment who has been designated as the nodal ministry for the execution of the policy. This shift in responsibility was perhaps one indication that the responsibility for successful R&R can't really be given to a particular ministry, but is central to the agendas of many. The draft has been circulated to 15 ministries, including Finance, Water Resources, Social Welfare, Environment and Forests, Power, Coal, Home and Surface Transport, as well as the Planning Commission. This document has been used as a basic text by various NGOs over past years to produce a draft alternative R&R policy after widespread regional discussion. The same draft alternative has also been submitted to the Ministry of Rural Areas and Employment for their consideration.

The circulating government draft emphasized equity, fairness, justice and equality on the distribution of burdens and benefits. The draft recognized the right to settle and reside in any part of the country, the special rights of Tribal, the customary rights to common property resources of those dependent on the forests, and also those classified as 'encroachers'. It recognized that the 'displaced' are actually 'uprooted from the soil'. It emphasized the need to ensure rehabilitation in any displacement process and stressed the need to ensure that the displaced persons actively participate in their own rehabilitation. It was also recognized in the draft that the adverse impacts of involuntary displacement are much wider than those just associated with loss of land. It was formulated on the expectation that future developments will increase rather than decrease the pace of displacement, as more and more land will be required for infrastructure expansion. The revised Land Acquisition Act indicated that R&R is likely to remain a necessary activity, which has to be undertaken prior to development.

In 1993, in the wake of World Bank withdrawal from Sardar Sarovar due to severe negligence on R&R activities, the Ministry of Rural Development prepared a draft policy in 1993 which was revised many a times after that. After nearly 19 years of continuous debate and discussion, Government of India notified a national rehabilitation policy on 17th February 2004 known as National Policy on Resettlement and Rehabilitation 2003 (GOI, 2003).

The main features of NPRR 2003 (GOI, 2003) was that it applied to such projects which were displacing more than 500 families en masses in the plains and 250 in the hills or the schedule area. The policy says that each project-affected families (henceforth PAF), whose house has been acquired, will get a site free of cost. Those families who are below poverty line will be given a onetime grant of Rs. 25,000/-for house construction. Land losers will be given one time grant of Rs. 10,000/-per hectare for land development and Rs. 5,000/-per family for agricultural production. The best part of the policy was that it made provision for the payment of monthly allowance of 20 days minimum agricultural wages for one year up to 250 days of minimum agricultural wages to the PAFs. Apart from that, a PAF whose entire land is acquired would get one-time financial assistance equivalent to 750 days of minimum agricultural wages for loss of livelihood. Lastly, the policy says that each rural artisan, small trader and self-employed PAF will get financial assistance of Rs. 10,000/- for construction of shops or working sheds.

The positive aspects underlying NPRR 2003 was its broad definition of PAF and 'agricultural family'. It made provision of separate rehabilitation agency for the execution of R&R work. Lastly, it restricted R&R benefit to those who have resided in the affected area for 3 years before the notification under section 4(1) of Land Acquisition Act. By this provision, it prevented outsiders from buying land in the affected area and in turn grabbing most of the rehabilitation benefits.

The first central policy on R&R was subsequently replaced by National Rehabilitation and Resettlement Policy (NRRP) by the end of 2007. "The NRRP's stated objectives include minimizing displacement and promoting non-displacing or least displacing alternatives; ensuring adequate and expeditious rehabilitation with the active participation of the affected families; ensuring protection of the rights of scheduled castes and scheduled tribes; providing better standard of living with sustainable income to affected families; integrating rehabilitation concerns into development planning and implementation processes; and facilitating harmonious relationships between the acquiring body and affected families. While these are useful policy directions, they mean little in practice without specific laws mandating them. Despite acknowledgement of concern for the displaced and democratic process, the policy does not make the right to informed consent explicit. Panchayat or other local bodies resolutions find no mention in ascertaining the views of the affected communities." (Sampat, 2013: 43-44)

In another attempt to overcome controversy surrounding payment of compensation and rehabilitation issues in the cities of northern states (Noida and Singur), the Land Acquisition and Rehabilitation and Resettlement Bill 2011 and the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Bill 2012 (RTFCTLARR 2012) was introduced. The LAA Bill 2011 sought to replace the LAA 1894 and bring R&R for the first time within the ambit of a land acquisition law. But the bill clearly conflated public purpose with industrialization, infrastructure development and urbanization.

The third and the latest version of the bill were released in December 2012 after several rounds of deliberations between various ministries. The bill claim that: "…. it is a bill to ensure, in consultation with institutions of local self government and Gram Sabhas established under the constitution, a humane, participative, informed consultative and transparent process for land acquisition for industrialization, development of essential infrastructural facilities and urbanization with the least disturbance to the owners of the land and other affected families and provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition and make adequate provisions for such affected persons for their rehabilitation and resettlement thereof, and for ensuring that the cumulative outcome of compulsory acquisition should be that affected persons become partners in development leading to an improvement in their post-acquisition social and economic status….." (GOI, 2012)

The RTFCTLARR 2012 allows for the acquisition of the land albeit with prior consent of Gram Sabhas or councils. However, no clear procedure as to how consent may be ascertained is mentioned and while Gram Sabhas and urban local bodies are

to be consulted, resolutions taken by these bodies find no legitimate mention. The steps to be followed, if there is no consent, are also not mentioned. However, what kind of changes the RTFCTLARR 2012 bill will go through before it eventually passed remains to be seen. In addition, when and how this bill will become law is an open question.

CONCLUSION

The most promising, pragmatic and fascinating progeny of scientific advancements, ironically, unravel altogether contrary picture when we take into account its credibility from the perspective of the welfare of the masses. The above mentioned empirical incidences across the globe gives a solid indication that most of the knowledge of scientific advancement is dominated and utilized by the powerful section of the society and subsequently its fruits are also captured by them. Hence, the benefit of the scientific advancement of a particular era reaches, by and large, to that section of the population who are rich, prosperous, politically dominant, and last but not the least controls the knowledge. By virtue of their preponderance in the society, they manipulate the benefits of scientific advancements and thereby exclude the remaining part of the underprivileged masses that does not have access to knowledge, power, awareness and affluence. The hegemonic relationship between the powerful and the powerless can be seen in terms of most of the development planning wherein even the single penny of expenditure is calculated and the marketing of the product of the industries is planned well in advance from the profit-loss point of view. But these advance planning does not have space for the natives on whose land the development project is going to be constructed. As a result, the problem of development induced displacement figures up behind the much publicized, hyped, people's friendly and poverty eliminating mega development projects which are considered as the product of a high degree of the scientific advancement and hallmark of excellence. Government apathetic attitude towards the whole issue can be smelled in terms of the state of policy on resettlement and rehabilitation in India. Since more than 3-4 decades, we are not able to finalize a concrete and water-tight resettlement and rehabilitation policy in India. Whatever policies we formulate, that remains piecemeal and project specific and thereby provides greater space for discrimination and exclusion in the society. Most importantly, developing country like India whose existence and survival is completely based on scientific advancement and subsequent construction of development project further accelerate the pace of development by construction of many more development projects and thereby would accelerate the pace of involuntary displacement in future due to unavailability of barren land. It is high

time and we need to rethink and re-plan our scientific development paradigm by making it more people's friendly. Only then, the goals of sustainable development-socially, ecologically and environmentally accountable and inclusive of common man can be attained and its fruits can be realized in a homogeneous manner.

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Inclusive Innovation in Health in India: A Historical and Contemporary Perspective

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Abstract—*India is one of the pioneering countries in the developing world that explicitly recognized the key role of science and technology in addressing problems of growth and development. Moreover, India has built a national inclusive innovation system which is identified with the welfare of the poor, marginalized and excluded groups as a channel for growth but as there is abject poverty and growing inequality at different levels it can be inferred that the resultant growth has not been inclusive. The inability of development efforts so far to reduce inequality and the perception that the rapid pace of technological change is fostering inequality rather than helping to reduce it have spurred a renewed concern around how knowledge and innovation can be related to development and, in particular, to—development as freedom as perceived by Amartya Sen. Against this background and with a heightened concern for development articulated in the recent Five Year Plans, the Science Technology and Innovation Policy (STIP) 2013 presents a new paradigm highlighting the role of innovation in fostering inclusive development/growth which implies " ensuring access, availability and affordability of solutions to as large a population as possible. But the paradox of this that the STI policies remain relatively isolated from social policies. This lead us to question the very foundation of knowledge and innovation initiatives targeted to empower poor people and to reduce inequality? In order to achieve inclusive development, apart from evolving an inclusive innovation system there is also a need to locate and address the varied types of exclusion that have emerged over time. This is all the more important when there is hardly any consensus on the credibility of the widely used indicators of poverty and inequality. The present paper tries to trace the development of inclusive innovation led health care models and mechanisms over the years and show how there has been a great need to make it aam adami centric (people centric approach) to deal with varied forms of exclusionary tendencies prevalent in the society.*

Key Words: *Community Healthcare Model Innovation, Innovation Process, Social Exclusion and Inclusion*

INTRODUCTION

Innovation is recognized as a critical driver of economic growth but its contribution to social inclusiveness can be successful only if it reaches a larger segment of the poor, marginalised and excluded groups. It is said that while growth dynamics have lifted many people out of poverty, they have not eliminated poverty and exclusion which continue to affect millions of people. Inclusive innovation has, therefore,

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become an imperative for countries' socio-economic development, especially in emerging and developing economies. According to World Bank (2014) report, in 2010, an estimated 4.3 billion (i.e. 62 percent world population) people lived on less than 1 USD per day. India is one of the pioneering countries in the developing world that explicitly recognized the key role of science and technology in addressing problems of growth and development. Science and Technology have always been an integral part of Indian culture. Natural philosophy, as it was termed in those ancient times, was pursued vigorously at institutions of higher learning. The Indian Renaissance, which coincided with our independence struggle, at the dawn of 1900s witnessed great stride made by Indian scientists. Jawaharlal Nehru, one of the prime architects of modern India, while addressing the Indian Science and Congress in 1938 stated that, science alone could solve the problems like poverty, insanitation and illiteracy, superstition and deadening custom and tradition our country faced. This got translated into an institutionalised effort by the Indian government after independence in 1947reflecting a strong state support for it. And since then the Government of India by establishing the Department of Science and Technology has been playing a pivotal role in promotion of science and technology in the country.

PARADIGMS AND PERSPECTIVES: A HISTORICAL PROFILE

India recognizing the importance of key role of science in enhancing the growth and development of society and generating access to new and improved goods and services has been quite committed. It is true that science strengthens advanced initiatives but beyond the domain of science, innovations play a crucial role in augmenting delivery of services and enabling its access. Against this backdrop let us discuss about the shifts in science and technology paradigms and perspectives over the years. The Scientific Policy Resolution of 1958 and the Technology Policy Statement of 1983 enunciated the principles on which the growth of science and technology in India has been based over the past several decades. These policies have emphasized self-reliance as also sustainable and equitable development. They embody a vision and strategy that are applicable today, and would continue to inspire us in our endeavors. The science and technology paradigm for India was laid down by the Science Policy Resolution (SPR) passed by Indian Parliament in 1958 which underlined the need to pursue self-reliance in technology. It aimed to 'foster, promote and sustain by all appropriate means the cultivation of science and scientific research in all its aspects' pure applied and educational areas. (GOI, 1958). Further the need to achieve self reliance was reinforced when the first comprehensive science and technology plan (1974-79) was formulated with the Fifth Five Year Plan. The agenda of self reliance was taken forward with Science Policy Statement of 1983 and subsequently by the Science and Technology Policy of 2003. The former aimed at achieving technology competence and self reliance whereas the latter emphasized the need for investment in research and development (R & D) and integrating programmes of the economic and social sectors with national R & D which involves building a national innovation system.

Going further in the recent years Science Technology and Innovation Policy (STIP) 2013 states that "Science and Technology and innovation for the people" is the new paradigm of the Indian science and technology innovation (STI) enterprise (GOI, 2013). The new policy is stimulant in its call to integrate the process of innovation with science and technology, and make new innovations inclusive as a means of fostering inclusive growth.

The policy calls for a framework to enable the integration of innovation with science and technology in identified priority areas. It also states that " new structural mechanisms and models are needed to address the pressing challenges of energy and environment, food and nutrition, water and sanitation, habitat affordable healthcare and skill building and unemployment"(1:3) The policy recognizes that innovation for inclusive growth implies "ensuring access, availability and affordability of solutions to as large a population as possible". (1: 3)

CONCEPTUAL ANALYSIS OF INNOVATION AND INCLUSION

Before dealing with the process of innovation and inclusion over the years it is necessary to familiarize with these terms. The concept of social innovation is not new, but has recently become a priority in the EU policy arena. Social innovation is a major concern within the Europe 2020 Strategy, although there is not a common EU definition yet. Broadly speaking, social innovation can be defined as "new ideas that work in meeting social goals" (Mulgan 2007).

According to the Bureau of European Policy Advisers "innovation refers to the capacity to create and implement novel ideas […] proven to deliver value", whereas "social refers to the kind of value that innovation is expected to deliver: a value that is less concerned with profit and more with issues such as quality of life, solidarity and well-being". (BEPA 2010) In the social service sector, it is social innovation means new practices, policies or processes to meet social needs and address societal challenges by improving the delivery, availability, quality and effectiveness of an existing service to create a new service to better meet users' needs (EU, 2010).

Social innovation involves various actors determining its development and social outcomes. Innovative social services can emerge at different levels of service provision and be represented by a new product (i.e. a new service) or by a new process (i.e. a new form of service delivery or a new form of service evaluation). In other words they are innovations that are both good for society and enhance society's capacity to act. (EU, 2010). Innovation requires openness to new ideas and instruments. If we combine both the words inclusion and innovation it implies creating new technologies, systems and approaches crucial to development for all.

