Chapter 6

Village Development

6.1. Introduction

The main objective of this chapter is to assess the quality of life in the villages of Uttar Pradesh and suggest ways and means to improve the same. The study followed a methodology of combining field visits, intensive village studies using a case study approach, analysing various documents collected from the departments, focus group discussions with field officers of the Government and the NGOs.

The results of the study are analysed and discussed in the following structure. The chapter presents an introduction about the state including the demographic and other related parameters in Section 6.2. This is followed by a review of approaches in the Five-Year Plans in selected sectors such as forest, land, agriculture, joint forestry, drinking water and energy and rural infrastructures in section 6.3. Section 6.4 provides case studies with respect to nine villages selected from across the state. The village study analysis provides the summary of varying situations across the state's villages with insights into the development with micro-level perspectives. Section 6.5 discusses the government schemes and programmes launched in Uttar Pradesh. The appendices provide the secondary data analysis related to the various government projects and programmes in the state, review of various literature on the development of villages in India.

6.2. Status of Village Development[1] in Uttar Pradesh: An Analysis

6.2.1 Agriculture Sector

Low Average Income Per Worker in Agriculture

Agriculture is the largest sector of the state's economy with its share being the highest both in the state income as well as in employment. However, there is a gross imbalance in these shares, and unlike the other sectors of the state's economy, its share in total workers of the state is far higher than its share in state income. As a result, the average income per worker of this sector, with the largest workforce having to support the largest section of population is far less compared to the corresponding income per worker in other sectors of the economy. The average income per worker in the main sectors in 1991 is given below:

TABLE 6.1

Average Income Per Worker

Sector	*Income (Crores Rs.)*	*No. of Workers (Lakh)*	*Average Income Per Worker (at Current Prices in Rs.)*
Agriculture	20846.24	301.60	6,912
Manufacturing	6879.18	32.05	21464
Others	21770.82	79.96	27347
Total: All Sectors	**49496.24**	**413.61**	**11967**

Source: Government of Uttar Pradesh, *Tenth Five Year Plan (2002-2007)* and *Annual Plan Vol.1 (Part 1)* of Lucknow.

1. For the purpose of the study the sectors including land, water, agriculture, energy and physical infrastructure are undertaken from the secondary data collected from various departments.

Stagnation in the Rate of Growth of Agriculture

It is well known that weather induced fluctuations are a normal feature in agricultural production and the rate of growth in the agriculture sector is influenced by these fluctuations. But when these fluctuations are very large, either because of droughts or floods, there is always a risk that rates of growth for a particular period do not always portray the correct picture depending upon the extent of loss in agricultural production in the base year or the terminal year of the period. The rates of growth given above are for different periods, covering a long span of time. If we look at the average annual growth in agriculture in some of the recent Five Year Plans, it was 2.7 per cent in the Sixth, Seventh and Eighth Five Year Plans. There was, thus, a unique stagnation in growth in agriculture at 2.7 per cent in the recent past in these three consecutive Five-Year Plans. Apart from stagnation in growth in agriculture, a trend of a lower growth of less than 3 per cent in agriculture continued to haunt the state in all these years.

The dependence of the state's economy on agriculture, on the one hand, and the poor performance of agriculture, on the other, is thus a matter of great concern for the development of the state. It would appear that either the efforts made for the development of agriculture are not adequate and do not match the requirement for such development or there are some constraints on growth which are not being addressed or the development in agriculture has reached a plateau beyond which it is now incapable of growing in the present scenario. These are some areas that require careful investigation in order to chalk out suitable strategies and policies for a higher and sustained growth in agriculture. The fact that the present schemes and policies for the development of agriculture are not yielding a higher growth rate is clearly borne out from the past experience and, therefore, instead of continuing the same in future, there is a need to have a well thought out, more comprehensive approach comprising a series of well coordinated and mutually supportive steps which can break the current stagnation and boost up growth in agriculture. This is where the proposed investigation must lead us to in the course of developing future plans and make a beginning for the same in the Tenth Plan.

Disguised Unemployment

A higher growth in agriculture is not all that is needed to improve the state's economy. The impact of a higher growth in agriculture on its economy will not be felt until it also leads to a raise in the income of the agricultural workforce. Currently, this workforce is much more than what is required for full and gainful employment. It is an accepted fact that the size of the surplus workforce is quite large, anywhere close to 30 per cent of the total workforce of this sector. This is not a recent phenomenon. It has been there in the past and has not undergone any significant change in all these years. The workforce in agriculture in 1971 was 213 lakh, comprising 78 per cent of state's total workforce. In spite of surplus labour in this sector, the workforce rose by 14 per cent to 243 lakh in 1981 and by yet another 24 per cent to 302 lakh in 1991, with a marginal decline of three percentage points only in the state's total workforce from 78 per cent (1971) to 75 per cent in 1981 and a little further to 73 per cent in 1991. But while these shares have gone down only marginally, the fall in the share of agriculture in the total state income has been far too steep.

Imbalance in the Distribution of State Income *vis-à-vis* Agricultural Workers

Against a decline of a mere three percentage points in its share in state's total workforce between 1971 and 1981, the share of the sector in the state income fell by seven percentage points in the same period, from 57 per cent in 1971 to 50 per cent in 1981, and by 9 per cent points in the following decades between 1980-81 and 1990-91, from 50 per cent to 41 per cent, against a far smaller decline of only three percentage points in its share in the state's total workforce. Thus, while way back in 1971, the contribution of agriculture to the total state income was 57 per cent and its share in the state's workforce 78 per cent the same contribution came down to 41 per cent 20 years later in 1991 with its share in total workforce still at 72 per cent. This is evidence of a trend of growing imbalance in the distribution of the state income against agricultural workers, which comprises about three-fourths of the total workforce of the state and whose income levels are, therefore, very material in creating a demand for goods and services, the most effective stimulant to growth in the economy. It is this workforce which must be targeted more effectively in our development policies, strategies and programmes so that the large surplus and under employed among them shift in due course, to more remunerative occupations, leaving behind a workforce which the sector requires for full and gainful employment.

The marginal decline in the shares of agriculture in the state's workforce, was accompanied by a very substantial increase in the workforce of this sector, the

same going up by 14 per cent from 213 lakh in 1971 to 243 lakh in 1981, i.e. an increase of 30 lakh in these 10 years, and rising still further by 24 per cent to 302 lakh in 1991, a still higher increase of 59 lakh in these 10 years. These are some disquietening trends and need urgent attention.

The main reasons for the above are briefly described. A lower productivity of main crops in most areas of the state, lack of diversification in agriculture from low value to high value crops, inadequate and inefficient infrastructure for development in rural areas and lesser employment generation in the other more remunerative sectors of the economy than what is necessary for the workforce in agriculture to shift to these sectors are some main and immediate reasons for these trends. Unless the development process in the state addresses these basic reasons in a satisfactory manner, the growth in agriculture and for that matter, in the economy as a whole will not pick up to the desirable level nor will the burden of population on agriculture for its livelihood reduce.

There are several other factors, which require immediate consideration such as the consistent increases in the number and area of uneconomic and non-viable agricultural operational holdings, inadequate and inefficient irrigation network, inadequate development of rural infrastructure, more particularly of roads and lack of proper and adequate marketing and storage facilities with little contribution from agro-processing units.

Increase in Number and Area of Uneconomic Landholdings

The operational holdings of less than one hectare in 1995-96 were 75.4 per cent of the total holdings and their area was 33.75 per cent of the total holdings. The holdings of the same size in 1990-91 were 73.8 per cent and their area 31.4 per cent and thus, in a short period of only five years, there was a significant increase in the shares of these holdings, both in the number and area of total holdings. In quantitative terms, the increase in the number was 14.18 lakh and in area 6.13 lakh ha. The average size of a holding in this category also came down to 0.39 hectare in 1995-96. The average size of all holdings of different sizes also came down from 0.90 hectare in 1990-91 to 0.86 hectare in 1995-96. The increase in the number and area of 'uneconomic and non-viable' agriculture holdings accompanied by their rising shares in all holdings of different size and their areas, on the one hand, and the falling number and area of more viable and economic holdings of 4 ha. and above, on the other, are acting as a major constraint on capital formation and growth in agriculture. It is necessary to assess the impact of these changes on agricultural development in the state.

6.2.2. Irrigation

Irrigation is the lifeline of agriculture and yet a large proportion of the area is unirrigated in the state.

TABLE 6.2

Gross and Net Sown Area

1998-99	*Lakh Ha.*	*1998-99*	*Lakh Ha.*
Net Sown Area	175.85	Gross Sown Area	261.62
Net Sown Area with Irrigation	126.91 (72.2%)	Gross Irrigated Area	176.98 (67.6%)
Net Sown Area without Irrigation	48.94 (27.8%)	Gross Area Sown without Irrigation	84.64 (32.4%)

Source: *Sankhikiya (Statistical) Diary*, Uttar Pradesh (various issues) and author's calculation.

It is evident from the tables that more than one-fourth of state's net area sown and close to one-third of its gross area sown for the year 1998-99 was without irrigation. The resultant loss to agriculture production on this account and its impact on the economy of the state, as a whole, where agriculture still continues to be the dominant sector, is not difficult to imagine. The fact that this should be there even when large parts of irrigation resources, both of surface water and groundwater, have still not been tapped is a matter of greater concern. According to some estimates, 74.09 lakh ha. of irrigation potential created from 'major and medium' irrigation schemes up to 1999-00 was 59.3 per cent only of the state's ultimate irrigation potential of 125 lakh ha of surface water, leaving a large balance of this resource still left for creation. Similarly, as on 31 March, 2002, the withdrawal of groundwater was 54.11 per cent of its net storage, leaving a large balance of the same for further withdrawal.

TABLE 6.3

Gross and Net Irrigated Area

1997-98	*Canals (Lakh Ha.)*	*Tube Wells (Lakh Ha.)*	*Private Minor Irrigation (Lakh Ha.)*
Potential	71.72	38.49	122.20
Net Irrigated Area	30.60 (42.7%)	7.05 (18.3%)	80.47 (65.85%)
Gross Irrigated Area	44.67 (62.3%)	8.95 (23.3%)	119.60 (97.87%)

Source: *Sankhikiya (Statistical) Diary*, Uttar Pradesh (various issues) and author's calculation.

There has been inadequate exploitation of the available resources for irrigation coupled with inefficiency in the use of the resources already exploited. Table 6.3 shows that there is a large gap between the potential of irrigation from canals and the actual area irrigated by them, both net and gross despite it being the cheapest source of irrigation. Consequently, farmers are forced to spend much more on other more expensive sources of irrigation, making their operations in agriculture costlier with a concurrent reduction in their income.

The same holds true for state tube wells as also private minor irrigation. There is, thus, lack of optimum use of investment made on these sources of irrigation and a large scope for improvement still exists.

6.2.3. Roads

A good network of roads is the first and foremost requirement for development. It not only makes it easier to transport goods and services but also saves on time as well as costs. Moreover, it facilitates the flow of information and knowledge. The construction of rural roads and programmes of village connectivity have received considerable attention in the past few years in the state. But, there are 53945 (55%) villages out of a total number of 97134 villages of the state, which are still unconnected. This gives some idea of the size of the problem that still remains unsolved. The extent to which these roads prove to be useful for development of agriculture will ultimately depend upon their quality and maintenance. Ensuring the quality of rural roads and their proper upkeep will require large resources, both financial and manpower, which may not be possible for the state government to provide. It should not be forgotten that while rural roads are, undoubtedly, very important, the state highways and district roads are no less important, for they are the main arteries in the total system of communication and deserve equal attention. The state's total metalled roads, at 93.6 km. per one lakh population in 1996-97, were far less than all the other major states, the only exceptions being Bihar and West Bengal. The corresponding length of these metalled roads in the same year was as high as 311.1 km. in Maharashtra, 234.7 km. in Tamil Nadu, 232.3 km. in Punjab and 172.8 km. in Haryana. The infrastructure of roads is also very essential for development of agriculture and in order to get the desired contribution from this infrastructure, the state must provide high priority to the construction and proper maintenance of rural roads as well as other roads, without which the purpose of rural development will not be served.

6.2.4. Energy

Energy is another vital infrastructure for the development of agriculture. It is cheaper and more convenient to operate tube wells for irrigation with electricity than with diesel. And, yet the electrified tube wells in the state are far less than those operated with diesel pumps. The electrified tube wells on March 31 in 1998, 1999 and 2000 were 5.63 lakh, 5.70 lakh and 5.73 lakh respectively against 29.07 lakh, 29.65 lakh and 29.90 lakh of diesel operated tube wells. The electrified tube wells were, thus, close to 16 per cent only in all these years against 84 per cent of diesel-operated tube wells. This is unlike most other states. The shares of electrified tube wells are very high in these states. Way back in 1991-92, Punjab and Haryana, the two other agricultural states in Northern India, had 69 per cent and 62 per cent electrified tube wells against UP's 16.6 per cent. The states of Tamil Nadu and Maharashtra had still higher percentages of electrified tube wells 75 and 92 respectively.

Despite the various advantages of an electrified tube well, the share of diesel operated tube wells is very large in this state on account of non-availability and irregular supply of electricity. There were very small additions to electrified tube wells in the past, 7000 in 1999 over 1998 and 3000 in 2000 over 1999 against additions of 58000 and 25000 to diesel tube wells in the same periods.

Infrastructure of Energy

Apart from irrigation, the infrastructure of energy also plays an important role in modernisation of agriculture, apart from improving the quality of life in rural areas. It is disquietening that this infrastructure is still not adequately developed in the state and its deficiency is acting as a major barrier to the pace of development, whether it is in agriculture or industries or other critical sectors of the economy.

Problems of Storage and Marketing

Last but not the least is the problem of storage and marketing of agricultural produce including horticulture produce. The facilities available on the ground for this purpose are inadequate and unsatisfactory. The cultivators, particularly the smaller ones whose number is very large in the state, always find it difficult to avail of these facilities to their advantage and seldom get a

fair deal for their produce from those who control or operate these facilities. There is little they can do to check their exploitation and except for big farmers with large holdings, who can hold back and have a good bargaining power, most farmers remain content with whatever they get for their produce. There is, therefore, an urgent need for streamlining the entire infrastructure developed over time for 'storage and marketing' of agriculture and horticulture produce to make it farmer-friendly, leaving no scope for exploitation of farmers, big or small, and responsive to the changing needs of farmers.

Insufficient Agro-processing Units

It is pertinent to note that except for the processing of sugarcane, where the state has 109 working sugar mills crushing around 30 per cent of the total sugarcane produced in the state, there are not sufficient agro-processing units, even though the state accounts for producing about 20-25 per cent of the total fruits and vegetables produced in the country. The role of agro-processing units in diversification within agriculture from low value to high value crops and in promoting improvements in production process, leading to higher productivity and production, is well known. However, what is more important than all this is the addition to the income, which accrues to the farmers in this process. These units are, therefore, a potential source of alleviating the present miseries and exploitation of farmers, on the one hand, and of augmenting their income on the other. This is what the development of agriculture requires today, perhaps, much more than anything else. A higher growth in the economy of this state is very much dependent upon the performance of the agriculture sector and to highlight, in that connection, some selected areas which require immediate consideration.

Apart from growth potentials of different sectors and the changing scenario in respect of their shares in state income, agriculture in itself has little or no potential of employment generation in this state. As already pointed out, the load of workforce in this sector is much more than what it can sustain. A sizeable segment of this workforce is surplus to its requirements. According to some estimates, the surplus workers are around 30 per cent of the total workforce in this sector. However, this should not be taken to suggest that the sector has no role in employment generation. To the extent, a higher growth in this sector raises the income level of its workers comprising more than 70 per cent of the total workforce of the state and creates more demand for non-agricultural goods and services, it makes its contribution to employment generation, which may be big or small, and dependent upon the increase in this demand. The fact that the share of agriculture in the total workforce of the state has been declining in the past, from 78 per cent in 1971 to 75 per cent in 1981 and still lower to 73 per cent in 1991, only corroborates the statement made earlier that this sector has little or no employment generation potential. The shares of other sectors in the total workforce in this period show a rising trend. The share of manufacturing sector has gone up marginally from 7 to 8 per cent and the share of services, from 15 per cent to 19 per cent. Similarly, the fact that the average income per worker in agriculture was far less than the corresponding income of his counterparts in other sectors of the economy is an evidence of the gross under-employment or 'surplus workers' in large numbers staying on in agriculture with far less income in the absence of more remunerative employment opportunities for them elsewhere. The average income per worker in agriculture sector was Rs. 2997 in 1981 and Rs. 3227 in 1991 as against the corresponding income of Rs. 4640 and Rs. 10622 in manufacturing sector and Rs. 10439 and Rs. 12112 in services sector. The rise, in the case of agriculture sector in these 10 years, was a meagre 7 per cent against a rise of 129 per cent in the manufacturing sector and 16 per cent in the services sector. This leads to a conclusion that for a higher overall growth or more remunerative and better employment generation in the economy, a higher and employment-oriented growth in other sectors is of very great importance.

6.3. Village Development: Synthesis of Field Investigations and Rural Case Studies

6.3.1 Methodology

The villages were selected based on the secondary analysis depicting the general nature of the state. On gathering the villagers, a group meeting was organised where the purpose of the visit was explained with special focus on women's developmental aspects. To ensure greater participation, village mapping exercise was carried out. This was followed by focussed group discussions, trend diagramming or seasonal diagramming and efforts were made in most villages successfully to hold separate meetings with the village women. A number of villages visited had government programmes under implementation and/or NGO presence.

6.3.2. Observations

It was observed that as one moved westward across the state from East and South, there was an increase in prosperity. The villages in the district of Varanasi were characterised by acute poverty which was relatively less in the southern district of Allahabad reducing further as we moved to Central Uttar Pradesh and Lucknow district with signs of well being becoming noticeable in the Bundelkhand region and aspirations of the people in the Bulandshahr district in western Uttar Pradesh matching those of any city dweller of Delhi or other metropolitan cities.

The family size in the villages ranged from six to eight with at least four children in most of the households. This holds true for all castes and religions. The high population growth rate has translated into a high rate of unemployment. The family planning programmes implemented through the public health centres (PHCs) and serviced by the ANMs are reported to be working well. However, these services need to be improved. The services like polio and other vaccinations in all the visited villages were complete and there were no complaints regarding such services.

The village health system for the poor is largely dependent on the public health services offered by the government. The PHCs located in the *tehsils* are providing the services in a better manner even though occasional shortages of medical supplies and favouritisms are reported. The poor people in the visited villages were satisfied with the *tehsil*-level PHCs and their services in general.

The status of women in general is appalling in all the villages. They are the largest labour force inside and outside the family. The macro-level figures of literacy levels among the men and women show wide disparity. The drinking water and sanitation problems are mostly left to the villagers. The health problems reflecting in the form of anaemia and other physical weaknesses are taking its toll in all the villages.

There exists more than one public-funded government programme to provide water, sanitation and other local infrastructure facilities to the villagers. However, the villagers are not satisfied with their services. There are several programmes aiming at the village development. Some of the popular ones are Swashakthi, Swajal (in Bundelkhand), Anthodaya, Annapoorna, Pregnant Women Scheme (Maitri Labh Yojana), School ration and scholarship for students, PDS schemes, old age pension and pensions for other disadvantaged groups, Indira Awas Yojana and agricultural programmes related to Integrated Pest Management (IPM). In general, the awareness about the government programmes related to village development is quite high across all segments.

During the last decade, the programmes carried out through group approaches seem to be working well. The credit programmes through the self-help group concept under Swashakthi and Swarnjayanti Gram Swarozgar Yojana (SGSY) or other government line department programmes are doing a better job of delivering and collecting the credit without any default or difficulties. However, the programmes executed directly by the line departments mainly through the contractors or *panchayat sarpanchs* are not satisfactory. They are reported as not serving the intended beneficiaries marked by the favouritism of the representative or the officials.

Across all the regions, agriculture and labour services to the urban areas seem to be the biggest employment provider for the poor in the villages. The wages of the labourers are comparatively low and range from Rs. 50-30 for men and women respectively in agriculture during the season. The labourers depend upon the urban labour employments in the factories and related works, which provide a continuous source of income for the families. Therefore, migration is also heavier towards the urban centres. The villages studied around Allahabad and Lucknow are good examples of such migration towards wage employment.

Several villages in western and central Uttar Pradesh practice more than single crop cultivation using the benefits of well irrigation. In general, village farmers report that agriculture is becoming an unviable proposition, resulting in very low revenue realisation at the year-end. Also, there has been a rise in the price of the agricultural inputs such as fertilisers, seeds, labour and pesticides, stagnant yields and or declining prices of the produces. Electricity is highly undependable and this adversely affects irrigation.

There is an undercurrent in every village that the farmers are not benefiting from any major government programmes. The next intervention in agriculture shall be in the form of raising the revenues of the farmers through the post-harvest activities.

There is landlordism reported in the villages selected in the urban fringes for the study. The landlords run their farms from the cities by appointing local caretakers. Since agriculture is not very rewarding,

attempts have been made to diversify into horticulture. The *harijan* and lower caste villagers have very much benefited through the government-sponsored credit programmes resulted in purchase of milch animals and animal husbandry.

The Swajal project implemented in parts of Uttar Pradesh in the Bundelkhand region is quite popular. The project adopts a novel approach of involving the villagers organised into an association. The village level associations formed through voluntary agencies are also implementing the project. The construction activities are done by the associations without any middlemen. Self-help groups are also formed and encouraged to take part in the future management and maintenance of the pumps and systems installed. The village studied gets good quality and regular piped water supply. Toilets at the household level are provided under the project. Overall, the villagers feel that this project is delivering the intended benefits and comparatively better than the Jal Nigam projects.

6.3.3. Thrust Areas for Clean and Green Village Development

The thrust areas for the clean and green village development programme are the following:

1. **Democratising the villages**: By far the projects implemented through the self-help groups or Swajal or any other group approach seems to have a better impact on the project and the intended beneficiaries. Therefore, the future projects shall have the approaches of building groups and implementing through them.
2. **Nested institutions**: The village level groups thus formed shall be strengthened through a nested institutional approach by continuous training and capacity building. This would provide a lasting support and result in sustained functioning of the civil society groups in the villages.
3. **Massive programmes required:** Programmes of a bigger scale implemented through the local organisations rather than the government need to be planned.
4. **Implementation of the village infrastructure projects** shall be at best done through the beneficiaries or through their groups. It is found in almost all cases that the implementation through these civic society groups is better than through the contractors or the middlemen.
5. **Strengthening the public health system**: The public health system is stretched and overloaded. This system benefits a large segment of the society and therefore the government programmes will strengthen them through interfacing their services with the large number of local organisations promoted under various projects.
6. **Convergence of services**: The services related to village development such as drinking water, health, sanitation and greening of the villages should be converged at the delivery point. The village level groups would be able to perform the job once the delivery is planned through them.
7. **Redefining the role of government, NGOs and local organisations:** It is amply clear from the success of the projects like Swajal that the conventional implementing role of the government shall be dropped and NGOs and local organisations shall be engaged to deliver the planned services and projects. In this context it may be recalled that empowerment of *Panchayati Raj* Institutions (PRIs) is seen as a potential system to boost development work in villages. However, with implementation of PRI, the role of non-government organisations (NGOs) and self-help group (SHG) may have to be re-defined as the two models occupy the same space. The state is working to develop a model of rural growth centre with the participation of private corporate sector and government to take into account both supply as well as demand side issues.
8. **Key performance areas**: The projects including drinking water, sanitation, electricity and village health improvement shall be defined as the key performance areas involving large number of local organisations and NGOs.

6.4. Case Studies

6.4.1. A Feudal Village in Urban Fringe—Saraimansoor Village in Said Abad Block of Hambia Tehsil in Allahabad District

The Saraimansoor village is located in Saidabad block of Allahabad district approximately 30 km from Allahabad on the Grand Trunk (GT) Road on the way to Varanasi. In fact, the GT Road divides the village into a larger southern section and a smaller northern section where the population density is higher. There were 1200 voters in the village; however, the study is restricted to the southern part of the village where a

single landlord called Sanjay Singh owns most of the land. The family owns distinct portions of the land as a means to avoid the Agricultural Land Ceiling Act of the government. The grandfather of the present generation was a feudal landlord and his landholding was much more than the 200 hectares held by the present generation of his descendants.

There were approximately 500 houses in this village with 8-10 family members and only 4-6 families owning cattle and using animal energy for farming operations. All other farmers used tractors and there were 20 odd tractor operators in the village. Electricity supply was highly erratic and there was only 4-8 hours supply between October to February and 8-10 hours supply during the seasons when irrigation was required.

The family of Sanjay Singh owns most of the landed properties of the village. The large *haveli* owned by Mr. Sanjay Singh's family was not occupied by any of his family members, who preferred living at Allahabad and other cities and visited the village only occasionally. He claimed that their family wanted development in the village but the plight and precarious living conditions of the remaining villagers told a different story. It is apparent that Singh's grandfather (though not educated in the literal sense) wanted development of their farm and ensured that the deep tube well was installed in the vicinity of their farmlands as long back as the early 1960s when the village was electrified. Most of the villagers living in the village were landless labourers working on Sanjay Singh's farm.

The village farmers use chemical fertilisers liberally and apply limited quantities of farmyard manure (compost) for cultivation. Apart from electrified groundwater pumping, chemical fertilisers and tractor-driven intensive agriculture was being practised. In the recent past, cultivation of *arhar* and other *dals* was reducing due to damage to the crops by the roaming herds of *Nilgai* whose number has increased significantly in the recent past.

It was reported that due to the limited time available to plough the land between two crops, large farmers in the area preferred mechanised farming notwithstanding the deleterious long-term impact of intensive agriculture to the crop production capacities of the soil. Moreover, there was a clear tendency to concentrate on cultivation of wheat and rice, which gave better returns than *dal*. Most of the big landlords preferred to live in cities as they wanted to give their children English medium education and also enjoy the comforts of a city. This growing trend of absentee landlordism was resulting in changing farming practices.

There was a clear trend to switch over from cultivation of pulses and grains to horticulture, as this allowed the landlords to live in cities without having to look after the crops on a day-to-day basis. All that was required was annual tillage, application of fertilisers and auctioning of the orchards without having to bother about day-to-day care required by foodgrain-based crops. Moreover, in the absence of the owners, it was not possible to rear domesticated animals such as cows and buffaloes, which require constant attention. The net result was a reduction in the production of food rich in proteins and production of staple diets rich in carbohydrates. Moreover, in the absence of cattle, application of organic manures has drastically reduced, thereby degrading the structure and texture of soil, reducing porosity, aeration and percolation characteristics of the soil.

Even small farmers were practising intensive agriculture and not bothered or aware about the long-term deleterious effects of these practices on the agro-ecosystem. Further, the reason given was that even though in the *kachar* region, i.e. the land area submerged by the Ganges during its maximum volume of water flow, agricultural practices were dependent upon natural silt deposition and chemical fertilisers were not being applied. This resulted in lower per hectare yields but, unlike in western markets, these organically grown crops did not fetch higher prices and hence there was no inducement for switching over to sustainable agricultural practices. Thus, the farmers, both small and large, were interested only in maximising their yields and not bothered about agro-ecosystem deterioration, loss of agro biodiversity and absence of cultivation of indigenous strains of crops.

This trend in conversion of agricultural lands into orchards was also reducing employment opportunities for the landless labourers who basically belong to the scheduled castes, forcing them to travel 30 odd kms to the city of Allahabad to work in highly erratic jobs as construction or road building. Subsistence level existence and increasing semi-starvation haunted these landless families.

There were two government primary schools, with one of the schools constructed on land donated by the *Gram Samaj* and the landlords. In this school, there were two teachers and one of them travelled every day from the city and taught the children and as a result the class started two hours late and ended an hour

early. There were more than 200 children studying in this school. The school building was very weak and the hand pump for drinking water was not working. The school supplied grains as incentive for children attending school.

