

CHAPTER SIX

SUMMARY, CONCLUSION AND SUGGESTIONS

6.1 Summary of major findings of the study

(1) Access to Land and Ownership of the Holdings in Barak Valley

1. Out of 450 samples from 6 ADOs in 3 districts, most of the farmers are small, semi-medium and marginal farmers. The land size has been interpreted according to the government classification. Land holding below 1 hectare constitutes 9.34% of the total samples while a total of 42 are marginal farmers. Small farmers are those who have land holdings 1-2 hectare of land. They are 20 to 30 in each of the ADOs and a total of 156 or 34.67%, which indicates that large section of farmers are small farmers.
2. Semi medium farmers are the most in the study area as 161 or 35.78% of samples belong to them. They hold 2-4 hectare of land and 20 to 30 farmers in each of the ADOs. 84 are Medium farmer's i.e.18.66% of the total and they hold sizable farm land in Barak Valley. The large scale farmers according to the sample survey are only 7, as in Barak Valley only a few large scale farmers are in existent and practice agriculture.

(2) Land Fertility Index

1. Land fertility index is of enormous importance in Barak Valley since the natural fertility of the soil contributes largely for the crop production in right time and in required amount in the midst of infrastructural bottlenecks. Land fertility index has been made to analyze properly the land's contribution in output. The mean observation is 0.514 in Barak Valley which shows moderate performance in this regard.

2. Output in Barak Valley is 30.75 quintals per hectare which is modest. The natural fertility of the soil along with application of modern technology is proving good for the productivity.
3. Sali paddy is the major crop of Barak Valley across all ADOs. The productivity of Sali and Auose are not much different. The potato and sugarcane are also produced but to the limited extent while the production of vegetables is very poor in Barak Valley.
4. Land distribution under different crops is highly skewed in Barak Valley

(3) Market Index

The mean Market Index is 0.526 in Barak Valley which is moderate. The sale of goods can definitely increase if the farmers are provided with proper infrastructural benefits like warehousing, transport, market information, grading and standardization etc. The marketing performance by the farmers is skewed in Barak Valley. Marketing is highly affected by all social sector variables as well as economic factors.

(4) Technology Achievement Index

The value of Technology Achievement Index is 0.542 which is estimated by taking scores of access to machines, fertilizer, pesticides, percentage of output by HYV seeds etc. The distribution of farmers shows that the average and poor performers are more in number than those of high level performers. The technology adoption in Barak Valley is highly affected by the farmer's capacity to purchase as well as their education and human development. The major constraint is lack of proper irrigation facilities for the farmers.

(5) Labour Productivity Index

1. The value of Labour Productivity Index is 0.290. The labour productivity in Barak valley region has been found to be very low. The major reason behind this is the lack of access to education, health and nutrition. The nutritional element in the food has been declining due to the erratic application of fertilizer and pesticides. During the sample survey in

villages of Barak Valley few farmers found to answer the actual measurement and mixture of fertilizer or pesticides. The prices of nutritious vegetables and fruits are very high in the local markets, thus reducing their health and nutrition. Moreover heavy dependence on farm land due to rise in population and lack of other employments is increasing, thus raising the land fragmentation and making the farm activities unprofitable.

2. Output per worker in Barak Valley is 41.4 quintals per worker. It ranges between 120.6 quintals to 8.9 quintals per worker. The productivity is determined mainly by the size of land under cultivation, number of workers applied, the extent of technology adoption, assured supply of water etc.

(6) Agricultural Performance Index in Barak Valley

1. The mean value of Agricultural Performance Index is 0.468 in Barak Valley which shows moderate achievement regarding entire agrarian system.
2. Few farmers belong to high group while most of the farmers performed lower than and just higher than mean value.
3. Six ADOs differ little regarding achievement in agricultural performance.
4. It has been found that social sector variables play a very significant role in the determination of agricultural performance in Barak Valley. Apart from them economic wealth, technology adoption, marketing of the output and land holdings of the farmer also affect the performance significantly.