India has developed a national innovation system as a way for growth but as there is abject poverty and growing inequality at different levels it can be inferred that the resultant growth has not been inclusive. India marked with disparities

among different geographical regions, between social groups, among different income levels and between the sexes has great social and economic inequalities. The Indian 'middle class' is rapidly growing but over a third of the population live on less than US$1 a day, and around a third of the adult population (34.8%), including over 190 million Indian women remain illiterate (UNDP 2010).The complex and dynamic relationship between India's adaption to the new global environment and Indian population, its health, health systems and healthcare related industries is one which has been close scrutiny. In the 1990s, civil society organizations actively campaigned against the healthcare reforms of the structural adjustment policy and produced considerable writings on the negative impact of this process on health and health services in India. (Dilip 2005).

This leads us to discuss the purpose of health care organizations. To start the healthcare organizations serve six distinct purposes–treatment, diagnosis, prevention, education, research and outreach. In serving these purposes, healthcare organizations must effectively manage quality, costs, safety, efficiency and outcomes. At the very core of healthcare are the needs of patients and the healthcare practitioners and providers who deliver care. Quite often, healthcare organizations arrive at innovation by relying on new or existing information technology. Mostly healthcare innovation focuses on three areas a) how the patient is seen, b) how the patient is heard and c) how the patient's needs are met.

The last century has produced a proliferation of innovations in the health care industry aimed at enhancing life expectancy, quality of life, disgnostic and treatment options, as well as the efficiency and cost effectiveness of the healthcare system (Varkey and Bennet, 2005).

Here, it becomes imperative to discuss about the definitional aspect of health care innovation. Healthcare innovation can be defined as the introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention and research, and with the long term goals of improving quality, safety, outcomes, efficiency and costs. If this has been the innovation in the health sector, then what are the implications of particular healthcare innovations on treatment, diagnosis, prevention, education, research and outreach? What are the barriers to disseminating healthcare innovation? Who are the beneficiaries of these innovations? How far these innovations in the health sector are inclusive? These questions need to be examined very carefully.

Currently at 1.2 billion, India's population is the second largest in the world behind China and is likely to surpass China by 2025. With such a huge population to take care of, India's national healthcare has to be extensive and all-inclusive. Healthcare is one of India's largest sectors in terms of revenue and employment, and is expanding rapidly. The private sector accounts for more than 80% of total healthcare spending within India. (Prasad, 2007) The Indian healthcare system and policy development are unique particularly because of the extraordinary population size and the nature of national health concerns.

But the paradox of all is that the STI policies remain relatively isolated from social policies. A careful examination of the document reveals that it neither articulates an inclusive innovation system, indispensable for generating inclusive development, nor locates the varied spaces of exclusion that have emerged over time.

The return on investment in health sector has been fragmented so far and the participation of private parties in health sector is increasing in recent time. Public spending on health is merely a small percentage of GDP and private investment is limited to some portion of avenues. Still there exists a lot of scope and potential for investment avenues in the sector including health infrastructure, health care industry, health insurance and health education. The need of the time is to identify the synergy of divergence among various health investment avenues so that the returns are percolated down to the masses for inclusive growth and development. That each one in the society is ensured inclusion. Now let us understand what does Inclusion mean? Inclusion is the process of ensuring that all are able to participate fully Inclusion is a development issue. The process of inclusion is not just about improving access to services, but also supporting people–including those who are discriminated against and marginalised–to engage in wider processes to ensure that their rights and needs are recognised. For achieving the inclusive development goal-human development is one of the key determinants. The Eleventh Five Year Plan (2007–12) and the Twelfth Plan (2012–17) lay great emphasis on inclusive, faster and sustainable growth which is possible provided the human development indicators grow. Among various measures of human development-health is one of the major indicators which determine the human development of a country.

In terms of various health indicators, India has improved significantly over the years. The crude birth rate per thousand of population has moved down to 22.1 in 2010 from 33.9 in the year 181. Similarly there has been gradual improvement in CDR (Crude Death Rate), TFR (Total Fertility Rate), MMR (Maternal Mortality Rate), IMR (Infant Mortality Rate) and Life Expectancy at birth during the period (GOI 2011–12) but there exists inequity in healthcare access.

It has been widely recognized that the advancement of science and technology is the only way to ensure that masses, majority of which are extremely deprived, under nourished, under-employed and get their due share in national economic growth and development. Growth and sustainability of growth are the two key words which have been in focus for all countries in the world trying to bring continuous improvements in the society for quite some time and *'all inclusive growth*' has been recognized as the most essential requirement for growth. Creating innovations, nurturing them and managing the benefits of innovations for societal growth are the main subjects talked about by policy makers across the continents.

Inclusive development is a key priority for governments in emerging and developing countries. In these countries, the growth process has often not helped

lower-income groups, in relative and sometimes in absolute terms: a majority of the world poor now live in middle income countries. Because innovation matters for growth, it is increasingly prominent on government agendas. The relationship between innovation and inequalities in income and opportunities raises some important policy questions: Do innovation and the resulting technological change necessarily lead to increased inequalities? Do policies aimed at supporting innovation foster inequalities in revenues, rewarding only the best trained and most skilled with access to resources? To what extent can innovation be mobilised to improve the life conditions of the lower income groups ("inclusive innovation")? What can policy do to make this happen?

In order to achieve inclusive development, apart from evolving an inclusive innovation system there is also a need to locate and address the varied types of exclusion that have emerged over time. This is all the more important when there is hardly any consensus on the credibility of the widely used indicators of poverty and inequality.

The inability of development efforts so far to reduce inequality and the perception that the rapid pace of technological change is fostering inequality rather than helping to reduce it have spurred a renewed concern around how knowledge and innovation can be related to development and, in particular, to *development as freedom* as perceived by Amartya Sen.

In order to achieve inclusive development there is a need to locate and address the varied types of exclusion that have emerged over time. This is all the more important when there is hardly any consensus on the credibility of the widely used indicators of poverty and inequality. Here we can analyse and how Amartya Sen's classification of social exclusion be helpful.(EU 2010) Sen considers four types of situations of social exclusion (i) constitutive exclusion occurs when being excluded is in itself a deprivation of intrinsic importance (ii)instrumental exclusion refers to casually significant exclusions that may not be impoverishing by themselves, but can lead to impoverishment of human life through consequences of great instrumental importance iii) active exclusion takes place exclusions come about through policies directly aimed at that result iv) passive exclusion is the result of policies that have not been devised to bring about that result but yet have consequences.

If it is viewed in terms of nature of outcome we could also have sustained exclusion versus transient exclusion. Very often, unbalanced development strategies (Krishnan, 1999) involve a degree of exclusion of some sectors for a temporary period. This may be termed as transient exclusion. On the contrary if the excluded remain excluded on sustained basis or for longer periods we have cases of sustained exclusion which is socially more oppressive. Even inclusion not properly done comes up with terrible outcome. There have been also cases of subordinated inclusion and illusive inclusion depending on how the inclusion takes place and how

the returns of inclusion are distributed. Subordinated inclusion occurs when inclusion takes place in such a way that its gains are not equally distributed. Illusive inclusion occurs when inclusion is ensured but the outcome is not different from that of being excluded. To the extent that these included hardly derive any benefits, inclusion is illusive. (Sen, 2002).

Moving ahead to development we find that the rapid pace of development in India has also resulted in a change in the kind and magnitude of diseases and health care needs. Heavy urbanisation and modernization has altered lifestyles of people while technology has opened up a number of innovative cost effective treatments, transforming the way health care is delivered.

INNOVATIVE HEALTH MODELS IN INDIA

In the last few years India has been making considerable progress, with several examples of innovative pilot programs and initiatives operating in the public and private sector with the most noteworthy government-led initiative being the National Rural Health Mission (NRHM) which was established in 2005. This initiative has signaled the repositioning and rejuvenation of the public health system and in doing so has placed the health needs of the disadvantaged and health equity firmly on the agenda again. (NRHM, & Gill, 2009) However, it remains to be seen whether the NRHM, and other initiatives will live up to their claims and overcome the challenges to achieving equity in health care (NRHM & (Bajpai, Ravindra and Dholakia, 2009).

A number of innovative health models in India have been developed that work towards the community health development. To discuss about a few, Sugha Vazhu Health Care (IKPTrust) was established in Tamilnadu with a broad vision to make Disease *free villages.* IKP trust mission is to enable the use of advanced scientific knowledge for the society. It follows a preventive and curative approach. It seeks to bridge the gap between private health care which remains inaccessible to large sections of the society primarily due to affordability and lack of poor infra-structure and public health care which is woefully inadequate.

Healing Fields Foundation founded in 2002 focusing on access and affordability to quality health care, encompassing community health education, health savings, e-learning, research, mobile technology and consultancy, has created innovative ways of addressing community health needs based on Self Help Group (SHG) model. It has been successful in Community mobilization through a series of awareness programs like sanitation, toilets, etc in villages.

Apollo Clinics initiatives to bring health care of international standards within the reach of every individual has brought such 60 operational clinics all over the country. It is an integrated model which offers specialists consultations, diagnostics, preventive health checks and 24 hours pharmacy all under one roof.

Arogya Parivar set up by Novartis as rural health care initiative and to promote health care access for the under privileged millions at the bottom- of- the- pyramid all over the country is based on the o4 As awareness, availability, affordability adaptability. Arogya Parivar has enhanced access to medicines for almost 50 million in India in 10 states covering 30,000 plus villages with 111 health programmes like, tuberculosis, skin and gynaecological infections, diabetes, micro nutrients during pregnancy and childhood, intestinal worms, acid flux, cough and cold allergies. It is expected to cover more people within its ambit.

Vatsalaya, 2013 India's first hospital chain works in Karnataka and Andhra Pradesh and aims to provide low-cost primary and secondary health care to semi-urban and rural India to people at the bottom of the pyramid. Its impact has been great because of its increased accessible and affordable nature through appropriate health care services.

Apart from overall health care centers specialized health care innovative centres in India have also been initiated. To name a few of them,

Akhand Jyoti Eye Care in Bihar which aims to make the State blind free by eradicating curable blindness and provides affordable, accessible, sustainable, quality curative and preventive eye care services to the rural masses by utilising local resources and local people.

Thyrocare started in 1996 by Thyrocare Technologies Limited spread all over the country aims to bring preventive diagnostic services to all Indians at a price they can afford and with quality they can trust. It also caters to critical diagnostic services related to growth metabolism, cancer, infectious diseases and infertility among others.

Dr. Mohan Diabetes Specialities Centre founded in 1991in the states of Andhra Pradesh, Kerala, Karnataka and Tamilnadu aims to provide high quality, affordable health care to diabetes patients across country and other parts of the world, as well as be a centre of knowledge dissemination and training to improve the state of diabetes care and spread awareness under one roof.

Aravind Eye Care started in southern India because of being largest and most productive eye care facility in the world is known as "*Macdonald's of Eye Care"*. Its vision is to eliminate needless blindness. It has pioneered ways to reach the poor and the rural blind, providing care free charge to patients unable to pay for care.

All these have been possible with distinct focus on research and design which ultimately resulted innovative products and technology. While some designs are technologically advanced with high capital requirements, others are quite simple and focused on rural issues and problems.

Lets us begin with Jaipur Foot an innovative prosthesis started in 1968 and is known globally provides cost effective prosthesis option to people suffering from

the loco motor disabilities. It has got a patient centric approach starting from procedures of client admission, treatment, prosthetic fitting to providing lodging and boarding facilities till the time they are given prosthetic limbs, callipers and other aids.

AYZH with clean birth Kit targets is committed to save and change lives, one product at a time, making one happy woman at a time, all over the country. Most remarkable part is that AYZH products are assembled and packaged by local women, creating economic opportunity in the community it serves. It is working hard to become self-sustainable. Strong rural penetration and deeper NGO partnerships are helpful.

Biosense visions for non-invasive anemia detection made accessible for all. It has been found that a large population of women is anaemic and due to inaccessibility and lack of roads, it has been impossible for them to travel to the Primary Health centres to get their blood samples tested. Furthermore, some do not even realize that they were anaemic and do not feel sick enough to justify the trip. This poses a huge danger to these women and is life threatening especially at the time of pregnancy.

Embrace visions to advance maternal and child health by delivering innovative solutions to the world's most vulnerable population. It is provided all over the country. According to WHO estimates nearly two million babies are born low weight and pre-mature each year and as many as 450 die every hour, mostly in developing countries due to inaccessibility to innovations in modern medicines.

Jeevan Blood Bank started in 1995 in Tamilnadu aimed to make safe blood and blood components available to all in need. This system depends upon cost recovery process from patients who can afford and those who cannot afford (children with cancer, thalassemia patients with renal renal failure and dialysis) get the blood component free of cost.

The poor often go into debt because of health care expenses. Further, the Yeshasvini Rural Health Insurance Scheme promoted by the Narayana, Hrudayalaya Hospital aims to initiate a medical revolution in India by bringing high quality coronary care and general primary health care services at affordable rates to the rural poor. The operational structure is part of a broader pattern of public private partnerships (PPPs) where the private sector provides expertise and executes the project and the government provides the financing as well as enabling conditions and incentives to achieve the social goals.

More interesting part of the innovation in science and technology could be seen how health services and telecommunications interface with each other. We find a number of tele medicines and mobile health clinics coming up in field of health care services.

Telemedicine and Mobile Health Clinics present an innovative and scalable solution to India's rural health care challenge. More than just a helpline, telemedicine provides the technology infrastructure to deliver consultancy, diagnostic services and treatment guidelines through internet and telephone connections from urban centres to remote rural villages. Its uses allows for better primary care training for primary health care workers in rural areas.

Health Point Services India(HSI) started in Punjab combining innovations in telemedicine, advanced diagnostic tools, licensed doctors, water treatment and low cost medications, brings affordable care to thousands of patients underserved by traditional health care infra structure. The HSI electronic health records provide detailed knowledge of the health profile of the community and also have a real time disease surveillance capability alerting local and State health officials on new disease outbreaks if and when the need arises.