According to many parents, scholarships amounting to Rs. 300 per year were not regularly disbursed to the scheduled caste and scheduled tribe children. Moreover, free books were being provided to the children by the government up to class III while the children were asked to pay for the books in class IV and V. The scheme for appointing 'Siksha Mittre' who were paid Rs. 2250 per month and appointed for a period of 10 months a year was not functioning satisfactorily and one of the teachers had organised the services of a person to provide private tuition. This measure raised the question in the mind of the parents as to why they should pay for private tuition, which implied that the teachers were not doing justice to their jobs.

The villagers were aware of the various government schemes under which they could take loans. However, the loans were largely to initiate economic development and not to meet any consumption needs or health or social needs. As a result, the villagers resorted to usual practices of diverting the assets purchased under government schemes to pay for various exigencies or other consumption needs. Most villagers claimed that various subsidy amounts given by the government did not reach them and formed part of the incentive for the block development officials, the *panchayat* functionaries and the bank officials. There was practically 100 per cent default in repayment of the loans, the argument being that they will all jointly face the consequences of non-repayment of these loans, which in any case were not being used for the purpose they had been given. The villagers were ignorant of specific details or names of the various government schemes under which they were eligible for subsidies and/or loans.

Geeta, a poor woman, works as a domestic help in the family of the landlord and earns Rs. 250 per month. Her husband was totally incapacitated by asthma or perhaps tuberculosis. She had been married for 12 years and had two sons alive while four children had died. She was pregnant again even after having undergone a family planning operation. Her husband took a loan for Rs. 5000 to start a cycle repair shop. However, he could not run the shop successfully and now was not in a position to repay the loan. He hoped that the loan would be waived off through the help of the landlord for whom Geeta worked. She felt that it was good when the landlord's family visited the village because then she got to cook the food for the landlords' family and in addition to her salary was allowed to eat the food as well. But when there was nobody living in the landlord's house, she had to manage all the expenses from the paltry Rs. 250 per month paid as salary to her. She wanted and was looking for work, in fact any type of work to increase her income.

According to many farmers, they are faced with continuous reduction in their returns due to increase in inputs, reducing or stagnant prices of produces. Though the village is well connected to the towns, agriculture is not linked to any market-oriented production, rather the landlords living in the towns do it in a safe way. The crops are chosen based on ease of cultivation rather than any economic consideration. In general, most of the villagers seem to have known adequately about many of the government's schemes, which are felt as doles rather than any planned programme to develop the poor in the villages.

6.4.2. A Village in the Urban Fringe-Munghari Village, Karchana Tehsil of Allahabad District in Uttar Pradesh

The Munghari village lies on the Allahabad-Mirzapur Road approximately 15 kms from the industrial district of Naini on the outskirts of Allahabad across the river Jamuna. The village can be reached by metalled road and takes less than an hour to drive from Allahabad. The village has a population of 14000 people and encompasses 1800 families. There were 315 families in Munghari proper without including the hamlets. On an average, a family has 8 members. The remaining hamlets had a population of 7000 people. The main occupation of the villagers was agriculture and there was 200 acres of farmland. There were about 570 *harijan* families living in the 18 hamlets while the total population in the village proper was 7000.

There were 8 deep tube wells installed by the government providing irrigation to the crops. There were also 25 privately owned hand pumpsets. Two to three crops were being grown every year. During the *kharif* season, paddy, *urad, bajra, til, moong and jowar* were cultivated. In the summer months, *moong* and vegetables were cultivated. Out of the 570 scheduled caste (SC) families, around 5 per cent own 1-3 *bigha* (1.5 *bigha*=1 acre) cultivable land while the remaining members of the SC families worked as agricultural labourers or industrial labourers in the factories located at Naini. There were around 45 upper caste families owning 25-30 *bighas* of land each (around 20 acres of

land). The landless labourers earn Rs. 40 per day as daily wage while in the industries in Naini men earn Rs. 50 per day for their labour while women were paid around Rs. 20 per day.

There were 2 schools in the village, both co-educational, the first school had 4 teachers and 208 students while the second school had 5 teachers and 325 students.Three kilos of rice was being given to each student per month irrespective of caste except in the months of May and June when the schools were closed. The *harijan* students were being given a scholarship of Rs. 25 per month. This scholarship was withdrawn if the student failed to pass the examinations. Thus, there was a balance of the grants received, which was refunded to the government when the scholarships were withdrawn. Scholarships were given to backward classes up to V standard only. Minority communities including Muslims were also receiving scholarships. In addition, there were four private schools including Vishwanath Chaurasia High School, Shri Dhanudhar Jha Poorva Madhyamic, L.P. Convent up to V standard and Saraswati Shishu Mandir up to VIII standard. Average number of children in a *harijan* family was 4 and most of them attended schools. It is estimated that approximately 80 per cent of the girls were going to schools, while the remaining 20 per cent did not attend schools primarily due to financial reasons. Scholarships were not received on time.

The most common diseases among women included leucorrhoea, anaemia, vitamin deficiency, etc. Vitamin A deficiency was common amongst women, males and children as well. Women got up at 4-5 a.m. and worked till 10 p.m. at night, which was roughly twice the number of hours worked by men. There were 34 cases of hysterectomy operations in 2001. The other family planning measures including condoms, copper-T, etc. were being supplied by the PHC sub-centre existing in the village. The PHC in Karchana *tehsil* and its sub-centres were highly effective in providing health services to the villagers including provision of vaccination against tetanus, iron and folic acid supplementation during pregnancy and common medicines such as paracetamol, aspirin, etc. from the sub-centre. There was acute vitamin A deficiency in the community and it was freely distributed by the PHC sub-centre. The government health worker was regularly visiting the village and the PHC system of health care seems to be effective.

Many *harijan* families own cattle for milk production with the average yield of 2-3 litres of milk per cow per day. Children were being given milk although the major portion was sold for money. The villagers were aware of the government schemes including Swarnajayanti Grameen Swarozgar Yojana (SGSY), Anthodaya, etc. The bank officials usually took 8 per cent of the total subsidy-cum-loan sanctioned while the block development officials took 12 per cent as their share and of late the *gram sabha* functionaries have also started taking 3 to 4 per cent. The loan component alone was being disbursed to the villagers in full. There were 10-15 villagers who claimed as not having received loans but were being hauled up by the government authorities for repayment of loans as outstanding against their names.

There were 165 people along with 8 widows receiving Rs. 125 per month as old age pension. The villagers were aware of the stipulations that all elderly people over the age of 65 were eligible for pensions but only a few were receiving them due to a shortage of budgetary provisions. There were also cases of those who did not meet the criteria yet received pensions due to their connections while there were some who fulfilled the criteria but did not receive pensions. The villagers wanted middlemen to be eliminated from the process of disbursement of loan and subsidy.

There were approximately 25 heads receiving 25 kg of grain per month which was recently raised to 35 kg per month per head being disbursed to Anthodaya card holders. This included 12 kg of rice and 23 kg of wheat, at Rs. 2 per kg of wheat and Rs. 3 per kg of rice per day for red card holders whereas the green colour card holders, known as Annapoorna scheme for people over the age of 65 years and above, were receiving 10 kg of wheat free of cost per month. The white card holders i.e. family below the poverty line numbering 189 were being offered grains at costs higher than the market rate and hence people were not availing the government facility.

Under the Indira Awas Yojana, 55 people had received grants of Rs. 15000 to Rs. 16000 each since 1988 for construction of brick houses. The villagers were aware that the government provision under the scheme was a grant of Rs. 20000 while the block development officials and the bank authorities were usurping Rs. 4000 to Rs. 5000. Under the Pregnant Women Scheme (Maitritv Labh Yojana), women from below the poverty line families were being paid Rs. 500 each for the first two children. The below poverty line card was not foolproof as other members of the family did not get the benefits of this scheme

and only the person in whose name the card was made was entitled to the benefits. Under the Baalika Samridhi Yojana, Rs. 500 per girl child born was being given to below poverty line families for the first and the second child.

This village case study indicated that the notion that government schemes existed only on paper could not be generalised across the board as the people were receiving benefits, albeit if not the entire amounts, at least partially. However, corruption and lack of motivation amongst government and bank officials remains a severe bottleneck hampering effectiveness in the implementation of government programmes. On the contrary, the public health system which is notoriously ill-reputed cannot be generalised across the board as the public health system from the general hospital downwards to the PHC and sub-centres were found to be functioning effectively in this *tehsil*. This is solely attributed to the management of the centres by efficient doctors and the custom set in the hospital over a period of time.

6.4.3. *Village with Uttar Pradesh Diversified Agriculture Support Project (UADASP) Project-Chakbankat, Daulatpur and Bhadsar Villages of Bakshi ka Talaab Tehsil in Lucknow District*

Around 30 kms from the city of Lucknow, Bakshi ka Talaab Tehsil on Sitapur road, north-west towards Delhi lies the block of Bakshi ka Talaab and village Chakbankat. This *Gram Panchayat* comprises nine villages including:

1. Barikat,
2. Lahupur,
3. Daulatpur,
4. Tarainchapurwa,
5. Bouriapurwa,
6. Belsinghpur,
7. Biblipur,
8. Bendhaura, and
9. Chawaranpurwa.

Chakbankat has an approximate population of 800 people with 300 voters. Since the *Panchayat Sarpanch* or *Gram Sabha Pradhaan* Shri Sunderlal, belongs to another village and was not supported by the villagers of Chakbankat in the elections, he neglects the development of the village and hinders the government programmes from reaching the village. The villagers participating in the exercise felt that government programmes such as the Indira Awas Yojana, Vriddha Pension and Widhwa Pension were not being implemented in the village.

The households in the entire hamlet are by and large below the poverty line. Families and women were practically illiterate. As labourers, the villagers fetched an income of Rs. 30 per day. The men did not approve of using family planning methods. DPT, tetanus vaccination, BCG, etc. and medicines that were supposed to be for free distribution were in fact being sold for a price by the PHC authorities. The average number of children per family was four.

In this village, the Central Integrated Pest Management Centre (CIPMC)—a wing of the Directorate of Plant protection, Quarantine and Storage, Ministry of Agriculture, Government of India has implemented an Integrated Pest Management (IPM) Programme over a period of 2 to 3 months in 2001. The CIPMC was the first to implement a programme on IPM in the village. However, the villagers were still apprehensive about the technological package of practices recommended under the programme and require periodical convincing. The villagers displayed a reasonable grasp over organic plant protection methods promoted by the officials of the CIPMC, Lucknow.

After village mapping, the investigators proceeded to Bhadsar village where the World Bank funded Diversified Agriculture Support Project (DASP), was being implemented by the District Project Coordination Unit set up by the Government of Uttar Pradesh under the DASP Project Management. The basic premise being promoted under the DASP project was reduced dependence on chemical applications that were deleterious and increased use of organic techniques for sustainable agro-ecosystem management. IPM measures were being promoted under the project on rice and mango crops. Insecticide use was being reduced to allow for survival of beneficial insects supported by compost application in 30-40 acres.

The DASP project envisaged coverage of 20 per cent of the villages in the first year in the Bakshi ka Talaab block, 40 per cent of the *gram sabha* coverage in the second year and 40 per cent coverage in the final year of the project, thereby the full block was being covered. However, in this village the project has completed its organising and promotional activity through the identified NGOs. The project implementation under phase-I was started in the year 2000. The four major components of the project were:

1. **Group Formation:** linked to agricultural activities with both male and female participation and promotion of integrated pest management techniques. Training to groups on seed banks, demonstration, women self-help group formation

and operation, vermicomposting including provision of nuclear earthworm cultures, production and manufacture of pickles, *papad*, *sattu,* etc. was being promoted. The male groups were being taught vermicomposting, NADEP composting, IPM, Integrated Plant Nutrient Management (IPNM), etc. through training and demonstrations.

2. **Integrated plant nutrient management:** included supply of micronutrients, nitrogen, potassium, phosphorus, etc. from organic sources.
3. **Bio-village and seed-village promotion:** including NADEP composting in above the ground brick 3.3 * 2 * 1 metre structures, cow pad pit (3 feet * 2 feet * 1.5 feet pits) by preparation of NADEP pits collection and composting of farmyard wastes, cow dung, etc.
4. **Area expansion through rapid extension:** and promotional measures for comprehensive impact.

Horticulture and floriculture were being promoted in the village. Bioorganics including bioinsecticides produced by various private companies were also being experimented with to prove efficacy. Use of Trichoderma, a type of soil fungi was being done for seed and soil treatment as a biofungicide. Low Tunnel Poly Viruses including Nuclear Polyhydrosis Virus to tunnel poly hoses used for vegetable nursery raising, insect predation prevention, disease prevention including viral infections, climatic adverse conditions acclimatisation, off-season cultivation, etc. made possible through temperature control, maturity promotion which were 8-10 days faster were being demonstrated. In addition, post-harvest technology for grading and processing was also being demonstrated and promoted through demonstration and training. Cross breeding through artificial insemination and re-conservation through crossing with sahiwal cows and murrah buffaloes to improve milk yield were also being promoted.

Sarvodaya Ashram Hardoi and Arthik Vikas Jan Kalyan Sanstha were the two NGOs involved in the grassroots level village promotion work. Information about the scope of the activities under the DASP project at the grassroots level was provided through focus group discussions with R.K. Singh, Block Coordinator and S.K. Tiwari, Block Level Functionary (Horticulture). The local facilitators were Geeta Singh from the Block Development Office and B.S. Kushwaha from the CIPMC, Lucknow.

6.4.4. A Village with Swa Shakthi Project-Ganeshpur Village in Bakhua Gram Sabha of Muhmadabad Tehsil in Sitapur District

The village can be reached by road from Lucknow on the Sitapur road after an estimated travel of three hours by public transport. The village has a total of 20 families and a population of 200 with an average family size of 10. Seven of the houses are of *harijan* families. On an average, the landholding per family was five *kutcha bighas* or one acre approximately. One family (*Chamaar*) did not own any land at all.

The predominant occupation in the village was agriculture. The total area of the village was three hectares (approximately 30000 square metres). No one from the village went to work outside the village. Two to three crops were being cultivated per year although sugarcane, which is an annual crop, was also cultivated. Wheat, rice and peppermint were the other major crops. Chemical fertilisers and some farmyard manure were used. Chemical pesticides predominantly Furadon was used in rice pest control. The source of water was tube well. Fifty per cent of the people were dependent on farm labour work for their livelihoods. Oil of peppermint was sold at Rs. 270 per kg. Peppermint distillation first started at Barabunki by CIMAP and later spread to the other villages. Peppermint distillation in this village was started about 10 years ago.

Women in the village woke up at 3 a.m. and attended to the household chores with cooking being completed by 7.15 a.m. Other household chores including serving of lunch was completed by 1 p.m. Supper started at around 6 p.m. and women went to bed at 10.00 p.m. Some women also ran shops called *kirana* shops. There were no schools in this village and the nearest school was situated at Bakhua Gram Sabha which was one km away. All girls were going to school.

An old man named Devi Dayal who estimated his age to be 70 years indicated that children had educational facilities even when he was a child. He also indicated that the first bore well was dug in 1960 and the boring was up to 60-65 feet. Chemical fertilisers were being used for the past 30-35 years. Scholarships were offered only in government schools and *anganwadis*.

An NGO called NEED (Network of Entrepreneurship & Economic Development) has been working in the village since 2001 and has facilitated formation of a women's group called Vikas Swashakti Sangh Samooh. This group had 13 members. The basic activity of this group included credit and thrift and recently NEED had

been able to facilitate linkage with the bank through which now the village women can avail of a bank loan 144 times the amount they were saving on a monthly basis or four times the total capital in their credit and thrift fund.

NEED was promoting health awareness, education, consciousness about environmental issues, sanitation and hygiene. Woman practiced family planning and after the desired number of children, they went for hysterectomy operations performed in government hospitals. Pulse polio immunisation camps had been held in the village and due to the awareness created by NEED it was well received. Tetanus vaccination, iron and folic acid supplementation was being provided to the pregnant women due to the efforts of NEED.

The village women were aware that the project implemented by NEED was part of the Swa Shakti Project of the Government financially supported by the World Bank. They were also aware of other government programmes such as:

1. **Indira Awas Yojana:** under which two people received Rs. 17000 each. They were aware that the bank officials and block development officials have usurped Rs. 3000 each, as the entitlement under the programme was Rs. 20000.
2. **Pregnant Women Scheme (Maitritv Labh Yojana):** under which two women from below poverty line families have benefited by receiving Rs. 500 each on the birth of their children.
3. **Baalika Samridhi Yojana:** the village women were aware that under this programme below poverty line families were entitled to receive Rs. 500 each for the first and the second girl child born to them. However, there were no beneficiaries under this scheme in the village so far.
4. **Antodaya:** under which there were three beneficiaries.
5. **Annapoorna:** under which there were two beneficiaries.
6. **Swarnajayanti Gram Swarajya Yojana:** under which a mud road construction had been initiated in 2002. Apart from the benefits of the road, the villagers were benefitting from working as labourers and receiving Rs. 28 in cash and Rs. 30 worth of wheat per day as labour charges. Only men went to work as labourers.

The women hope to take up stitching, embroidery, processing and packaging of pulses, etc. as a cottage industry when they had accumulated sufficient capital and also by taking a loan from the bank under the Swashakti Swayam Sahayatha Samooh (self-help group) promoted by NEED. However, the women were apprehensive about their capacity to go out of the village and take up marketing work related to the sale of their products.

6.4.5. A Village with a Long Standing NGO Work- Salarpur Village in Rasoorgarh Gram Sabha of Chirigaon Block in Varanasi Tehsil in Varanasi District

The village has a total population of 12000 and on an average there were 8-10 members in a family. *Harijan* families number 120 while there were no Muslim families and most of the others belong to the land owning class called Kushwaha (Maurya). Though Kushwahas own land, they also get Uttar Pradesh government reservation benefits like the scheduled castes.

The women and children from the *harijan* families worked on piecemeal seasonal jobs such as peeling green gram, packaging *bindis* (bought by urban women as a cosmetic) on ridiculously low incomes. The women were earning less than Rs. 10 per day through these activities done for outside merchants. They were interested in income generating activities but they are unable to go out of the village in search of work due to traditional customs and values.

The entire family was dependent on the male members who essentially worked as construction labour or as masons in far off places to support their families and these *harijan* families were just barely surviving. The women indicated that their major problem was the absence of latrines.

There were two self-help groups for women organised by the Centre for Social Research (CSR), a Delhi-based NGO working in a cluster of 20 odd villages in and around the Chirigaon block of Varanasi. The women were contributing Rs. 40 per member to the credit and thrift fund of the SHG. In the absence of the ability to operate a bank account, the money was kept in a box while the keys of the box were kept in the custody of the President of the SHG. Small consumption loans at two per cent monthly interest were given to members of the SHG.

The orthodox and traditional society did not permit the families to send their girl child out of the village

for primary education. However, the villagers welcomed the opportunity provided by the CSR of opening a primary school for girls in the village premises itself. Most of the developmental activities in a cluster of 20 odd villages were in the area of women's development and empowerment and were being implemented by the Centre for Social Research.

CSR has selected the following three focal areas for concentrated impact:

1. Political empowerment of women by enabling them to participate socially as equal to men specially in the *Panchayati Raj* system.
2. Economic empowerment of women by enabling institutionalisation through organisation of self-help groups, *mahila mandals*, focussing on credit and thrift activities.
3. Sexual empowerment of women by promoting reproductive and child health and addressing the social issue of the rights to the decisions made regarding the number of children, child spacing and rights over their own bodies, use of reversible contraceptives, etc.
4. Primary and vocational education of the girl child, adolescents and women.

The village is characterised by caste-based discrimination, acute poverty and lack of education amongst the people. Exploitation, lack of opportunities and subjugation is the cause for reducing them to a state of fatalism and acceptance of the fact that they are destined to a state of poverty and hunger in their lives.

6.4.6. Balon Village in Dibai Tehsil of Bulandshahr District

The village is located as far as 60 kms from Bulandshahr on Delhi-Badaiu (Moradabad) highway. However, the visitor would be surprised to find the absence of a single thatched roof house even in the *harijan basti*. All houses are built of cement concrete and the remarkable degree of urbanisation strikes you with electricity connections, piped water supply and television sets with cable attachments throughout the village. There were two nationalised banks in the village, five primary schools (three run by the government and two private schools, while two of the primary schools run by the government were for girls only). There was a PHC sub-centre in the village with the PHC situated at the Kasau village. The ANM visited the village regularly and pulse polio camp had been organised. Folic acid, iron supplementation and anti-tetanus vaccinations were being given to all pregnant women. While the people did not object to children being vaccinated but the emergence of mischief-makers has resulted in people resisting distribution of vitamin A supplements.

There were 1200 families in the village and on an average had 7 members. There was a total population of 7500 in the village. The basic problem the villagers felt was the lack of proper drainage systems connected to their toilets as in large cities. There were 2 *haats* in the village and 60 *harijan* families, most of whom did not own any agricultural land and had to migrate outside the village for earning their livelihood. There were 200 *jatavs* (SC families) and 10 per cent of the households belong to landowners.

Fifty per cent of child deliveries were performed in the houses. At present a quack lady doctor was delivering and facilitating childbirth in the village and the villagers wanted a regular hospital to be opened in their vicinity.

Some of the *harijan* families had received Rs. 16000 under the Indira Awas Yojana to construct their houses. The villagers were aware that the block development officers and the bank employees had usurped Rs. 4000 and their entitlement was Rs. 20000 under the Indira Awas Yojana. Some people had also received loans to start micro-enterprises under the Prime Minister's Rozgaar Yojana.

Electricity supply was erratic and transmission lines not of adequate quality even though the village was within a five kilometre radius of the Narora atomic power project which had earlier promised to provide 24 hours of uninterrupted power supply to the inhabitants within the above-mentioned radius of the atomic power station. The Narora atomic power plant project had also promised medical facilities for all villages within this radius of the project, which had not been realised.

The Government of the Uttar Pradesh, Department of Irrigation was blamed by the villagers for not maintaining the branch canals and supplying water for irrigation. Three crops were being cultivated including *rabi, kharif* and *jaid*. Chemical fertilisers (NPK) are extensively used and agricultural operations were mechanised. The landless in the village preferred migrating to cities in search of livelihood and supply of agricultural labour was dependent on migrations from other places into the village. The acute scarcity of agricultural labour was cited as one of the reasons for the use of tractors. Intensive agricultural practices were

defended on the ground that the availability of time for preparation of the land before the next crop was so less that bullock-driven agriculture was not feasible. Moreover, use of hybrid seeds and chemical fertilisers enhanced yields by a factor of four. An interesting factor that came to light was that in the neighbouring district of Moradabad, where the landholdings were small and tractor-driven tillage was not possible, people had reverted back to the use of bullocks for tillage of land. Thus, further division of the land will make it impossible to practice tractor-driven agriculture and result in reintroduction of traditional tillage practices. However, they were very clear for the time being that people would not take up organic farming methods or practice sustainable agriculture.

A meeting with the women and talking to them about their daily routine indicated that most women woke up around 5 a.m. while those who owned cattle woke up even earlier as they had to tend to the cattle and milk the animals. After taking care of personal hygiene, the women cleaned the house, which took approximately one hour followed by washing of utensils and cooking breakfast for school going children and preparing them for school. They serve tea and breakfast for rest of the family around 7.30 a.m. Those involved in farming went to the fields at 7.30 a.m. and came back at 10.00 a.m. to do the rest of the household work. Ladies from non-farming families on the other hand finished the normal household chores by 8 a.m. The women performed *pooja* and other related activities till 11 a.m. before cooking lunch which finished by 12 noon. Lunch was usually served at 1 p.m. and the children returned from school at 2 p.m. when lunch was served to them. The women rested from 3-4.30 p.m. in the afternoon and elderly ladies were allowed to gossip and socialising in the evenings. The younger ladies were required to clean and cut vegetables for preparation of dinner. Dinner was usually served between 8-9 p.m. after which the women watched TV before going to bed around 10 p.m. They claim that prosperity in the village was not due to any help from the government but was achieved through the efforts of the villagers. Their expectations included a good school, training centre for women and a hospital in the village.

6.4.7 A Swajal Village-Simathri Village, Moth Tehsil in Chiragaon Block of Jhansi District

To reach the village one has to travel 30 kms from Jhansi on the Jhansi–Kanpur highway and another seven kilometres on the village roads before reaching Simathri. The village has a total of 268 families (households) including about 80 *harijan* families. Some (a few) own less than one acre of cultivable land amongst SC, ST families. The village has approximately 1000 acres of arable land. Two crops per year are usually cultivated. The maximum landholding per family is around eight acres and minimum is one bigha (2.5 bigha=1 acre). Migration in search of work was limited as those who owned limited or no agricultural land preferred to undertake share cropping to migration in search of work outside the village.

One private primary school and one government-run primary school are present in the village. There is one *anganwadi* in the Centre and one post office in the village. The PHC is located seven kms away at Chiragaon. Private doctors are preferred for treatment and child delivery at Chiragaon instead of the government PHC facilities. Complicated cases are taken to Jhansi for treatment. The ANM visits and gives tetanus vaccination. Children are given all the six vaccinations including pulse polio drops. There is no objection from parents to vaccination of the children.

The Bundelkhand region in the state of Uttar Pradesh is the only place where the Swajal Project, a World Bank funded government project, primarily aimed at providing accessible drinking water supplies and organising the community to form self-help groups with the primary objective of capital formation to initiate economic activities or give consumption loans, is being implemented. Under the project, provisions are provided for a Support Organisation (SO), typically a local NGO to interact with the village community and form a village institution called the Village Potable Water and Sanitation Committee (VWSC). The VWSC and the SO implement the project jointly and the progress is monitored with fund release functions being linked to progress by the District Project Management Unit (DPMU) of the Swajal project that is part of the government structure responsible for implementation of the project.

The Swajal project has a one year planning phase in which VWSC is formed including the holding of an 'agree to do' (ATD) meeting to select the most feasible option amongst three possible choices including installation of hand pumps, tube well (or open well) with tank and/or mini-piped water supply or just piped water supply to the entire village. In mini-piped water supply option, a single source of water, usually groundwater, is used to fill a tank and provide piped water in village clusters (*mohalla*). Other parts of the village where installation of hand pumps or bore well are possible options, these are also used to provide

water supply coverage to the entire village. VSWC is independent of the elected *Panchayat* body and is a voluntary body of the villagers. These volunteers are entitled to reimbursement of incidental costs for travel, etc. However, it is claimed that they are not given any honorarium or salaries.

The SO is responsible for providing technical support for which funds are provided from the Swajal project. The Swajal project also pays the SO the costs of execution and salaries of two personnel including a social developmental professional and a civil engineer or other technical professional responsible for providing technical assistance to the VWSC. The SO is thus required to maintain two accounts, one for its own costs and one for the costs of installation, fabrication, construction of the piped water supply system, hand pumps, the other for provisions, etc. In case the project is not completed as per schedule, the cost of time overruns has to be borne by the SO. In this village, Development Alternatives, a Delhi-based NGO with its field office located at Taragram, Orcha, around 40 kms from the village is the SO.

Planning includes identification of technical choices (feasibility) and cost estimate preparation, which is completed in one year's time, and the DPR (Detailed Project Report) is the output of the planning phase. Joint accounts operated by the representatives of VWSC and the SO are formed in the implementation phase of nine months for hand pump installation, 12 months for mini-piped water supply and 15 months time frame for piped water supply systems. Piped water supply programme envisages the likely population growth in 20 years and makes provisions to cater to this population by way of capacity of the overhead tank. The overhead tank is designed to provide 50 litres of water per capita to the villagers and the likely population even after 20 years from the implementation of the project.

The Swajal project was started in 1996 and was to end in 2002 with implementation in four batches. Development Alternatives as one of the three NGOs implementing the Swajal project in the district of Jhansi has covered 27 villages (five villages in batch I; six villages in batch II; eight villages in batch III and eight villages in batch IV). Six villages were provided with piped water supply; one village provided with mini- piped water supply and hand pumps; while the remaining villages were provided with hand pumps.