Major Findings on Achievement on Human Development & Poverty

(7) Wealth Index

Wealth index is a composite measure of economic and social parameter of life of a man. It includes different facets of human life comprising essential household

commodities, utility services or basic civil amenities, electronic gadgets, vehicles etc. The parameter is not only indicative of economic richness rather social and environmental aspects of human life. The mean of Wealth Index is 0.560 in Barak Valley which is moderate.

(8) Education Index

1. The mean value of Education Index is 0.616 in Barak Valley which is moderate. A total of 294 farmers or 65% have performed in the high category. It indicates that these farmers have better schooling and they have also sent their children to schools. These farmers have understood the need and importance of education in life and are eager to see their children with better life having education.
2. The medium level performers have constituted 14.4% of the sample farmers. They have lower level of schooling and many of them have sent their children to schools.
3. The last group of farmers have failed in both enrolment and literay level. The illiteracy also exists in this category.

(9) Health Index

1. The mean performance of index value 0.771 denotes moderate achievement in health. The distribution of farmers in Barak valley shows that 58% farmers are there in safe zone which is indicative of better Body Mass Index (BMI) and no Child Mortality. This group of samples are health conscious and scored more than 0.798 index value.
2. There are 33.5% farmers belonging to the medium category and are vulnerable section. They are deprived at least in one of the parameter. Either child mortality or malnutrition exists.
3. The lower and very low level performers belong to high risk zone and they are deprived in both the indicators and scored below 0.376 index value.

(10) Nutrition in Barak Valley

The mean of Body Mass Index is 21.05 in Barak Valley which is normal. The achievement in nutritional status in Barak Valley shows that Body Mass Index of 62% of the samples are in proper zone. They have achieved the safe level of BMI of 18.5 kg/m^2 - 25.5 kg/m^2 . This zone is referred as normal BMI zone. The mal nourished portion constitutes 29% of the samples or 132 in number. Their BMI is below 18.5 kg/m^2 . The lack of nutrition affects the work capacity of the farmers, especially those who work in the field. The number of overweight people is 41 or 9% of the total in the study area. Their BMI is more than that of the normal range of 18.5 kg/m^2 - 25.5 kg/m^2 .

(11) Quality of Life Index

Performance in human development has been measured by achievement in quality of life/standard of living. The mean value of Quality of Life Index is 0.643 in Barak Valley which is moderate. The quality of life is highly affected by not only social sector parameters like enrolment, schooling, child mortality, nutrition, drinking water, sanitation etc but also agricultural factors like marketing, technology adoption, worker's productivity etc. The quality of life index in Barak Valley is highly concentrated around the mean performance. However there are large number of farmers who are less than average or poor performers. A few high level performers also exist.

(12) Multidimensional Poverty Index

1. The mean performance of Barak Valley is 0.250 MPI while the maximum or the worst performer having the index value of 0.886 and the minimum or the best performer has achieved 0 value. The farmers who have scored zero or index value of 0.00 means no deprivation at all. They have qualified in all ten indicators of deprivation. They are 17 in number or only 4% of the total samples under study. The best performer are mostly rich people, having big land holdings or better performer in wealth index, education and health index etc. Those farmers who have scored in between 0.100 to 0.200 are regarded as safe or above poverty line. They

are sizable in number in Barak Valley as 180 farmers or 40% of the total farmers. These farmers are well-off and they have deprivation in some of the indicators but qualified in most of the others. However it is clear that these 40% farmers are neither deprived in both the health indicators nor deprived in both the education indicators. Out of six indicators of living standard, hardly they may be deprived in 2/3 indicators.

2. Those farmers who have scored between index value of 0.200 to 0.33 are vulnerable. Though they are not referred as poor yet deprivation score is close to risk zone. They constitute 8% of the farmers in my study area or 35 in all. The farmers who are multi dimensionally poor scored more than index of 0.33. This cut-off has been set by experts earlier. In Barak Valley the performance is really alarming. They are 181 in number which is huge or 40% of the total samples. As 40% of the farmers are found multi dimensionally poor by the international standards out of 450 samples, for entire population a large number of poverty ridden people can be found out by the same methodology. All government claim about poverty reduction and schemes will be put before question. There are farmers found during sample survey who are heavily affected by poverty. By MPI methods they scored more than 0.500 index value and thus fall in the category of 'severely poor'. They constitute 8% of the total farmers under study or 37 in number.