Ambulance Service-Ziqitza Health Care Limited was launched in Mumbai in 2002 but spread to Bihar, Punjab and Rajasthan. It started the Dial 1298 for ambulance program to provide reliable high quality emergency ambulances in India.

Apart all these business models there have also been other sustainable approaches for effective health care delivery and high social impact such as e-Mamta initiative of the government of Gujarat, Muskan Ek Abhiyan-The Smile Campaign initiative by National Rural Health Mission in Bihar.

But despite the above innovative measures for the common people especially people on the margins and for whom accessibility, affordability and availability of health services is beyond reach the situation does not appear to be improving much.

India's health system faces the ongoing challenge of responding to the needs of the most disadvantaged members of Indian society. Despite progress in improving access to health care, inequalities by socioeconomic status, geography and gender continue to persist. This is compounded by high out-of-pocket expenditures, with the rising financial burden of health care falling overwhelming on private households, which account for more than three-quarter of health spending in India. Health expenditures are responsible for more than half of Indian households falling into poverty; the impact of this has been increasing pushing around 39 million Indians into poverty each year. In this paper, we identify key challenges to equity in service delivery, and equity in financing and financial risk protection in India. These include imbalanced resource allocation, limited physical access to quality health services and inadequate human resources for health; high out-of-pocket health expenditures, health spending inflation, and behavioural factors that affect the demand for appropriate health care

Equity in health and equity in health care have been a longstanding guiding principles, with commitment to the serving the needs of the poor and underprivileged being central to health policy documents. The 'Health Survey and Development Committee Report' of 1946 led by Sir Joseph Bhore set out a detailed vision and plan for providing universal coverage to the population through a

government-led health service (Bhore & Bannerjee, 1946) Since then, health policies and priorities have been outlined in the Five Year Plans, developed as a part of India's centralized planning and development strategy. The first official National Health Policy, put forward in 1983, reiterated the need for universal comprehensive care.(GOI, 1983) Influenced by the Alma Ata declaration, the policy emphasized the primary health care approach, in addition to recommending decentralization of the health system, improved community participation, and expansion of the private sector to reduce the burden on the public sector. While the next National Health Policy of 2002 continued to champion India's vision, this was to be carried out on the 'basis of realistic considerations of capacity' (GOI, 2002). More recently in 2009, the Government of India drafted a National Health Bill proposing the legal framework to recognize the 'right to health and 'right to health care' with a stated recognition to address the underlying social determinants of health. (GOI, 2009) However, implementing policy commitments to equity in health care remains a challenge given India's institutional and implementation capabilities (Pritchett, 2009) even though this is a challenge facing the global health community, and not unique to India. (Gwatkin, 2000) The 11th Five Year Plan, and the NRHM both emphasize the foundation of primary care, and further promote a holistic approach to inter-sectoral responses to complement this.

We find varied patterns of communicable disease slike dengue, chikungunya HIV-TB co-infection Japanese encephalitis and Novel H1N1 infections etc. showing its increasing trends (Table 1) The magnitude of these communicable diseases have been heavily coming on human lives (Table 2) causing deaths in huge numbers. (Table 3).

Table 1: Pattern of Communicable Diseases

Trends of Communicable Diseases in India	
Diseases showing increasing trends	Diseases showing decreasing trends
Dengue, chikungunya	Poliomyelitis
HIV-TB co-infection	Tuberculosis
Cholera O139	Neonatal tetanus
Japanese encephalitis	Measles
Leptospirosis	HIV/AIDS
Novel H1N1 infections	
Eradicated: smallpox, guinea worm	
Eliminated: yaws, leprosy	

Source: Ministry of Health and Family Welfare, 2010, (http://mohfw.nic.in/index.php)

Table 2: Burden of Communicable Diseases

Communicable Diseases	Magnitude of the Burden
TB	283 cases per lakh population in 2007
HIV	2.27 million HIV-positive persons in 2008
Malaria	2 million deaths per year
Leprosy	130,000 affected people

Source: Ministry of Health and Family Welfare, 2010, (http://mohfw.nic.in/index.php

Table 3: Causes of Death

Causes of Death	Overall	Rural Areas
Communicable diseases, maternal, peri-natal and nutritional	38%	41%
Non-communicable diseases	42%	40%
Injuries	10%	10%
Ill-defined causes	10%	9%

Source: Ministry of Health and Family Welfare, 2010, (http://mohfw.nic.in/index.php)

As a result India is rated quite badly on the basic health care indicators when benchmarked not just against the developed countries but also against the BRIC nations. The IMR is for example is not just more than seven times that of the US but also thrice that of Brazil or china according to WHO health care Report 2012. A significant number of people in India, especially those living in rural parts or are poor do not have access to health infra structure or trained health professionals. It is estimated that India has an average of 0.6 doctors for every 1000 people compared to the global average of 1.23. (CII & Technopack Advisors Ltd 2011) And this happens because exclusion is practiced worldwide mostly on the lines of gender, caste, religion, ethnicity, color, race, nationality, and others. The implication of social exclusion is such that it starts a process which involves denial of rights and opportunities which the majority enjoy, resulting in the inability of individuals from excluded groups to participate in the basic political, economic and social functioning of the society, thereby causing high human poverty and deprivation among them (Thorat, 2009) This lack of access to resources and consequent inability to utilize them is further accentuated by denial of opportunities which enhance access to resources and their utilization. It can be experienced by anyone who is vulnerable to such hindering conditions.

Similarly, there are marked variations in general hospitalization rates by gender, wealth, and urban-rural residence. (NSSO 2006) Some of this variation may be due to differences in actual and perceived need and health seeking behavior; indeed, there is evidence of gender inequalities in untreated morbidity with the likely underreporting of illness among women. (Sen, Iyer & Geroge, 2002)

Utilization of preventive services such as antenatal care and immunizations remains suboptimal, with marked variation in the utilization of these services by gender, socioeconomic status, and geography. In 2005–6, the national immunization coverage was 44%. Inequalities in immunization exist by household wealth and education, with absolute and relative inequalities showing signs of reduction over time Inequalities exist by caste: in 2005–6, immunization coverage among scheduled tribes and scheduled castes was 31.3% and 39.7% respectively compared to 53.8% among other castes with absolute inequalities between these castes increasing over time. Coverage remains higher in urban areas (58%) compared to rural areas (39%), although absolute and relative urban-rural differences have decreased over time. Over time, the absolute gender gap has increased with an

absolute 2.6% gender gap in 1992–3 increasing to 3.8% gender gap in 2005–6. Inequalities by wealth, education and urban-rural residence however persist, even though absolute and relative inequalities have decreased over time.

There are certain sections of the society like dalits and tribes who have least access to quality health services and therefore, they are the worst victims of India's pitiable health performance, costly medicines, and non-availability of quality service at government hospitals, market-driven privatization of health sector. The concept of social exclusion and social determinants in health would be useful to analyse the health deficit to the marginalized communities of India.

There have been cases of denial of admission in the primary health centre through discriminatory access to primary health centers and denial of visiting to dalits home, denial of giving information about health facilities, lack of care leading to requirement of private medical attention and loss of income, delay in complication delivery leading to private medical attention (Thorat & Sadhana, 2010)

As the saying goes "Health is Wealth" and rightly so as ill health may lead to loss of income especially to poor families living on daily income. The WHO has defined health as 'a state of complete physical, mental, and social well being and not merely absence of disease or infirmity'. This definition was accepted in the Alma Ata Declaration of Health by the 31st World Health Assembly in 1978, according to which primary healthcare is a key to attaining 'Health for all by 2000'.

Has that happened for all people? What about the people on the margins? What is their health status in comparison to mainstream people? Do people on the margins have equal access to the healthcare facilities mainstream people? This lead us to question the very foundation of knowledge and innovation initiatives targeted to empower poor people and to reduce inequality?

The discrimination is broadly in the areas of service providers which include doctor, lab technician, pharmacist, and grassroots level health workers such as Auxiliary Nurse Midwife (ANM)/ Village Health Worker (VHW)/ Lady Health Visitor (LHV) and Anganwadi worker (AWW). And the outcome is high mortality rates, child morbidity and treatment, in access to health facilities for dalit children suffering from fever & diarrhoea, less awareness level of treatment across social groups.

Awareness level across social groups about treatment that deaths from diarrhoea are most often caused by dehydration due to loss of water and electrolytes is low. Nearly all dehydration related deaths can be prevented by prompt administration of rehydration solutions. Because deaths from diarrhoea are significant proportions of child deaths, the Government of India has launched the Oral Rehydration Therapy (ORT) Programme as one of its priority activities for child survival. One major goal of this programme is to increase awareness among mothers

and communities about the causes and treatment of diarrhoea but this is hardly taken care of by the service providers. The vaccination of children against 6 serious but preventable diseases (tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles) has been a cornerstone of child healthcare system in India. As part of the National Health Policy, the National Immunisation Programme has been implemented on a priority basis. The Expanded Programme on Immunisation (EPI) was initiated by the Government of India in 1978 with the objective of reducing morbidity, mortality and disabilities from 6 diseases by making free vaccination services easily available to all eligible children. The Universal Immunisation Programme (UPI) was introduced in 1985-86 with the objective to cover at least 85 per cent of all infants against the 6 vaccine-preventable diseases by 1990.

CONCLUSION

Health care is a key aspect of any developing nation and the need for quality, accessible and affordable health care is a necessity. Even though progress has been made, inequalities and exclusion continue to persist in access to services. There are differential trends in relative and absolute inequalities suggesting differential uptake and access to services by different groups and understanding these nuanced patterns has policy implications for better targeting services to vulnerable groups. Given the cost of treatment, disease burden, and the poor public health care facilities, the moral and ethical discussion on the "right to live" assumes a greater significance in India.

From the above discussion, it is obvious that investment in health is imperative in sectors such as, health infrastructure, health services and health peripherals. Unless infrastructure and health services and health peripherals converges with each other towards inclusionary approach no innovative measures can ever succeed. The challenge of *how to prioritize and implement pro inclusive or equity health policies* when resources are limited requires a deliberative approach.

Apart from this with slogan *health for all* along with its innovative and inclusionary goal can be successful only when various health wings are working in synchronization with each other leading to a holistic strategy for reducing cost, affordable pricing, equitable delivery of services, sound information network, quality and standard practices. Health being a concurrent subject requires more investment friendly climate, entrepreneurial spirit and political will both by the state and central government. The investment in health sector made by government, private sector, foreign parties, community, market, consumers, insurance companies, venture capital firms, other entrepreneurs and public at large will have to be converged somewhere so that the returns may be distributed to a vast bottom of the pyramid ensuring inclusive development failing to which innovation for inclusion be just a rhetoric.

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Grants-In-Aid Devolution Criteria: A Vital Need to be More Inclusive

Asha Srivastava[1]

Abstract—*On the issue of transfer of resources through FC, there are differences of opinion on whether the Constitutional mandate of FC would be violated while deciding the principles of vertical and horizontal transfers. Here, in this paper, special attention has been paid to the devolution criteria of Grants-in-Aid (GIA) through FCs. The major normative concerns of policy making is equalization. In the case of recommendations of successive FC it has been observed that greater weight is assigned to redistributive factors in the formula for transfer to the States while the Twelfth FC slightly reversed this trend by increasing the weight attached to income neutral factors such as area and population and decreased the weight for redistributive factors. Only just fourteenth FC has made a benchmark restructuring in devolution criterion by increasing the share of states in divisible pool to 42 percent which was 32 percent during thirteenth FC. It has included two new variables 2011 population and forest cover while excluded fiscal disciple variable. Despite several achievements on Centre-State financial relations, the fiscal transfers in India require further reforms concerning both its vertical and horizontal dimensions. These concerns revolve around some main methodological issues for consideration such as stability in vertical transfers, measurement of fiscal capacity, determination of relative weights of sharing criteria, composition of transfers, growing centralization of expenditure on state subjects, gap filling approach to determine transfers, etc. For policy angle there is a need to address the institutional space provided by the federal democratic structures within permanent rule set by the Constitution which in turn is responded to the political implications. If grants were to incentivize greater clearness and accountability in public spending, then they would improve the effectiveness of public expenditure and targeting of public goods.*

Key Words: *Federal Structure, Inclusion, Finance Commission, Maximum Social Welfare, Grants in-Aid*

INTRODUCTION

Welfare is a form of social protection and inclusion for which fiscal policies come forward to help overcome the adverse situation that affects needy individuals. The ultimate goal of social welfare is to lift welfare recipients out of poverty and make them self-sufficient. Finance Commission`s (FC) central policy goals highlights competition between the States and impose rule based constraints on the policy flexibility of the States. The real challenge is to address the intra-regional horizontal

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and vertical disparities from Panchayati Raj Institutions to Centre. In the last decade, the problem of disparity between different regions of the country and different regions of the state has become economically and politically important. This situation occurred due to contradiction in Centre-State relations.

Fiscal imbalances are inherent feature of all federations. India being a federal country also faces this problem. Decisions are taken by both the layers of the government and the decisions affect the same people. Federal government faces the responsibility to see that the marginal sacrifice of the sum total of federal and state taxation for each individual is equal. When more public expenditure funds are utilized on poor States the benefits are maximized. R.N. Bhargava was of the view that federal scheme of expenditure are complementary and supplementary to each other. Fiscal imbalance is common to both developed and developing countries. In order to remove or minimize fiscal imbalances, fiscal adjustment is necessary. Fiscal adjustment is made through the process of resource transfer from the Central Government to the State Government. Mrs. U.K. Hicks observed that there is built in imbalance between the resources and needs in all the federations.

A.R. Prest also held the same view regarding fiscal imbalance. May observed that, "even if there is an initial balance, changes in the economic conditions and new demands for public services would be bound to upset the balance." Both the vertical and horizontal imbalances exist in the economy. G.F. Break called these imbalances as the 'fundamental gap' between the functions and resources of the respective government. In the federal structure of the economy, the functions and resources of the Central Government and the State Government are not uniformly distributed hence fiscal imbalances are common and natural. Oates observed that the optimal degree of fiscal decentralization will vary substantially among different societies. The important feature of any federation is that the Central and regional government should, as far as possible, be independent of each other in their respective constitutionally demarcated spheres of action but at the same time they should be strongly related for the development of the country.