Social aspects included awareness building regarding health and hygiene (HESA–Health, Environment and Sanitation Awareness), WDI (Women Development Initiatives) including self-help group (SHG) formation plus economic activities. In this village five SHGs including four women's SHGs and one men's SHG have been formed. Community Technician (CT) and Community Worker (CW); one each for each village had been provided for and trained by the SO.

The primary activity of the SHG is credit and thrift. Each SHG has a range of 10 to 20 members. Each SHG receives a grant of Rs. 25000 in three instalments. The grants are related to the savings made by the SHG members and are subject to the members affecting savings worth a specified sum of money. Only one instalment of Rs. 5000 had been released as grant so far in this village. There is total transparency in the transaction and the villagers report no corruption or usurpation about the project.

The SHG members elect a President who deposits the collections/contributions of the members in a bank account. Each SHG member contributes a specified sum, which is same for all the members, on a monthly basis ranging from Rs. 20 to 100. All contributors must contribute the same amount and no variations are allowed. Monthly meetings are held to give loans to the members, a process that is called 'inter-loaning.' These loans attract a monthly interest of two per cent of the loan amount. Consumption loans and loans for income-generating activities are thus, possible. Collective income generating projects are envisaged after the capital grows. The Swajal project envisages giving of matching grants of Rs. 5000 after the SHG members had saved Rs. 5000 (from contributions alone and excluding the interest income from inter-loaning).

A second instalment of Rs. 10000 as matching grant would be released from the Swajal project after the SHG members' contribution/savings exceed Rs. 15000 while a final instalment of Rs. 10000 would be released after the savings exceed Rs. 25000. These funds must be from the savings alone and should not include interest earned from inter-loaning. Thus, the maximum matching contribution possible is Rs. 25000 and is known as the PRIP grant from the Swajal project. If the SHG members wish to launch any developmental project, the entire second and third instalments of the matching contribution can be given in advance.

Linkages are made with the banks for giving loans. Banks can give loans amounting to 144 times the monthly contributions of the SHG members or four times the bank balance of the SHG savings with a maximum ceiling of Rs. 1.5 lakh/SHG for any economic activity. Thus, small-scale cottage industries promotion

is possible with the banks charging one per cent interest per month on the loan amounts. On the other hand, the inter-loaning provisions provide for a payment of two per cent interest by the person taking a loan. So far only inter-loaning has been affected without taking any loan from the bank. In this village in one of the SHGs, inter-loaning was resulting in an interest income of Rs. 1100 per month for the SHG credit and thrift fund. This SHG has already affected capital formation worth Rs. 50000 in the two and a half years since it was established.

The Swajal project envisaged preparation of an Implementation Project Completion Report (IPCR) by the SO before the final payment is released. Payment to the SO was in instalments with 50 per cent of the disbursements being affected after establishment of the Joint Account with the VWSC. Forty per cent of the amount forming was released to the SO as the second instalment, after completion of the first phase of the project activities. Ten per cent of the costs for carrying out the first phase activities and 10 per cent of the implementation phase costs were planned for release after submission of the IPCRs.

The social component of the project envisaged reproductive and child health awareness, village cleanliness and prevention of stagnant pools of water near the hand pumps, collection of Rs. 4/month from each family for meeting the costs of repair of the hand pumps by the VWSC. As a result of these measures, all the hand pumps installed under the Swajal project were working well while some of the hand pumps installed by the Jal Nigam were defunct for want of proper repair and maintenance.

Other activities included vaccination and preventive medicine awareness, delivery/child birth, *dais* training, adult education for literacy of the women SHG members, construction of toilets linked to soak pits and training of Village Maintenance Worker for undertaking repairs and maintenance work of the hand pumps on payment basis from the funds collected by the VWSC from each family using the hand pumps.

Two hundred and twenty toilets linked to soak pits had been constructed under the project, making it one of the cleanest villages in Uttar Pradesh. These toilets were fitted with slanting WCs designed to reduce the water required to flush and also allowing the soak pits to absorb the amount of water and excreta flowing in. Construction of these toilets had positive implications for environmental sanitation as people did not have to defaecate in the open agricultural fields. In addition, 17 kitchen gardens had been started using wastewater for irrigation in the village. Ten families had also taken the initiative to dig 32 compost pits. Plantation of horticultural trees including *amla*, mango, citrus, guava and *jamun* was also being undertaken under the project.

The impact on women due to the Swajal project included four functional SHGs. For example, in one of these SHGs called Mahalakshmi Self Help Group, 10 women were saving Rs. 100 each per month and had affected savings worth Rs. 29000 in the 29 months that the SHG was working. They had also received matching contribution worth Rs. 5000 from the project. While inter-loaning was the only activity so far, the women members were contemplating starting food processing, packaging, establishing flour mills and marketing of their value added products once sufficient capital formation had been affected.

6.4.8. A Swajal Village-Garhmau Village in Jhansi Tehsil of Baragaon Block in Jhansi District

In this village, two SHGs formed had 10 and 11 women members and the members were saving Rs. 30 each per month for the last 10 months since its inception. Inter-loaning was practiced for such exigencies as payment of children's school fees, purchase of agricultural inputs, loans for treatment of sick family members, etc. The women were contemplating purchase of *shamans* and tents for renting out for parties, meetings, marriages, etc. and taking up small domestic animal rearing work such as goats and sheep. Women had benefitted from time and labour saved in the collection of water from a single source as practiced earlier.

A standby arrangement for pumping water is also being implemented with generator back up to pump water from the bore well. Nineteen tap stands and 20 individual connections had been provided under the project. Individual connections cost Rs. 1000 per installation and those taking water from the tap stand had to pay Rs. 550 each for shared water supply. In addition those with individual household connections were paying Rs. 100 per connection while those drawing water from the common tap stands were paying Rs. 20 per house per month. A little more than 200 families representing a population of 1500 had benefitted from improved water supply. In addition, more than 200 toilets had been set up in individual households resulting in the village winning a government award for being the cleanest village in the state of Uttar Pradesh.

6.4.9. Bhojla Village, Jhansi Tehsil in Baragaon Block in Jhansi District

This village, approximately 12 kms away from Jhansi, requires a visitor to travel for 5 to 6 kms on the Jhansi-Gwalior road before turning to the Gwalior-Unnaobalaji road to travel about 7 kms. For a long stretch, the Unnaobalaji road is in a bad condition.

The village has 712 households (families) and a total population of 3100. There are two government run schools, one up to class V and the other up to class VIII in the village. In addition, there are four private schools, one up to 10th standard and three schools up to class VIII. There were 152 *harijan* families with some being totally landless. With the majority of the *harijan* families owning around one acre of land, they preferred livelihoods based on agricultural cultivation on their own lands and through share cropping instead of migrating in search of livelihoods elsewhere.

The Swajal project was also being implemented in this village. Basundhara, a grassroots implementing NGO from Jhansi was the Support Organisation in this village. Mini-piped water supply scheme was under implementation in this village and 10 private domestic water supply connections had been provided with the tap stand connections requiring users to pay Rs. 50 per family as installation costs while the private connections were provided to those who had paid Rs. 1000 for installation. Mini-piped water supply was being provided in two clusters to 90 families. In addition, 29 hand pumps have also been installed.

Bundelkhand typically is categorised by low soil depth with bedrock at 4 to 5 feet below the soil surface and salinity in groundwater. In this village a fresh water aquifer has been struck at a bore depth of 150 feet with 100 litres of water yield per minute. The entire yield would be used for filling an overhead tank that is having a designed capacity of 10000 litres. Hand pump installations also require drilling of up to 150 feet depth.

Three SHG women groups had been formed. Progress in the implementation of the Swajal project in this village has been affected by delays in implementing the project by another NGO. The village forms part of the batch IV villages started in 1999. As a result of the delay of six months, a new NGO was identified to do the organising job. Soon after the agency was selected, work was restarted in January 2001. Due to these delays, Basundhara had to complete the planning phase in a period of three months only, which preceded signing of an agreement for the implementation phase in September 2001 for 12 months.

Basundhara faced difficulties initially in building rapport with the community, as the three months planning phase was not adequate to build community goodwill and mobilise community participation. Moreover, there were questions and delays involved in accepting the design of the overhead tank for the mini- piped water supply scheme at higher government levels causing further delays. As a result, the project is now moving into a consolidation phase including maintenance and construction of the overhead tank and other pending jobs being taken up in the consolidation phase. Twenty-nine hand pumps, 72 toilets and 22 compost pits have already been installed/constructed.

Social aspects include health awareness training and impact assessment through three-monthly surveys to ascertain the efficacy of health awareness training measures such as steps to assure safe drinking water and safe disposal of waste. A PHC exists in the village and was served by a doctor and ANM. The ANM and the social worker of the SO were involved in conducting the health training programmes. Pulse polio camp was well received. All six vaccinations were being provided by the ANM to children as also folic acid and iron supplementation and immunisation against tetanus provided to pregnant women at no cost. The doctor attended the PHC daily and provided adequate health services.

The Mozer model was adopted to evaluate the success of the Swajal Project. The model indicated that women saved approximately 4 to 5 hours of time, earlier spent in fetching potable water for the family. This fact had brought about dramatic changes in the daily routine of the women. Earlier they got up at 4-5 a.m. and worked non-stop till 11 p.m. snatching a bare five hours of sleep every night. The Swajal project had made it possible for the women to sleep an hour extra at night. Instead of cooking only one meal at night and feeding stale food to the family in the morning, the women were able to cook food twice a day and feed the family freshly cooked food twice a day.

Moreover, men saved Rs. 20 everyday spent earlier in eating the morning meal outside in dhabas. Due to the extra water available, the women were able to bathe twice a day in the hot climate and household cleanliness had improved. Now they were able to relax and sleep for three hours during the daytime, which was earlier used for income generating activities, once savings in their SHGs permitted initiation of these economic activities.

However, a word of caution to end this case study. The hasty implementation due to the change in SO had left a lacunae in the credit and thrift activities of the SHGs and the women required greater confidence building to collect contributions from the members and depositing the same in the bank.

An interesting sidelight during this visit was an interview with Ajit Gupta, contractor, overhead tank constructor, who was in the process of constructing the overhead tank of the village. Mr. Gupta was present during the initial briefing regarding the purpose of the visit provided to the villagers by the investigator and listened carefully to enumeration of the issues relevant to improving the quality and standard of living of women in the society in general in India. After pondering over what had been said by the investigator, Mr. Gupta expressed the observations regarding the society in general which are provided in Box 6.1.

BOX 6.1

Uttar Pradesh Today as Seen by a Contractor

Mr. Gupta felt that general awareness and education had improved information flow even in villages. Many people were now reading the newspaper and were aware about what was happening in the world outside. This enhanced awareness but at the same time eroded morals and ethics. When a common man read about large scams and illegal usurpation of money by politicians, he also started dreaming of making money using unfair means. Education was, thus, making people think negatively and committing similar 'ghutalas' as the politicians. People were being made corrupt by a top-down process and emulating the values of the country's leaders. Mr. Gupta felt that if the leaders were dishonest and willing to do anything to retain power, the common man felt justified in wanting to follow suit.

As a contractor, he visited government offices frequently and was amazed to find officials consuming alcoholic drinks during office hours sitting in their seats and gambling, totally disregarding their social obligations and commitment to work in return for the salary they were getting. Bribes were the only motivating factor through which the public could get work done in these government offices. However, he drew attention to a hoarding he had read on a truck body, which stated, "*Nabbe Pratishat Chor Phir Bhi Bharat Desh Mahaan*" meaning even with 90 per cent of the population being dishonest, our country is great. He elaborated that the 10 per cent who were honest, religiously and devotedly kept working and hence this country was still running.

Centuries of feudal landlordism and subjugation had reduced the public into a state of passive acceptance of all forms of exploitation and subservience. To the question, "what then was the solution?," Mr. Gupta replied that the vested interests of the feudal landlords and upper castes were preventing education from reaching the masses. If the people got educated these feudal forces feared that the masses would teach them the laws of the land and demand for their rights and entitlements. Education was the only answer and when it reached the masses change would follow. Uttar Pradesh was following in the steps of Bihar. Kaka Hathrasi, an eminent Hindi poet has said in one of his poems "If caught for taking bribes, bribes would see to it that you got away without punishment."

6.5. Government Programmes/Schemes in Uttar Pradesh

6.5.1. Rural Water Supply

The Government of India (GoI) circulated revised guidelines in the year 2000. The prime objectives of these guidelines are as under:

- To ensure coverage of all rural habitations with access to safe drinking water.
- To ensure sustainability of the systems and sources.
- To preserve quality of water by institutionalising water quality, monitoring and surveillance through a catchment area approach.
- Introducing sector reforms by institutionalising community participation in capital cost sharing and bearing 100 per cent operation & maintenance (O&M) cost.

While implementing the Rural Water Supply Scheme, the following norms have been adopted for providing potable drinking water to the population:

- Forty litres per capita per day (lpcd) for human beings to meet the requirements, drinking three lpcd, cooking five lpcd, bathing 15 lpcd, washing utensils 7 lpcd and ablution 10 lpcd.
- With normal output of 12 litres per minute, one hand pump or stand post is provided for every 250 persons.

Demand-driven approach in place of the existing target-based/supply-driven approach emphasises:

- Community/beneficiary contributing 10 per cent of capital cost.
- The system of distribution is based on the demand of public.

- Recovery of O & M costs and replacement costs in full to ensure the financial viability and sustainability of the schemes.

An outlay of Rs. 1151.96 crores had been proposed for the Ninth Five Year Plan against which Rs. 1094.82 crores is likely to be spent.

6.5.2. Sector Reform Programme

According to ARWSP (Accelerated Rural Water Supply Programme) guidelines issued in 1999, incentives would be given to states, which initiate steps for institutionalising community participation in the rural water supply programme in the form of additional funds, as indicated below:

Twenty per cent of the annual outlay will be earmarked in accordance with the ARWSP criteria to those state governments which will implement the following broader elements of this programme:

- Adoption of a demand-driven approach based on empowerment of villagers to ensure their full participation in the project through a decision making role in the choice of scheme design and management arrangement.
- Focus on village level capacity building (Village Water and Sanitation Committees) and 10 per cent capital cost sharing.

TABLE 6.4

Allocations of the Plan-Outlay by Major Heads of Development (Rs. Crore)

Major/Minor Head Head of Development	*Tenth Five- Year Plan Proposed Outlay (at 2001-02 prices)*	*Annual Plan, 2002-03 Proposed Outlay*
Economic Services	67942.83	6912.14
Agri. & Allied Activities	5173.42	815.83
Rural Development	7267.91	1126.18
Special Area Programmes	2390.21	431.00
Irrigation & Flood Control	8070.78	1104.84
Energy	7338.72	1125.00
Industry & Minerals	1485.76	121.55
Transport	7474.14	849.76
Science, Technology & Environment	2410.25	66.00
Gen. Economic Services	26331.64	1271.98
Social Services	15862.72	1556.06
General Services	427.45	81.80
Grand Total	**84233.00**	**8550.00**

- Ensure an integrated service delivery mechanism by streamlining the functions of the agencies involved in project implementation.
- Hundred per cent sharing of O&M cost by users.
- Taking up of conservation measures for sustained supply of water through rainwater harvesting and groundwater recharge structures

6.5.3. Government Programmes

The Ministry of Rural Development is implementing a number of programmes with the support of the GoI aimed at sustainable development of rural areas with focus on the disadvantaged sections. A strategic pro-poor policy has been adopted under which the rural poor are treated as a net resource with their own ideas and experiences in tune with the local conditions. A number of new initiatives have been introduced in the course of the last two years. While some of these are based on the experience gained over the years, others are in response to the needs, which had yet to be effectively addressed.

Keeping in mind the fact that the rural roads are vital to economic growth and poverty alleviation in rural areas, in December 2000, GoI launched a major initiative—the Pradhaan Mantri Gram Sadak Yojana (PMGSY)—with the objective of providing connectivity to all unconnected habitations with a population of more than 1000 by the year 2003 and similar such villages with a population of 500 by the year 2007. This programme was started to construct all weather roads in villages with more than 1000 population by end of 2003 and in all villages by 2007. It is 100 per cent a centrally sponsored scheme. The construction work is managed by Public Works Department (PWD) and Rural Engineering services as per specifications laid down by the GoI. The *zilla parishad/village panchayat* makes annual work plans and recommendations. This scheme if of prime importance due to the importance of rural roads for economic growth and poverty alleviation.

In April 2000, GoI launched the Pradhaan Mantri Gramodaya Yojana comprising five programmes relating to rural drinking water, rural housing, primary health, primary education and nutrition. A separate department for drinking water supply in the Ministry of Rural Development, GoI was created to expedite the availability of safe drinking water to people in rural areas. The department had been mandated to provide safe drinking water in all rural habitations by 2004. To achieve this objective, many programmes like the

ARWSP and Pradhaan Mantri Gramodaya Yojana–Rural Drinking Water (PMGY-RDW) are being implemented to resolve the drinking water crisis in rural habitations.

To meet the shortage of housing in rural areas, the Government of India has launched a comprehensive Action Plan for rural housing, envisaging construction of houses and upgradation of unserviceable *kutcha* houses. The Action Plan is being implemented in various programmes such as Indira Awaas Yojana (IAY), Credit-cum-Subsidy Scheme for Rural Housing, Innovative Scheme for Rural Housing and Habitat Development, Rural Building Centre, Equity Contribution by Ministry of Rural Development, to HUDCO, Samagra–Awaas Yojana and National Mission for Rural Housing and Habitat Development. Indira Awaas Yojana is designed to provide houses to the people below the poverty line free of cost. The central sponsorship is 75 per cent and 25 per cent contribution is from the state. The unit cost of these houses would be around Rs. 22000 in difficult terrain (hilly) and Rs. 20000 in the plains. According to the government reports, IAY is said to be successful in delivering results.

6.5.3.1. Jawahar Gram Samriddhi Yojana (JGSY)

The programme was started on April 1, 1999 to ensure development of rural infrastructure at the village level. This programme is sponsored by the Central government with 75 per cent budgetary allocation and 25 per cent by the state government. It is a wage employment programme. The Scheme aims to provide employment opportunity to the rural unemployed. It responds to creation of demand-driven community village infrastructures—durable assets at the village level and the assets to enable the rural poor to increase the opportunities for sustained employment. Implementation of JGSY is done entirely by the village *panchayat*. The Central Rural Sanitation Programme encompasses personal hygiene, safe water, and garbage and wastewater disposal. The components of the programme include construction of individual sanitary toilets for households below the poverty line, construction of village sanitary complexes for women, setting up for sanitary marts, intensive camping for creation of awareness and health education amongst other measures.

6.5.3.2. Swarnjayanti Gram Swarozgar Yojana (SGSY)

A new programme known as 'Swarnjayanti Gram Swarozgar Yojana' (SGSY) was launched in April 1999. This is a holistic programme covering all aspects of self-employment replacing the Integrated Rural Development Programme (IRDP) in rural areas. This scheme envisages as organisation of the poor into self-help groups, training, credit, technology, infrastructure and marketing. The Centre and the states in the ratio of 75:25 fund the SGSY. Under the programme, more than 250000 goups were formed and up to March 31, 2004 around 18000 groups have already received loans and have started different income generating activities. During the current year, more stress will be given to distribution of loans through such groups.

Salient features of SGSY include the following:

- SGSY aims at establishing a large number of micro-enterprises through a group approach in the rural areas and it is rooted in the belief that rural poor in India have competencies and given the right support can be successful producers of valuable goods/services.
- The objective under SGSY is to bring every assisted family above the poverty line in three years. Towards this end, SGSY is conceived as a holistic programme covering all aspects of self-employment, *viz.*, organisation of the rural poor into self-help groups and their capacity building, planning of activity clusters, infrastructure build-up, technology, credit and marketing.
- The effort under SGSY is to cover 30 per cent of the poor in each block in the next 5 years through an efficient programme. SGSY will seek to promote multiple credits rather than a one-time credit injection. The credit requirement of the Swarozgar will be carefully assessed. They will be allowed and, in fact, encouraged to increase their credit intake over the years.
- SGSY will seek to lay emphasis on skill development through well-designed training courses. It will also ensure upgradation of the technology in the identified activity clusters.
- SGSY will particularly focus on the vulnerable groups among the rural poor. Accordingly, the SC/STs will account for at least 50 per cent of the *swarozgaris*, women for 40 per cent and the disabled for 3 per cent.
- The central allocation earmarked for the states will be distributed in relation to the incidence of poverty in the states. However, additional parameters like absorption capacity and special requirement will also be taken into consideration during the course of the year.

There are two main aspects of SGSY, namely activity clusters and the group approach. Each block has to concentrate on 4 to 5 key activities based on local resources, occupational skills of the people and availability of markets so that the *swarozgaris* can draw sustainable income from their investments.

6.5.3.3. Sampoorna Grameen Rozgaar Yojana (SGRY)

In November 2001, the Sampoorna Grameen Rozgaar Yojana (SGRY) was launched by merging Jawahar Gram Samriddhu Yojana and Employment Assurance Scheme (EAS). Gainful employment, food security and strengthening of community, social and economic infrastructure in rural areas are the objectives of this important scheme. This will be available to all rural poor (BPL/APL) who are in need of wage employment and willing to take up manual unskilled work. In order to ensure people's participation, the programme is being implemented through the *Panchayati Raj* Institutions. The funding for the programme is shared as 75:25 from the Central and state governments. Of the total wage of Rs. 58 per day per person, five kg of rice or wheat is provided along with the cash component. The powers to decide which work to be carried out are available with the three level levels of *Panchayati Raj* system such as *zilla panchayats*, *kshetra panchayats*, and *gram panchayats*. *Gram panchayats* have the freedom to decide on which work to choose depending on the needs.

6.5.3.4. Indira Awas Yojana (IAY)

This scheme targets the poor people without proper houses. The beneficiaries are selected in open meetings of the *panchayats* which prevents allocation to non-eligible beneficiaries and prevents corruption. The poorest of the beneficiaries who live without a house or live in huts without a door are given pucca houses free of cost. There are two parts to the scheme: one for new houses, where Rs. 20000 is provided and the other for repairing houses for which Rs. 10000 is provided. The expenditure of the schemes is met with 75 per cent Central assistance and 25 per cent state contribution. Eighty per cent of the funds under the scheme are earmarked for new house construction and the rest 20 per cent for repairing of old houses. Efforts are always made to enable *panchayats* to work under this project by giving them their roles.

6.5.3.5. District Primary Education Programme (DPEP)

The District Primary Education Programme (DPEP) launched in 1994 sought to operationalise this objective. Central to the design of DPEP was the concept that in a vast country such as India, education has to be contextual. This involved local area planning that disaggregated targets and decentralised management and planning. DPEP envisaged that ideally planning was to be from below, i.e. from the village upwards. In DPEP, a beginning was made with focus on the district as a unit for planning and implementation. DPEP was recognised as a key to universalisation of education. After decades of state-level planning, there was a growing realisation that the local communities would know their needs and requirements better as far as education was concerned. The programme focussed on a participatory process with community support to facilitate faster educational development in the educationally backward districts of the country. The programme targeted districts:

- that were educationally backward with female literacy below the national average; and
- where total literacy campaigns (TLCs) have been successfully leading to enhanced demands for elementary education.

The DPEP programme was sanctioned by the GoI as a centrally-sponsored scheme in September 1997 under DPEP–II to cover the 15 districts of Maharajganj, Siddharthnagar, Bonda, Hardoi, Badaun, Lakhimpur Kheri, Lalitpur, Deoria, Pilibhit, Basti, Moradabad, Shahjahanpur, Sonbhadra, Bareilly and Ferozabad. The districts were selected based on the criteria of female literacy rate being lower than the national average of 39.2 per cent. The total project outlay was Rs. 537.55 crores. As per the sharing pattern of DPEP, as a centrally sponsored key scheme the GoI bore 85 per cent of the cost while the Government of Uttar Pradesh met the rest of the 15 per cent. The GoI mobilised its share from the soft lending window of the World Bank namely IDA. The Government of India along with the international funding agencies reviewed and supervised the project on a six monthly basis through a Joint Supervision Mission (JSM).

A three-tier system was being followed for providing health services to the population. There was a community health centre (CHC) catering to a population of 1 to 1.2 lakh people, below which there

were decentralised PHCs catering to a population of 30000 people. At a still lower level there was a sub-centre catering to a population of 5000 people. Thus, keeping these figures in mind, it was not necessary that a particular village would have health service facilities as at the lowest level, i.e. at the sub-centre level population of 5000 people were covered by each PHC and hence a PHC may cater to a cluster of villages. At the sub-centre level, maternal and child health and the small family norm was promoted and there were 18565 sub-centres in the state of Uttar Pradesh. At the PHC level, elementary medicine, primary health awareness and general services and a doctor were available. There were 30640 PHCs in the state. At the CHC level surgery, medicine, gynaecology, radiology and all other health facilities were available for control, prevention and treatment of all communicable diseases with special focus on malaria, tuberculosis, leprosy and eye ailments. At the PHC level, orthopaedics and general surgery were available; in addition all facilities are available including specialised facilities at the district hospital level. At the tertiary level, medical colleges and state hospitals were providing referral services.

At the sub-centre level, i.e. at the grassroots level, vaccination against the six common diseases including DPT, polio, measles, hepatitis and TB were being carried out in addition to vitamin, iron, folic acid and calcium supplementation being given to women, children and others as found necessary during different stages of life.

The trouble with these schemes of the government is that they are supply-driven, centrally planned and top-down interventions and not demand-driven bottom up developmental activities. While coverage of how well the government schemes were running was generally ascertained from the investigations in the field during the village visits and are presented in the case studies, special focus has been given to a specific few large externally aided projects with importance to and addressing the issues of promoting gender equity, cleanliness and promoting green villages in the next two sections.

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APPENDIX A-6.1

Externally Aided Projects

External aid constitutes an important source for financing sectoral and regional development programmes. Uttar Pradesh receives foreign aid in the shape of additional central assistance, through GoI under bilateral assistance and assistance from multilateral donor agencies such as World Bank, Asian Development Bank, Organisation of Petroleum Exporting Countries, and European Economic Community. In general, the aid ranges from 20.96 per cent to 33.41 per cent in the Five-Year plans.

Proposals for the Tenth Plan (2002-2007) and Annual Plan (2002-2003)

Keeping in perspective the fiscal and economic restructuring of the state, an outlay of Rs. 21427.69 crores, with a reimbursable portion of Rs. 17599.28 crores has been proposed for the Tenth Five-Year Plan for 44 projects. The corresponding figures for the year 2002-03 are Rs. 2373.76 crores and Rs. 2129.53 crores respectively for the 8 continuing and 10 pipeline projects. The objectives and components of the different projects taken in 10th Plan are given below:

Main Ongoing Projects

i) Uttar Pradesh Sodic Land Reclamation Project-II

Uttar Pradesh Sodic Land Reclamation Projects seek to increase agricultural productivity by reclaiming sodic land in 10 districts of the state. The main components of the project are:

- The on-farm development and land reclamation component and address the need for beneficiary-led on-farm reclamation in sodic soil areas of the state. Active community participation and well-coordinated government interventions are critical elements in the project approach.
- The rehabilitation and maintenance of main drain components will improve the drain network, which will have positive environmental impact.
- Technology dissemination will establish a community-based demand-driven system for technology dissemination in the project area.
- Upgradation of farm to market roads will take up the rural roads contribution in areas where sodic land is being reclaimed.
- Human Resources Development and institutional capacity building of support services will have focus on staff training and institutional strengthening in the *panchayats*, NGOs and existing government agencies.
- Adaptive research will verify and refine the available technologies to suit the specific needs of local farmers and to bring about sustainable increase in productivity.