6.2 Major factors identified as responsible for the present agricultural and human development scenario

1. The major marketing problems in Barak Valley are mainly due to limited access to finance by many small traders, the small amounts that most farmers have to sell and the high costs and underdeveloped mode of transport. Government interventions are designed to gradually overcome these constraints. Otherwise, even with these limitations, the marketing system is moving, although farmers complain low and variable prices, these reflect the costs and risks of the current market system. Sometimes

the market is unfairly blamed for an inability to cope with sudden production surges caused by encouragement of farmers to diversify into, or expand production of, specific products without consideration of the whole value chain, the size of the final market, agro-processing capacity and the financing and risk costs involved.

2. The realisation of the vision and mission will hinge on the capacity of rural producers and processors to deliver the results. The link between performance and human development is obvious – the farmers and processors must have the knowledge and skills necessary for improved performance. While strategy for growth only states that the target beneficiaries are ‘small-scale farmers’, within this very broad group actual benefits are likely to vary widely. For example, the criteria used for road development and maintenance, the selection criteria used in providing marketing training to farmers’ groups, the presence of agro-processing facilities in the locality, the farmers’ ability to generate a marketable surplus, are just a few of the parameters that determined the actual beneficiaries within the farming community. Some of the components also target traders, although there should be indirect benefits for all those marketing produce through the new sources of finance that are mobilised. From a gender perspective, the majority of players in rural market chain are male.

3. The linkage between agriculture and human development proves the importance of agriculture to promote human development where agriculture is the mainstay of life. Human development in the agriculture and rural development sector entails the acquisition and building of scientific knowledge and farming skills by farmers, and is a sine qua non for sustained agricultural performance. As farmers increase their knowledge and skills, they increase their agricultural performance, and as their performance increases they not only become more confident but they also extend their horizon toward the outside world through increased

transactions and contacts with traders and government agents. The knowledge and skills that result in increased production performance also bring about changes in people's attitude towards agriculture and the environment. In addition, improved health and nutrition is associated with improved agricultural performance and transformation.

4. The failure to link commodity production and the market using appropriate infrastructure has been considered one of the biggest omissions in the current approach to fight poverty. There are many potentially productive areas of the region that are essentially not part of the productive economy simply because of lack of good infrastructure (roads, rail and telecommunication services). Because of the infrastructural deficiencies that have constrained smallholder producers from participating in supply chains, there has been a proliferation of exploitative middlemen taking advantage of the inadequacies of small producers in accessing markets. Integrating producers into new supply chains is critical if poverty is to be reduced.

5. Four infrastructural elements are identified as critical to smallholder production and integration into supply chains: transportation, storage, communication and irrigation in the present study. In the effort to support rural development, Government is dividing the country into different ecological zones and, therefore, promoting the production of certain crops in particular ecological zones. This effort, however, has not succeeded in the absence of strong infrastructural investment that will link the producers to the markets.

6. The labour productivity in Barak valley region has been found very low. The major reason behind this is the lack of access to education, health and nutrition. The nutritional element in the food has been declining due to the erratic application of fertilizer and pesticides. During the field survey a few farmers could become able to answer the actual measurement and

mixture of fertilizer or pesticides. More over the prices of nutritious vegetables and fruits are very high in the local markets, thus reducing their health and nutrition.