All the countries having federal form of government face the problem of fiscal imbalance. The experiences of older federations also show the same result as the new federations face. In a federal system, the general government serves as the agent of the member units with taking major taxing and spending powers with them. Horizontal and vertical imbalances are the common and natural feature of federations. Countries having federal form of government do not treat the peripheries in uniform manner. They often offer flexibility in accommodating the special needs or demands of constituent units. This takes the federal government in treating some members as less equal than others. From the constitution itself a number of problems arise relating the Union-State relationships. There is no unanimity among the States on many issues and hence the dispute of allocation of resources arises. Issues related to devolution are (a) The volume of support to local bodies and the parameters that

should be used for deciding interstate allocations; (b) the basis on which grants are distributed between rural and urban areas; (c) whether local bodies can be provided a share of the divisible pool instead of a grant; (d) possibilities for using a devolution index; (e) how to prevent delays in transmission of funds to local bodies and (f) whether the use of conditional ties is advantageous.(fincom.nic.in)

GIA DEVOLUTION AND INCLUSION

Inclusive growth is the foundation of India's development project. India's recent economic growth performance has, indeed, been commendable. Nevertheless, such growth must make a verifiable difference to the lives of the poorest and most vulnerable citizens. This is the global Millennium Development Goals (MDGs), and our country also holds this objective India has the potential and the resources to secure such a bright future for its citizens. The pressure laid on inclusive growth in the Eleventh Plan has intended that such growth has been accompanied by a intensive effort, by all levels of government, to invest in the delivery of public services, mainly those which promote progress in achievement of the MDGs. But, to achieve this potential, it is necessary that resources be mobilized and deployed in such a manner that the recent high rates of growth are maintained and even increased. Thus, sustainable and inclusive growth is fundamental for achieving the MDG. Inclusivity includes every sphere of development for all. Inclusivity is justified, not merely to ensure equal treatment of citizens by governments, but also for long term economic efficiency reasons, so as to lessen the burden of fiscally-induced movement on high-income states.

The process of nurturing inclusion is incremental. It requires time and unwavering pledge. Still, the benefits of persistently ruthless for inclusion are at once striking and numerous. Solving the problem of social exclusion is urgent. Tensions are rising around the world, due to demographic shifts, migration, food price shocks, and economic volatility.

The focal point of Øyen, e. 1997 is the first is a broad sweep to guide policy makers. It states that social inclusion is-

"The process of improving the terms for individuals and groups to take part in society"[1]

A second, sharper definition takes into account how the terms of social inclusion can be improved and for whom. It articulates social inclusion as

"The process of improving the ability, opportunity, and dignity of people, disadvantaged on the basis of their identity, to take part in society".

The aim of any government lies in fact of providing maximum social advantage to all irrespective of their residing place and accept the path of social welfare. According to Amartya Sen, " welfare provides individuals with the basic needs necessary to live a

healthy life with the capability to enjoy the freedom that are inherently available to all and this is the aim of resource transfers". The importance of welfare for under-privileged individuals is felt who need governmental assistance in the form of welfare. A welfare state is a concept of government in which the state plays a key role in the protection and promotion of the economic and social well-being of its citizens. The generation of resources and its distribution among the units are equally important. Due to unequal distribution, economic development among different parts and different people exists across the states. Hence the GIA devolution should be made more inclusive in order to provide maximum social welfare. 14th FC increased the share of states in divisible pool to 42 per cent which is a very appreciable step from state's side.

NEED OF RESOURCE TRANSFER

The Indian constitution favors central government by placing more productive and elastic resources at the Centre on efficiency and equity considerations. The unimportant and low yielding resources are assigned to States while expensive and expansive functions are entrusted to States because they are more capable to meet the local needs and preferences. The main cause of vertical imbalance may be either due to imbalances in the division of functions and tax powers between the two tiers of government or due to overlapping of powers. In India no overlapping of tax powers exists as no tax powers is mentioned in concurrent list. Thus vertical imbalance is purely due to constitutional powers and functions. The main reason behind horizontal imbalance is wide disparities in the geographical nature of terrain in Indian federation. This disparity is focused through economic development of States which is explained by difference in per capita state domestic product. To eliminate the imbalances and to ensure minimum service standards in the States federal fiscal transfers are essential and it is also a constitutional part.

In order to remove the financial imbalance, federal resource transfers are inevitable part of Indian federation. Resources are transferred to States through FC, Planning Commission and other Central government ministries. Indian Constitution according to Article-280A contains a novel provision for the appointment of FC after every five years under the supervision of Chairman. The Committee suggested that 'FC' should be set up to deal with the matters relating to the division of resources between the Union and the States. Planning Commission is a permanent body that transfers resources.

Seligman emphasized that the division of resources should be based upon the principles of efficiency, suitability and adequacy. But Gyan Chand was not satisfied by these factors of Resources allocation, thus he added integrity to the list as one of the essential requirements. Cooperation between Centre and the State Government is an essential feature for the success and development of any economy. On the

resource availability side we see that the resource entrusted to the Central Government have greater degree of elasticity and buoyancy than the resources entrusted to the States. The examples of such resources are income tax, custom duties and many others. The result of such distribution is that the Centre has normally more resources than its requirement. This uneven distribution of resources between the Centre and the States has resulted in an inherent imbalance in a federal set up, in favor of the federal government. Unless of course the basic principle of resource allocation (efficiency and uniformity) are not adhered to result in an efficient tax system with overlapping powers and so on. In this situation it is the duty of the Central Government to help the poor States of the country to forge ahead for which the Centre must act as a medium of transfer of resources from the Centre to the States and relatively better off States to the poorer ones. But this is not an easy task for the Centre because richer States may not agree voluntarily to transfer resources. Chart 1 shows the gross fiscal deficit of centre, states and combined. The fiscal condition was worst during 1999–2007 and it improved remarkably during 2007–09. In order to fill the gap between revenue and expenditure, transfer of resources is essential.

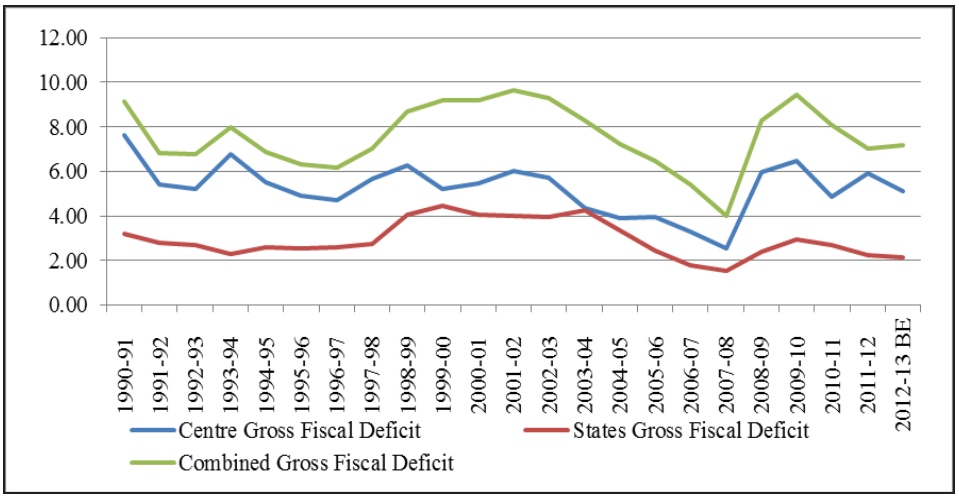

Fig. 1

Source: RBI

FISCAL DEFICIT IN CENTRE AND STATES

India being a federal form of government also faces the problems of transfer of resources and the provisions made in the Constitution. The aim of federal government is to maintain the basic structure of the Constitution and to tone the system of changing times. The federal government should promote a co-operative process of shared responsibilities. At this time India needs a revised fiscal policy to meet the revolutionary advancements in science and technology, increasing

population, rapid communication, changing attitudes and thinking and many other objects. At last the expectation of people from welfare State. Coordination between the Union and State Governments are the extremely important aim of federal government. In this changing context the resources and expenditures of Central and State Government is very important. In India the major resources are with Central Government while the expenditures of the States are increasing day-by-day. States have to depend on Centre to meet their requirements. The resources are transferred to States through various channels like Planning Commission (PC), FC and other Central Government transfers. By means of fiscal policies a government adjusts its level of spending to monitor and influence the economy of a country. When taxes are collected and expenditures are made by Central or State Government a fiscal policy becomes operative. There is need of transfer to correct the vertical fiscal imbalances (VFI) horizontal fiscal imbalances (SFI). Transfer of resources make a correction in the fiscal gap between the expenditure needs and revenue means of a state. The fiscal capacities of the States differ due to the difference between geographical and climatic conditions. The access to revenue base varies from region to region. Transfer of resources provide minimum standard of services and upgrades the level of services to ensure common minimum standard across regions. The older federal fiscal systems of Australia and Canada also follow the equalization principles though the definition and method of application is different. The resource transfers specially grant are the most practical way of correcting the inter-jurisdictional spillover effects. When the locally provided services spread to persons who are not legally required to contribute to costs of the services create spillover effects are possible only by grants. Though transfer of resources, centre may use the services of state governments to implement certain schemes of national importance. This can be very easily performed by means of grants.

Here in this paper special attention has been paid to inter-se allocation of GIA during successive FCs. Till now Fourteen FCs have been formed.

The seventh schedule of the Constitution specifies the legislative, executive and fiscal powers of the Centre and Union Governments. In 1992 the Seventy-third and Seventy-fourth Amendment created Eleventh and Twelfth schedule of the Constitution. The Eleventh schedule contained twenty-nine items for rural local bodies and the twelfth schedule contained eighteen items for urban local bodies. Their responsibility of devolution of functions was given to State Governments. The State also instituted a system of sharing their revenues and giving grants to urban and rural local bodies. A number of Central schemes are implemented by the local bodies and the funds regarding this purpose are passed to them either directly or through the State Governments. The State's share in expenditure on economic services is about two-thirds, on social services are 83 per cent and on administrative services is about 68 per cent. The State's role in providing public health, education and family welfare is about 90 per cent.

CONSTITUTIONAL PROVISIONS OF DETERMINING GRANTS

Article 280 of the Indian Constitution describes the appointment and the duties of the FC. Article 280(3) (b) of the Indian Constitution requires the Commission to make recommendations as to the principles which should govern GIA. Article 275(i) of the Constitution recommends the specific 'sums' to be paid to state which are assessed by the need of assistance of the states. Article 270 deals with percentage share. Need of the states mean assessment in relation to norms applied to both revenue effort and the desired level of service provisions The service provision in this context mean are limited to merit goods like education and health services provided by government, law and order situation in the state, general administration, etc. The goods and services which give maximum social advantage to the society can demand for grants. No private goods that are provided by state will be entitled for grant. Needs are not taken for any shortfall in revenue relative to expenditure and that can be met by increasing grants. In India the budgets of the Central and State Governments are divided into capital budget and revenue budget. The provision of revenue budget is made under Article 112 and that of capital budget is made under Article 202 of the Indian Constitution. The revenue budget is divided between plan budgets and non-plan budgets. The plan budgets are traditionally considered by Planning Commission while the non-plan budget is covered by the FC. It makes provision for plan and non-plan side of the budget. Uptill Eighth FC the constitutional position was not confirmed. The Governor of the Ninth FC in its term of reference asked for plan and non-plan sides of the revenue accounts should be considered together in assessing the receipts and expenditures of the Centre and the State or to assess the total revenue and total expenditures of the Central and State Governments. It does not make any distinction among the plan and non-plan receipt and expenditure of centre and state. This consideration of the Ninth FC in plan component of the revenue budget was a landmark from the past experiences. It can also be remarked as an encroachment in the field of Planning Commission. It was marked as the turning point in the controversial issue regarding role and authority of the FC versus Planning Commission. It has also put a question mark to Article 275 versus Article 282 of the Indian Constitution. Article 275 of the Constitution has become a controversial issue in this regard. The expenditure requirements accounts of States can also be taken of particular circumstances of a state that may result in higher per capita cost. By the experience of earlier FCs we can comment that the FCs are in favor of the Centre and States are not getting their due share. The Centre fixes the TOR to FC in its favor and the FC are bound to act accordingly. To come out with this problem there should be no binding to FC in form of TOR. The backward states need some grants for structural changes., But there is no mention of this type of grants in the TOR of Thirteenth FC. It shows that the backward States will not be able to get this type of grants, which they really need. The Thirteenth FC cannot take the benefit of the experiences of earlier FCs because it has to remain conscious while making its recommendations, the time of serious global economic recession, which has also affected the Indian economy and the fiscal situation of the government also.

DEVOLUTION THROUGH FCS

The FC recommends the principle of distribution of resources between the Centre and the States along with the proceeds of the taxes and their allocation among the States. The FC recommends on the basis of detailed assessment of the financial position of the Central and State Government. The FCs is provided with Terms of References by the Finance Ministry for allocation of resources. The FC transfers are made differently for two categories, General Category States and Special Category States. These transfers are made on different norms. But till now once during 1984-85 the recommendations of the Eighth FC, Centre did not accept the entire set of recommendations. Till now 14 FC have been formed and have worked independently. Some of them have been quite assertive. The FC of India is an unique organ of the Indian Constitution, having no parallel in any other federations.