The total cost of the project is Rs. 1469 crore and the duration would be from April 1999 to September 2005.

ii) Uttar Pradesh Health System Development Project

The aim of the project is to develop an appropriately managed health system, through the delivery of effective services, stemming from policy reform, institutional and human resources development, in addition to investment in health services. The main components of the project are:

- Developing a strategic management capacity, through formulation and review of health system performance, and the establishment of a drug policy, public-private partnership, manpower activities as well as pursuing policy reform, analysis and research in the health sector, and
- Improving the quality of clinical practice in public health services and of access to health services. Programmes and services will focus on disease prevention and health needs.

The total cost of the Project is Rs. 478 crores and the duration woud be from July 2000 to June 2005.

iii) Uttar Pradesh Diversified Agriculture Support Project (UPDASP)

The principal objectives of the project are to increase the agricultural productivity, to promote private sector development and to improve rural infrastructure. The main components of the project are:

- Support for technology development, enhancing capacity for research coordination and increasing productivity of small holders;
- To support rural infrastructure development by improving rural roads in the project area, rural markets and market information collection and dissemination systems;
- To establish a demand-driven technology dissemination system through rationalisation, reorienting and strengthening line departments, increase participation by the farming communities mobilised with the help of NGOs and support human resource development and greater use of information technology; and
- To support increased private sector involvement and public-private partnerships in agri-business development.

The total cost of the project is Rs. 699 crores and duration from September 1998 to September 2003.

iv) Uttar Pradesh Rural Water Supply and Environmental Sanitation Project (Swajal Project)

The main objectives of the project are:

- To deliver sustainable health and hygiene benefits to the rural population through improvement in water supply and environmental sanitation services, which will increase rural incomes through time-saving and income opportunities for women, test an alternative to the current supply-driven

services delivery mechanism, promote sanitation and gender awareness.

- To promote the long-term sustainability of the rural water supply and sanitation sector.

The total cost of the project is Rs. 127 crore and duration from August 1996 to May 2003.

The scheme envisages the following important features:

Selection of Appropriate Technology: Based on feasibility studies, consultation and agreement with the communities, awareness though exposure visits, technical options available based on energy requirements (gravity schemes in the hills and solar energy in Bundelkhand). Solar energy had many problems in non-availability of equipments, panels and pumps and so was dropped.

Group Formation by NGOs: Selection of NGOs is based on criteria that they are local, have expertise in related rural works and staff. The groups and NGOs are provided with sufficient funds. Also in around 75 villages, equipments and services of the private companies and government agencies are also utilised.

Selection of Project: The selection of the source is also based on the suggestions and consent of the local people. Catchments protection, tank rehabilitation, afforestation, rainwater harvesting are also included as part of the projects. Even though there needs to be a thrust on water conservation it could not be given. Since May 2002, after the National Seminar on Water conservation this activity is also included with the permission of the World Bank. Since the SWAJAL project came to an end by 2003, not much could be achieved in conservation but the same is done presently through the State Drinking Water and Sanitation Mission.

v) Uttar Pradesh Forestry Project

The principal objectives of the project are to:

- improve public sector management;
- increase both forest cover and productivity; and
- conserve biodiversity.

The components of the project are:

- institutional development; and
- forest development through natural forest management, plantation, farm community forestry, research and technology development.

The total cost of the project is Rs. 159 crores and duration from February 1998 to July 2003.

vi) Water Sector Restructuring Project-I

The main objectives of the proposed water sector reform programme are to:

- increase productivity of water;
- increase and sustain agricultural productivity; and
- improve the living standard of rural poor.

These objectives would be achieved by a series of overlapping investments. The above first project in the series would help create the enabling environment for achieving these objectives by:

(1) establishing new institutions required to carry forward the water sector reforms process;

(2) adapting a river basin approach to identify issues and constraints to development in the sector starting with Ghaghra-Gomti basin and formulating a comprehensive environmentally sustainable development strategy;

(3) rightsizing and capacity building of irrigation and drainage sub-sector institutions;

(4) promoting agricultural intensification and diversification; and

(5) piloting replicable management option for sustained irrigation and drainage operations.

The total cost of the project is Rs. 6000 crore for 10-15 years.

vii) Swashakti Project

Evolving state government policies and plans for women's development has paralleled changes at the national level. The Planning Commission, with the aim of converging the benefits in the social and economic development sectors for women in the Ninth Plan, has envisaged "inclusion of an identifiable women component plan in the programmes of the respective ministries right from the planning process, to monitoring and implementation of programmes to ensure the reach of benefits to women." The project envisaged to:

- empower women as agents of social change;
- adopt an integrated approach towards empowering women through convergence of existing services;
- adopt a special strategy of 'Women's Component Plan';
- organise women into self-help groups to mark the beginning of a major process of empowering women; and
- equip women with skills in modern upcoming trades.

Components

The project included institutional capacity building for women's development; support mechanisms for women-managed income generating activities; mechanisms to access social programmes and leverage funds for community asset creation; provide effective project management systems.

Strategy of the project emphasises the importance of a holistic approach including a judicious blend of empowerment and development activities.

Successful experience with SHGs are reported everywhere in the state irrespective of the region and there is a growing response of banks to group lending; increasing opportunities provided through

the *Panchayati Raj* system for women to play a role in decision making. The project seems to attract a lot of interest among the women, government departments and banks and is popular among the various schemes for its activities. The programme has designed many institutional mechanisms and designs which are unique for a state like Uttar Pradesh. It has the following:

i. State Project Steering Committee (SPSC) as a forum of policy guidance and review at the top level;

ii. State Project Working Group (SPWG) to assist and coordinate various activities involving various line agencies to provide linkages;

iii. District Project Coordination Committee (DPCC) with responsibilities to ensure line department/bank support to SHGs and interchange of views at the district level;

iv. Cluster Level Working Group (CLWG) by the selected NGOs in the 20 villages;

v. Association of clusters and cluster of groups to share experiences and collective action;

vi. Non-government organisations (NGOs) responsible for the development of the groups and members;

vii. Women's Development Corporation (WDC) to play the key role in promoting the project concept, as well as guiding, coordinating and monitoring the implementation of the project;

viii. Banks and other lending institutions responsible for providing credit to the SHGs; and

ix. Technical line departments to provide the needed assistance.

The Swajal Project and the UPDASP projects are of special interest to the theme of the study of clean and green villages and these seem to be attracting a lot of interest in the development circles. Hence, it is discussed in some detail in the next section.

APPENDIX A-6.2

Review of the Ninth and Tenth Five-Year Plans

According to the Tenth Five Year Plan (2002-2007) and Annual Plan (2002-2003) Vol.1 (Part-1) of the Government of Uttar Pradesh, the developmental propositions of Uttar Pradesh are as given below:

Fifty years of planning, from 1951 to 2001, the state has had nine Five Year and six Annual Plans in this period, involving an expenditure of Rs. 82.566 crore. The expenditure up to the end of the Annual Plan 1997-98 in the state was Rs. 58472 crores. It was only 5.1 per cent of the all-India expenditure, at Rs. 1155572 crore for the same period. The outlay of the Ninth Plan (1997-2002) of the state (including Uttaranchal), at Rs. 46340 crore is 5.4 per cent of the all-India outlay at Rs. 859200 crore. It is a matter of concern that the shares of the state in the all-India plan expenditure/outlay have been far less than the share of the state (16.2%) in the country's population. In consequence to this, Uttar Pradesh continues to be one of the most backward states of the country, far behind most states in per capita income as well as with respect to the levels of socio-economic development.

Investment

The plan expenditure of a state in public sector is not only the main source of financing its development plans. It also creates the infrastructure and lays the foundations for attracting investment from other sources. It is in this context that the size of this expenditure is very crucial for development. The central investment in its non-departmental undertakings used to be quite large in the past and played a catalytical role in development of the area where the investment was made. The share of Uttar Pradesh in this investment has also been on a much lower side right from the beginning until it picked up in the 1980s to reach a figure of 8.6 per cent towards the end of 1992-93. There has been no upward movement since then. This share again is far lower than the share of the state in the country's population. The state had thus a clear disadvantage of a large magnitude both in allocation of public sector plan outlays and of central investment in public enterprises. There is little scope now in the present dispensation for correcting the imbalance in allocation of central investment. However, the Centre can still take some corrective measures and use its good offices for larger flow of private investment in this state.

The regional disparities cannot be reduced nor can the problem of backwardness of the state be solved through the instrument of public sector plan outlays only. The role of private sector investment has now become far more important in this matter and it is necessary, therefore, that while looking at the question of regional disparities, the possibilities of maximising investment from all the available sources should be explored instead of confining the area of consideration to the allocation of public sector plan outlays only.

Understandably, the state has received inadequate and less than its legitimate share in the resources from different sources for its development, keeping in view its population and backwardness. Nothing brings it out more clearly than a comparison of per capita plan expenditure of the state in the Five-Year Plans with those of all-states averages and individual states. There are large gaps in these expenditures, with its per capita plan expenditure being

substantially short of all-states average expenditure in every Five-Year Plans. The shortfall in the more recent past was the highest, at 27 per cent, in the Eighth Plan and lowest, at 9 per cent in the Fifth Plan. The per capita plan expenditures of Uttar Pradesh were also lower than most states. It was the lowest among all states in the Eighth Plan, except West Bengal and Bihar with some states like Punjab, Haryana, Gujarat and Karnataka reporting far higher figures. The picture was almost similar in the earlier Five-Year Plans, with large gaps in per capita plan expenditure of Uttar Pradesh and of most other states. These gaps together with almost similar gaps in investment from other sources continued to have their impact in the state on the pace and pattern of growth in the economy. It is for this reason that Uttar Pradesh is lagging behind in comparison to most of the states in the country in the race for development, whether we measure it on the scale of per capita income or on that of some well-known indicators of socio-economic development.

The per capita income of the state at current prices in 1996-97 was Rs. 7743 against the all-India value of Rs. 11554. In 1999-2000, it was Rs. 9323 as against Rs. 15562 of all-India. It was the lowest amongst the major states with the exceptions of Orissa and Bihar only. The figures of some prosperous states for the year 1999-2000 are staggering. The per capita income of Maharashtra was Rs. 23398, highest among all states, followed by Punjab with Rs. 23040, Haryana with Rs. 21114, Tamil Nadu with Rs. 18786, Gujarat with Rs. 18625, Kerala with Rs. 18262 and Karnataka with Rs. 16343, all higher than per capita income of all-India, at Rs. 15562. The levels of socio-economic development in most sectors in these states are also much higher than those in Uttar Pradesh and these differences in per capita income and level of development are largely due to the differences in investment from different sources. It is more particularly due to the differences in per capita plan outlay and the shares in central investment and financial assistance from some other all-India institutions.

TABLE A-6.2.1

Gap in Per Capita Income of the State and the Country

Item	*Rs. at Current Prices*	*Percentage*
Prior to the First Plan (1950-51)	8	3.0
At the End of the Eighth Plan	4100	35.3
At the End of the Fourth Year Plan of the Ninth Plan (2000-01)	6766	41.0

A close look at the pattern of deployment of resources in the Five-Year Plans throws up the following few important points for consideration:

(1) The resources deployed in power, irrigation and transport are an investment on economic infrastructure for development. The share of the resources deployed on economic infrastructure in the Five-Year Plans, from the First to the Ninth Plan, was in the range of 41 per cent to 68 per cent of the total expenditure. The share rose from a modest 41 per cent in the First Plan to 66 per cent in the Fifth Plan and in the Annual Plan of 1979-80, it was 68 per cent i.e., the highest among all plans. The share started declining thereafter and came down to 60 per cent in the Sixth Plan, 52 per cent in the Seventh Plan, 49 per cent in the Eighth Plan and 45 per cent in the Ninth Plan, very close to the share in the First Plan.

(2) It will be recalled that the highest growth of the state's economy of 5.7 per cent took place in the Fifth Plan, thereafter it dipped to 3.9 per cent in the Sixth Plan and 3.2 per cent in the Eight Plan. The Ninth Plan is also not likely to fare better. A declining share of expenditure on economic infrastructure in the Plan and the declining trend in the average annual growth and economy has, thus, gone together.

(3) Between the three sectors comprising economic infrastructure, the share of power rose from 15 per cent in the First Five-Year Plan to 38 per cent in the Fourth and Fifth Plans. Thereafter, there was a substantial decline in its share to 27 per cent in the Sixth Plan and still lower to 25 per cent in the Seventh Plan, 26 per cent in the Eighth Plan and the lowest 18 per cent in the Ninth Plan. The declining share of power in the last four Five Year Plans, from 1980 onwards, is indicative of a lower priority assigned to the development of power in this period. Power is the most critical input for development and a lower priority for this sector is bound to have an adverse impact on development, more particularly in the two critical sectors of the economy, agriculture and manufacturing, leading to deceleration in the overall growth in the economy.

(4) The shares of irrigation reveal a similar story. It received a high priority in the First Five-Year Plan, with its share was kept as high as 21 per cent. The share came down to 11 per cent, both in the Second and Third Five Year Plan, but rose again to 16 per cent in the Fourth Plan, 21 per cent in the Fifth Plan and 22 per cent in the Sixth Plan. It started declining to 16 per cent in the Seventh plan, 11 per cent in the Eighth Plan and 12 per cent in the Ninth Plan. The decline in the shares of irrigation in the most recent three Five Year Plans does not augur well for the development of agriculture. Irrigation is still the most critical input for agricultural development. The decline in the share of irrigation in plan expenditure amounts to a decline in the share of agriculture and is a matter of great concern.

(5) The share of transport in the total expenditure shows a rising trend, from 4 per cent in the First Five Year plan to 8 per cent in the Fifth Plan, 10 per cent in the Sixth Plan, 11 per cent in the Seventh Plan, 12 per cent in the Eighth Plan and the highest, 17 per cent in the Ninth Plan. This is a welcome feature for the simple reason that transport is vital for the development of agriculture, manufacturing, trade and commerce. It is a major source of employment generation, both in the rural as well as urban areas.

(6) The social infrastructure comprising education, medical and public heath and water supply and sanitation, is equally important for development. Unlike economic infrastructure, which is an investment on physical assets contributing to growth, social infrastructure is basically an investment on human resources in order to ensure greater efficiency in the use of resources for development.

(7) The resources deployed on social infrastructure were 21 per cent of the total expenditure in the First Five-Year plan. This was the highest share of social infrastructure in all the five-year plans. There was a decline in this share in the subsequent Five-Year Plans, going as low as 9 per cent in the fifth Five-Year Plan, thereafter, the share started rising, and stayed at 16 per cent in the Eighth and Ninth Five Year Plans. Amongst various components of social infrastructure, the highest share was of Education. It was 13 per cent in the First Five Year Plan, the highest among all plans. The share declined in subsequent plans and was the lowest, at 4 per cent in the Fifth and Sixth Plans. It rose again to reach the highest 9 per cent in the Eighth Plan, but declined again to 7 per cent in the Ninth Plan. The share thus varied between the lowest of 4 per cent and the highest of 13 per cent in these Five Year Plans.

(8) The share of medical and public health was again highest at 9 per cent in the First Five-Year Plan, thereafter it declined and was the lowest at 1 per cent in the Fifth Plan. In the remaining plans, the share varied between 3 per cent and 4 per cent. The share of water supply and sanitation rose from 1 per cent in the Second Plan to reach the highest of 7 per cent in the Ninth Plan. The share of medical and public health and water supply and sanitation combined together, was the highest, at 10 per cent in the Ninth plan and 7 to 8 per cent in the Sixth, Seventh and Eighth Plans.

(9) The combined shares of economic infrastructure and social infrastructure in total plan expenditure were 62 per cent (41+21) in the First Plan, 55 per cent (42+13) in the Second Plan, 60 per cent (44+16) in the Third Plan, 71 per cent (61+10) in the Fourth Plan, 75 per cent (66+9) in the Fifth Plan, 72 per cent (60+12) in the Sixth Plan and 64 per cent (52+12) in the Ninth Plan respectively. The highest share of the resources for social and economic infrastructures was in the Fifth Five-Year Plan and the lowest in the Second Five-Year Plan. In all the four Five-Year plans following the Fifth Plan, the share showed a declining trend.

(10) After accounting for the combined shares of economic and social infrastructure, the most critical prerequisites for development, the balance share of the resources went to the other sectors of the plan. By and large, the resources on these sectors were not meant for creation of assets and were not contributing to the capital formation, as such these were primarily meant for discharging some other obligations of the state. There was a perceptible rise in the shares of these sectors in the recent three Five Year Plans. The share rose from 28 per cent in the Sixth Plan to 36 per cent in the Seventh, 35 per cent in the Eighth and 38 per cent in the Ninth Plans.

(11) Viewed in totality, the shares of the sectors discussed above together with the expenditure in absolute terms, from the First to Ninth Five -Year Plans, have been given below:

TABLE A-6.2.2

Total Expenditure from the First to the Ninth Five-Year Plan

Major Heads	*Expenditure (Rs. Crores)*	*Percentage Share*
Economic Infrastructure	41482.49	51
Power	20491.26	25
Irrigation	11624.51	14
Transport	9726.72	12
Social Infrastructure	11347.06	14
Education	5230.05	6
Medical and Public Health	2363.75	3
Water Supply and Sanitation	3753.26	5
Others	29376.67	35
Total: All Sectors	**82566.22**	**100**

(12) It can be seen that the share of power, the most critical input for development, was 25 per cent only. Considering the importance of power for development and for the provision of amenities, which contribute to improvement in quality of life, the share cannot be said to be adequate. The state is already deficient in energy. It is the most vital input for development, both in agriculture and manufacturing sectors. The investment on energy is not forthcoming in the private sector either. In these circumstances, there is need for a higher share for power development in the state.

(13) The share of irrigation is also on a lower side. The area irrigated is still close to 72 per cent and there is a need to spend more on development of irrigation in order to maximise productivity in agriculture. It is therefore, equally important to provide more resources for irrigation in the future plans.

(14) The share of medical and public health is also very low. Considering the growth in population and the present state of health care in the state, there is an urgent need to improve the infrastructure for better health care in rural areas in particular. The share of medical and public health also, therefore, needs to be increased.

APPENDIX A-6.3

Projects Aiming at Village Development in Uttar Pradesh

The Swajal Project

Uttar Pradesh and Uttaranchal are affected by acute water scarcity with 30 per cent habitation receiving water less than the basic service level of 40 lpcd as prescribed by Government of India. The capital cost of these rural water schemes is fully subsidised by the government. The operation and maintenance cost though theoretically chargeable to the consumers, is also *de facto* almost fully subsidised by the government. The maintenance of rural water supply systems is also not of a high standard, due to which almost one-third of rural water supply schemes are out of operation at any given time.

Sanitation levels in the state are also below the national average, with only 2.5 per cent of the population using latrines/water carriage systems. Therefore, access to improved water supply and environmental sanitation remains a high development priority for the state government. According to the Centre for Development Studies, Uttar Pradesh Academy of Administration, Nainital, writing in a Report on the Swajal Capacity Building Programme, 1999-2000, the Uttar Pradesh Rural Water Supply and Environmental Sanitation Project, popularly known as the Swajal Project, is a World Bank-assisted pilot initiative covering 1000 villages in 19 districts of Uttarakhand and Bundelkhand over a project span of six years, i.e. 1996-2002.

Objectives of the Project

The project has two main objectives. The first objective is to provide sustainable health and hygiene benefits to the rural population through improvements in water supply services and better environmental sanitation conditions. The second objective is to promote the long-term sustainability of the rural water supply and sanitation sector by providing assistance to the two states in identifying an appropriate policy framework and strategic plans for implementation. An active and total participation of the village community, right from planning to the operation and maintenance stage is an essential element of the project approach and strategy.

TABLE A-6.3.1

The Project Cost

	Project Cost (Loan No.4056-IN)
IBRD	Rs. 252.47 Crores
GoUP* and Uttaranchal	Rs. 16.10 Crores
Beneficiaries	Rs. 32.76 Crores
Total	Rs. 300.76 Crores

Note: * Government of Uttar Pradesh.

The project adopts an integrated approach to water, sanitation, health and hygiene and aims to bring about sustainable changes in the health seeking behaviour of people for improved standards of living. The Department of Rural Development, GoUP, through a society named 'The Project Management Unit' (PMU), is engaged in the management and implementation of the Swajal project. The rural water supply (WS) component will provide choices to consumers regarding technology, in terms of type of technology and service level. In the hills, these include piped water supply schemes, captured springs with hand pumps, rainwater harvesting, and spring development (including combinations of technologies most suited to demand and local conditions). In the Bundelkhand region, choices included piped water schemes from tube wells and surface sources (where required), and hand pumps. The environmental sanitation (ES) component will primarily focus on local behaviour change, and personal, domestic and environmental sanitation improvements including sullage drainage, solid and animal waste disposal, cattle troughs, bathing cubicles, and promotional and household latrines.

Active community participation in the project, with the assistance of SOs, is envisaged in all four stages of the project, *viz.*, preplanning, planning, implementation and O&M. The project also includes a health education component to increase people's awareness of the linkages between their behaviour and their health (especially regarding water-related diseases and sanitation-related practices). In order to ensure equitable access among people in the project villages to water supply and environmental sanitation and to prolong the life of the facilities created, the project will include activities aimed at involving the beneficiary communities in the planning, decision making, implementation and O&M of the WS and ES installations and behaviour changes.

Furthermore, communities will be expected to share in the capital cost of the 'package' of WS and ES facilities (in the form of cash/labour) and own and maintain the facilities at their own cost. Because of the close relationship between people's health awareness, their demand for improved water and sanitation facilities, and their willingness to bear responsibility for these facilities, as well as the hardware aspects of the project, all project phases will be led by communities with the assistance of NGOs. To facilitate all this, a government order has been issued forming VWSCs. A VWSC, basically a subcommittee of a *gram panchayat*, will have representation of women (30%) as well as the weaker sections of the society (20%). The VWSC will look after the project components at the village level.

Village Selection and Planning

The villages are selected on the basis of transparent criteria of demand, need, technical feasibility, economic viability, social and environmental soundness, laid as per the legal agreement between World Bank and Government of India. Planning Phase is a 12-month long period during which community self-investigation, problem analysis, feasibility study, community action planning, technical survey and preparation of engineering designs of the system take place. Once the community action plans and engineering designs

have been discussed and finalised and upfront capital cost contribution has been collected by the community, the community and the SO submit the Implementation Phase proposal to the PMU. Thereafter, the Implementation Phase Tripartite Agreement (IPTA) is signed between the community, the SO and the PMU.

Different Models for Mobilising Community Participation and PMU Approaches

Confusion over what is 'participation' has often led to disillusionment with approaches that are said to be 'community-based' or 'participatory'. The project tends to define in broader terms the concept of participation in general.

i. **The Cheap Labour Concept:** The view that participation is 'free-labour' and that obtaining such labour is sufficient 'participation'. The view that the payment of some share of capital and maintenance costs in cash or kind is sufficient defines participation.

ii. **The Cost Sharing Concept:** The view that the payment of some share of capital and maintenance costs in cash or kind is sufficient defines participation.

iii. **Formal Agreement Concept:** The view that when users commit themselves to perform specific tasks for a project through a formal, preferable written agreement, the project has achieved adequate participation.

iv. **Decision Centered Concept:** The view that participation has taken place if users have been involved in decision making at critical stages from project preplanning to the planning stage through implementation, maintenance and evaluation.

Project Actors and their Roles

The PMU/DPMU

The role of the PMU/DPMU (District Project Management Unit) is to facilitate a support system of participating organisations for the locally implemented programme, which includes facilitating a training and technical assistance strategy, and within that strategy:

- identify external and locally valid sources of support;
- assess, strengthen the capacities of support organisations (SO), provide continuous point of convergence, act as a forum for institutional memory;
- ensure overall accountability and evaluate performance, process and impact;
- provide leadership and innovation in both community's development and construction activities;
- conduct special studies related to improvements in this and related sectors; and
- continuously adapt its networking approach based on empirical findings.

Support Organisations (SO)

The role of SOs is to assist communities to organise themselves, inclusive of all segments of the community, and to analyse and decide upon options, plans, implement, manage operations and maintenance and evaluate their own water and sanitation projects. This includes:

- Facilitating a participatory decision making capability within the community for collective planning and action, and in particular ensuring that women are able to participate in decision making.
- Working with the training network of the PMU pertains to:
  - provide needed technical support at each phase of the project;
  - assist community by providing relevant non-formal education, hygiene and sanitation education;,
  - conduct pre-feasibility studies and assist communities in collecting appropriate baseline and impact information on their project;
  - assist communities to complete and formalise their tripartite agreements, and follow-up in collection of cash contributions, participation in construction, setting of an O&M fund and a system for ongoing collections; and
  - assist communities in completing schemes and in implementation phase activities reports.

Services Agencies

The role of Service Agencies is to:

- provide comprehensive community development, and construction training and technical assistance to SOs and communities in a geographical area;
- carry out special studies and case studies, conduct training, communication materials including participatory materials and social marketing materials/community development; and
- carry out monitoring and evaluation activities as required assisting PMU/DPMUs.

Communities

The role of communities and their water users is to:

- agree to make cash, labour and local material contributions for construction and to contribute the stipulated amounts needed for establishing an O&M fund, and agree to make regular contributions thereafter to cover 100 per cent of maintenance costs and fulfill these agreements;
- make considered choices in the development of their own water and sanitation projects;
- form representative VSWCs, with at least one-third women representatives;
- complete water and sanitation schemes and all the terms of their tripartite agreements;

- monitor and evaluate their own progress and assist in reporting back to the project on their progress; and
- operate and maintain water system for the benefit of the whole community, and continue to improve the community's hygiene and sanitation practices.

The innovative features of the project, which are different from many related schemes, shall be summarised as follows:

i. Active community participation in the project from the beginning in the selection of source, technology, materials and their management through simple and workable methods, with the assistance of SOs. The project also includes a health education component to increase people's awareness about links between their behavior and their health.

ii. The institutional arrangement for the project with a needed facilitation from the top makes it function without much problems at the level of implementation.

iii. Communities are sharing in the capital cost of the 'package' of water supply and environmental sanitation facilities (in the form of cash/labour) and operating and maintaining the facilities at their own cost.

iv. To facilitate all this at the village level, VWSC is formed in each project village. The is a sub-committee of the *gram panchayat*.

Project Management

The PMU located at Lucknow, is a registered body, which has been formed under the Rural Development Department of the Government of Uttar Pradesh (GoUP) & Uttaranchal. A full-time Director is in place in PMU, Lucknow and there are two DPMUs to facilitate project management and operations functioning in the Bundelkhand Region—one in Jhansi and one in Banda. After the bifurcation of Uttar Pradesh into the two states, the Uttaranchal PMU commenced functioning on July 16, 2001 and is located at Dehradun. The Uttaranchal PMU has eight DPMUs in Dehradun, Srinagar, Chamoli, Uttarkashi, Pithoragarh, Bhimtal, Almora and Bageshwar to facilitate its project management and operations.

TABLE A-6.3.2

Status of Projects Completed under Swajal Projects for Uttar Pradesh (as on June 2002)

Name of the District	*Number of Villages*					
	Batch-1	*Batch-2*	*Batch-3*	*Batch-3X*	*Batch-4*	*Total*
Jhansi	5	5	19	13	20	62
Jalaun	0	3	11	31	55	100
Mahoba	2	0	6	6	28	42
Lalitpur	1	6	3	29	9	48
Chitrakoot	0	6	10	1	35	52
Banda	1	0	2	5	11	19
Hamirpur	0	3	7	9	14	33
Deoria	1	0	0	0	0	1
Total	**10**	**23**	**58**	**94**	**172**	**357**

TABLE A-6.3.3

Financial Status of the Project (as on 30 June 2002) in Rs. Crore

Original Cost (Uttaranchal and Uttar Pradesh)	300.00
Revised Cost (Uttar Pradesh Only)	127.56
Reimbursable Cost (Uttar Pradesh Only)	107.15
Funds Released during Entire Period	131.45
Actual Expenditure since Beginning	114.00

Concerns of the Project

While the project is viewed as one of the highly successful project in the recent times by the administration, there are a few concerns expressed at different forums, officers and intellectuals. These include:

Appropriateness of the Technology and Choices: While it is good to provide choices for the users depending on the need, area and other criteria, it is equally important to provide appropriate technology. It is observed by many that the technologies provided under the project are highly exploitative and alien to the local environment and culture may result in failure in the long run. For example, many parts of the hills are provided with collection wells and pumps which are over designed and many times not needed.