7. The natural fertility of the land is not at all lower in the Barak Valley region yet the output or productivity is lower. The major reason behind this is the higher cost of land management and little access to government extension services. The poor performance of government sector along with low level of skills of farmers is the cause of poor fertility and resulting poor productivity.
8. The poverty in the valley as measured by Multidimensional Poverty Index show that most of the farmers maintain a low level of living. 48% of the farmers suffer from Multidimensional poverty. This also reduces the performance level of the farmers while it is found that agricultural performance plays a vital role in reducing poverty and enhancing the standard of living.
9. Access to basic amenities of life like electricity, drinking water, cooking fuel, standard toilet facility as per MDG guideline, and possession of essential commodities and electronic Gadgets as per guideline of National Family Health Survey etc show that wealth index in Barak Valley is highly varied. The standard of living is much lower than the other parts of the country.
10. Human development is all about enhancing the choice set of the farmers which is possible only by increasing income of the farmers, increasing the access to basic amenities of life. In Barak Valley agricultural performance can only promote this since most of the poverty is associated with the people of this sector.

6.3 Conclusion

Agricultural Performance is an essential component for raising Human Development, achieving food self-sufficiency, increasing income of the rural mass, having more access to basic amenities of life and alleviating poverty and food insecurity among smallholder farmers. The infrastructure and institutions such as irrigation, input and product market, credit and extension services found to be poorly developed. The technologies people use, play a significant role in determining how fast agricultural productivity grows and how that growth affects the poor and the condition of natural resources. The development of agricultural technology for both food and non-food crops, the dissemination of assets and information, developing agricultural research and extension facilities targeted towards the smallholder farmer, all work together to promote long-term agricultural productivity. The results show that emphasis on development and extension of rural services and enhancing production resources of the farming community lead to improvement in quality of life and have considerable influence on agricultural sustainability.

The results indicate that the Sustainable Agriculture and Human Development in Barak Valley are found to be affected by policies that influence both economic and social factors. The study of factors determining the sustainability of agricultural system shows that social participation factors play the greatest role in the sustainability of agricultural system. By and large factors such as education, health, infrastructural support services, ecological factors etc have the greatest contribution to enhancement of sustainability in the agricultural system of the region under investigation.

6.4 Suggestions and Policy Implication

Marketing

1. The agriculture and rural development sector have remained the key to socio-economic transformation and consequently to poverty reduction in the country. Poverty reduction and human development strategies must

therefore be based on approaches that link agriculture to other sectors at all levels.

2. The marketing network along with rural infrastructure like pucca roads, access to regulated markets for all farmers, corruption free co-operative society, warehousing facility etc can definitely improve the marketing of local products.
3. In order to widen financial access and outreach to rural farmers, the following measures are recommended: (i) development of innovative financing packages that are suitable and flexible for small farmers with long gestation periods; (ii) support mechanisms that trigger savings mobilisation at village level; (iii) devise strategies to attract small farmers to engage in the expansion of their farming enterprises to semi-commercial and commercial farming; (iv) and decentralising financing of small farmers to ensure lower costs of processing, monitoring and enforcement of agricultural loans.

Knowledge and innovation

1. The task of increasing agricultural performance is directly linked to building human capacity through the enhancement of farmers' knowledge and skills. There are three key factors that contribute to building this human capacity, namely: research and technology adoption, agricultural advisory and technical services and agricultural education and training.
2. The Government should reformulate the national agricultural research system, putting in place a policy and legal framework that responds to the needs of human development in the agriculture and rural development sector. The vision of the new agricultural research system and policy is "a farmer-responsive research system that generates and disseminates problem-solving, profitable and environmentally sound technologies on a sustainable basis". The mission for research is "generation, adoption and

dissemination of appropriate technologies, knowledge and information through an effective, efficient, sustainable, decentralised and well coordinated agricultural research system”.

3. Support should be extended to technology development and multiplication, where emphasis should be placed on responsive commercial orientation and customised packaging and dissemination of best farming practices to poor rural farmers. The Government should support socio-economic and strategic research, which would meet the needs of poor farmers, incorporate gender analysis and address biotechnology and genetic resource conservation. Appropriate farm power and post-harvest technologies, including agricultural transport and marketing, should be accorded high priority in funding and institutional support. In order to restore and increase soil fertility in a sustainable manner, appropriate land and water resources management practices and technologies should be identified, developed and disseminated to the rural masses.