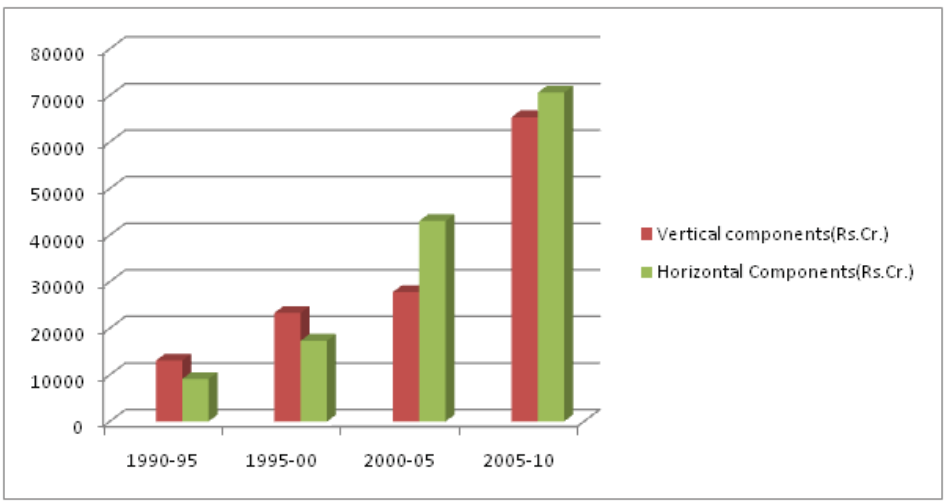

Fig. 2

Source: Source (Basic Data): TFC Report

FC TRANSFERS: VERTICAL AND HORIZONTAL COMPONENTS

Thus these trends as shown in Fig. 2 focus on existence of horizontal and vertical imbalance in Indian federation and force for resource transfer to states. In this environment, fully offsetting the fiscal deficit of poorer states would require massive transfers to be made to them in order to remove disabilities and significantly soften their budget constraints.

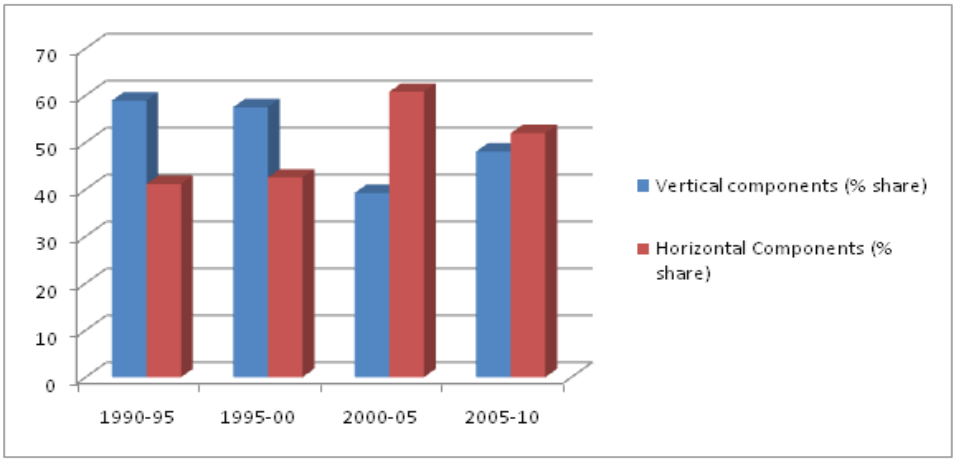

Fig. 3

Source: (Basic Data): TFC Report

PERCENTAGE SHARE OF VERTICAL AND HORIZONTAL COMPONENTS

In Indian context, multiple agencies are transferring and poorly designed transfer system has resulted in only a limited equalization device. In addition, regional policy of the centre and various sources of "invisible transfers" have led to a significant volume of inequitable resource flows. Given the large differences in fiscal capacities of the states and the failure of the transfer mechanism to offset the fiscal disabilities of poorer states, there are wide variations in the standards of infrastructure and services provided across states, depending on their fiscal capacity. This in turn has led to significant differences in the flow of private investments. The inability to offset the fiscal disabilities of the states has also led to the introduction of several specific purpose transfer schemes to ensure minimum standards of services

The FC has the responsibility to recommend scheme of transfer of resources in order to ensure financial equilibrium between States during that period and to design/ formulae to allocate transfer of resources between them. But practically FC cannot solve this problem alone. The actual working of the revenue sharing mechanism of FC is sharing of tax revenue and disbursal of GIA. Different criterion of GIA transfers is adopted by FCs. "The criteria of fiscal capacity and fiscal discipline used by Thirteenth FC, which are given a weight of about two-thirds in the formula, are inadequate, inconsistent and subjective. The allocation outcome based on such a formula along with the discretionary nature of grants neither reflects equalization nor efficiency and hence provides confusing signals to States for their future fiscal behavior and growth orientation" (Archana, R. Dholakia).

RESOURCE TRANSFER THROUGH FC

The devolution of resources through FC is in the form of shares in the tax revenues of the central government and GIA from the state's share of central revenue. When previous FCs recommended shares in the net yield from individual taxes such as income tax and union excise duties, then the economists criticized this by saying that a share in taxes is more elastic than fixed GIA. Eleventh FC combined the entire yield from taxes and distributed one consolidated share and the states felt that they have got elastic share for the entire period but this was not correct. After the twelfth FC the share of GIA increased and that of taxes decreased. The hidden factor behind is the increasing responsibilities of FCs with imposition of many conditionalties. If the responsibilities of FFC are increased and it is supposed to cover more objectives then again the share of GIA needs to be increased. But some economists believe that the share of GIA transfers should not exceed 12 per cent of total devolution. (Thimmaiah G., 2013).This is not very sensible, in fact they are ignoring the requirements of FCs to meet the increased liabilities.

1. *Tax Sharing*: States get their share from the revenue obtained through taxes by the central Government.
2. *GIA:* States receive GIA according to the recommendations of FCs on the basis of TOR provided to them.

Table 1: Composition of FC Transfers to States (Rs. Cr.)

FC	Period	GIA		Share in Central Taxes		Total	Total Percent Share
		Amount	Percent a Share	Amount	Percent Share		
Ninth*	1989–95	11030.38	9.96	99667.64	90.04	110698.20	100.00
Tenth	1995–00	20300.30	8.96	206343.00	91.04	226643.30	100.00
Eleventh	2000–05	58587.39	13.47	376318.01	86.53	43905.40	100.00
Twelfth	2005–10	142639.60	18.87	613112.02	81.13	755751.62	100.00
Thirteenth	2010–15	258581.00	18.03	1448096.0	81.97	1706676.0	100.00

*Ninth FC covered six years

Source: Report of Twelfth FC &Thirteenth FC

To judge total transfers through FC the percentage share of GIA transfers and percentage share of taxes and duties transfers in total are calculated. The share of GIA transfers has remarkably increased after Eleventh FC. The Twelfth FC also showed an increase while during Thirteenth FC it was almost same or minor decrease.

The bar diagram in Fig. 4 shows the increasing trend of GIA transfers during successive FC and the share of GIA and taxes in total transfers through FC.

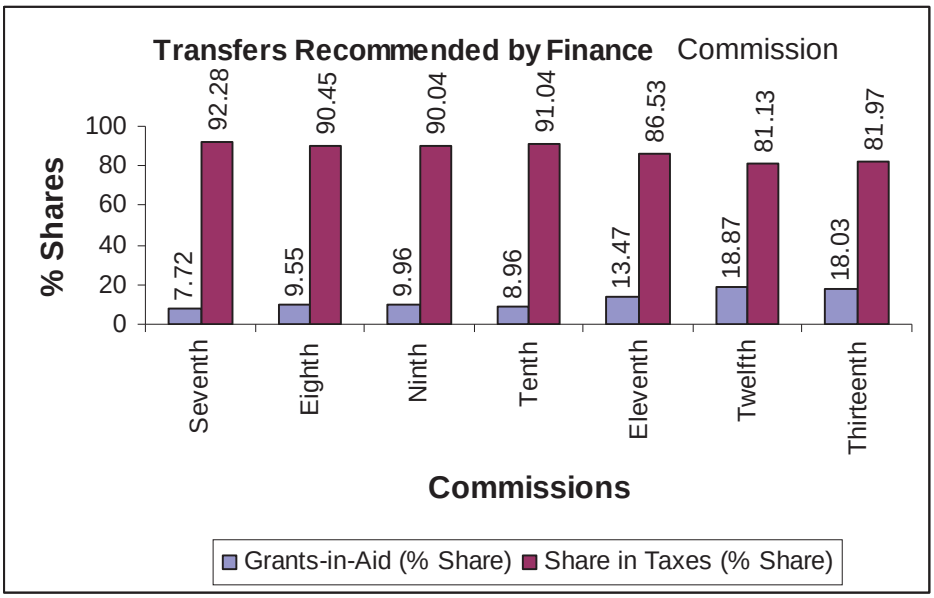

Fig. 4

RECOMMENDED BY FCS

But Chart 4.5 clearly focus that the transfers through GIA is not uniform rather it changes with the policies and priorities of the existing government. The FC is not free to decide the resource transfers. FC is provided with terms of references by the central government to work accordingly. By calculating the variance of GIA transfers through FC this becomes very clear.

The Variance in Grants in-Aid transfers during Seventh FC till the Thirteenth FC is 86.65 in nominal terms. High value of variance shows that the GIA transfers are not uniform during successive FCs and there is a vast disparity in transfers. The disparity ratio of the Ninth to Thirteenth FC is 142.61

Variance (Ninth FC–Thirteenth FC) = 81.65

Disparity Ratio = 142.61 (max. /min.)

In India the proportions on which the net proceeds of income tax are shared between the Centre and the States on one hand and as between the States on the other are determined on the recommendations of FC. Union excise duties are shared on permissive basis. When the first FC was set up only three commodities were shared but now all the union excise duties are shared by the Centre with the States. The percentage of share depends on the recommendations of the FC. The percentage share changes in different FCs.

The statutory transfers consists of sharing of central tax revenues and grants recommended by the FC and these are supplemented by grants from the P C and discretionary grants from the central ministries. The size of transfers mainly determined by considering the availability of central revenues after accounting for the relevant expenditure requirements. This represents the supply side of funds for inter-governmental transfers. The demand side of the fund comes from the two considerations firstly from the assignment of responsibilities of the state government and secondly from the need for ensuring minimum provision of services by the states with less than average fiscal capacities. The low fiscal capacity states are falling behind the average level of service provisions, so this leads to transfer of resources. We aim to find the best principle of transfer of resources in a consistent manner. The transfer of resources to states is made not only through recommendations of FC but also from other channels such as PC, central government ministries in form of plan grants and non-plan grants. An equal per capita transfer norm is not practicable in horizontal dimensions due to difference in per capita fiscal capacities and differential costs of providing services. States can't control cost disabilities due to difference structures like large areas relative to population, hilly terrains, difference in rainfall and droughts, etc. In finding out a suitable and acceptable scheme of transfers there are conceptual issues and practicable problems. The grants can be unconditional and general purpose or conditional and specific purpose. Revenue capacity is measured by GSDP at factor cost though GSDP is not a perfect correlate of income or fiscal capacity. GSDP is an indicator of the domestic product and not of income and consumption. GIA mainly target to achieve a degree of equalization. Many better off assessed states do not get grants under Article 275. These grants are usually unconditional. Grants are very effective transfer instrument for specific state and specific purpose targets. The two types of unconditional transfer tax revenue sharing and assessed gap grants depend on the extent of vertical imbalance and the current horizontal imbalance. Total transfers recommended by the FC, share of grants have been less than 15 per cent on an average from Seventh to Tenth FC.

Now the question of economic management arises. What are provisions made in the Constitution for fiscal devolution of resources to meet these expenditures. The macro-economic management belongs primarily to Central Government and external borrowing also depends on the Centre. All States are indebted to Central Government and loans are provided to them for assistance according to the Central Plan. The Twelfth FC has recommended a fiscal restructuring plan to eliminate current deficits. The Centre has passed fiscal responsibility and budget management act (FRBMA) and most of the States have passed fiscal responsibility acts (FRAs).

It is noteworthy that since the 73rd and 74th Constitutional Amendment, the Central FCs have been exclusively paying attention to the transfer of resources directly to Panchayats and Municipalities (Local Bodies). This is a step towards decentralization process and it strengthens the local bodies financially

INTER-SE ALLOCATION OF GIA

GIA distribution formula of FC has started from gamble and ends at policy. The distribution formula of GIA has remained an issue of great concern because FC is the only constitutional body of resource transfer. Gadgil formula and Modified Gadgil formula were adopted for FC transfers and to justify the transfers on equalization and efficiency grounds. Gadgil formula has given few criterions for FC resource devolution and it was later revised twice to give better criteria. Modified Gadgil formula changed few criteria slightly to justify the rationality of resource devolution.

GIA devolution constituted from 7.4 per cent to 26 per cent of total FC transfers during successive FCs. Here we are concerned with GIA transfers from Ninth FC to Thirteenth FC. Till Ninth FC GIA transfers were used only as gap filling instrument for plan deficit and non-plan deficit. There was no indication of exact weight age of GIA transfers. They were only assessed by the FCs after having close look of revenue and expenditure pattern of the concerned States. There was no clear cut methodology for GIA transfers, only revenue deficit grants were given to states and for this reason some developed states have not favored the FC by not giving their exact financial condition to the FCs. So High Income States were benefited and the Low Income States were deprived off. No clear criteria for GIA were formed before Ninth FC. From Ninth FC normative approach for GIA transfers was adopted. From Eleventh FC onwards special weight was given to selected criteria for GIA devolution. Eleventh FC made population, geographical area, revenue effort and distance from highest per capita and geographical area as indicators of GIA devolution.

During Tenth FC GIA transfers were assessed on needs. This was not enough for motivating the states to indulge on the basis of fiscal profligacy. They used inter-state ratio of slum population derived from 1971 census. Since the amendment of Article 280 came after setting up of the Tenth FC, its influence on the TOR was not discernible. A very alarming fact came out that GIA transfers in the Tenth and Eleventh FC had tax buoyancy of magnitude more than one and the income elasticity of revenue expenditure has been less than one. From this fact it is clear that the States that receive GIA are neither lethargic in revenue rising nor spend thrift. Nine out of twelve states that received GIA under Article 275 in 2001-02 were found to

be fiscally prudent and the additional GIA were provided from the incentive fund as recommended by Eleventh FC.