Selection of NGOs and Continuance after the Project Period: The NGOs are selected based on a set of criteria which are often termed as external to the situation and the funds given for such organising work is considered as huge and make them burdened after the project. Also, many NGOs are faced with precarious situations that many of their talented and good employees have left and joined the selected organisations and it amounts to luring and in the long run, many organisations with long standing work and dedication will suffer.

Source Augmentation: The selection of the sources of water is done locally based on the situation. However, the extraction mechanisms and the availability do not match. For example, many springs have dried up because of the over draining and extraction. This is compounded by the crisis in the natural resource management in general and leads to infructuous investment. The programme does have a component of source augmentation. However, this does not match with the requirement in the field.

Uttar Pradesh Diversified Agriculture Support Project (UPDASP)

In Uttar Pradesh, there are perceptible differences in the agricultural resources and consequent income imbalances exist among the regions. The Western part is relatively better developed in comparison to the other regions. It has also been the forerunner of the 'Green Revolution' in the state. The Eastern region is characterised by cereal-based agriculture. The Central region resembles the eastern region in several agricultural characteristics. Bundelkhand is a semi-arid and resource poor region, where rainfed agriculture is commonly practised.

Almost all the available arable land in Uttar Pradesh has already been brought under cultivation, it is now recognised that future growth would largely come from improvements in productivity and diversification into the production of high value commodities in the farming systems linked to regional specialisation and sustainable management of resources, especially land and water. In Uttar Pradesh, the combination of technologies introduced in the past has initiated the process of agricultural diversification leading to enhanced employment opportunities in:

- the change from traditional cereal cropping patterns to intensive cultivation of high-value cash crops;
- commercial animal husbandry; and
- rural off-farm activities.

The UPDASP proposed to assist the government in its effort to accelerate diversified agricultural growth in the state in line with regional advantages of different agro-ecological zones. The project aims to:

- strengthen the delivery of agricultural services to exploit market-led opportunities;
- integrate project investments with policies and legislative/ regulatory framework that facilitates rationalisation of public and private sector roles;
- support the expansion and rehabilitation of rural infrastructure; and
- foster *Panchayati Raj* institutions, NGOs, and beneficiary participation for devolution of responsibility for sustainable management of rural assets.

To facilitate these aims, the enabling objectives of the project are:

- strengthening of the technology base and dissemination through research, extension and facilitating access to agricultural credit;
- improving natural resource management; supporting growth-enhancing, income-generating programmes;
- facilitating post-harvest value addition activities; and
- upgrading of essential rural infrastructure.

Project Components

The project has the following five main components:

i. **Technology development:** The main objective of this component is to augment and strengthen the ongoing research activities.

ii. **Technology dissemination:** This is to make the public service more demand-driven and accountable. The strategy adopted to achieve this objective incorporates the increased involvement of farmers in the technology development and dissemination process through farmers' self-help groups (FSHGs).

iii. **Private sector development** in input arrangement and post-harvest activities that include promotion of private nurseries, vets, para-workers and farm polyclinics.

iv. **Rural Infrastructure (roads and markets)**

Rural roads: The project would support the improvement of about 1600 kms of rural 'farm to market' roads to all-weather road standards in the districts. Almost all the roads would be improved on the existing alignments where little or no additional land is required. An amount of Rs. 198 crores has been earmarked towards improvement/reconstruction/new construction of about 160 kms of roads.

Rural markets: The main focus of this sub-component would be to improve the village markets (*haat painths*) to be used by small farmers. The project would support the upgrading of up to 145 existing high operating frequency rural *haat painths* managed by the *panchayat*.

v. **Economic policy analysis:** The project would assist with the establishment of an Economic Policy Analysis Unit (EPAU) in the state. The initial focus of its work programme, however, would be to assess the impact of the policy reform programme being supported under the project.

BOX A-6.3.1

Project Approach and Implementation Strategies

i. **Diversification and Intensification**: Diversification into high value crops/commodities, high technology agriculture and non-farm sector activities.

ii. **Holistic/Integrated Approach *versus* Piecemeal Approach**: Issues related to (i) productivity, (ii) marketing, (iii) post harvest, (iv) agro-processing, (v) credit, (vi) rural infrastructure, (vii) research, (viii) technology dissemination, and (ix) natural resource management are being addressed.

iii. **Bottom up approach *versus* top down:** Planning from bottom, by beneficiaries and for beneficiaries, through SREP/PRA (Participatory Rural Appraisal) technology.

iv. **Demand Driven *versus* Supply Driven**: Inputs/services and production/output as per the market demand.

v. **Shift from Input Delivery to Extension Services:** Thrust is not limited to delivery of goods and services but towards new methods of technology development and dissemination.

vi. **Group Approach *versus* Individual Approach**: Implementation through farmers interest groups (FIGs) and farmers associations.

vii. **Participatory Planning, Management and Monitoring:** Devolution of powers to village *panchayats*; village *panchayat* participation in planning and management of rural assets; participation of farmers in identifying needs, planning, implementation and monitoring.

viii. **Cost Sharing/Recovery Basis:** Phased full cost recovery for goods and services.

ix. **Broad-based Extension and Farming System Approach:** All the line departments to share common resources (man-power) for introducing farming systems.

x. **Policy Reforms and Institutional Restructuring:** Policy changes necessary for achievement of DASP objectives are concurrently addressed.

xi. **Privatisation and Commercialisation:** Privatisation of input supply and marketing.

xii. **Capacity Building and Enabling Environment:** For private investment and creation of enabling environment/ level playing field.

xiii. **Sustainable Development:** Creation of self-reliant mechanisms and efficient and effective natural resource management.

The project has been targeted for a period of five years effective from September 30, 1998 to March 31, 2004. Project completion is expected by September 30, 2003 and credit/loan closing by March 31, 2004. The cost of the project (UPDASP) amounts to US$ 160.5 million.

Expected Outcome/Impact

The project document claims that the following outcomes are expected:

- commodity-wise increase in production and productivity;
- minimum post harvest losses;
- encouragement to value addition activities;
- full cost recovery for public inputs and services;
- better and efficient use of fertilisers/pesticides;
- improvement in management of markets;
- increased private sector participation in input and direct services;
- increased number of private nurseries;
- increased agro-industry ventures; and
- better coordination/work culture in research and extension agencies.

Innovations under UPDASP

Many innovations have been tried in the project during its implementation. Some of them worth referring are:

1. **Preparation of farmer-based action plans:** Identifying the needs and issues of the farming communities through participatory processes like Participatory Rural Appraisal (PRA), Rapid Rural Appraisal (RRA) and Rapid Institutional Analysis (RIA) for preparation of Strategic Research and Extension Plans and Action Plans.
2. **Implementation through FSHGs:** For implementation of these action plans through participation of farming communities, NGOs are being involved. The project does not involve any subsidy and most of them are carried through credit facilitation from banks.
3. **Technology dissemination through FSHGs**: Apart from identification of technological gaps, the farming community is also involved in technology dissemination, innovative and effective use of postcards as feedback channel.
4. **Privatisation of services:** With the objective of providing better services to farmers and wean them away from free lunch culture, an alternate line of private services are being promoted. The farming community is being encouraged to pay for good quality, timely and doorstep services.
   - Concept of para-workers in farm clinics, paravets and parahorts;
   - Privatisation of extension services through NGOs;
   - Linking for input supply and marketing with private sector like Nagarjuna fertilisers, Salora, Floritech, Excel, NDDB, etc.
   - Creating self-reliant input and marketing linkages;
   - Involvement of private veterinary doctors.
5. **Integrated and farming system approach:** Here paddy demonstration, seed production is taken up, and mushroom cultivation is also promoted apart from dairy activities. Similarly in pulse production groups, goatery is promoted.
6. **Concept of bio-village:** In every project district, one village has been designated as bio-village. Here, biodynamic fertilisation, compost, vermi-culture, cow pat pit, green manuring, bio-control agents, IPM, IPNM, ICM, etc. are being promoted with the objective of conserving soil–plant-environmental health. As of now, 22 such bio-villages have been promoted.
7. **Concept of a seed village:** With a view to attain self-sufficiency in good quality planting material, seed village concept has been promoted.
8. **Setting up of Agricultural Technology Management Agency (ATMA):** For facilitation of convergence of all services related to agriculture and allied sector, better outputs of research and extension, the ATMA is being set up in two districts, Saharanpur and Jhansi.

APPENDIX A-6.4

Discussion on the Choice of Technologies for the Promotion of Clean and Green Villages

Introduction to Management of Natural Resources

Land, Agriculture, Water

The Green Revolution, which ushered in an era of plenty as far as food production was considered, has now begun to backfire with degradation and loss of the soil's capacity to support vegetation. Soil compaction, loss of microbial fauna of soils, insect and annelid populations that convert nutrients in the soil into a form useable by plants are resulting in the gradual decrease in crop yields. Thus, attempts to shift from intensive agriculture to methods of organic farming which avoid use of chemical fertilisers, pesticides, etc. is another area where work needs to be done. Thus, agricultural strategies and practices which attempt to regenerate the soil by avoiding dependence on external inputs and non-renewable sources of energy are very important if future food security is to be ensured once the non-renewable energy resources are exhausted. The quality of life of majority of the people living in the developing countries is affected by the quality and quantity of water available. Thus, finding new sources, extracting in a sustainable manner, and treatment of available water to make it fit for human consumption is another area in which work needs to be done.

Thus, a wide variety of projects including micro-watershed development, promotion of biodiversity conservation, harvesting of renewable sources of energy, ecosystem management for sustainable use of natural resources, protection and regeneration of forest resources are important for preservation of the natural environment. Enhancing water availability, water quality improvement and improved harvesting of fresh water resources, etc. also require development initiatives.

Gender and Natural Resource Management (NRM)

The critical social issue related to natural resource management is the role that women have to play. Most of the subsistence activities, including the collection of fuel wood, drinking water, agricultural operations, family food security, care of children, etc. are activities which a woman needs to perform and hence the availability of natural resources is of critical importance to the quality of life and drudgery that women face due to the degradation of natural resources. Thus, the importance of NRM must necessarily be viewed from the perception of how it impacts the lives of woman. Not only does depletion of natural resources adversely affect women, they are the most likely group to be interested in sustainable use of natural resources, and hence, work to conserve the natural resources must necessarily ensure the active participation and involvement of women from the local communities.

Biodiversity Conservation

Thus, apart from sustainable management of ecosystems, regeneration of micro-watersheds (both through afforestation and/or civil engineering structures such as check dams, gully plugs, percolation tanks, etc.) can be implemented by grassroots development agencies to reduce soil erosion and enhance recharge of groundwater and also reduce floods through regulation of the flow of fresh surface water over different seasons. Thus, micro-watershed development, especially in degraded lands, is a natural resource management activity that could be implemented by grassroot organisations.

Forestry Resources Management

After Independence, the colonial forest policy and administrative system were generally retained without much change. Rapidly disappearing wildlife and forests led to the passing of the Forest Conservation Act, placing tight restrictions on the felling of trees in 1980. However, only with the passing of the National Forest Policy Act in 1988, the usufruct rights of the forest dwellers were acknowledged for the first time. In 1990, Ministry of Environment and Forests passed a resolution extending specific rights and responsibilities to villagers over the public forest domain. Over the past decade, more than 17 Indian states have issued orders with guidelines for the implementation of Joint Forest Management (JFM) schemes and Uttar Pradesh is one among them. The failure of the community forestry programme led to the belief that the only way forests could be protected was through JFM and by the mid 1990s, US$ 150 million (30% of all donor support to the forestry sector) had been earmarked for supporting JFM.

The difficulty with social forestry, as has been observed over the past 30 years, basically revolves around the need to cut the regenerated timber if any monetary benefit is to accrue to the villagers. Thus, social forestry and agro-forestry became an activity similar to agriculture wherein trees were cultivated and sold for commercial purposes or used otherwise. This, in other words, did not result in an increase in the area under forests, as was the originally anticipated outcome of the social forestry initiative.

BAIF's Experience on Social Forestry

An experiment by BAIF in 1997 envisaged raising of horticulture plants like cashew and mango on the land belonging to marginal farmers and tribals. The idea was to cultivate mango (Rajapuri and Keshar varieties) along with cashew (*Anacardium occidentale*), jackfruit (*Artocarpus heterophyllus*), papaya (*Carica papaya*), curry leaf, tarmarind, *palanji*, eucalyptus, *Acacia nilotica, Acacia auriculiformis*, Gliricadia and teak as a strategy for composite production of timber, fodder, fruit and nitrogen-fixation while promoting carbon sequestration.

The idea behind this approach of setting up horticulture/social forestry units was that such units, supported by live-fencing using *Acacia nilotica,* eucalyptus and teak, appears to be an innovative method for carbon sequestration and ensuring that once the trees grow up, they are not felled as the fruits of the trees provide food

and income to the farmers. In this way, the project not only addressed global warming but also provided for the livelihood development of the local community.

In areas where soil moisture is low resulting in arid conditions, the monetary value perceived from the cultivation of mango and cashew is very high and thus, in great demand from the farmers. Hence, horticulture plantations surrounded by live fencing of leguminous trees yielding fodder and fixing nitrogen are important strategies that can replace the social forestry project with a more successful alternative mechanism of promoting agro-forestry for livelihood development, carbon sequestration, soil and water conservation.

The 73rd and 74th Amendments also address a new policy supporting land reform and local governance through the *Panchayat Raj* system and indicate a larger political desire for decentralisation as well as local empowerment.

Issues Relevant to Development of Agrarian and Forestry Resources

Development can be defined as a process of empowerment through education. This does not imply that providing civic services is not a part of development. Building roads, schools and drinking water facilities also improve the quality of life. However, by education not only skills required to take up economically gainful activities are developed but the capacity to make informed decisions on one's life improves. The above is a very generalised description of what is meant by development. However, in practice, there can be different strategies used for promoting development. By sustainable development in its most generalised conception what is implied is that resources such as soil, fresh water and vegetation are maintained or consumed at a rate not exceeding the rate at which they is regenerated. Further, the environmental and ecological natural systems that support human life are maintained for posterity without contamination, pollution or degradation.

Sustainable development with people's participation further implies that the principle of 'inclusion' is applied and indigenous knowledge and systems used to promote improvements in the quality of life of the inhabitants of a particular area. It is becoming increasingly clear that traditional or conventional agricultural systems were more environmentally friendly and thus sustainable. Moreover, the present needs of the people must be met before we can talk about conserving the ecosystem for posterity.

Technologies for Sustainable Development Programmes

Each technology should be evaluated before promotion to serve the small, marginal and sub-marginal farmers, landless peasants and farm women and before dissemination against the criteria that would *inter alia* include the following:

- It would not displace labour, on the contrary promote employment opportunities for the landless, small, marginal and sub-marginal farmers.
- It would provide an economic renewable energy alternative to non-renewable commercial energy sources like expensive diesel and electricity for water pumping devices for the marginal and sub-marginal farmers.
- The technology would be ergonomically designed for continuous operation for long periods with minimal repair and maintenance in rural/remote areas.
- It would be amenable to decentralised construction/ installation.
- It would be affordable and within the purchasing power of large sections of the rural society.
- It would be user-friendly, i.e. requires minimal user training and easily accepted by rural people.
- It would promote environmental conservation-oriented development and affect savings or increase income in terms of financial returns.
- It would use existing skills and locally available building materials for construction (fabrication), installation, service, repairs and maintenance.
- It would promote rural employment generation with a minimum of skills upgradation and knowledge transfer.
- It would be environmentally friendly and not contribute to increasing the atmospheric levels of carbon dioxide or pollution.
- It would be gender-sensitive in so far as it reduces the drudgery in the lives of women and gives them a measure of control on their destinies.

Having enumerated the concepts to be promoted for sustainable development, it may not be inappropriate at this point to consider what constitutes sustainable agriculture.

Sustainable Agriculture

While technology has allowed great progress in agricultural production, its negative impacts, which may leave barren lands as the heritage for the generations to come, points to a need to reconsider use of high external input production systems in favour of more sustainable agricultural practices. It is also necessary to develop technologies that are environmentally sound and ecologically conservation-oriented. In other words, sustainable systems of agriculture need to be developed and practiced especially for the vast dry land areas farmed mainly by the poor, small and marginal farmers.

The food matter working group of the liaison committee of NGOs to the European Community has prepared a fairly comprehensive definition of sustainable agriculture which not only refers to technical aspects, but also gives due attention to social and cultural issues:

"Sustainable agriculture is designed to respond both to the needs of the population and to natural and ecological constraints in a given region. Its objective is an optimum yield of agricultural products on a sustained and long-term basis, without destroying the

environment. The priority is to identify and develop the resources available in the region, such as labour, water, nutrients, etc. rather than to rely on external inputs. This does not exclude the use of technical and synthetic methods from foreign sources, but their level must be kept to a minimum in order that these external inputs endanger neither the natural environment nor the physical and economic integrity of the population. Agriculture will be truly sustainable only if the social and cultural dimension of those who put it into practice are totally integrated into the process and if the decisions on implementation belong to them."

As tropical regions are characterised by a high diversity of physical, social and economic conditions, it is very unlikely that one single type of farm technology will be appropriate to all the different locations.

TABLE A-6.4.1

Conventional and Sustainable Agriculture

Conventional Agriculture	*Sustainable Agriculture (Ecofarming)*
Productive Simplification of the System	Production guided diversity of the system
Specialisation	Diversification of crops
Separation of Trees, Fields, Forage Crops	Integration of trees, fields, forage crops,
Special Cultures, Animal Husbandry	Special cultures, animal husbandry
Linear Flow of Nutrients and Energy	Circular flow of nutrients and energy
Fertility by Use of Chemicals throughout	Fertility by high biomass
Fertilisers and Pesticides	
High Input	Low input
High Production	High production
Low Stability	High stability
Intensive Mechanical Tillage	Moderate tillage
Mechanical Erosion Control	Biological erosion control
Fencers	Hedges
Susceptible High Yielding Varieties	Resistant varieties with medium and high yields
Monoculture	Mixed cultivation
Elimination of Weeds	Tolerance of weeds
Aim: Increase in Production	**Aim:** Increase in production

Some Criteria for Appropriate Agricultural Projects

Today, it is common sense among many funding agency project officers and decision makers that, in contradiction to the original ecological farming models, sustainable agriculture cannot be achieved without adequate adaptation to the physical and social conditions of local people.

Roland Bunch of World Neighbors has compiled some relevant criteria for projects in order to choose the most appropriate farm technology together with local project beneficiaries.

1. Is the technology recognised by the poorest farmers as being successful?
   - Does it meet a felt need?
   - Is it financially advantageous?
   - Does it bring recognisable success quickly?
   - Does it fit local farming patterns?
   - Does it deal with those factors that limit production the most?
2. Will the technology benefit the poor?
   - Does it utilise resources the poor people already have?
   - Is it culturally acceptable to the poor?
   - Is it land or labour intensive rather than capital intensive?
   - Is it simple to understand?
3. Is the technology aimed at adequate markets?
   - Are market prices adequate and reliable?
   - Are the markets available to small farmers?
   - Does the market have sufficient capacity to absorb increased supply without appreciable decrease in price?
4. Is the technology safe for the area's ecology?
   - Does it avoid or reduce nutrient drain or erosion?
   - Does it conserve resources such as groundwater and natural vegetation?
   - Does it avoid or reduce contamination of water, soil or air?
5. Can the technology be communicated efficiently?
   - Does it require a minimum of on-site supervision?
   - Is it simple to teach?
   - Does it arouse enthusiasm among the farmers?
   - Is the technology widely applicable?

It should be clear that such a list of criteria would never be fully applicable at a project level. But it could perhaps help project staff and decision makers in orienting their focus on some basic elements.

APPENDIX A-6.5

Review of Literature on Issues Related to Village Development

1. *Indian Development: Selected Regional Perspectives,*

Jean Dreze and Amartya Sen (eds.), Oxford.

Chapter titled "Uttar Pradesh: The Burden of Inertia", by Jean Dreze and Haris Gazdar

One of the lessons emerging from a wide range of recent development experiences was that public action could play a powerful role in promoting essential aspects in improving the quality of life and the literature on this subject including a number of instructive case studies. In this chapter, the authors investigate an example of the other side of the same coin, i.e., the penalties of inaction. The state is characterised *inter alia* by exceptionally high levels of mortality, fertility, morbidity, malnourishment, social inequalities, illiteracy and a slow pace of poverty decline. Some of the analysis presented in this chapter was essentially of a comparative nature and dealt with how Uttar Pradesh had failed in comparison with another region, South India (defined as the union of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu), as a reference region. The chapter also makes considerable use of field observations, derived *inter alia* from village studies as well as from field work to take the analysis beyond more aggregated secondary data alone.

Uttar Pradesh was primarily an agricultural state with a high proportion (about 80%) of its population living in rural areas and primarily engaged in the agrarian economy. Although urbanisation and non-agricultural employment were increasing over the years, conditions in production of agriculture and the distribution of agrarian assets (cultivable land) remained the most important factors affecting the livelihood standards of the population.

Two developments in the agrarian history could be regarded as significant turning points. The first came with the reforms of land revenue and property rights that followed India's independence, genuinely known as '*zamindari* abolition'. These reforms abolished the role of private intermediaries in the land revenue system and led to a clearer definition of private property rights regarding land ownership. The structure of land ownership has remained, more or less, unchanged since then. These early reforms coincided with the post-independence adoption of social and economic development as the official goals of public policy. The second development was the spread, in the 1960s and 1970s, of modern agricultural practices in western Uttar Pradesh, and the subsequent diffusion to other regions of the state.

The land reforms limited the powers of large feudal landlords, and gave ownership rights to the vast majority of tenant farmers who previously did not own land. The reforms did not, however, eradicate landlessness nor did they prevent the persistence of massive inequalities of land ownership in the state. The land ownership structure had changed little in Uttar Pradesh in the forty years since the abolition of *zamindari*.

Technological change has significantly enhanced private agricultural incomes and also laid the basis for some diversification of economic activity. In the absence of major re-distributive programmes, however, the gradual expansion of private incomes has only led to a slow decline in conventional indicators of poverty. This, combined with the fact that other basis of improvement in human well being (such as efficient public services and widespread literacy) were severely neglected over the same period, resulting in comparatively limited achievement with regard to the elimination of endemic deprivation.

Evidence has been provided in the study regarding the short and precarious life of the people in Uttar Pradesh. Female life expectancy was below 50 years, and the under-five mortality rate was as high as 141 per thousand. Among all major Indian states, Uttar Pradesh has the highest under- five mortality rate, the second highest crude death rate, and the third lowest life expectancy figure. The number of maternal deaths per 100000 live births was estimated to be as high as 931 in the mid-eighties. Survival indicators in Uttar Pradesh were quite dismal not only in comparison to international figures but also in relation to what has been achieved in the more advanced Indian states. For instance, a new born girl child can expect to live 20 years longer if she is born in Kerala rather than in Uttar Pradesh. And the probability that she will die before the age of one was more than six times higher in Uttar Pradesh as compared to Kerala. According to the national family health survey, Uttar Pradesh was only second to Bihar (among India's major states) in terms of the incidence of under nutrition among children below the age of five. Apart from low survival chances, demographic characteristics of Uttar Pradesh included high fertility rates and birth rates among all states. Uttar Pradesh has made comparatively little progress in terms of the demographic transition from high to low levels of mortality and fertility.

Empirical analysis of the determinants of demographic outcomes in India have consistently brought out the crucial role of literacy in reducing mortality and fertility rates. The four states that are commonly identified as lagging behind the rest of the country in terms of the demographic transition (Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh) are also the four states with the lowest literacy rates. The 1991 Census indicated that, for persons aged seven and above, the literacy rate in these four states ranged from 38 per cent in Bihar to 44 per cent in Madhya Pradesh as against 59 per cent in South India (with an even larger North-South gap in the younger age groups).

The poor educational record of these four states was particularly striking in the case of female literacy. In Uttar

Pradesh, only one woman out of four in the 7+ age group was able to read and write in 1991. Further, aggregate literacy figures hid the sharp variations between different regions and population groups, implying extremely low achievements for the most disadvantaged groups at a more disaggregated level. While the 7+ female literacy in Uttar Pradesh was 25 per cent in 1991, the figures goes down to 19 per cent in the rural areas, 11 per cent for the scheduled caste, 8 per cent for the scheduled castes in the rural areas and 8 per cent for rural population as a whole in the most educationally backward districts. Currently available data from the 1991 Census did not permit further desegregation, but the 1981 census figures suggested that in Uttar Pradesh female literacy was close to zero for a large section of the society. For instance, the crude literacy rate among the scheduled castes in rural areas in 1991 was below 1.5 per cent in 18 of the 56 districts in Uttar Pradesh, and below 2.5 per cent in a majority of the districts.

It is further stated that despite its far-reaching individual and social significance, literacy alone was not a momentous achievement in terms of the amount of learning involved. If we consider a more demanding criterion of educational attainment such as the completion of primary and secondary education, the achievement rates were still lower. For instance, in 1992-93, only half of all literate males in Uttar Pradesh and 40 per cent of literate females had completed the cycle of eight years of schooling involved in the primary and middle stages. Many children in Uttar Pradesh, if they are literate at all, acquire this skill 'on the basis of a fleeting passage through the educational system'. Another sobering feature of the educational situation was the high level of illiteracy in the younger age groups indicating that it was not the case of a lot of adult illiterates pulling down the average literacy rate with most of the younger people being literate. Even in the younger age groups, illiteracy was endemic especially in the rural areas. In the late eighties, the incidence of illiteracy in the 10-14 age group was as high as 32 per cent for rural males and 61 per cent for rural females and more than two-thirds of all rural girls in 12-14 age group had never been to school. Uttar Pradesh is nowhere near the realisation of the constitutional goal of free and compulsory education for all children up to the age of 14, which was supposed to have been reached by 1960.

The persistence of endemic illiteracy was in fact not very different from that found in Bihar, Madhya Pradesh and Rajasthan. There is another field, however, in which Uttar Pradesh seems to fare worse than most, if not all other states—that of gender inequality. In 1991, the number of females per thousand males in Uttar Pradesh was as low as 879. One Indian state has an even lower female-male ratio: Haryana bordering on western Uttar Pradesh, where there were only 865 females per 1000 males in 1991. However, disaggregated figures show that the 'epicentre' of the problem of low male-female ratios is not in Haryana but in western Uttar Pradesh. The western region, which has more than one-third population of the entire state and nearly three times the population of Haryana, has a female-male ratio of only 0.84. The authors present a table on the survival chances of the female species which is as indicated in Table A-6.5.1:

TABLE A-6.5.1

Survival Chances of Female Species of Uttar Pradesh against South India

	Uttar Pradesh	*South India*
Females Per 1,000 Males (1991)		
All Ages	879	979
Age 0-6	928	962
Gender Bias in Survival		
Ratio of Female to Male Death Rates (1991)		
Age 0-4	1.16	0.94
Age 5-14	1.17	0.97
Age 15-34	1.26	0.84
Maternal Mortality Rate, Per 100000 Live Births (1982-86)	931	365
Gender Gap in Life Expectancy (1990-92)		
Female-Male Difference in Years	-2.2	+3.1

The authors go on to state, "Some brief international comparisons may help to put this extraordinary number in perspective. The only countries with a female-male ratio lower than 0.84, amongst all those listed in the *Human Development Report* 1994, are the following: Kuwait (0.76), Bahrain (0.73), Qatar (0.60), and United Arab Emirates (0.48). These exceptionally low female-male ratios are overwhelmingly attributable to male in-migration. If we exclude the cases of exceptional male in-migration, the country with the lowest female-male ratio in the world is Pakistan, with 92 females per 100 males. This is considerably above Uttar Pradesh (which, incidentally, has a much 'larger' total population than Pakistan), not to speak of western Uttar Pradesh. The state is not just a setter of world records when it comes to the female deficit in the population; it is virtually a league of its own.