4. The key strategies to achieve a more farmer-responsive research system are: the decentralisation of research by establishing Agricultural Research and Development Centres in key agro-ecological zones, greater stakeholder involvement in priority-setting, planning-implementation and evaluation of research. For greater involvement of the private sector in both financing and conducting research, an Agricultural Research Fund could be established as a conduit for private sector funds.

The Five major themes that can contribute to human development:

1. Understanding people, their livelihood systems, demands and the impact of innovations
2. Enhancing the innovation process and partnerships
3. Enhancing integrated management of natural resources

4. Technological options which respond to demands and market opportunities
5. Enabling policies and linking producers to markets

Agricultural education

1. Agricultural education is a priority area of efficiency, which requires it as the primary tool of human development to achieve agricultural modernisation. The vision of agricultural education is one in which “agriculture is treated as a business and an honourable profession, and farmers acquire knowledge and skills that enable them to increase productivity, profits so as to improve their quality of life”. The rationale for including agricultural education has arisen from: (i) lack of a coherent policy for agricultural education and training; (ii) insufficient funding for agricultural education and training; (iii) ineffective institutional framework for the delivery of agricultural education and training; (iv) inappropriate curricula and teaching and learning methodologies in agricultural education and training; and (v) negative attitudes towards agriculture in general and agricultural education and training in particular.
2. At the primary school level, more pupil friendly posters, tapes, videos, and informative materials should be developed and widely circulated in schools. Facilitation mechanisms to informal education approaches, such as visits to model farms, should be applied to stimulate interest in pupils. Functional adult literacy is a affirmative action strategy for the people with disabilities, women and other vulnerable groups should be formulated.
3. During the field survey in most of the parts of Barak Valley, very few farmers could tell the proper fertilizer/pesticide measurement for their HYV seed and land. It indicates the severe problem of ignorance about agro-education especially in Barak Valley.

Land

1. Experience from other countries/states indicates that land reform is costly and requires significant political support. However, there are two general concerns. Many poor farmers do not understand what their legal rights to land are, and this deters them from investing in infrastructure, perennial crops and trees, or soil conservation technologies. Where people do understand their rights under the law, they may have no faith in local juridical systems to enforce these. Secondly, rights to land are still highly disputed, even though they may provide the major labour input on the land. Appropriate steps may be implemented to address this with political support.
2. Land reform, as well as improved management and administration are seen as contributing to the increase in production by (i) enhancing food security through redistributing land to the landless and land poor, thus giving them opportunities to be directly productive; (ii) facilitating investment and enhancing efficiency in the use of factors of production; and (iii) contributing to resource conservation by providing up-to-date inventories of natural resources and improving allocation of land to its optimal use. Steps in this regard are necessary.

Water

1. Water and its sustainable management and utilisation are required for increasing agricultural production. The vision of water for production encourages availability of water all year round for increased and sustainable commercial agricultural production without degrading the environment. This is expected to involve simple water harvesting techniques, improved rainwater management and effective use of early warning systems and meteorological forecasts, rather than heavy investment in irrigation systems.

2. Water for Production Strategy and Investment Plan should be drafted which sets out its principles as having: a poverty reduction focus; demand-responsive approaches; sustainability; cost-efficiency; decentralisation and management at the lowest level; private sector involvement; a gender-responsive approach; incorporation of environment and health concerns; and a sector-wise approach to planning.

3. Water resources management such as exploring and costing optional technologies (e.g. boreholes, dug wells) for increasing water supply at the household level; installing and training the community in rain-water harvesting and collection from rooftops and storage tanks in schools, medical facilities and other appropriate buildings; providing material and training to filter and/or disinfect all collected water depending on the raw water quality; and promoting the creation of ventilated improved pit latrines.

Environment and Natural resources

1. Increasing agricultural productivity without degrading the environment is one of the challenges of the government. This requires greater mainstreaming of the environment, improving the linkages between, in particular, environment committees and agricultural services and research, appropriate monitoring etc.

2. Land tenure is very important for the commercialisation of agriculture, both in terms of providing collateral for finance and allowing larger-scale production. At present it is difficult to consolidate the increasingly fragmented landholdings. Internationally equitable access to land is increasingly recognised as a necessary prerequisite for pro-poor growth in agriculture. For all of these reasons, the medium term impact of investment in agriculture is likely to be constrained unless the land issue is addressed more expeditiously.