Table-2: *Inter-se* Allocation of GIA among States

FC	Indicators	Weight Allotted (%)	PRIs	ULBs
Ninth	Plan deficit	--	--	--
	Non-Plan deficit	--	--	--
Tenth	Plan deficit	--	--	--
	Non-Plan deficit	--	--	--
Eleventh	Population	40		
	Index of decentralization	20		
	Revenue effort	10		
	Distance from highest per capita income	20		
	Geographical Area	10		
Twelfth	Population	40		
	Geographical area	10		
	Distance from Highest per capita income	20		
	Index of deprivation	10		
	Revenue Effort of which, (a) With respect to own revenue of States 10 (b) With respect to GSDP 10	20		
Thirteenth	Population		50	50
	Area		10	10
	Distance from highest per capita sectoral income		10	20
	Index of devolution		15	15
	Proportion of SC, STs in the Population		10	--
	For Local body grant utilization		5	5

Source: Calculated from Reports of IX, X, XI, XII&XIII FCs.

Table clearly shows the changing GIA allocation criterion among the states during successive FCs. The macro aspect of the weights are taken for eg devolution is made for entire population of the state not for the population below poverty line. In the micro perspective population below poverty line will more clearly reflect the actual condition and need of the state. It also gave different weights to these indicators on priority, severity and need of the States. This clearly indicates the normative sense of Eleventh FC for GIA transfers. In the Twelfth FC, GIA transfers were also based on specified weight criterion and indicators. It gave same weight to population of 40 per cent as Tenth FC but Twelfth FC reduced the weight 40 per cent of geographical area from 20 per cent to 10 per cent. Revenue effort was given same weight by Twelfth FC as by Eleventh FC but Twelfth FC divided the weight for two components, i.e. with respect to own revenue of States 10 per cent and with respect to GSDP 10 per cent. Eleventh FC has given 10 per cent weight for distance from highest per capita but the Twelfth FC increased it to 20 per cent. For revenue effort both Eleventh and Twelfth FCs gave 20 per cent weight but the Twelfth FC divided the revenue effort in two parts: (i) with respect to own revenue of States and (ii) with respect to GSDP both was given 10 per cent weights.

Thirteenth FC divided the GIA devolution in two separate parts for Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs). After 73rd and 74th Amendment of the Constitution the lower level of government was also given place for resource transfers. The PRIs and ULBs were financially empowered by the FC transfers also. The earlier FCs did not define them. Thirteenth FC for GIA devolution increased the weight for population to 50 per cent both for PRIs and ULBs. As Twelfth FC did Thirteenth FC also gave 10 per cent weight for area. For distance from highest per capita sectoral income Thirteenth FC allotted 10 per cent weight for PRIs and 20 per cent for ULBs. Thirteenth FC described distance from highest per capita income and redefined it as distance from highest per capital sectoral income. Thirteenth FC introduced 15 per cent weight for index of devolution for PRIs and ULBs. Thirteenth FC for the first time gave 10 per cent weight in GIA devolution for SC/STs proportion in population of PRIs but for ULBs no special attention was paid. It also introduced incentive of 5 per cent each to PRIs and ULBs in local body grants utilization Index.

Two important aspects of Thirteenth FC for grant transfers for improving the revenue of the States and incentivizing them for better fiscal performance are noteworthy. Weight age of the Index of Fiscal Discipline in the tax devolution scheme was increased to 17.5 per cent from 7.5 per cent given by Twelfth FC. But it has dropped an important indicator of tax-GSDP ratio (which measures fiscal efforts of a State). Another objective of 'distance from highest per capita income' criterion was used to give equalization objective. It was given 20 per cent weight age but that was replaced with distance from highest per capita sectoral income and differentiating PRIs and ULBs with 10 per cent and 20 per cent weight age respectively. But do these changes in formula of GIA devolution really reflect the twin objective of equalization with efficiency with the result of improving the growth performance of States or fiscal performance.

The States like Haryana, Goa and Maharashtra, the HIS will see a very large increase (more than 153 per cent) in the amount they received from tax share and grants, while the average increase for all the States is 126 per cent. The Low income state Odhisa has seen an increase of only 113 per cent. Thus, the objective of equalization from this transfer is not met. Again a question arises that UP and Bihar receives more grant than Odhisa, where all the three States are low performing states. Again the HIS Gujarat, Punjab and Kerala have 110 per cent, 99.36 per cent and 105 per cent respectively have increased allocated GIA. All these States are above average in respect of per capita GSDP and own revenue expenditure ratio (Archana R. Dholakia, 2010). Hence it can be concluded that formula for GIA devolution needs to be more realistic and scientific in order to have equalization and efficiency results and hence the combination of these two reducing horizontal imbalances cannot be achieved

FC AND GRANTS-IN-AID

The political environment of India has been changing continuously from the time of Independence. The public sector strategy is dominated by planned development and this in turn creates multi-level fiscal system with centralizing the fiscal powers. Due to globalization and liberalization the Indian federalism faces great challenges. To create an efficient infrastructure is a major challenge by creating a competitive environment before the Indian Federation. It becomes even more challenging when the states of the Indian Federation are facing severe fiscal stress. This becomes more problematic for poorer and backward states. To check the sharply increasing inequalities in service standards an appropriate transfer system has to be designed. The political situation of the country is changing very drastically due to the emergence of coalition governments at the Centre and regional and coalition parties in the States. This situation of federalism presents serious issues for the functioning. To find an appropriate substitute for reforming the tax system to enhance revenue productivity with minimum distortions to ensure a common market in the country and to get an appropriate substitute for declining customs revenue.

Due to historical factors there was centralized federal constitution but there is a considerable demand for decentralization and the recent economic and political situations have paved the way for greater degree of decentralization. The end of the party rule, emergence of coalition governments at the Centre, increasing role of regional political parties in the political affairs of the country have resulted in greater decentralization on the political front. In 1992, the amendment of constitution gave constitutional status to local bodies below the state level has furthered the process. The political infrastructure of the country gave some important changes. Replacement of the dominance of one party rule at the Centre and State with coalition governments at the Centre and some States. The regional parties came in power in many states which resulted in greater inter-state frictions. The time period of ruling declined so the political parties and politicians adopted populist policies for short-term political gains. The medium or long term developmental agenda replaced populist policies for short-term. The regional parties even play the pivotal role for strategic alliances as member of coalition at the centre has led to asymmetric arrangements in the functioning of fiscal federalism.

GIA should contain clear objectives. The states should be completely independent and flexible in setting priorities. They should not be constrained by the categorical structure of programmes. Some unforeseen changes in the fiscal situation of the recipient state can occur hence the grant programme should be flexible and transparent while allocating GIA simplicity is very essential. In this circumstances GIA can be used as an effective instrument for growth and development.

Until 1999-2000, the Constitution provided only for the sharing of personal income tax and union excise duties, thereafter, all central taxes were included in divisible pool. Grants achieve certain purposes which cannot be fulfilled by tax devolution and other transfers. The most important consideration is that they provide greater stability to states. Grants enable the application of the equalization principle. The need of the states is more focused by providing grants. The Twelfth FC has emphasized on health and education. Likewise the priorities can be better met by grants according to the demand of time. The Twelfth FC has given special grants to eight states for education and seven states for health-specific purpose.

Conditional grants provide fulfillment of special and particular objective. Only grants can achieve this target. The GIA reduces imbalance between functions and resources existing at lower level of governments. GIA improve the quantity and quality of governmental services in backward areas. It also ensures the equalization of level of public services and promotes development of services of national importance. GIA also help in reducing regional disparities in the levels of economic development and growth and improve inter-governmental relations. GIA are supplementary source for resource transfers to meet state's fiscal needs and to reduce regional disparities.

FISCAL EXCLUSION

A high degree of vertical and horizontal imbalance exists in Indian federation. The states depend on centre for their current expenditures. Though the revenue resources of the State have increased considerably yet the dependency of the states on the centre has not reduced. The revenues of states have grown faster than the revenues of the Centre but at the same time the expenditure share of the states have also increased at an even faster rate. The state governments in 2002-03 collected only 41 per cent of total current revenues but their share in total current expenditure was 57 per cent. From the revenue sources assigned to them, they could finance only 54 per cent of their current revenue expenditure. In other words, the states depend on central transfers to finance about 46 per cent of their current expenditures. The states share in total expenditures increased from 52 per cent in 1990-91 to 57.5 per cent in 2002-03.

Of the 29 States in India 18 are relatively homogeneous general category states and rest 11 are mountainous states in the north and north-east. The 17 general category states differ widely in size, revenue raising capacities and efforts made by them, expenditure level and dependency on the centre. The 11 mountainous states are different from others hence marked as "special category states." There has been an instant demand for review of centre-state financial review in India for balanced fiscal reforms. The financial resources of the Centre are highly elastic, while those of states are relatively inelastic due to the basic assumption of the constitution in favor of a strong centre and weak and dependent states. The centre is extending its

parameter of functions gradually, keeping the states completely dependent on it. The centre-state transfers are channeled as two-thirds goes with Planning Commission while one-third goes with FC. The centre contributes a large amount of resources in the form of discretionary grants to the states, thus it makes a distinctive power to affect the decision-making process at the state level. The revenues obtained from the income taxes withheld from their own employees are with the states and local governments. They receive total 100 per cent of the proceeds from the federal tax on financial operations in gold, 30 per cent for the states and 70 per cent for the Municipalities.

The states want freedom to spend the resources, so they favour a larger part of FC transfers as tax devolution rather than grants-in-aid. The states consider that tax devolution is their entitlement by its very nature. Tax devolution is unconditional while the GIA may be conditional or unconditional. It has been carefully considered from the states and the experts in the allocation of revenues of GIA. GIA have some unique characters which the taxes do not carry. (i) GIA are determined in absolute terms and their amount is also known, (ii) GIA are specific and better targeted towards a certain program, (iii) while determining GIA the cost disabilities and redistributive considerations can be accounted better but this is not possible in tax devolution. This is the basic cause behind the increasing share of GIA in recent FC transfers.

Table 3: FC Devolution-GIA and Shares in Taxes

Commissions	Period	Grants-in-Aid		Share in Taxes		Total Amount
		Amount	% Share	Amount	% Share	
Ninth	1989–95	11030.38	9.96	99667.64	90.04	110698.02
Tenth	1995–2000	20300.30	8.96	206343.00	91.04	226643.30
Eleventh	2000–05	58587.39	13.47	376318.01	86.53	434905.40
Twelfth	2005–10	142639.60	18.87	613112.02	81.13	755751.62

Source: Report of the Twelfth FC.

The above figures clearly indicate that during Ninth FC and Tenth FC the percentage share of GIA slightly decreased by 1 per cent but the percentage share of GIA increased during Eleventh FC by approximately 5 per cent and again during Twelfth FC it was also increased by another 5 per cent approximately. It means that the Twelfth FC increased the transfers through GIA by 10 per cent from Tenth FC. This shows a very favourable increase in GIA resource transfers. Resource expenditure through GIA affects positively and is target oriented. The GIA transfers of revenues to the states are based on the assessment of needs and developmental concerns of the states. The GIA transfers during Twelfth FC included non-plan revenue deficit, health sector, education sector, maintenance or roads and bridges, maintenance of buildings, maintenance of forests, heritage conservation, state specific needs, local bodies and calamity relief. Eight states are awarded GIA amounting to Rs. 10171.65 crore for Twelfth FC for education sector under the major head 2202 and every eligible state has to spend minimum of Rs. 20 crore a

year. Seven states have been awarded grants amounting to Rs. 5887.08 crore for health sector under major head 2210 and 2211 with a minimum expenditure limit of Rs. 10 crore a year. These grants on education and health are additionality over and above normal expenditure to the normal sector expenditures. Education and health were the key targets for Twelfth FC and it had paid full attention to these two sectors. The earlier eight FC have expressed that adverse incentives are associated with a gap filling approach where the case of larger gap in the past will lead to larger transfers. They do not bother whether available revenue capacity was adequately exploited or whether there was an undue growth in expenditures. Till Eighth FC gap filling approach was adopted by FCs. In normative approach the states are assessed in terms of revenues that they ought to raise given their respective capacities and this can effectively neutralize such an adverse incentive. On the expenditure side unlike the past history the expenditures are assessed on the basis of needs consistent with an average or minimum acceptable level of service and the relevant cost norms.

CONCLUSION

The increasing vertical imbalance and horizontal imbalance between the center and states has created a great concern affecting the centre state relations. There has also been an increase in the amount of the non-shareable portion of central revenue receipts. Another distress is spatial dissimilarity in the fiscal capacity and fiscal needs of different states. The main cause of this spatial inequality varies significantly, depending on the particular state. The different states are at different stages of the development conversion, so their fiscal needs also vary over time. The Constitution provides general guidance on addressing the needs of the states and the Centre as well as taking account of state-specific needs, but does not provide the prescriptive framework for FCs. An important consideration has come into force is recent decentralization initiatives and the increasing pace of urbanization have significantly increased the fiscal obligations of the third tier of government, but not the devolution of human and financial resources to discharge these obligations. This has increasingly become an important dimension of the work of every FC making the work of every Commission multi-dimensional in nature.

The designing of fiscal grants is critical to ensure the efficiency and equity of local service provision and fiscal health of State Government. While making fiscal policies due place should be allotted for GIA transfers. The GIA objectives should be expressed very clearly and even the sharp details should be mentioned. By this step the GIA transfers will be guided effectively. The State Government should have complete independence and autonomy in setting priorities. The grant giving authority should provide flexibility in allocation of priorities according to the need and demand of the circumstances of the concerned State. The grant should have enough room to accommodate the unforeseen changes in the fiscal situation of the

recipient State. The economy of the States changes with time and they should be made free to change with fiscal situations. GIA transfers should be made for population below poverty line.