The main cause of Uttar Pradesh's low female-male ratio is the considerable female disadvantage in survival from birth until the mid-thirties. For the 0-4 age group, female death rates in Uttar Pradesh are 16 per cent higher than the male death rates, in contrast to the typical pattern of a strong female advantage in that age group, which applies even in South India. The female disadvantage in childhood is especially influential, since mortality rates tend to be particularly high in the younger age groups. Further, the link between excess female mortality in childhood and parental neglect of female children in this region of India is well documented. Uttar Pradesh's low female-male ratio is a tangible reflection of the anti-female discrimination.

The effects of female disadvantage in child survival are enhanced by even greater gender disparity in death rates between the ages of 15 and 35. This is in contrast to South India, where in the same age group, the gender gap changes in favour of females. Much of the excess female mortality in this age group in Uttar Pradesh reflects the combined effects of high maternal mortality and high fertility. The average number of births per woman is about twice as high in Uttar Pradesh as in South India, and the risk of maternal death from a particular birth is almost three times as high. Anti-female

discrimination in infancy and childhood, combined with high levels of fertility and maternal mortality, imply that female life expectancy at birth in Uttar Pradesh is 2.2 years below the corresponding figure of males—in contrast with a three year advantage of females over males in South India.

Before concluding on this issue, it is worth mentioning that the female-male ratio in Uttar Pradesh is not only low, it has also been steadily declining since the beginning of this century—from 0.94 in 1901 to 0.88 in 1991. It is difficult to explain this steady decline of the female-male ratio in Uttar Pradesh without invoking the persistence, and possible accentuation, of unequal gender relations."

The authors further state, "It might be tempting to think that the main cause of Uttar Pradesh's low achievements in terms of survival chances, child nutrition, fertility decline, basic education, gender equality, and related aspects of well-being, lies in the high levels of poverty. There is, however, little evidence to support this hypothesis. Of course, there is plenty of poverty in Uttar Pradesh. In 1987-88, almost half of the population was estimated to live 'below the poverty line', but, the incidence of poverty is also high in India as a whole. In fact, poverty indicators for Uttar Pradesh and India have been quite close to each other in most years for which the relevant data are available. Differences in poverty levels between Uttar Pradesh and India as a whole cannot explain why the state does so much worse than the average in terms of a wide range of indicators of well-being.

To prevent a possible misunderstanding, we should emphasise that we have no intention of diminishing the significance of high poverty levels in Uttar Pradesh, either as an indicator of material deprivation in that state, or as a cause of other kinds of deprivations. Obviously, the low level of incomes in Uttar Pradesh are a major constraint on individual and social opportunities. The point is that in this particular respect, Uttar Pradesh is not very different from India as a whole, so that the causes of the state's extraordinary backwardness in terms of basic social achievements (such as child survival and elementary education) have to be sought elsewhere."

Regional contrasts give an indication of the cause of the state's extraordinary social failures. A comparison between eastern and western Uttar Pradesh with roughly comparable population indicates that western Uttar Pradesh has enjoyed significant economic growth during the last three decades and is now considerably more prosperous than the eastern portion of the state. The head-count ratio of rural poverty in 1987-88 was only 26 per cent in the western region as compared to 43 per cent in eastern Uttar Pradesh. Moreover, real wages in western Uttar Pradesh were about twice as high as in the eastern region.

In spite of this economic advantage, western Uttar Pradesh was no better than the eastern region in terms of indicators of well-being and social advancement. According to the authors, in 1981 (the latest year for which region-specific mortality data are available), western Uttar Pradesh had a higher child mortality rate than eastern Uttar Pradesh, with a particularly large east-west gap for female children. Western Uttar Pradesh also had considerably higher fertility rates. Moreover, the western regions had singularly failed to achieve any kind of lead in the field of literacy and education notwithstanding their comparative prosperity. Also gender inequality seems to be more extreme in western Uttar Pradesh than in any other part of the state. Some indicators of this failure are given below:

TABLE A-6.5.2

Comparison of Salient Data on Health, Education and Services against Uttar Pradesh

	Uttar Pradesh	*South India*	*Kerala*
Health			
% of Recent Births (1992-93) Preceded by			
Tetanus Vaccine	44	85	94
Antenatal Check-up	30	73	97
Proportion of Births Taking Place in Medical Institutions, 1991 (%)	4	50	92
Proportion of Children Aged 12-23 Months who have Received Some Vaccination, 1992-3 (%)	57	87	89
Proportion of Villages with Medical Facilities, 1981 (%)	10	20	96
No. of Hospital Beds Per Million Persons, 1991	340	964	2,418
Education			
Proportion of Rural Settlements of 300 Persons or More Having Primary School, 1986 (%)	47.7	87.6	75.2
Proportion of Primary Schools Held in 'Open Space', 1986 (%)	17.2	3.4	0.0
Proportion of Primary Schools with only One or Two Teachers, 1986 (%)	41	66	1.3
Proportion of Rural Children Aged 12-14 Who Have Ever been Enrolled in a School, 1986-7(%)			
Females	32	72	98.2
Males	73	86	99.6
Other Services			
Proportion of the Rural Population Receiving Subsidised Cereals from The Public Distribution System, 1986-7	2	63	88
Per Capita Supply of Foodgrains through the Public Distribution System, 1986-7 (Kg/Year)	3	28	60
Proportion of Rural Households with Electricity Connections, 1991	11	41	42

The authors state, "The figures speak for themselves. Whether we look at health care provisions, or educational facilities, or the public distribution system, or indeed at almost any essential public service for which relevant data are available, Uttar Pradesh stands out as a case of resilient governmental inertia as far as public provisioning is concerned. Here again, the contrast with Kerala is particularly striking, but even the contrast with South India is quite startling."

Levels of government expenditures alone cannot explain the above differences. The authors indicate that the proportions of

government expenditure allocated to health and education, for instance, are similar in Uttar Pradesh and South India. In absolute terms, per capita government expenditure on education in the state is only 23 per cent below the corresponding figure for South India, with a similar proportionate gap in the case of health.

"The restricted scope and quality of public services in Uttar Pradesh, in comparison with South India, seems to have less to do with the level of government expenditure than with the distorted patterns of social spending as well as with the defective functioning of the services in question," state the authors and it is recommended that anybody interested in getting a complete picture of the comparative performance of the government machinery in Uttar Pradesh as compared to South India should read the complete text of the book.

2. *Water Resources in the Himalayas: Harvesting, Tradition and Change*

Piyoosh Rautela (ed.), Wadia Institute of Himalayan Geology, Dehradun, Concept Publishing Company

The author indicates that in the newly established state of Uttaranchal and previously Uttrakhand (hills of Uttar Pradesh), there has been a tradition of developing water sources both for domestic consumption, agriculture and animal husbandry linked to religious values and culture of the people. However, during the British *Raj* and subsequently during the Brown *Sahib's Raj* after Independence, most of the traditional wisdom used in the design of water harnessing structures such as smaller and larger variations of drinking water sources known as *bawari (*called *bouru* and *naurh),* which used to have provisions for washing clothes and utensils and providing drinking water to animals without polluting the source of the water has become dysfunctional. These have largely been replaced by piped water supplies located on top of the traditional water source.

Traditionally the *bawaris* were noted to discharge water even during the middle of the month of May. However, most of these traditional structures have silted up or gone into disuse due to the faulty planning and management of water resources in these hilly regions. Moreover, due to deforestation, many of the perennial sources have become seasonal and not capable of meeting the water needs of the population throughout the year. Traditional irrigation sources were dependent on small depressions in the hillside in which water used to collect during the rainy season and were used to feed the animals and for irrigation later on. These sources known as *chappri* enhanced groundwater recharge, reduced surface run-off, etc. but due to the faulty present day management practices have largely gone into disuse.

Some of the springs in the various townships such as Almora can be broadly classified as conventional open pit type with slate roofing (*naula*) and as closed tanks with piped outlets called *dhara*. Protected from external surface contamination, the *dharas* were predominantly used for drinking water purposes while the *naulas* were used for other domestic uses. Many villages in the region have rainfed earthen tanks (*khals* or *chals*) large enough to serve as watering ponds for two months for the village cattle. The book also mentions that there were numerous *naulas* which are lined percolation storage tanks that collect near subterranean flow. Moreover, in heavily populated centres, *naulas* were the sole source of drinking water before piped water supply came into being. Even today the *naulas* supplement potable water.

While, in passing, the book mentions the work being done by Trees for Life/HIMCON Ranichauri for demonstrating rejuvenation of springs, in the absence of detailed elaboration of the work being done to harness water resources by any specific agency specially with focus on women's empowerment, the opportunity for studying strategies for gender sensitisation and women's empowerment for management of water resources is not available.

However, the study mentions that an average woman had to spend long hours in the collection of water for domestic use, fuel wood and did practically all the work related to agriculture in addition to the gender-based traditional role of cooking food and taking care of children and tending to the domesticated animals. Obviously, the situation is ripe for social interventions designed to empower women and reduce the drudgery in their lives in the state of Uttaranchal.

3. *Women's Participation and Decision Making in the Management of the Key Natural Resources Mainly Land and Water*

Conducted by Harmeet Saini, April 2000 supported by the International Water Management Institute, Sri Lanka on the work done by N.M. Satguru, Water and Development Foundation, Dahod, Gujarat, India

The author indicates that earlier literature shows that failure of irrigation schemes can be traced to the fact that women were not recognised as farmers. Today also women are officially not recognised as farmers and irrigators since the ownership and control of land was in the hands of men except in the case of widows or when the offspring were only female. Traditionally women were performing many roles and tasks such as child bearing, upbringing of children, children's education, cooking, collecting firewood, water, etc. in addition to working in agriculture including irrigation, etc. even though decision making earlier was practically totally in the hands of men.

While looking at the role and involvement of women in irrigation, one cannot ignore the fact that an important factor for the deteriorating status of women in the agriculture sector is that all modern commercial agriculture that promoted technology focussed on the male members. "All training and inputs focussed on them, where they were taught the latest technology, leading to increase in incomes and production. The women were neglected in this area and today also most of them use traditional methods of farming." This has also resulted in a shift on the kind of crops being grown with men focussing on cash crops while the women's preference for growing food crops for family consumption has got relegated to a lower priority.

Irrigation is a male-dominated activity as they own the land. As a result, women's priorities are not considered. Moreover, lack of exposure, education, cultural prejudices and social factors are a hindrance to women's participation in public forums such as water

users bodies. In fact even the women prefer sending their male family members to participate in these forums due to a lack of self-confidence, lower education and exposure and male dominance in matters outside the home. Another important factor is the preoccupation of women with their domestic chores and reproductive role which hinders their participation in public forums.

The Navinchandra Mafatlal Sadguru Water and Development Foundation (NMSWDF) has been using an integrated approach with emphasis on community participation, capacity building for people-centered village institutions managing local resources by organising irrigation cooperatives, women milk producers cooperatives, women saving and credit groups, and banking, village forest institutions, women horticulture cooperatives, youth groups, etc.

While the approach of the Foundation has been to involve women in all the developmental activities, claims with regard to achieving family food security by enhanced food production through making cultivation possible throughout the year, facilitating access to fuel wood and water needs and reduction in the reproductive tasks of women have resulted in an improvement in the social and economic status of women. The Foundation is also encouraging tribal populations to discuss the underlying causes of gender discrimination in tribal societies as well as exploring ways of mitigating discriminatory beliefs, practices and institutions.

Water and Sanitation Programme–South Asia (WSP-SA)

All the reviews covered under this section are part of an international partnership to help the poor gain sustained access to improved water supply and sanitation services financially supported by the Governments of Australia, Belgium, Canada, Denmark, Germany, Italy, Japan, Luxemburg, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom; the United Nations Development Programme (UNDP) and the World Bank.

(i) Touching Lives Across Borders

"South Asia contains a fifth of the world's population and nearly half of the world's poor. They are distributed across three large countries: Bangladesh, India and Pakistan, the adjacent island country of Sri Lanka and the mountain kingdom of Nepal."

The main developmental challenges in this region are overpopulation, high poverty levels in the villages, towns and cities, slow economic growth, ineffective investment and widespread institutional failure.

The region features some of the best and worst practices with respect to water and sanitation services. At one extreme, inefficient, centralised agencies operate inadequate and fast-deteriorating services and make huge yet ineffective new investments. Management of water as primarily a social and political good skews resource allocation, leading to serious inefficiencies, service failures and long-term resource depletion. At the other extreme, the region boasts of numerous highly effective local, people-centered initiatives. Small-scale private entrepreneurs fill gaps in the service delivery chain while NGOs mobilise local action and find new solutions to the pressing problems of water supply and sanitation.

WSP-SA's central focus in the region is to promote new institutional arrangements that seek to explicitly recognise the poor as valid customers of improved, sustainable services. The programme aspires to support reform in the water and sanitation sector in South Asia; facilitating change through partnerships with the leading agencies in the region and demonstrating success on the ground in replicable pilot activities. WSP-SA seeks to be a leading source of field-acquired knowledge, policy support and investment advice in the region.

Rural Agenda

The rural water supply and sanitation sector in South Asia is undergoing a steady transition. Pilot projects and a few large-scale investment programmes have demonstrated the viability of demand-driven approaches and their contribution to sustainable service delivery. Policy statements increasingly reflect the adoption of these new approaches. The key challenge in the sector is integrating these innovative yet marginal demand-responsive approaches fully into national policies and programmes. This requires the internalisation of the reform process and the restructuring of sector institutions.

Through its 22-year presence in the region, the programme has gathered extensive field experience in rural water supply and sanitation. It has implemented rural pilot programmes and supported and implemented large investment programmes. The programme is recognised as a leader in this sector and is playing a catalytic role in supporting country stakeholders to mainstream participation, partnership, and consumer-responsive service delivery based on user demand.

Urban Agenda

The overall regional urban vision for the sector focusses on the transformation of major utilities and municipalities into efficient organisations that excel in pro-poor service delivery, and use the private sector (both large and small-scale) effectively.

The key urban challenges currently facing the sector fall into three categories. First, to immediately build the capacity of 'market-leading' city-level institutions. Second, to establish within state/provincial/national-funding mechanisms incentives for desired changes, and third, at the national level, to define what urban policy-making is required to promote the sought for changes and explore regulatory and management needs.

WSP-SA has the specific advantages of practical experience at the municipal level and an understanding of the needs and demands of the poor communities. Its role therefore focusses on demonstrating partnering approaches, supporting scaling up through single-city investments and state/provincial/national mechanisms, networking to support the transformation of lead sector institutions and bringing international and regional lessons and experience to bear.

Consumers Financing Service Delivery

It is widely recognised that an increased financial stake from poor consumers can potentially guarantee improved delivery and

operation of services for water supply and sanitation through micro-finance. To explore the mechanisms of successful micro-credit for infrastructure development in South Asia, two major studies of micro-finance institutions were carried out in urban India in partnership with the Mahila Housing SEWA Trust and SEWA Bank. The study confirmed the enormous potential of micro-credit to improve service delivery at the lowest level and found a direct relationship between investments in water and sanitation infrastructure and the incomes of the target families.

"In India, SEWA estimates that the potential demand for micro-credit from women in the informal sector for housing/infrastructure loans is around $ 5000 million (of which $ 500-$ 750 million is for community-level water and sanitation investments)."

The second study conducted in rural Bangladesh, examined the impact of micro-credit in the water and sanitation sector and documented five organisations that provide such services. The study confirmed the willingness and ability of individual households to pay for services, and indicated that many poor families were already taking loans and investing in infrastructure development. In Bangladesh, WSS coverage through micro-finance institutions and the private sector was three times greater than that of government-subsidised programmes.

Strategic Alliance to Inform and Support National Policy

"The Rajiv Gandhi National Drinking Water Mission, Government of India, and WSP-SA have signed a strategic alliance to assist the rural poor in India to gain access to improved drinking water and sanitation services. WSP-SA assists the Rajiv Gandhi Mission in accelerating the ongoing policy reform in the rural water supply and sanitation sector, in bringing a more demand-responsive approach to service delivery, promoting a facilitating role for the government and encouraging participation of the private sector and NGOs. As a part of the alliance, WSP-SA is assisting selected state governments in implementing the national 58-district Rural Water Supply and Sanitation (RWSS) pilot project. The strategic alliance also ensures the dissemination of lessons to key decisionmakers in the national and state governments."

Ahmedabad *Parivartan*

"In 1997, the 1029 slums (informal settlements) and 1383 *chawls* (tenements) in Ahmedabad, housing approximately 300000 families, had little or no access to basic urban services. In response to this growing problem, the Ahmedabad Municipal Corporation launched *Parivartan* (meaning transformation)—an ongoing programme which brings affordable and sustainable basic infrastructure services, including water and sanitation, to the slums and *chawls* of the city.

"The project brings target communities, local NGOs and the private sector to work together in a unique partnership. WSP-SA provided conceptual design support and technical assistance during the implementation and also documented the project."

(ii) METGUIDE-'Methodology for Participatory Assessments' (MPAs) with Communities, Institutions and Policy Makers

Rekha Dayal, Christine van Wijk and Nilanjana Mukherjee

The "Foreword" by Nemat Shafik, Vice President, Private Sector Development and Infrastructure, The World Bank, succinctly provides an abstract of the contents of the book which is reproduced below:

"Alleviating poverty requires tangible improvements in poor people's lives, such as clean water, decent housing and sanitation, access to health care and education. The Water and Sanitation Programme (WSP) works with its partners to find better ways for the poor to gain sustainable access to water supply and sanitation services. A critical step to this end is to increase participation of the poor, in particular women's participation, in service development.

During the 1990s, the WSP and others learnt that focussing exclusively on women was insufficient and the focus shifted to a gender approach, seeking a better balance between understanding women's and men's perceptions, wants, burdens, and benefits. Experience also indicated that water and sanitation investments which take local demand into account are more likely to be sustained. This calls for new methods and tools, to enable project planners and service providers to engage with all consumers and to ensure that frequently excluded groups—most often women, and particularly poor women—are not overlooked.

The MPA draws upon participatory approaches such as participatory rural appraisals and self-esteem, associative strengths, resourcefulness, action planning, responsibilities (SARAR) tools and methods that have proven their effectiveness in involving communities over the years while adding important new features. It is designed to involve all major stakeholders and analyse the community situation with four major user groups— poor men, poor women, better off men, better off women. In doing so, it operationalises a gender and poverty analysis framework for assessing the sustainability of water and sanitisation services.

The MPA uses a set of sector-specific indicators for sustainability, demand, gender and poverty-sensitivity. It measures them using a sequence of participatory tools with communities, project agencies and policy makers. After assessments in the community, the results are used by representatives of users and agencies in 'stakeholder meetings', to jointly evaluate institutional factors that are affecting the project's impact and sustainability at community level. Results of institutional assessments are then used to review policies at the programme or country level.

The MPA generates large amounts of village-level qualitative data, some of which is quantified using an ordinal scoring system, by villagers themselves. The quantitative data that results can be statistically analysed. This feature enables analysis across communities, projects and time, and at the programme level, so the MPA can be used to generate management information for large-scale projects and data suitable for programme analysis.

The MPA lends itself to many potential uses. The qualitative information generated visually at the community level allows easy conversion to both numeric processes as well as graphic representations. Community level graphics are produced immediately following applications of participatory tools with women and men, both poor and the better-off groups, allowing for presentation to and verification of results with the rest of the community. Consolidation of the same information across time and communities helps project implementers and mangers see trends and analyse causes. Assessments from several projects can be quickly consolidated at programme or country level for policy analysis.

The MPA is designed to be an integral part of a project, not an add-on or a stand-alone. Using the MPA thus requires either a funding agency committed to designing a new project or an on-going participatory project wishing to undertake participatory assessments.

While many countries have pools of facilitators experienced in suing participatory methods, specific training in the MPA is essential because the MPA comprises a lot more than a set of participatory tools. Firstly, the MPA adds an analytical framework that drives towards sustainability and permits participatory data to be coded quantitatively for the analysis of sustainability. Secondly, because it is participatory throughout, it encourages learning on the part of participants. Skilled facilitators sensitive to gender and poverty issues are key to fostering the cycle of learning and action, at the community, stakeholder meetings, and policy levels.

A comprehensive training programme that combines workshop learning with supervised field experience is essential to build the necessary skills.

The MPA presented in the *Metguide* is such a tool. The MPA was developed by the WSP's Participatory Learning and Action initiative, which investigates the links between demand-responsive, gender-sensitive approaches and sustainability, undertaking assessments in 18 large projects in 15 countries. While the assessments add to the evidence that projects that pay attention to gender and poverty have better outcomes, the methodology itself breaks new ground in three important ways. First, it mainstreams gender and poverty indicators into a participatory methodology that can be used to monitor key aspects of sustainability. Second, it provides a means for stakeholders at various levels—community, project and service provider, and policy—to clearly visualise how their actions can contribute to the goal of sustainability. And third, it uses quantitative statistical methods to analyse qualitative data obtained from communities through participatory techniques.

The MPA, used properly, gives consumers a greater voice in the service delivery process. It helps project and task managers engage all parts of the community, not just the leaders and more vocal members. Communities benefit because they learn about their services through the process, and may identify problems and agree on solutions. The methodology and indicators are applicable not only to monitoring, but to project preparation, and their potential use extends well beyond the water and sanitation sector to any service which would benefit from the poor's active engagement. The *Metguide* and the methodology for participatory assessments are a significant, but a first, step in pulling together key social and sustainability indicators into a single, user-friendly tool."

Eighty-eight assessments were carried out using the above methodology and key findings are given below:

"The statistical analysis generally affirmed the qualitative findings from the 88 assessments and demonstrates the importance of demand-responsive, gender and poverty-sensitive approaches to positive service outcomes. The PLA team defined 'sustained water supply service' as a service that regularly and reliably provides enough water of an acceptable quality for at least domestic use. Breakdowns are rare and repairs rapid (within 48 hours), and local financing covers at least the regular costs of operation, maintenance (O&M) and repairs. The following findings emerged from the analysis:

A higher level of participation in establishing a community-managed rural water supply service is significantly associated with a better sustained service. Participation in this context meant that the community carries out the O&M and management is paid for and done by men and women.

Contrary to expectations, a higher demand for a water supply service as expressed through initial payments in cash and/or kind is negatively related to the sustaining of the service. Factors associated with sustained services are community participation in maintenance and management, good governance in participation and service management, and satisfaction of all user categories—women, men, rich, poor—with the service and its direct and indirect benefits.

Good governance at the community level during the project cycle is positively correlated with a more sustained water supply. 'Good governance' in this case comprises the following characteristics: a local organisation monitors contributions to construction and deals with defaulters, women participate in monitoring and control, male and female community members are trained in technical, managerial, financial, and water use/hygiene aspects, and accounts are shared with the entire community—females and males.

Water services financed by bilateral donors have a significantly higher association with sustainability than services financed by other means.

The more sensitive and supportive the implementing agencies' score on participation, gender, and poverty issues, the higher the scores are for sustained services in the associated communities.

An 'effectively used service' was defined as the combination of the percentage of households with easy access to the improved water supply, the percentage actually using the improved water supply always, at least for drinking, and the environmentally sound use of the water system (drainage present and no stagnant water). Findings on effective use were:

Services that score better on gender and poverty sensitivity in the communities also score better on the effective use of water. However, gender and poverty sensitivity made no significant

difference with respect to sustained services. This seems to indicate that services that do not regard gender issues or the poor may perform well technically and financially, but leave an important segment of the population unserved and have less impact on the use of safe water. Both general access and safe use are important—though not the only—factors in achieving a positive impact on public health.

The more demand-responsive the project, the better the access to and use of the service. Demand-responsive projects offer male and female users from all socio-economic strata information and choices in technology and service level, location of facilities, and type of local management, maintenance and financing systems. The greater and wider the voice and choice, the better the access and use.

Communities with higher service levels and concurrent improvement of water supply, sanitation, and hygiene (though not necessarily through the same project) had a better effective use than communities with only water projects or a lower service level."

(iii) Linking Sustainability with Demand, Gender and Poverty

Bruce Gross, Christine van Wijk and Nilanjana Mukherjee, The International Water and Sanitation Centre under the Water and Sanitation Programme

The World Bank's policy research team on engendering development has found that gender inequality was more pervasive in poor countries. In these countries, the disparities were greatest amongst poorer people. Although in no part of the world have women achieved full equality, in poorer regions they continue to have fewer rights, lesser access to resources, and more limited voice. Many of the disparities between women and men—in rights, resources and voices—are also disparities between the poor and better off in society. Although women and girls bear the brunt, these disparities reduce economic growth and constrain development generally.

This report presents the results of a study of community-managed water supply services in 88 communities around the world. It adds to the evidence that giving more attention to the service demands of women as well as men of the poor members of a society as well as those who are better off, pays off directly in terms of sustainability of the services. According to Nemat Shafik, Vice President, Private Sector Development and Infrastructure, at the World Bank writing in the "Foreword" of the Report "Providing greater voice and choice to all during the process of service establishment results in greater equity later—a better distribution of the burdens and benefits among community members, and improves water supply that more community members use in a health promoting manner. Greater access to women and poor people to training and to participate in water users' committees also contributes to sustainability."

According to the study, "To shed more light on the linkages between sustained services and project approaches that are more demand-responsive and gender- and poverty-sensitive, the WSP, in collaboration with the IRC conducted participatory assessments with 88 communities that had managed and sustained their water supply systems for three or more years.

"A random sample of communities was chosen from 18 projects in 15 countries, funded by a range of donors, NGOs, and governments. All the 88 communities included agreed to participate. The assessments were carried out from mid- 1998 through mid-1999.

"The methodology developed to conduct the assessments assumes that the objective of community-managed water supply and sanitation projects is to create a service that is not only effectively sustained, but is also effectively used by the members of the community. Effectively sustained service is defined as a service that regularly and reliably provides enough water of an acceptable quality, as perceived by users as well as authorities, for at least domestic use. Breakdowns are rare and repairs are rapid (within 48 hours), and local financing covers at least the regular costs of operation, maintenance, and repairs. Effectively used service defined as the combination of the percentage of households with easy access to the improved water supply; the percentage always using the improved water supply at least for drinking; and the environmentally sound use of the water system (presence of proper drainage and lack of stagnant water).

"A working hypothesis was developed, based upon findings from pervious studies, informal evidence, and years of experience from the field: communities better sustain their services when projects are more participatory, demand-responsive, and gender- and poverty-sensitive. Effectively sustained services and effectively used services thus are the study's two dependent variables. They were defined and assessed separately so that relationships between them could be tested, as well as between each of them and the study's independent variables."

"Participatory approaches involve people actively in making choices about their services. Gender- and poverty-sensitive approaches go further. A gender-sensitive approach gives equal access to project inputs and processes relevant for the future service, such as information, training, new functions and jobs, and decision making to both women and men. In addition, a gender-sensitive approach pays attention to the distribution of work, resources and benefits between women and men, such as inputs given during construction of the service and use of water for productive purposes within the household. To be gender-sensitive, projects must be prepared to deal with women and men separately, if, for example, women cannot speak up in meetings with men."

Table A-6.5.3 gives the variable clusters and the indicators which number 28 in all. The analytical framework for the assessments, the variables, and the indicators were initially developed by the Global Participatory Learning for Action (PLA) Team and refined at a workshop with water and sanitation practitioners and specialists in gender and participatory approaches from Africa, at Bangalore, India, then pilot tested in Kerala, India.