3. There are several other issues that affect agricultural performance and rural development. These relate to land, the environment and disease. As the agricultural sector becomes modernised and land becomes scarce, labour is expected to be released to the industrial sector and urban areas for wage employment. Cash remittances from urban areas are important to the rural poor while food from rural areas is vital to the urban poor. The importance of urban migration and wage employment as a coping strategy for the rural poor implies that better competitiveness and information in rural areas about urban economic opportunities can help the poor.
4. Water, biomass, land, soil and weather are critical factors in supporting the sustainability of agriculture, enhancing rural livelihoods and reducing the vulnerability of the poor. The quantity and quality of natural resources are, however, declining as a result of inappropriate use of arable land, excessive cultivation, population pressure, inadequate fertilisation or soil erosion through removal of crop residues. This is aggravated by drought conditions, wetland encroachment and reclamation and use of hazardous chemicals in a manner that is harmful to the bio-diversity and well-being of the communities.

Rural Infrastructure

1. The failure to link commodity production and the market using appropriate infrastructure has been considered one of the biggest omissions in the current approach in fighting poverty. There are many potentially productive areas of the country that are essentially not part of the productive economy simply because of lack of access infrastructure (roads, rail and telecommunication services). Because of the infrastructural deficiencies that have constrained smallholder producers from participating in supply chains, there has been a proliferation of exploitative middlemen taking advantage of the inadequacies of small producers in

accessing markets. Integrating producers into new supply chains is critical if poverty is to be reduced.

2. Four infrastructural elements are identified as critical to smallholder production and integration into supply chains: transportation, storage, communication and irrigation. In the effort to support rural development, Government is dividing the country into different ecological zones and therefore, promoting the production of certain crops in particular ecological zones. This effort, however, may not succeed without a strong infrastructural investment that will link the producers to the markets.
3. Schooling and health services must promote in rural areas for better human development.

Critical Linkage

1. The linkage between agricultural performance with rural development and human development arises from the fact that: (i) substantial land and human resources are tied to this sector; and (ii) the sector contributes significantly to food security, national income and the balance of payments. Agriculture is still a major source of livelihood for the majority of population in Barak Valley and remains the engine of growth. More importantly, the growth of other economic and social sectors is heavily dependent on the agriculture and rural sector, including those which contribute most to human development. Arising from previous analyses improved and sustained agricultural performance and development and progression in the knowledge and skill of farmers are required to be directly addressed.
2. Human development in the agriculture and rural development sector entails the acquisition and building of scientific knowledge and farming skills by farmers, and is a sine qua non for sustained agricultural performance. As farmers increase their knowledge and skills, they

increase their agricultural performance, and as their performance increase they not only become more confident but they also extend their horizon toward the outside world through increased transactions and contacts with traders and government agents. The knowledge and skills that result in increased production performance also bring about changes in people's attitude towards agriculture and the environment. In addition, improved health and nutrition should be ensured for improvement in agricultural performance and transformation.

In the long run this transformation generates positive backward and forward linkages with other sectors such as research, extension services, trade, agro-processing, transport, finance and education, among others.

3. Rural development program should emphasize on building rural utility services by Government. As a result of time poverty, women face many more trade-offs than men, and these impose restrictions on their economic choices and the enhancement and exercise of their capabilities. Time poverty hinders women's capacity to benefit from poverty-reducing programmes. The two key underlying issues behind women's time poverty are mobility and access. Bringing water, health, education, market, credit and energy services nearer to households would be the ideal.

Overall, the experience and evidence from research indicates that returns to agricultural development could be very high and far reaching, not only in the smallholder sector, but in the entire economy as well. It should be emphasized on certain variables which reduce the farmers' vulnerability to loss of income, bad health, natural disasters and other factors. In addition, an understanding of local cultural practices and preferences is important if smallholder farmers are to benefit from agricultural technologies developed through research. All these form a potentially useful area of study for future research