Taking whole population will not meet the exact requirement of the concerned state. Education and health sectors which have cumulative effect on the developmental process should be added for devolution. These have cumulative effects on demography and will help the state in improving the infrastructure. The allotment of funds should be made well in time, the objective should be clear and its attainment level should also be confirmed till the goal is achieved. The expenditure data should also be maintained and made available for research and future policy. Hence for Green growth rethinking growth strategies with regard to their impact on environmental sustainability and the environmental resources available to poor and vulnerable groups is the need of the hour and GIA devolutions will be helpful to meet this objective by restructuring the allocation criteria. Fourteenth FC has come forward with bold steps in this direction.

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Benchmarking of Irrigation Projects for Social Inclusion in UP: A Basin-wise Study

Alpana Srivastava[1]

Abstract—*Economical use of water by effective and efficient water management in irrigation sector is imperative to cope up with the increasing population and developing agriculture technology. Uttar Pradesh, India's fourth largest state is endowed with plenty of water resources, vast fertile soil and favorable climate, perennially-flowing rivers. A number of large, medium and small canal systems have been developed for irrigation in the state through massive investments under successive five-year plans. The need of the hour is to benchmark these irrigation projects so that they become not only economically viable but socially equitable and environmentally feasible.*

A small study was conducted for micro-level investigation of the sub basin called Jaunpur branch basin (JBS). This was taken for rehabilitation by World Bank under Uttar Pradesh water restructuring project (UPWSRP). Jaunpur Branch Sub-Basin (JBS) covers 0.6 million ha areas located between Sai and Gomti Rivers, of which 0.32million ha is in the canal command. It lies in parts of Barabanki, Jaunpur, Pratapgarh, Raebareli and Sultanpur Districts covering 43 blocks. The project was initiated to rehabilitate the canal as close as to its designing stage. De-siltation, repair, lining and various are measures were adopted to improve the canal water capacity.

After the project intervention about 41 percent respondents in Haidergarh branch and about 20 percent in Jaunpur branch informed that their respective minors were de-silted. There is a significant increase, over the two years, in positive response in this aspect from Haidergarh branch. The majority of those giving positive response (95% in HB and 99% in JB) said that the silt was disposed off on canal banks itself. Regarding the proper maintenance of outlets and fields channels, about 22 percent from HB and only about 3 percent respondents from JB gave positive/ affirmative response, three is about 21% increase in positive response in this regard from Haidergarh branch.

It is seen that the revenue increase in by 1.31 times since base year 2002-03. In figure this increase is from Rs 289 lakh to Rs 379 lakh. Rate of increase in revenue (@31%) surpassed to rate of increase in irrigated area (@27%). The increase in area irrigated is 1.27 times from the base year 2002-03. Reduced Water depth in kharif 0.92 m against 1.78 m and in rabi 0.52 m against 0.92 m is the positive impact of cannal rehabilitation. Water availability has increased to 66% of designed roster. In kharif 748 MCM against 1134 MCM and in rabi 322 MCM against 530 MCM.

These performance measures are now adopted as the benchmark for the above basin and regular monitoring is done at each stage by the irrigation department. Hence it is now not only use as a tool for performance assessment but it is also helping in identifying levels of performance & undertaking corrective measures. This is helping small and marginalized farmer in holistic manner.

Key Words: *Benchmarking, Efficiency, Performance Measurement. Social Inclusion*

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INTRODUCTION

To ensure that project activities also benefit the poorest and most marginalized populations, social inclusion is central to the project's intervention logic. The wide-spread caste-based discrimination patterns have a negative impact on development effectiveness, as they prevent equal access to natural resources and employment opportunities and results in economic marginalization of the disadvantaged groups (DAGs), such as Dalits and minority groups. The project enforces a strict equity policy to ensure that these groups are included in all project activities as per their proportionate representation in the different communities. This is more important for irrigation projects as the livelihood of 80% of the rural population depend on agriculture in India and more specifically UP, the study area.

Water is the backbone for farming community in India. It comprises of more than 80% of small and marginal farmers. Out of these, nearly 50% are BPL. Social inclusion of these farming community in benchmarking of canal water projects will help in improving not only the efficiency and delivery of water to field but also sustainability.

The present study is based in UP water basin which has sufficient amount of water but highly mismanaged distribution. Conveyance efficiency and field application efficiency is very low in these farms. Effective management at top level is needed to bring efficiency in the system, and at the same time, strict monitoring to be done from the grass root level to the higher level. Putting checks in form of benchmarks at various levels helps in achieving the twin objective easily.

Benchmarking is a management tool helping in the evaluation of irrigation projects at macro or micro level and suggest methods to improve the system on concurrent basis. Benchmarking may be defined as the identification and application of organisation specific best practices with the goal of improving competitiveness, performance and efficiency. It is a continuous process that involves:

a. Internal assessment of the organisation

b. Comparing it with the best practices of more successful similar businesses in the market

c. Determining performance gap between current practice and best practice

d. Selecting best practices, tailoring them to fit the organisation and implementing them

The cycle of improvement continues. Benchmarking does not substitute other diagnostic and appraisal analyses, but rather complements them. Benchmarking is used to compare the processes with the best practices and to adopt suitable ones. The cycle of improvement should continue for realizing the potential envisaged. In the irrigation system, this would improve the efficiency of the system and result in savings in water usage.

Benchmarking methodology was adopted upon the request of the World Bank to the Consultative Group of the International Programme for Technology and Research in Irrigation and Drainage (IPTRID) in December 1999. A research study to develop guidelines for benchmarking in the irrigation and drainage sector was launched by IPTRID as a joint initiative of partner institutions, namely, World Bank (WB), Food and Agriculture Organization of the United Nations (FAO), International Water Management Institute (IWMI) and the International Commission on Irrigation and Drainage (ICID) and coordinated by the IPTRID Secretariat. Two International Consultants, Professor Hector Malano, University of Melbourne, Australia and Dr. Martin Burton, Director, ITAD-Water, United Kingdom, were engaged by IPTRID to develop these guidelines in consultation with the IPTRID partner institutions and the Secretariat. The process began in early 2000 and since then a number of formal and informal meetings, consultations and discussions have been held.

Benchmarking is not merely performance assessment but it helps in identifying levels of performance & undertaking corrective measures. Benchmarking in the public sector in general & the irrigation sector in articular is a more complex task as it is subject to site-specific characteristics. Benchmarking is found beneficial in following respects:

a. From management point of view:
    1. Better knowledge of system.
    2. Better management of resources (water, manpower & finances).
    3. Policy making in Water Resources Development & Management.
b. Service provision point of view:
    1. Efficiency, transparency & accountability to users.
    2. Commitment to excellence in service provision.
c. User point of view:
    1. Develop confidence about the service.
    2. Enhance agricultural production.
    3. Effective participation in management of irrigation projects.

MACRO-INDICATORS OF BENCHMARKING

The five key area of performance major in any irrigation project are mentioned below:

- System Performance
- Agricultural Productivity
- Financial Aspects

- Environmental Aspects
- Social Aspects

Each of these areas can be analyzed by using various performance indicators.

BENCHMARKING IN RELATION TO UTTAR PRADESH IRRIGATION PROJECTS PERFORMANCE

As the irrigation systems of the State are facing the challenge of increased competition for water, efficiency of the existing system has to be improved. Hence in the 11th Plan it is proposed to introduce the bench marking for effective irrigation management with the objective of identifying the best management practices, prioritizing and evaluating rehabilitation and remodeling of projects with an objective to improve irrigation efficiency. For benchmarking exercise, there is need to collect key performance indicators and record them. Data collected at micro level could be analyzed by comparing the observed values with ideal values required for the performance indicator.

The data presented in this paper is based on information collected from various sources of irrigation department Uttar Pradesh.

RIVER BASINS OF UP

The State is mainly covered by the major eight basins. The Yamuna and Ganga sub-basin covers nearly 57% of the total state area (Yamuna 29.08% and Ganga 27.91%). as can be seen from figure 1.

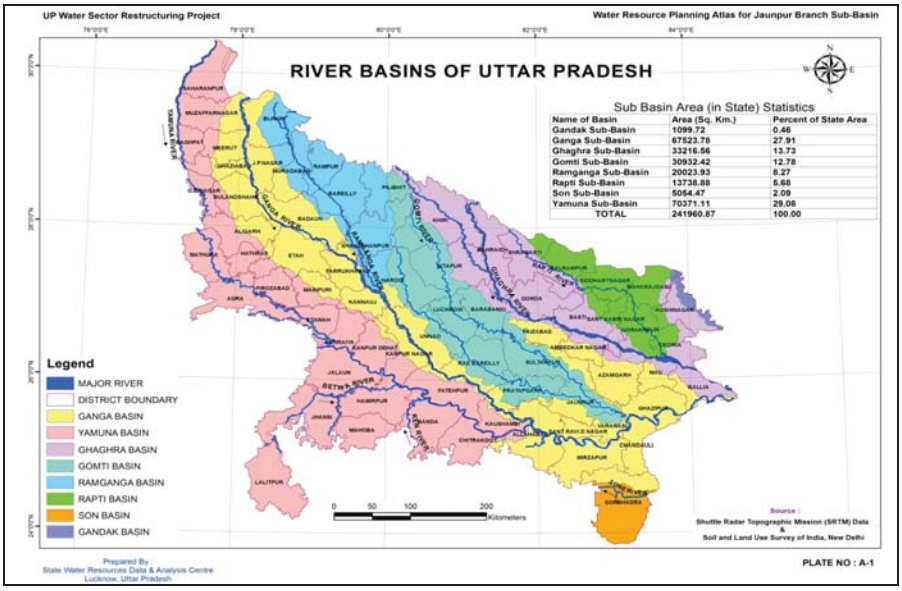


Fig. 1

Table 1: Basin-wise Water Availability and Command Area

Sl. No.	Basin	Geographical Area (lac ha)	Culturable Area (lac ha)	CCA
1	Ganga Basin	67.54	46.12	28.45
2	Yamuna Basin	70.38	49.70	33.14
3	Ramganga Basin	20.02	15.33	7.25
4	Gomti Basin	30.93	19.66	14.84
5	Ghaghra Basin	33.21	22.97	14.95
6	Rapti Basin	13.73	9.86	8.35
7	Gandak Basin	1.09	0.83	0.63
8	Son Basin	5.05	1.41	2.5
	Total	241.95	165.88	110.11

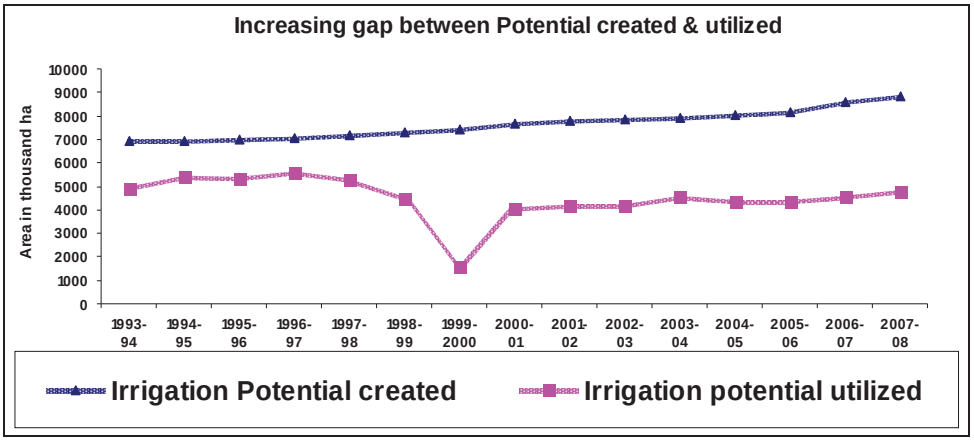
PRESENT STATUS OF IRRIGATION UTILIZATION

Potential created never matches the potential use and this leads to inefficiency of the system performance. The need is to identify the reasons and mitigate them. The overall reasons for less utilization are as follows:

1. Low water yield in the reservoirs.
2. Diversion of irrigation water to non-irrigation uses.
3. Taking more percentage of crops that require more water like paddy and sugarcane.
4. Thin & scattered irrigation resulting in low efficiency.
5. Low utilisation during kharif (Rainy) season.
6. Reduction in storage capacity due to silting.
7. Poor/approximate assessment of the irrigated area in the command.
8. Non accounting of irrigated area outside the command (influence area).
9. Poor maintenance of the infrastructure due to financial constraints.
10. Non participation of beneficiaries.

The gap between the utilized and created irrigation potential is showing an increasing trend. Third plan was best with minimum gap. The trend of 6th, 7th and 8th plan were encouraging, but the performance was worst hit in 9th plan. It is also noteworthy that against created irrigation potential of 31113 thousand hectares, the actual utilization of potential was only 22419 thousand hectares in 2002–03. This lag of nearly 90 lakh hectares (27.94%) is a cause of serious concern. It could be due to several reasons such as:

- Non-construction of on-farm development works below the outlet,
- Change in cropping pattern to more water intensive crops,
- Loss in live storage due to sedimentation,
- Low water use efficiency due to disrepair of the system etc.
- Heavy load of silt in river waters and thereby excessive siltation of the canals has reduced the carrying capacity of the canal system
- Decline of water reaches at tail end areas of the canals.



Graph 1

Further, the irrigation potential created can be described as 'protective irrigation' rather than 'assured irrigation'. The difference in operating costs of canal irrigation and tube well based irrigation is in the ratio of 1:7 and rising cost of diesel is placing a heavy burden on the small and marginal farmers. Consequently, farmers only provide only that much irrigation as required to save the crop rather than meet the full requirement of water for the crop. These gap need further research investigation so as to improve the system. The trend is shown in graph 1 below and the gap analysis is further bifurcated in to major and minor irrigation potentials and they were analyzed. Irrigation potential is continuously increasing where as utilization is constantly decreasing showing technical and allocative inefficiency of the system.