TABLE A-6.5.3

Indicators for Water Supply Services

Variables	*Indicators and Sub-indicators*
A. Effectively Sustained	**System Quality** • Construction matches design, quality of materials and workmanship. **Effective Functioning** • Service operation in terms of water quantity, quality, reliability and predictability. **Effective Financing** • Coverage of investment and/or recurrent costs. • Universality and timeliness of payments. **Effective Management** • Level and timeliness of repairs. • Budgeting and keeping accounts.
B. Effective Use	**Hygienic and Environmental Use** • Proportion and nature of population using the service. • Degree of improvement in water use habits. • Presence and state of waste water disposal provisions for R/P.
C. Demand-responsive Service	**User Demands** • Type and proportion of contribution at the time of establishment of service, by M/W, R/P. **Project Responsiveness to Demand** • User voice and choice in planning and design, by M/W, R/P. • Satisfaction of user demand for M/W, R/P. • Ratio of user-perceived costs-benefits for M/W, R/P.
D. Division of Burdens and Benefits	**Gender and Poverty Focus during Establishment and Operations** • Nature of community payments at the time of establishment of the service. • Cost sharing/contribution sharing between and within households for construction and O&M. • Division of skilled/unskilled and paid/unpaid labour between M/W, R/P in establishment and management of the service. • Division of functions and decision making between M/W, R/P.
E. Participation in Service Establishment and Operation	**Participation during Establishment and Operations** • Degree of control in construction schedules and quality of works by M/W. • Composition, status, and rules and tools of control of managing committee, as present and known to M/W, R/P. • Responsibilities for maintenance and management. • Type of skills created and practised among M/W, R/P. • Transparency in accounts (M/W, R/P).
F. Institutional Support for Gender- and Poverty-sensitive, Demand-responsive Participation	**Enabling Organisational System** • Indicative strategy as reflected in service objectives, implementation strategies, and project performance criteria. • Sex and class disaggregated planning and monitoring systems in operation. • Experience as reflected in the type of agencies involved, field teams, and team approach. **Enabling Organisational Climate** • Capacity building, managerial support, and staff performance incentives.
G. Policy Support for Gender and Poverty-sensitive, Demand-responsive Participation	**Supportive Sector Policy and Strategy** • National sector policy for water and sanitation present with sustainability and equity as explicit goals. • Degree to which national sector strategies are present to guide the achievement of the policy goals and incorporate participation, demand-responsiveness and gender and poverty perspectives.

Note: M/W: men and women, R/P: rich and poor

TABLE A-6.5.4

Key Indicators for the Assessment in Water Supply and Sanitation Services

Variable	*Indicators and Sub-indicators*	*Source of Information*
A. Effectively Sustained	**Functioning System**	
	• Level of quality of the works (degree to which they are suited to operation).	• Technical team members • Local records, operators and service administrators
	• Service operation in terms of water quantity, quality and supply reliability.	• Users (M/F, R/P)
	Effective Financing	
	• Coverage of investment and/or recurrent costs.	• Socio-economic Team members
	• Universality and timeliness of payments.	• Local records • Users (M/F, R/P)
	Effective Management	
	• Level and timeliness of repairs.	• Local records, service administrator, operator, mechanic, etc.
	• Budgeting and accounting for service.	• Users (M/F, R/P)
B. Effective Use	**Hygienic Use by All**	
	• Proportion and nature of population using the service.	• Users (M/F, R/P)
	• Degree of improvement of family water use habits.	
C. Demand-Responsive Service	**Meeting User Demands**	
	• Range of service characteristic users contribute to, for M/F, R/P.	• Users (M/F, R/P)
	• Achieved balance of user-perceived cost-benefit for M/F, R/P.	
D. Division of Burdens and Benefits	**Economic Participation**	
	• Division of skilled/unskilled and paid/unpaid labour between M/F, R/P.	• Users (M/F, R/P)
	• Cost sharing/contribution sharing between and within households.	• Local service administrators and workers (M/F)
	Management Participation	
	• Function holding and decisionmaking by M/F, R/P.	• Local service administrators (M/F)
E. Participation in Service Establishment	**User Voice and Choice in Planning and Design**	
	• Degree of informed decision making by M/F, R/P on: service initiation; choice of technologies and service levels; location of facilities; choice of local service management organisation; type and size of contributions to service exploitation; and choice of local maintenance system.	• Local service administrators (M/F) at the time of establishment of the service. • Users (M/F)
	User Contribution to Service Establishment	• Local records
	• Type and proportion of contribution by M/F, R/P.	• Local service administrators (M/F) at the time of establishment of the service.
	• Local monitoring and control, specifying M/F, R/P.	• Users (M/F, R/P)
	Management Capacity Created	
	• Type of management skills created among M/F, R/P.	
	• Composition, status and areas and tools of control of managing committee, as present and known to M/F, R/P.	• Local records • Local service administrators (M/F) at the time of establishment of the service. • Users (M/F, R/P)
F. Institutional Support for Gender and Demand-Responsive Participation	**Enabling Organisational System**	
	• Indicative policy as reflected in service objective, implementation approaches and project performance criteria.	• Project documents Staff (M/F)
	• Sex and class disaggregated planning and monitoring systems in operation.	• Manager (M/F) in charge of project at the time of implementation
	• Required project expertise reflected in type of project agencies, field teams and team approach.	
	• Extent and nature of staff training available for new approaches.	
	Supportive Organisational Climate	
	• Understanding and incentives for demand-responsive and gender and class sensitive participatory approaches.	• Staff (M/F) and • Manager (M/F) at the time of implementation
G. Policy Support for Gender and Demand-Responsive Participation	**Supportive Sector Policy and Strategy**	
	• National sector policy for water and sanitation present with sustainable services and equity as explicit goals.	• Policy documents • Project documents
	• Degree to which national sector strategies are present to guide the achievement of the policy goals and lay down community participation and management; gender sensitivity and gender equity; and demand-responsiveness.	

(iv) Voice and Choice for Women: Water is their Business; UNDP–World Bank Water and Sanitation Programme, South Asia

The above communication aims to share the methodology and indicators used for a series of participatory assessments as part of the global initiatives of gender and participation. The objective was to evolve guidelines for conducting social assessments on ongoing projects to allow demands of consumers to guide key investments and manage services. It is believed that there exists a positive link between sustained and effective WSS Services and the use of demand-responsive, participatory, gender and poverty-sensitive approaches that benefits both men and women, rich and poor.

Although 'gender' and participation 'frequently feature in project documents', they are rarely translated into the actual design, implementation, monitoring or evaluation strategies. Empirical evidence however, indicates that both sustainability and impact of projects can be positively affected by proper attention to, including a gender perspective, in planning user participation. Gender must be perceived as a specific parameter of socio-economic analysis. Women and men have different roles and responsibilities in society and hence their demand for goods and services also differ. A particular concern is that women continue to be excluded from decision making. Often their involvement is limited to mandatory representation on user committees, etc. with inherent danger of increasing demands on women's time without giving them a voice. While the results and observations from using this methodology in existing projects has not been presented, it is indicated that the PLA initiative aims at testing this novel methodology for social assessment. It grew extensively on two methods currently in use:

(i) the participatory evaluation methods developed within the bank and

(ii) the Systematised Minimum Evaluation Procedures (MEP) developed by WHO as well as the Global RWSS study of the WSP

The analytical framework reflects the following assumption:

(i) the degree to which the community sustains an installed water supply and/or sanitation service, has an effect on;

(ii) the degree to which the population—male and female, rich and poor uses the service, and is in turn positively associated with;

(iii) the degree to which the services meet the demands of the respective population category; and

(iv) the way in which the burdens and benefits of the service all divided between men and women, rich and poor.

The relationship between variables (i) to (iv) are assessed at the community level and formed the basis of analysis of the current status of WSS services. These relationships are also a product of the processes through which the services were established and the institutional and policy environment underline these processes.

"The assumption is that the degree of gender and poverty-sensitive participation in sustaining WSS services is positively associated with:

(v) the degree of gender and poverty-sensitive participation in the establishment of service;

(vi) the institutional support for such approaches; and

(vii) the presence and application of demand-responsive and gender and poverty-sensitive principles and policies in the project and the sector.

Variables (v) to (vii) are assessed through a historical analysis of the role of the enabling institutions at all levels—community, service delivery and policy—at the time of the establishment of the service.

There are many 'exogenous factors' that influence the variables considered in the assessments; not all of these can be spelt out clearly and included in the analytical framework."

4. Private Sector Participation in Water and Sanitation Programme in South Asia

The Programme is an international partnership to help the poor gain sustained access to improve water supply and sanitation services. The programme's funding partners are the Governments of Australia, Belgium, Canada, Denmark, Germany, Italy, Japan, Luxembourg, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom; the United Nations Development Programme and the World Bank.

(i) Empowerment through Entrepreneurship in Water and Sanitation: Women's Mela, November 25-26, 1999, Chitrakoot, Uttar Pradesh, India

"Although women are the primary stakeholders in the water and sanitation sector, their participation has often been restricted to a representative capacity; that is, it has simply meant membership of the village water and sanitation committee. Far too often they are excluded from the key decision making roles and their economic empowerment has remained crucially lacking. Can women earn a living, or even supplement their income through water and sanitation? Finding answers to these questions was what the women's *melas* were all about. It also provided women entrepreneurs with a unique opportunity to share their experiences and examine the factors contributing to the success and failure of programmes in villages all over India. The *mela* was hosted by UNICEF, the Water and Sanitation Programme–South Asia and Vanangana, an all-women NGO working in this region. The first of its kind in this sector, the *mela* was a celebration of women's empowerment and its huge success prompted a strong demand from the participants to make it an annual event."

More than 50 women masons and mechanics participated in the *mela*. They came from 10 projects spread across eight states—

Andhra Pradesh, Tamil Nadu, Kerala, Gujarat, West Bengal, Assam, Bihar and Uttar Pradesh. Some participants travelled for two days to reach Chitrakoot and for most of the women, this was the first time they had travelled out of their villages. The majority of the mechanics and masons belonged to the scheduled and backward castes.

The language barrier was overcome by the natural bonding amongst the participants and by using music, song, dance, *nukkad* (street theatre) and *phad* (a traditional story-telling technique in which a brightly coloured painted cloth is slowly unfurled during the narrative) to tell their stories. There were common themes... of water shortages, long treks to fetch water and of health problems caused by lack of decent sanitation. There was a common cause... a desire to improve their own lives and that of their communities."

All the women participants reported being constrained by social prejudices from families, the local community, from *panchayats* and local leaders especially during the early stages of training. Criticism centers around women working outside the home, working as equals with men in non-traditional roles, depriving men of employment, travelling and staying away from the village and the sheer disbelieve that women were capable of doing a man's work. They were further hindered by unequal wages, lack of timely supply of spare parts from government institutions, discouragement by government institutions to involve women in the operation and maintenance services and absence of marketing outlets for these spares in the private sector.

(ii) "Why Some Village Water and Sanitation Committees are Better than Others", a study of Karnataka and Uttar Pradesh (India)

"The water and sanitation sector is continuously developing and testing new strategies to identify the factors that promote sustainable RWSS projects throughout the world. A key lesson from global research over the past decade is the strong relationship between a demand-responsive approach and overall project effectiveness (Narayan, 1995; Sara and Katz, 1998). As a result, external support agencies and governments in India and around the world are relying upon community-level organisations to respond to community demand and assist in the planning, construction and maintenance of water projects. Based upon evidence that these community-level organisations can lead to more effective projects, the Karnataka and Uttar Pradesh RWSS projects were designed to have committees that functioned at the village level."

Scrutiny of existing literature indicated that four committee features associated with project success at the village level were—transparency, participation, inclusion and ownership. While in both Uttar Pradesh and Karnataka the objective of the project is to provide sustained water and sanitation services (through construction of latrines), provide health and hygiene education and build drainage facilities wherever required. While there are differences in demography, culture, gender-based education pattern, etc. in the different locations, both projects required establishment of village committees to assist or undertake planning and implementation of schemes and be entirely responsible for operation and maintenance. Since there exists structural differences in the scope of activities carried out by the Village Water and Sanitation Committees (VWSCs) it would be unfair to compare the finding. As there were substantial differences in the number of villages attending the VWSC meetings in Karnataka and Uttar Pradesh which were affected by caste homogeneity, village population and also the mandate given to the VWSCs comparisons would be unfair. However, it was concluded that there is greater transparency in the villages with VWSCs as compared to the control villages, transparency substantially contributed to success in achieving the objectives of the project.

VWSCs were established independent of the *panchayats* due to the fact that *gram panchayats* often administered an area larger than the village of interest; were concerned about the inclusion of marginalised groups; had a potential for political interference and rent-seeking and due to many other responsibilities diluting their focus solely on water and sanitation programme within the village, studies are indicated to establish or disprove the efficacy or otherwise of VWSCs. Another important constraint was the fact that both these projects were of recent origin and even though it can be assumed that consumer satisfaction and effective tariff collections are both indicators of sustainability, no conclusive evidence with regard to post-project sustainability due to the establishment of VWSCs could be arrived at. The study also concluded that VWSC villages better facilitated participation, inclusion and ownership of marginalised groups such as scheduled castes and tribes.

(iii) Developing Private Sector Supply Chain to Deliver Rural Water Technology: The Growth of Private Sector Participation in RWSS in Bangladesh

Prepared by Andy Robinson and Ajay Paul conducted under the WSP-SA an international partnership to help the poor gain sustained access to improved water supply and sanitation services. The programme's funding partners are the Governments of Australia, Belgium, Canada, Denmark, Germany, Italy, Japan, Luxembourg, the Netherlands, Norway, Sweden, Switzerland, United Kingdom, the United Nations Development Programme, and The World Bank

People in Bangladesh are poorer compared to other South Asian countries. Moreover, Bangladesh has an extremely high population density and more than 50 per cent of the rural population is dependent upon daily wage labour for their livelihood as they do not own any land. Bangladesh also suffers from political instability and poor economic performance and has also not been successful in attracting foreign private investment and is dependent upon a thriving NGO sector which has attracted more than US$ 500 million in foreign funds from international organisations.

Bangladesh's largely agricultural economy depends on water which is fortunately bountiful due to tropical rain for about eight months in a year. The Ganges, Brahmaputra river basin and delta are also dominant physical features. However, the limited land area forces the population to cultivation on the fertile alluvial sediments in the delta which are prone to frequent floods resulting in loss of crops.

Use of groundwater for domestic and irrigation purposes boomed in the 1970s. Prior to this, most of the rural population obtained its drinking water from ponds, many of which were polluted resulting in the death of more than 2.5 million children every year from water borne diseases. Fortunately, the shallow groundwater tables allowed for a shift of water sources from surface water to microbiologically purer groundwater sources for domestic consumption. Millions of hand pumps were installed during the 1980s and 1990s and it is now estimated that 95 per cent of rural drinking water supplies are at present obtained from groundwater.

"Twenty-five years ago, the private sector was almost completely uninvolved in the provision of goods and services for rural water supply and sanitation in Bangladesh. The situation is radically different today; it is estimated that more than 65 per cent of the approximately four million hand pump tube wells have been privately installed, and there are 3000 privately run latrine production centres, accounting for more than 65 per cent of the sanitation market. Bangladesh bears testament to the private sector's success in creating effective supply chains for hand pumps and sanitary goods, which are now available from traders throughout the country, with competition keeping prices reasonable and products reliable. The private sector has demonstrated clear advantages over the public and NGO sector in reducing production costs, and in the efficient distribution of goods and services. Whilst much of this success is undoubtedly due to the particular conditions and circumstances found in Bangladesh, it is also clear that some of the strategies used to encourage private sector participation are general and should be replicable in other countries."

The Treadle Pump: An NGO introduces a low-cost irrigation pump to Bangladesh

The treadle pump was developed in 1979 by a team working with the Rangpur Dinajpur Rural Service (RDRS), an NGO working in north-west Bangladesh. RDRS has developed the new pump to meet an unsatisfied demand for foot-operated manual irrigation pumps. The treadle pump offered a unique alternative to existing hand-operated pumps by making it possible to pump larger volumes of water through the easier foot-operated methods.

The RDRS workshop in Rangpur began manufacturing pumps in 1980, with an initial capacity of 600 pump heads per month. In addition, RDRS helped finance four private workshops increasing the total monthly output to 2500 pump heads. Despite early indications that the treadle pump was an attractive and affordable product, RDRS provided a 50 per cent subsidiary to farmers on the purchase price and maintained some 200 salaried extension workers to promote the pump in northern Bangladesh. By 1984 sales had reached 7000 pumps per year but further increases were limited by production capacity and the absence of a nationwide sales network, and the fact that the short supply chain from the manufacturer to the customer did not use the promotion potential of retailers. As it was later established, the key to expansion and increased coverage lay in effective marketing.

The potential market comprised 12.5 million small and marginal farmers with an average Landholding of 0.5 to 2.5 acres. The pump is appropriate for all areas of Bangladesh except the Chittagong Hill Tracks, the coastal belts, and parts of the north-west, where the groundwater table is too low for lifting water by suction.

The International Development Enterprises (IDE), an NGO based in the United States, is supporting the development, marketing and distribution of the treadle pump in Bangladesh. IDE estimates that already 1.3 million pumps exist in Bangladesh. IDE's involvement has been in three geographical areas comprising 30 per cent of the total pump sales in Bangladesh. However, IDE's influence on market share is not static even in these areas and never exceeded 50 per cent at any time. The marketing strategy of IDE had six main components:

1. **Diversifying the Production Base**: IDE began working with manufacturers from all over the country to expand the production base and introduce competition.
2. **Quality Control:** IDE acted as a wholesaler, purchasing pumps from the manufacturers, carrying out quality control inspections, giving the pump a new name and selling them to a network of rural dealers.
3. **Promotion:** IDE staff, pump dealers and locally hired promoters used various innovative promotional and marketing strategies to sell the pumps.
4. **Training:** IDE's staff members were trained to identify and build links with rural traders mostly small hardware shops who were interested in selling the pumps. They also trained and supervised the work of installation teams.
5. **Creating a Dealer Network:** IDE created a countrywide dealer network to purchase pumps at wholesale prices to sell them to farmers. It also set ceilings on profit margins for both producers and retailers.
6. **Coordination:** IDE set up a manual pump group in which all involved in promotion of irrigation pumps discussed common issues. Through this group IDE advocated for reduction in government subsidies.

By 1988, IDE's inputs had resulted in booming sales of treadle pumps. Further with 20 independent manufacturers nationwide, vigorous competition set in and resulted in prices to drop and manufacturing quality suffered. In response and with a view to ensure long-term sustainability of the supply chain, IDE pulled out wholesaling altogether and began working with regional manufacturing partners. This was attempted on the belief that by influencing the manufacturers, IDE would be able to ensure quality control with majority of pumps entering the markets. It provided technical assistance to improve product quality and business practice helping open up new markets and form private dealer networks. In 1988 and 1989, the first year that IDE implemented this strategy, treadle pump sales rose again.

In 1990, IDE withdrew from two districts where sales were significantly high assuming that demand alone was enough to sustain the continued sale of the product. Cheaper and poor quality products again entered the market with stiffer competition and technology acceptance problems appeared. Nevertheless, a vital

lesson had been learned: "Although increasing demand can stimulate the development of the private sector supply chain, large numbers of initial sales alone do not indicate a successfully established product."

IDE's response was a resumption of a direct role in the market by setting up a brand name (Krishak Bandhu—farmer's friend) for marketing and sales organisation. "It conceived of this as a flagship organisation to establish a quality benchmark and to manufacture and sell treadle pumps and other agricultural inputs through an exclusive network of manufacturers, dealers, and installers working to set standards of quality and service. The model worked well, but IDE's main donor felt it was inappropriate to support a profit making organisation. Consequently, Krishak Bandhu (KB) became an independent limited company in 1995, staffed by former IDE personnel."

At the same time, IDE began a generic promotion of the treadle pump by supporting all manufacturers and installers regardless of the brand name. This strategy led to problems as in some regions some partners produced a low quality product with poor service. Finally in 1998, IDE developed the Quality Partner Catalyst Approach. This strategy aimed at increasing quality consciousness to encourage production of better quality products, thus achieving greater customer satisfaction, increasing sales and a higher return on investment.

This approach has resulted in significant improvement in the quality of pumps entering the market as it was linked to various IDE incentives. IDE's experience indicates that both types of customers exist including those who are quality conscious and willing to pay higher prices as also those who want a cheaper product if it means a reduced life span of the product.

"The treadle pump is not a drinking water pump, but its success has encouraged IDE to enter the drinking water sector with the development of the *Jibon* pump for low water table areas. It is using the same approach with this product, including phases for research development, establishing a dealer network, and marketing and promotion, to be followed by eventual withdrawal."

5. *K.B. Pump Brings Better Tomorrow* (A collection of case studies)

Dr. Premananda Panda (compiled), IDE.

The Krishak Bandhu Pump developed in Bangladesh and being promoted by IDE is simple to construct, easy-to-operate pedal pump which can efficiently be used in pumping water from shallow groundwater horizons from a maximum depth of 20 feet. It efficiently irrigates around two acres of land and can be operated by the farmer and his family members through manpower and hence is labour-intensive. It can be easily operated by women as also children which is not the case with the traditional water-lifting device called *tenda*. The total cost of a KB Pump is around Rs. 2500 and can easily be maintained by the farming family. Introduction of this pump in various states including Orissa has resulted in a dramatic change in fortunes of the small and marginal farmers who were previously dependent on the vagaries of nature for irrigation with crops often adversely affected due to droughts or erratic rainfall.

Dr. Panda has documented 40 case studies of success stories in the use of the KB Pump by small and marginal farmers in Orissa, a large percentage of which have been able to successfully cultivate paddy and vegetables. It has also resulted in the empowerment of women farmers or from farming families as they are able to lift water for irrigation independent of their husbands and ensure production of vegetables and cereals successfully even in the absence of their husbands.

Three of the case studies describe the experiences of three women with the treadle pump which are reproduced below :

(i) "Living on No One's Mercy, but a Pump"

She might be deserted by her husband but her self-esteem and dignity have not deserted her yet. When Dangi Marandi, in her late thirties came back to her brothers with her 10 year old daughter to stay with them and not return to her husband again, she made up her mind that she would not be a burden on anyone. But it was not to be that easy. After trying her hands in different things, she gradually tried to make a living out of cultivation of a few small patches of land that she encroached upon at the river bed in her native village Hesalpata in Jamad block of Mayurbhanj district.

As the villagers were sympathetic towards her plight, she did not face any problem from them for encroachment, but irrigating her cropland by carrying patches full of water from the river was a hell of a job. Determined as she was, she never gave up. Her perseverance and sincerity caught the attention of many. One among them was the local Village Agricultural Worker (VAW) who made her aware regarding the suitability of KB pump for her cause. Subsequently, the VAW also organised an evening discussion with the villagers regarding the advantages and availability of this pump. Within a few weeks, six tribal farmers of her village bought one metal KB pump each on government subsidised rate of Rs. 727 from the local government sales centre of agriculture implements. One among them was Dangi, who bought her KB in January, 1997.

Dangi Marandi uses the pump to lift water from the river to irrigate about 0.10 to 0.20 acres of land on the river bed to grow variety of vegetables such as brinjal, tomato, onion, chilly, cauliflower, greens, etc. Since the use of the pump, she has already generated about Rs. 6000 from sales proceeds of vegetables apart from home consumption, Rs. 1100 during 1997, Rs. 2050 during 1998 and almost Rs. 2800 during 1999 till end March.

- This extra income, however small they may be, has immensely helped to ensure food security— she spends a major part of the money to buy paddy for home consumption, also buys agricultural inputs. It also came handy for the treatment of her own health.
- Except changing the washer once, given freely by the local VAW, she has neither done any repairing nor has faced any problem. She is quite happy regarding her status—having a pump and earning money. "I feel very good that I could also buy a pump like others. I think KB is the only 'machine' that is cheap but very strong, long lasting and trouble free. I wish I had land of my own, where I could make use of the KB

pump to its full capacity," she observed with a bit of nostalgia in her voice.

(ii) "Owner of Water, Winner over Husband"

Lili Pradhan in her late thirties lives with eight other members of her family including husband Bishnu Pradhan, three sons, two daughter-in-laws and three grandsons in village Tubey of Banrpal Block in Angul district. They have two acres of rainfed agricultural land. At the time of need, they used to irrigate through five dug wells they have—two of which were fitted with *tenda*.

About two years ago, the local Lady Village Agricultural Worker (LVAW) had organised a meeting with the women of their street regarding low cost irrigation through the KB pedal pump. She was also present at that meeting. A few days later the local field office of IDE arranged one live demonstration of the pump operation in her village. From the very first day of the meeting, Lili had made up her mind to purchase a KB Pump, but her husband was not in favour. Even after the demonstration, her husband did not show any interest. She somehow managed to purchase one metal KB pump in July 1997, with an arrangement that she would pay in three instalments.

In about two years of having the KB pump, their paddy crop in some of the patches have been saved couple of times through timely irrigation during the long dry spells. They shift the KB pump between their five dug wells distributed in various patches of their land as per the need. Even they managed to get few extra bags of paddy.

She admits that the pump is responsible for her new found enthusiasm to grow vegetables in large scale. They grow a wide variety of vegetables, including lady's finger, green peas, potato, onion, garlic, greens, short bean, rib gourd, chilly, etc. During the first year, out of an estimated production of about Rs. 6930, she got about Rs. 4000 from the sales proceeds after their own consumption; similarly, during the second year she generated about Rs. 10350 from sales out of the total estimated production of about Rs. 12800. KB also helped to grow sugarcane—they got 4 quintals of *gur* (type of molasses) costing about Rs. 8000. These extra earnings has really made her confident and relatively free to run the family smoothly, she confides.

There has been no need to repair her pump, yet. Going through her own experience, she strongly advocates that KB is really fit for the marginal and small farmers. "The cost is so low that any one serious about farming can buy it, even through loan and payback the entire cost within one year."

Observing the performance of the pump and the benefits accrued through it, Bishnu Pradhan, Lili's husband, has also in the mean time developed weakness for the pump. He now compliments her bold decision.

(iii) "Women and KB: Pedalling to Empowerment"

Like many other women of her village, Ayodhya Pradhan, in her early thirties used to help her husband in almost all the activities relating to crop growing, except in irrigation—drawing water by *tenda* from the dug well. She had never imagined that irrigation one day would be so easy for them.

Ayodhya lives with her husband Rasraj Pradhan, daughter and son in village Kusmel of Loisinga block in Bolangir district. They struggle hard to eke out a living out of only 1.5 acres of rainfed upland. Water being available at a shallow depth in their village, they have dug two water holes. To supplement the family income she used to devote her time round the year to grow vegetables, with helping in irrigation while her husband did wage earning and other jobs. However, owing to difficulty in irrigation through *tenda*, which only her husband could operate, she was never able to utilise the full potential of the land.

Things changed very fast once they had a KB pump. It was the initial days of IDE's operation in Bolangir district, when a few villagers of Kusmel were already users of the pump. The demonstration impact was quite strong. Ayodhya could not resist and impressed upon her husband to have one KB. They took advantage of the loan facilitated by IDE field staff through the local branch of the State Bank of India and bought a metal KB pump in November, 1996. Since then she has been growing vegetables round the year in about 0.5 acres of land.

This has made both husband and wife busy in agricultural activities, round the year—in production and marketing. They grow vegetables, such as short bean, brinjal, cucumber, onion, bitter gourd, rib gourd, potato, tomato, green leaves, cauliflower, etc. Excluding the family consumption, over the last three years they have been able to generate more than Rs. 30000 out of vegetable selling—Rs. 13400, in 1996-97, Rs. 8900 in 1997-98 and Rs. 8000 in 1998-99, till March.

Savings out of this income came in very handy to meet the medical expenses when both husband and wife suffered from malaria. The regular income helps them to manage the every day expenses, they also feel free to invest in agricultural inputs. Since the installation, their KB pump has only required replacement of the washer twice, which they did by themselves.

"I feel so confident—I never imagined that I could be so useful to help increase our family income, that too not going out, only working in our own field, a small pump did it all," Ayodhya sums up the impact.