RECOVERY OF WATER CHARGES

For efficient performance of irrigation system, it is necessary that the system should be self-sustainable. The water rates for irrigation and non-irrigation should be such that annual water charges accrued should meet the yearly O & M expenditure fully. In addition, capital costs should be partly covered. The situation in UP is very grim

because the rates last revised was in 1995. If we calculate the accelerated expenditure with the average inflation of 6% per year then also the deficit in last 15 year becomes very high. The other reason is not full recovery of the irrigation cess levied due to many reasons. The result can be seen in the table 2 below where the recovery percentage has come down to 14 only. In this situation it is hard to sustain any system and timely intervention from government is need of hour.

Table 2: Annual Revenue Generated and Expenditure in Uttar Pradesh Irrigation Department

Year	Expenditure				Revenue Received	Net Result	Annual Recovery (Ratio)
	Annual Maintenance	Electrical Energy	Directorate & Administration	Total			
1995–1996	6712.69	6962.33	2179.58	15854.60	10659.91	-5194.69	0.67
1996–1997	8820.16	5295.53	23693.05	37808.74	10078.47	-27730.27	0.27
1997–1998	5044.83	5326.66	2512.13	12883.62	4085.50	-8798.12	0.32
1998–1999	6340.74	6496.53	26677.19	39514.46	4912.71	-34601.75	0.12
1999–2000	5721.19	8138.98	40256.18	54116.35	4016.05	-50100.30	0.07
2000–2001	7443.06	12.96	46538.07	53994.09	28213.37	-25780.72	0.52
2001–2002	9031.76	2166.00	50836.11	62033.87	11575.84	-50458.03	0.19
2002–2003	8157.89	9001.97	49110.93	66270.79	9012.17	-57258.62	0.14
2003–2004	8707.72	9011.71	56098.47	73817.90	13609.76	-60208.14	0.18
2004–2005	7760.65	9000.00	56990.84	73751.49	17659.78	-56091.71	0.24
2005–2006*	4378.45	9000.00	59961.29	73339.74	12070.51	-61269.23	0.16
2006–2007*	4292.99	9000.00	81000.90	94293.89	12868.77	-81425.12	0.14
Average	6867.68	6617.72	41321.23	54806.63	11563.57	-43243.06	0.25

To keep the balance of expenditure and revenue and to sustain the system it is necessary that the efforts be made so that it can reach near 1. The efforts are needed from government interventions and public participations. Below is shown the B-C ratio which is 1: 1.23 for Sharda Shayak System and IRR is only 14%. Similarly we should do the same recurring yearly analysis for other major or medium irrigation projects.

WATER USE EFFICIENCY

It is of utmost importance to use water more efficiently to cater to the needs of a large population. Water use efficiency is a key parameter to be monitored and evaluated. Water use efficiency is a function of agro-climatic conditions, status of irrigation system, soil type, cropping pattern, participation of farmers, irrigation practices etc. Thus efforts are to be made to improve water use efficiency, to achieve more irrigation and crop yield per unit of water.

This small exercise is done to compare the performance and efficiency of different systems in the state and accordingly an action can be taken to the extent needed for the particular system. This should be done at micro-level on regular basis.

Below is the example of micro-level investigation of the sub basin. This is impact assessment of UPWSRP project in the pilot area of Jaunpur-branch sub-basin. The system has under gone modernization and restructuring. The impact was assessed in form of:

- Increase in area irrigated
- Increase in revenue generated
- Decrease in application of field water depth
- Adherence to roster
- Decline in water logging
- Strength of Water User Associations (WUAs)

Few of these indicators are shown below. In 2007–08 as compared to 2002–03:

1. Increase in area irrigated by 1.27 times
2. Reduced Water depth
    - In kharif 0.92 m against 1.78 m
    - In rabi 0.52 m against 0.92 m
1. Water availability 66% of designed roster
    - In kharif 748 MCM against 1134 MCM
    - In rabi 322 MCM against 530 MCM
1. Increase in revenue by 1.31 times
    - Increase from Rs 289 lakh to Rs 379 lakh
    - Rate of increase in revenue (@31%) surpassed to rate of increase in irrigated area (@27%)

Table 3 gives field application depth available during both seasons. This indicator is quiet high in Jaunpur branch sub basin and need reduction.

Table 3: Total Canal Water Supply & Field Water Depth (2002–08)

year	Kharif Water Availability	Depth	Rabi Water Availability	Depth	Total		% of Water
	MCM	m	MCM	m	MCM	Depth	Available
2002–03	1134	1.78	530	0.90	1664	2.67	103
2003–04	881	1.57	582	1.03	1463	2.61	91
2004–05	1015	1.86	561	0.95	1576	2.82	98
2005–06	1174	1.08	229	0.41	1402	1.49	87
2006–07	693	1.10	311	0.55	1003	1.65	62
2007–08	745	0.98	322	0.52	1067	1.49	66
D-Roster	1105	0.61	509	0.39	1614	1.00	100

Table 4: Reduction in WATERLOGGED Area (between 2005 & 2007)

mbgl	% Area 2005	% Area 2007
<3	29	22
3 to 5	27	25
5 to 8	30	30
> 8	14	23

The above table 4 helps in developing land degradation index. If this indicator improves than it can enhance other indicators also like increase in agriculture land, production, productivity, revenue and over all environmental benefits.

BENCHMARKING CAN HELP

- Improvement through comparison,
- Setting norms and standards.
- Improving efficiency with sustainability.

In practice, the main requirements for successful benchmarking are:

- A strong and active commitment from senior management to lead and implement the benchmarking process
- A willingness to change and adapt based on the benchmarking finding
- A realisation that the competition is constantly changing.
- An openness to new ideas, creativity and innovativeness in their application to existing processes. A continuous benchmarking effort.

Benchmarking has some inadequacies which must be clearly recognised and understood before continuing the exercise:

1. Don't try and benchmark too many things to begin with. Select two or three key areas, and then gradually add others over time.
2. Don't waste time benchmarking things that are just "nice to know". Every benchmark should aim to improve performance in an area that contributes to profits or customer satisfaction
3. Be precise in defining what is to be measured. A lack of clarity can lead to confusing an inappropriate benchmarks
4. Test the benchmarks internally before consulting with outside systems
5. Remember that your organisation's priorities may change with time, and so your benchmarks should be regularly reviewed (and changed if necessary) to reflect this.

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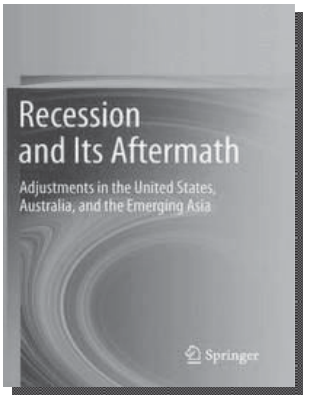
Book Review

MAAJID HUSSAIN BHAT



RECESSION AND ITS AFTERMATH: ADJUSTMENTS IN THE UNITED STATES, AUSTRALIA AND THE EMERGING ASIA BY NMP VERMA
ISBN 978-81-322-0531-9
Pages 267
Price-$139.00

Occurrence of short-term disturbances in the working of a market economy is a common phenomenon, making a capitalist economy susceptible to market failures at medium intervals. The core and crux of this book is "recession" i.e. a fall in the GDP of an economy for at least two consecutive qu arters of a calendar year. This book beautifully reflects the editor's accuracy in skills to simplify the complexities of recession and its after effects within the peripheries of human intellect.

The first window "Understanding Recession: Conceptual Arguments and US Adjustments" by N.M.P. Verma comprises of a thorough revision of the classicalist, new-classicalist and modern approaches about the dimensions of a market economy. Accordingly the phenomenon of fluctuations in macro variables has been explained. The author has scrutinized the differences in the autonomous and induced investments, henceforth their role in lifting an economy from recession and make it land in a boom. The author has very logically linked the whole work with the financial crisis of United States and later its dissemination in Europe and some emerging Asian countries.

The second chapter "The Financial Crisis and the Great Recession in the United States" by Mukti Upadhyay gives a historical background of a financial crisis. In this chapter, the author while pointing out the financial crisis of United States explains how the negligence in regulating market forces lead an economy to the verge of a slump. The author stresses on the role and responsibility of the public institutions in directing the market forces to avoid such disasters in a capitalist economy. It is in place to mention here that in the United States sixteen banks turned bankrupt and nearly a hundred were in the danger zone, resulting in a substantial slowdown in almost entire world. The author calls for the need of global policy coordination to combat such situations.

In the third chapter "Dynamics of Deflation and Unemployment: Fall into an Abyss of Depression" by Anson Wong, the focus has been laid on the scenario of deflation as a more serious threat than inflation. This chapter examines the relationships between deflation and employment. On these grounds the economies of Europe, Hong Kong and Japan have been compared to United States. The author has made an attempt to address the above causal relationship. Finally the author focuses on the need of efficient monetary and fiscal policies to stimulate the improvement in an economy. In the fourth chapter "Market Fluctuations and

Country Risk Relationships for Australian and Indian Energy" by John Simpson, the author has magnified the investment prospects and the similarities in Indian and Australian energy sector markets. The usage of various econometric models in the sectoral stock and energy markets of both the countries has made the similarities vivid. This leads to the conceptualization of the country risk relationships. This chapter ends on highlighting the policy implications like India and Australia should not make unnecessary delays in the increased energy resources trading and two-dimensional equity FDI into energy stock market sector.

The fifth chapter "The Chinese Economy After the Global Crisis" by Liang-Xin li is devoted to the economic activities of Asian giant China. In this chapter, the author has studied how Chinese economy was no exception to fall vulnerable to the financial crisis of 2008 leading to opening up of the Chinese economy to the rest of the world. In the third quarter of 2008, China felt the shocks of crisis and the next immediate quarter turned to be a big blow to the Chinese economy. Having little effect on the financial markets of China the crisis led to a dramatic decline in the exports. With the introduction of expansionary monetary and fiscal policies the author predicts a bright future of the Chinese economy. In the sixth chapter "The Role of Macroeconomic Fundamentals in Malaysian Post Recession Growth" by Lee Chin, the author puts light on the Malaysian economy and its performance in the post-recession period. The author has studied some causal relationships and made an attempt to assess the long-run equilibrium among the various variables by using time-series analysis and the co-integration technique. Finally, the author admires the importance of the fiscal policy as a tool in promoting growth in Malaysia in the post-recession era.

In the seventh chapter "Impact of Global Financial Crisis on Economic Wellbeing: A Case of South Asia" by Nikhil Chandra Shil, the author has highlighted the impacts of recession on the South Asian economies. Using statistical techniques, the author has generalized that the growth rates in the recent years have lowered in the south Asian economies. The negative impacts on the FDI inflows, decline in exports, rising pressure of unemployment and increasing inflation are some key inferences. Finally the author is of the view that crisis has made the South Asian countries its victim but the later has responded well with timely adjusting their monetary and fiscal policies. The eighth chapter "The Asian Economic Crisis and Malaysia's Responses: Implications for the Banking Sector" by Balakrishnan Parasuraman is devoted to Asian financial crisis 1997–1998 and its implications on the banking sector. The author explains the significant negative after-effects of Asian Financial crisis on the Malaysian economy. Among various cause of crises, the author has been all and more concerned to the liberalization of financial sector by the Asian economies. The crises led to loss of jobs and decline in income with banking sector being the prime victim. In Malaysia there was an increase in the non-performing loans which led to mergers and consolidations. The banks rendered bound to reduce the number of excess workers and hence the loss of employment in the banking sector.

In the ninth chapter "Output Growth in Post Liberalized India: An Input–Output Structural Decomposition Analysis" by K.K. Saxena, the author examines the trends

in output growth in India in Post-liberalization era. The effects of average growth in final demand, changes in the composition of final demand, changes in input-output coefficients and interaction of change in technology with change in final demand on the growth in output over the period 1993–94 to 2006–2007 have been empirically analyzed. The analysis has proved that the change in final demand rather than domestic demand as the main contributor to the output growth in the post-liberalization era. Thus, it is quite a good indicator that Indian economy is driven by domestic market that is why it resisted the terrible shocks of crisis in 2008. In the tenth chapter, "The Recent Recession: Impact and Future Prospects for the Indian Banking Sector" by D.K. Yadav, the author has highlighted the performance of Indian banking sector throughout and after the recession period. Comparing the Indian banking sector to its foreign counterparts on the basis of non-performing assets, Return on Assets and CRAR the author has very well explained how Indian banks have done well in the pre-recession period and maintained the momentum afterwards also. Provided the Indian banking sector has a concern over technological advancements, cost management techniques, risk and recovery management approach the author views recession as a golden opportunity for Indian banks to push their operations on the global level. The eleventh chapter by Basanta K. Sahu "Impact of the Global Downturn on the Indian Economy" the author examines the impact of the global downturn on the Indian economy. From Indian perspective, financial markets were not much exposed to the crisis, but India also had to face speed breakers in its rising growth rate. The negative effects of the slowdown were reflecting in the declining demand for manufacturing products, rising unemployment, reduced exports and a tendency to fall in FDI inflows. Although there were negative impacts of the global slowdown on the Indian economy as well, the timely adjustments in the policy structure helped to combat these problems. The author also lays stress on the short-term policy measures and the diversification of economic base in order to make Indian economy secure from the external shocks.

The book has been designed quite well and covers almost all the major aspects of recession and its after effects, It seems to be an intellectual treasure on the reader's desk. The phenomenon of market failures have been explained very nicely in the context of the global financial crisis of which the epicentre was in developed countries mainly the United States of America, which makes this book very useful to have a learning exposure to the dynamic market operations. Moreover the after-effects of a financial crisis have been given a handsome touch in the context of emerging Asian economies. In nutshell, this book is of prime importance to entrepreneurs, financial experts, investors, students, academicians and the policy makers.

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