6. *The Treadle Pump: Changing the Lives of Women and Men*

Uma Ramaswamy and Sulagna Sengupta,
International Development Enterprises, New Delhi.

IDE uses a market-oriented mechanism for dissemination of this technology through setting up small scale production (manufacturing) units, by appointing distributors, dealers and commission agents who sell the pump through a financial package which includes incentives and targets. The authors have indicated that the decision to purchase the pump is generally that of the farmer, although, more often than not the farmers have been found to consult their wives, as the women are also able to operate the pump. By and large the women users from North Bengal, Orissa,

Eastern Uttar Pradesh, North Bihar and Terrai Nepal (where the field work was done by the authors) indicated that they did not visit the shops from where the pumps were purchased and IDE officials agree that the marketing strategies gives greater exposure to the user. Further, the information dissemination mechanisms focussed more on publicity in places where men frequent more than women such as the village weekly markets, etc. The authors indicate that while many women are interested in the product demonstration, pricing, crop diseases etc., they find themselves inhabited in the presence of men. "I believe that women's capacities are equal to those of men. A few months ago, I took a lot of effort and persuaded women from my neighbourhood to participate in a farmer meeting. But we returned frustrated as we found men talking all the time and we were given no opportunity to express our views. Separate meetings have to be organised if women have to participate. Women also need to attend these meetings as much as men do." observed Suniti, a *panchayat* member in Haldimohan., echoing the views of many others in the field sites. Significantly, IDE's marketing campaigns have given insufficient thrust to address women directly.

The authors have indicated that introduction of the KB Pump has contributed significantly to women's empowerment and involvement in irrigating crops as traditionally "Men had have to play a major role not only in watering major crops but also with devices which requires 'greater skills and strength'."

The authors argue that introduction of new technologies brings in their wake changes in the lives of women and men who traditionally have specific but different tasks to perform in the production system. Technological change was a social process that affected existing socio-cultural relations that govern division of labour between men and women. However, introduction of this technology has produced distinctly different socio-cultural changes in different parts of the country and Nepal where it has been introduced. For example, in coastal Orissa, the culture of marginal and small farmers from dominant caste restricts women's role to the household domain and as such there was a reluctance both from men and women to take up pedal pump operations by women at a distance from their homes. In North Bengal, homogeneous settlements of marginal and small farmers belonging to backward communities have promoted a different culture, which does not discourage women to treadle. For many women, this technology has brought about a shift in their employment profile—from wage work to working on their farms. In the Kushwaha community in North Bihar, tradition encourages women to market the vegetables, but women are reluctant to treadle, a task that they have left to their men folks. In Terai, Nepal, the gender orientation of international NGOs has increased the awareness levels of women, changing their mindsets.

The authors indicate, "The division of work between men and women in the farming households is interdependent and complex. Nearly everywhere, there is much sharing of work and women and men are seen doing farm activities together. Despite this, women and men are found to have certain tasks that give them certain stereotypical roles, distinct domains and identities. It is important to understand this because it is these distinct domains that give women and men not only different identities but differential starting points in life. The case studies from the five field sites reveal that wherever women and men have brought flexible arrangements in their roles and work divisions, they have not only got multi-skilled but crossed rigid thresholds of traditions to get connected to the expansive worlds that they have not known, enhancing their mental horizons and enriching their lives."

7. "The PLA Initiative" at Vellangallore Panchayat, Thrissur District, Kerala

Christine van Wijk, Rekha Dayal and Shalini Sinha for a clinic on sustainability Monitoring, PREM Week, July 14, 1999, UNDP-World Bank Water and Sanitation Programme–South Asia.

"Recognising the linkages between user participation and sustainability of the services, the Vellangallore *Panchayat* initiated an innovative intervention drawing on resources from the community and service institutions in a mutually supportive framework."

Due to financial and manpower constraints, the government of Kerala has been able to deploy only a limited number of staff to operate, maintain and manage the rural distribution of water in the Mala Water Scheme, which is a Dutch-supported water supply scheme covering six *panchayats*. The result is that Kerala Water Authority cannot appropriately allocate the limited amount of water available.

"Areas on higher ground in Vellangalore do not get water at predictable times and when they do, it is inadequate, often for only an hour at a time. This especially affects the poorer households, which use public taps financed by the local council. Better-off households have private taps. Most rich families have also built storage reservoirs attached to their water connection that automatically fill up and do not require manual supervision. Households without private connection have to wait till water comes into the public taps. This makes it hard for the women to manage their time and work."

As a result, the concerned women have resorted to an informal arrangement for lane-based water management to combat the problem. A pot is left below the tap, and the women living nearest to the tap listens for the sound of water falling into the pot (if she lives within the earshot) or otherwise checks for water flow. Sometimes a girl child is posted near the tap who warns others when the water starts to flow so that all may fill their pots. This is one of the reasons for depriving girl children from attending school. This system works but is extremely inconvenient. It makes people reluctant to pay for water and contributes to poor cost recovery of the scheme. A vicious circle has been created in which poor service and poor payment has become mutually reinforcing.

These insights were revealed during the PLA carried out in August-November, 1998.

The purpose of a PLA exercise is not just to learn about the existing situation alone but also to plan and implement remedial measures. The PLA exercise revealed that the root cause of water shortage was uneconomical use of water and not source or design

deficiencies. Several other factors for poor performance of the Mala Water Scheme included infrequent and slow repair of leaks, which was related to the level of preventive maintenance and resources available with the Kerala Water Authority (KWA), mechanical failures in the pumping system, shortage of electricity and indifferent management by the KWA. The objective of the intervention was to test the potential of solving the problem by joint action of all the stakeholders and recognise women's needs, commitment and management by enabling them to lead the process. This was to be implemented in a gender sensitive way by also involving men to share the responsibilities and benefits.

Significant active participation by women is already visible at all levels in Vellangallore: in the community, the *panchayat*, SEUF (The social support organisation) and the KWA. The interventions planned recognised that women are the most affected and have already undertaken informal management measures, management within the *panchayat* is also planned through a representation from the women.

8. *From Subsistence Agriculture to Irrigated Farming: Experience of Community Managed Lift Irrigation in Bihar and Orissa Plateau*

Tilak D. Gupta, Professional Assistance for Development Action (PRADAN).

The story began a decade ago, when an IAS Officer requested PRADAN to help, promote Lift Irrigation (LI) Schemes in the District of Ranchi with financial support from the District Rural Development Agency (DRDA). PRADAN's approach was not just based on technical feasibility but also the capacity to organise Water User's Association (WUA). The WUAs are involved in the planning, implementation, operation and maintenance of the LI schemes. As the groups gain experience and expertise, their energies are channalised to implement other rural development activities.

After the IAS officer requested for PRADAN's help within two years time, 40 microlift irrigation schemes managed by WUA became operational and as other DRDAs became interested, the programme spread from Ranchi district to Dumka, Godda, Lohardaga, Hazaribag district, etc. The existing women's saving and credit groups organised by PRADAN in Hazaribag were inspired to own and manage the LI schemes. Women managed LI schemes subsequently spread to Dumka and Godda districts also.

According to Tilak D. Gupta, the following has been the experience of PRADAN with women controlled LI schemes in Bihar:

"At Purhara, very few inhabitants were on view, upon our arrival. All have gone to the river bank for digging the well, intimates a 10 year old boy. Walking down almost a kilometre from the village, we meet men and women of the village engaged in the construction of an intake well for the lift irrigation system. The lift irrigation system at Purhara is managed by the local Mahila Sinchai Sanchalan Samiti (MSSS), an all-woman group.

One wonders how the Mahila Samiti manages to exercise its control over the irrigation scheme within a conservative social milieu. Yes, it was pretty difficult a task for women to assert themselves but the fact that our women self-help groups were successfully functioning in the village and its neighbourhood made the task a little easier," affirms Mukta, a PRADAN professional.

At the site of the intake well, the Mahila Sinchai Samiti, appears to be in control of the earth work being done there. Samiti representatives are busy supervising the work. Each beneficiary family has to contribute labour for the construction of the intake well, decided the MSSS and the decision is being carried out by the men folk. "If members of any family fail to report for work, I inform the Samiti and the Samiti persuades the concerned families to contribute their quota of voluntary labour," says Vinod Yadav, who has been appointed by the Samiti to keep the accounts.

The women managed LI scheme at Purhara was installed in May 1995. Finance came from the DRDA. While the women of Purhara were ready to shoulder the responsibility of managing the LI scheme, the men of the village initially resented female encroachment in what was considered to be an exclusive male domain of agriculture and irrigation.

The LI scheme at Purhara, to all accounts, is doing well. The Samiti representative receives payment for irrigation charges and issues a coupon to the landowner. The operator runs the pump to supply water only on receipt of the coupon. For the members of the MSSS, the irrigation charges are Rs.15.00 per hour plus the fuel cost. Out of it, Rs. 4.00 per hour goes to the operator appointed by the Samiti. The rest goes to the Samiti funds. The all-women *Samiti* arranges for lubricants and repairs. Already it has saved Rs. 4000 for buying a new machine when the life of the old one would expire. For the families of the Samiti members, irrigated agriculture means eating wheat bread instead of one made from Marua (finger millet), tells elderly Somri Devi, a leading figure in the *Samiti*. Non-members are also given water but at a higher price, inform Samiti members.

Truly, the LI scheme has changed the face of agriculture at Purhara. There was only one paddy crop earlier of local variety and its yield was poor even in best of times, reports Sohua Devi, a Samiti member. "Now, with irrigation facilities, we get not eat only wheat and potato but also a much better yield of paddy," she adds. "This year there was a drought-like situation and no paddy would have been harvested without lift irrigation," interjects Pachia Devi. "We used to cook in the evening and had to manage with left-overs for breakfast and lunch, say the men at Purhara. Nowadays, we can afford to have three freshly-cooked meals a day," they affirm.

Material benefits apart, the LI schemes have exposed the women to the outside world and radically changed their self-perception, tells Anjana, a PRADAN professional. Somri Devi's version seems to confirm Anjana's view. "Without the responsibility of managing the LI schemes, we would have remained condemned to a life of household drudgery," she acknowledges. "By taking charge of the Sinchai Samiti, we have come out of the narrow confines of our home to mix with various kinds of people and participate in public life," she adds with a broad grin.

In the beginning, women faced a lot of problems in running the LI schemes at Purhara and other places. At Khandi village in

Chauparan block for instance, the MSSS came to know that the operator was supplying water to selected villagers during the night even without coupons issued by the Samiti and pocketing the money received from them. "We immediately put a stop to night irrigation and appointed a new operator," says Sahodari Devi. At Lathia village in Barhi block, the men refused to accept women's control over the LI system and refused to buy coupons from them. It took a number of meetings there before the men folk eventually recognised the women's ownership over the scheme.

Right now, all-women MSSSs run 50 LI Schemes in difficult blocks of Hazaribagh, Godda, Lohardaga, Kodarma and Dumka districts. It is not that women have already assumed full control over these schemes. Illiteracy, lack of technical training regarding the maintenance and operation of pump-set as well as the dead-weight of patriarchal tradition remain obstacles on the way. Moreover, without land rights and equal say in decisions pertaining to agricultural operations, women's control over irrigation system tends to remain incomplete. Yet, there is little doubt that Mahila Samiti —managed LI schemes have substantially enhanced women's status in a male-dominated world.

9. "Women in Water Sector—Need for a Revolution"

R. K. Khanna, Director (EIA) Central Water Commission

The author indicates that one of the four guiding principles of the international conference on Water and Environment held at Dublin during January 1992 was 'Women play a central part in the provision, management and safe guarding of water' stated as "this pivotal role of women as providers and users of water and guardians of the living environment has seldom being reflected in institutional arrangements for the development and management of water resources." Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes including decision making and implementation, in ways defined by them. Agenda 21 of the Rio de Janeiro held in June, 1992 is also stated as advocating the need for development of public participatory techniques and their implementation in decision making, particularly the enhancement of the role of women in water resources, planning and management. The paper presents the following proposed actions from Agenda 21 as under:

a. Development of public participatory techniques and their implementation in decision making, particularly the enhancement of the role of women in water resources planning and management.

b. Strengthening of the managerial capabilities of water-user groups, including women, youth, indigenous people and local communities, to improve water-use efficiency at the local level.

c. Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behaviour and the full participation of women at all levels in sector institutions.

d. Human resource development at all levels, including special programmes for women.

e. Encouragement of the local population, especially women, youth, indigenous people and local communities in water management.

f. To recognise and actively support the role of rural population, with particular emphasis on women.

g. Train staff at all levels, including farmers, fishermen and members of local communities with particular reference to women.

The paper argues that there is a marked difference in the attitudes of men and women towards the basic natural resources such as water, forest and land. Men see these resources basically as producing crops and money. It is women who depend on the ecosystem for the family's food, fodder, fuel, water and livelihood needs. Women are traditionally against deforestation, depletion and siltation of water resources, land degradation and environmental pollution. No women wastes water because she is aware of the trouble she has in fetching water.

The role of women in various activities such as agriculture, participatory irrigation management, drinking water supply and sanitation, etc. is discussed in the paper. The paper indicates that around 50 per cent of the labour for agriculture is provided by women. They play a distinctive role and as such should be made responsible for making participatory irrigation management a success. In the realm of drinking water supply and sanitation, a knowledge, attitudes and practices (KAP) showed that women in rural India spend between one to four hours a day collecting water. The study indicated that women were, on an average, making nine trips to a water source collecting almost 200 ltrs of water for an average of six members per family or 32 ltrs per person per day. Women usually were more knowledgeable about water sources, their locations and their reliability.

In recent years, there has been a greater emphasis on empowering women by imparting knowledge, information and training. The community-based Convergent Services Programme and the IEC component under Development of Women and Child in Rural Areas (DWCRA) sort to sensitise women regarding their needs and to help them prioritise and articulate these effectively and fulfill them by utilising existing facilities/provisions under various government programmes in a better way. The author indicates that in UNICEF-supported projects local Women and Village Water and Sanitation (WATSAN) communities help decided the best location for the new water source. Mobilising women to decide the location for a water source and training village women as hand pump mechanics were the first step for the community participation in water supply and environmental sanitation programme. The paper also argues that diversification of the role of women and opening up of more opportunities in processing of foods, value addition through post-harvest technology, poultry, sericulture, agro-based cottage industries, etc. were required for women's economic empowerment. The paper gives the zest of the two studies conducted in Gurrabbadu (Andhra Pradesh) and Danda (Gharwal, Uttar Pradesh)

highlighting the plight of women and the girl child involved in domestic water management. In Gurrabbadu, the women were calculated to be walking an equivalent of five kms by spending at least two hours in collection of approximately 150 ltrs of water per day. Together an adult woman and a girl child from the family were found to be carrying as much as 375 ltrs of water per day and making roughly 25 trips to the hand pump to be able to meet the family's domestic water requirement including the water required for cattle. The effort was further aggravated by non-functioning hand pumps and waiting for their turn at the hand pump sites.

In the Danda study, in Garhwal hills, women were found working eight hours a day in agriculture apart from the time spent in collecting water. The water authority provided water through the water supply schemes which has four storage tanks and 15 stand posts. The water supply was highly irregular and unpredictable. On an average the stand posts functioned for just nine days in a year. As a result, in practice, the Danda women were dependent on spring water. Due to scarcity of water, vegetation growth was low and there was inadequate availability of green fodder in the region. This in turn reduced production of both cow-dung and milk.

The other problem in the Garhwal area was migration of male members of the family particularly from the upper caste families to towns which was the cause of further stress for women. A comparison between the two areas showed that migration was higher in villages with greater water scarcity although both the villages were from the same eco-region.

10. "Impact of Government Investments on Sustainability of Drinking Water and Sanitation Services in Six Villages of Chata, Block of Mathura District, in Uttar Pradesh"

Commissioned by Rajiv Gandhi National Drinking Water Mission (RGNDWM) by Winrock international, a Developmental Consultancy Organisation

The study was undertaken between September and November, 1998 and made an assessment of the current status of water supply and sanitation in the six villages with the objective of contributing to sectors learning by way of developing and fine-tuning indicators for broader state-wise evaluation. It brought into sharp focus current and future needs and recommended alternatives for designing and implementation of water supply and sanitation services based on demand-responsive approach. The objectives of the study were to identify and develop indicators while examining the sustainability of service delivery with regard to:

- technical sustainability;
- financial sustainability;
- effective use;
- participation quality; and
- effective management.

The in-depth study was carried out with the help of a combination of methods for secondary data collection as well as qualitative assessments using Participatory Rural Appraisal (PRA) techniques.

1. Technical Sustainability

- There is a range of water supply technologies in the villages studied, ranging from traditional dug wells to piped water supply with household connections. Dug wells continue to be a sustainable source of freshwater, though not protected from bacterial threats and despite the presence of saline water in the adjacent sandy groundwater pockets. Some handpumps, installed 10-15 years ago are still in use, while a majority of them are not in operation owing to salinity or breakdowns.
- Piped water supply schemes, planned without consideration to groundwater conditions and socio-economic conditions, are facing functionality threats due to brackishness/salinity in groundwater and poor utilisation. Where possible, people have fallen back on the use of open (unprotected) dug wells.
- Water supply systems are maintained centrally by the Uttar Pradesh Jal Nigam. Links between the UPJN and the users are minimal, as are its links with the *Panchayati Raj* Institutions. There was no user participation in the choice of technology and service level. Dependence on the UPJN combined with irregular hours of supply and poor response towards repair needs have created a totally indifferent attitude in the minds of the users to the condition of facilities.
- Sanitation service delivery has been top down and subsidy driven. Latrines have been provided under the Indira Awas Yojana and barely covers a fourth of each village. Our survey showed that more than 70 per cent of the villagers continue to use the fields for defecation. Sanitation's crucial linkage to water supply and to health continues to be overlooked.
- Environmental sanitation is limited to drainage built haphazardly because under JRY, the emphasis is solely on provision of rural employment with little attention to design of appropriate drainage systems.

2. Financial Sustainability

- The financial inputs towards installation and O & M, quality and regularity of water supply through household connections or public stand posts, and the user charges levied on the people, are all unconnected to each other. In other words, basic concepts of financial management have not been applied.
- The system of collecting a monthly flat rate is not practical. First, the transaction costs are high compared to the monthly charge. Second, effective penalty is difficult to apply, both procedurally and due to social fall-outs.
- Lack of awareness for indoor sanitation has led to an absence of a felt need or demand for latrines. Yet, heavily subsidised latrines have been installed. The subsidy could be

better used for education/awareness purposes, which would lead to a demand for establishing latrines, and the government could facilitate the process at that time.

- Despite limited allocation of JRY funds, it appears that the pros are unable to utilise the funds to their advantage. There is evidence of low rate of returns on the funds that are spent on water and sanitation haphazardly. Despite that, a large sum of money remains unspent at the end of every year.
- Decentralisation of financial resources at the village level would improve the rate of return on investments in installation and O & M because, unlike the current system, they would be geared towards meeting services that are demanded. However, the ability to shoulder the responsibility of financial management calls for developing competence among the PRIs, efforts towards which should be taken up simultaneously.

3. *Effective Use*

- Most of those having piped water connections in the house do not use this water for drinking and cooking due to salinity. They walk or cycle, sometimes for two kilometres or more, to collect water for drinking and cooking from public stand posts or dug wells.
- Most of the public stand posts and pipes leading to them remain damaged and vessels are filled from the pool of water collected at the bottom, thus contaminating the water while collecting.
- Electricity supply was found to be available for only about three hours in a day. Consequently women queued up near public stand posts for several hours to obtain the water they needed.
- The open dug wells, which is the other regularly used source of water for drinking and cooking, tend to be accessed according to caste and a clear understanding was evident as to the rights of access to each caste community.
- Water source distances (stand posts or dug wells) were on average 1.5 to 2 kilometres from individual households. This adds drudgery to women, as collection of water is essentially a chore carried out by women.
- The majority of households continued to use the fields for open defecation. The construction of latrines was not accompanied with health and hygiene education.
- Household latrines, provided as part of the housing schemes, are used for bathing. As a result, the pits dug for solid waste collection overflows with water.
- The incidence of water-borne diseases is high, especially in the rainy season. As there is no effective drainage, there is a high reliance on unsanitary sources of drinking water and outdoor defecation is the norm.
- There is little awareness and therefore hardly any demand for environmental sanitation. Outdoor drainage facilities and cleanliness norms form part of the common property resources of the village, and public campaigns should be promoted so that they are recognised as resources by the people.

4. *Participation Quality*

- Users are habituated to the water supply agency—in this case the Uttar Pradesh Jal Nigam—making all decisions and taking responsibility for water supply delivery. Despite facing unsatisfactory quality and supply of water, they await UPJN's intervention for corrective measures. Users are not fully aware of a possible role they can play in managing the water supply.
- In a few exceptional cases, village leaders have undertook minor repairs and were involved in monitoring and following up on complaints to the UPJN.
- There are no recognised user groups such as village water and sanitation sommittees or any sub-groups to the *panchayats* to oversee the workings of water supply and sanitation facilities.

5. *Effective Management*

- **Effective Functioning**: Problems with water quality and quantity leading to a decreasing number of acceptable and safe water sources, coupled with poor maintenance implies that an adequate service level is not being maintained in the villages studied. Misuse of latrines as bathing cubicles implies that the latrines are not being used for the right purpose.
- **Effective Financing**: No cost sharing or recovery principles are in place. *Gram panchayats* have a meagre allocation for water supply maintenance which they sometimes use for minor repairs. A monthly flat fee is collected for household connections, which goes directly to the UPJN. It was found that collection was not regular and penalties not imposed for non-payment. Payments were not linked to accountability to users in terms of quality of service provided. Subsidies for latrines did not ensure utilisation of facilities.
- **Effective Operation and Maintenence**: *Gram panchayats*, though entrusted with O & M of rural water supply schemes, have little skills or incentives to undertake maintenance. At this level, there are no records on system performance and tool kits, spare parts, etc.

Recommendations of the Study

- **Technical Sustainability:** The technological options suggested below should be seen in the light of an overall strategy of decentralisation to the *gram panchayat* and user levels.

Possible technological options could include: (a) roof water harvesting and sanitary dug wells at the household level, (b) sanitary dug wells and hand pumps at the community level with a 1:150 source to population ratio, (c) a *panchayat*/village/habitation level of maintenance of created facilities, where free spare parts can be supplied and entrepreneurs and *panchayat*-based trained mechanics to undertake maintenance.

- **Financial Sustainability:** If water supply facilities are to be operated and maintained in a satisfactory condition, clean water should be treated as an economic good. User charges have to be instituted at least to fully recover O & M costs. This requires water charges to be correctly assessed (especially in the case of piped water and individual connections) and collection procedures improved. In time, *gram panchayat* and users must develop the competence for and assume responsibility for capital investments for new and replacement of systems.
- **Effective Use:** Public awareness has to be created on the scarcity value of water and the need to levy water charges on users in proportion to benefits received. This has to be done by public awareness campaigns.

Emphasis has to be given to hygienic use of drinking water and sanitation facilities and therefore health and hygiene education must accompany water and sanitation delivery. Priority should be given to making traditional wells which are in much use.

- **Participation Quality:** Users and their representatives (*gram panchayat*) need to be encouraged to assume responsibilities for water and sanitation systems and their delivery. At the same time, the government's/agency's role has to be shifted to one of facilitator from that of service provider. This means that *panchayat* and users' (with a focus on women) role in decision making and implementation of water supply and sanitation delivery must be maximised. Several steps have to be instituted to make this happen including the transfer of functioning assets to the *Gram Panchayat* and the possible establishment of water and sanitation committees under the *gram panchayat* that can concentrate on water and sanitation activities.
- **Effective Management:** There are two main recommendations:
  1. Strengthening of operational guidelines and procedures for the water agency (in this case the UPJN) so that it can be more responsive to the *gram panchayats* and users requests.
  2. Devolution of resources and powers so that *Gram Panchayats*, assisted by the UPJN, can choose the level of service they wish, raise the funding for complete O & M (and eventually, capital investments), oversee the preparation of designs and cost estimates for alternative public water supply and sanitation schemes, and ensure their implementation.

11. Discussions with Mr. Alok Gupta, District Project Coordinator, UPDASP, Lucknow

According to Mr. Gupta, the basic problem that had implications for the development of the farmers' interest was the need for keeping prices of essential commodities low in urban areas, to prevent urban unrest. In view of the fact that prices of foodgrains produced by farmers cannot be increased, various measures to subsidise agricultural inputs including hybrid seeds, chemical fertilisers, power, (both electric and diesel) and irrigation have been the standard conventional method of benefitting the farmers. However, this was an economically unviable solution as subsidies ultimately affect the tax payer and is not an acceptable proposition.

Arbitrarily fixed foodgrain procurement prices to help farmers at levels much above the price at which foodgrains are being sold in the open market resulted in market bureaucratic nexus formation and procurement being affected by supply of foodgrains purchased from the open market rather than from the farmers. Under such a corrupt system, only the influential farmers are able to sell their foodgrains to the public procurement system, while the majority of small and ordinary (marginal) farmers have no other choice but to sell their foodgrains to private traders at prices much less than the official food procurement prices.

Under such conditions, the UPDASP, as it was earlier called was conceived to promote intensification and diversification of agriculture to benefit farmers by enhancing productivity, reducing input costs by introducing suitable changes in the technological packages including permaculture or sustainable agricultural elements and time-tested traditional agricultural systems to reduce dependence on expensive chemical inputs (fertilisers, pesticides, etc.).

The basic strategy adopted under the DASP project, which was financially supported by the World Bank, and the Uttar Pradesh state government envisaged training demonstrations and provisions of inputs for promoting organic farming to help the farmers. This project initiated in the year 2000 was due for completion in September 2003 to be followed by a six months phase-out period and ultimate closure in March 2004. This project is being implemented in 32 districts of the state, while different targets such as 20 per cent of villages coverage in the first year, followed by 40 per cent additional coverage in the second year and coverage of the remaining 40 per cent of the villages in the third year was envisaged. The Project also focusses on development of 32 model villages (one each in all the 32 districts being covered under the project).

Initially, Village Level Functionaries (VLF) to work in the different districts, were appointed on a contractual basis for one year. This system ran into trouble when the VLFs started agitating for absorption as regular permanent government employees. In view of the fact that regular posts did not exist nor could regular appointments be given, the services of the VLFs were terminated and NGOs were given contracts for mobilisation of farmers and

promoting their institutionalisation through formation of self-help groups (SHGs). These SHGs are organised as farmers' interest group devolving around common interest, e.g. paddy cultivation, vegetable cultivation, etc. with credit and thrift as the major initial activity. Unlike the general practice of organising SHGs to take up credit and thrift activities for giving loans designed to support economic ventures only, the SHGs created under the DASP project were also to give consumption loans to meet the financial needs for illnesses, deaths, marriages, etc. as these needs were primarily met by taking loan from moneylenders at exorbitant interest rates. The second aspect was the linkaging of SHGs to lead banks to give loans to the groups for consumption and for economic activities. This strategy, it was hoped, would substantially reduce, if not eliminate the practice of taking loans under various subsidised government schemes for purchase of agricultural inputs and domestic animals, but in reality, the loan was never used for the purpose for which it was given. The loans being consumed or used to meet unforeseen eventualities and thereby the possibility or scope for repayment of the loan did not exist. It is thus, not surprising that the provisions provided under the DASP project is resulting in almost 100 per cent repayment of loans.

The DASP project has mobilised technical input and professional expertise from various Government departments such as Horticulture, Agriculture, Animal Husbandry, Panchayati Raj, etc. This technical manpower is partially supported through meeting operational costs for activities related to the DASP projects while the professionals continue to be part of their line departments performing their normal duties and drawing salaries from their parent departments. Linkages have also been developed with Central government departments such as the Central Integrated Pest Management Centre (CIPMC). The farmers interest groups and the farmers' field training centres set up in different villages provide the platform for training, learning by carrying out demonstrations and subsequent extension. This creates a mechanism for face-to-face interaction with farmers and ensures maximum effectiveness in the transfer of technology.