Chapter – 6

Major Findings and Suggestions
6.1 Major Findings

1. Potato production is shifting from European base to Asian and developing countries. Also the acreage for potato is not increasing in the developed countries so supply must now be harvested from developing countries like China and India.

2. India ranking third in the world production and fourth in the area has a negligible share in the world trade. However, it was found that export is dependent on production. The export depends upon the surplus of produce after consumption. But there are other factors affecting export, other than quantity of production like international quality standard of produce, price competitiveness and demand.

3. West Bengal, the second largest producer in India contributes more than 30% of the India’s total produce having yield higher than India’s average and after meeting domestic requirement, substantial quantities remain surplus. The yield of West Bengal is related to the yield of India as the factors affecting yield like seed quality, seasonal fluctuations, disease attack (e.g. lateblight) are similar for both West Bengal and India.

4. The surplus of West Bengal is either exported to other states or processed, which is a negligible amount and the rest is either sold at a below remunerative price or left to rot, resulting in huge economical set back to the farmers. The cold storage capacity in West Bengal is inadequate and is almost half of the produce. Most of the cold storages are located in an around the consumer market.

5. Most of the varieties of West Bengal are unfit for processing but are acceptable as table potatoes.

6. Export of potatoes is a neglected sector in West Bengal as the amount exported has a negligible share in total produce. Export has been periodical and on an irregular basis. Lack of awareness about the demand and the nature of demand remains a major weakness according to the exporters. Stepping up of potato export is only done in glut years as a crisis management. According to the exporters procurement of potatoes for export from the crop point rather than from the cold storage, would make export more price competitive. Although Haldia and Kolkata port has adequate infrastructural facilities yet
there were no potato exports in some of the years from these ports, which were found during the analysis for the period 2000-01 to 2004-05.

7. SAARC and South East Asian countries are the potential export markets, due to similarity of growing seasons and acceptance of Indian variety. It would also be cheaper for these countries to import Indian potato rather than importing from European countries at an exorbitant price. Sri Lanka, Mauritius, Malaysia, Maldives, Saudi Arabia, United Arab Emirates, Singapore, Nepal and Bangladesh may be treated as the target export countries for seed and ware potatoes. The contribution of export of these countries to India's total export is quite significant, because of the similarity of growing season, acceptance of Indian variety, optimum transit time and commercially viable freight charges.

8. Lack of proper pre and post harvest management and high input costs, sometimes increases the cost of production, and also results in fluctuation of domestic wholesale price.

9. Cold storage infrastructure and malpractices is one of the major bottlenecks, as mentioned by the farmers. Ignorance of the farmers regarding the modern pre and post harvest technologies, TPS progeny seeds and Government assistance is the major hurdle for development of potato production. Processing still remains as an unknown term to most of the small farmer.

10. The channels of distribution identified were:

   (1) Producer → Cold storage → Commission agent → Wholesaler →
       → Retailer → Consumer

   (2) Producer → Commission agent / Wholesaler → Retailer → Consumer

   The second channel of distribution were preferred by farmers having financial obligations, to get a faster return on investment.

11. Potato being semi-perishable commodity needs quicker transportation. Potatoes being bulky, the cost of transportation is high. Insufficient transport facilities, from crop point to cold storage due to shortage of rural roads remains a constraint.

12. Direct access of the producers to competitive markets, direct and free marketing, competitive trading, information exchange and adoption of innovative system are restricted by APMC Act. However the Department of Agriculture has formulated a "Model Act" in order to assist the state in
drafting a suitable law for removal of barriers which introduce monopoly rents in the functioning of Agricultural markets. Some of the states have already reformed the law. But in West Bengal this reform has not yet been done and has just been initiated.

13. The concept of contract farming has recently gained importance. Small farmers in West Bengal are capital starved and cannot have major investment in land improvement and higher inputs. Contract farming is the only way of filling this gap. But there remain a lot of controversies in West Bengal regarding this concept, and some view it as a means of exploitation of poor farmers, rather than a mutual benefit. Therefore there remains a need for proper mass education and encouragement of entrepreneurs, in view of several observed and perceived benefits.
6.2 Conclusion
The objectives of sustainable agricultural development in the coming years are food and security. With the current rate of population growth it has been predicted by Western experts that India will have to import over 40 millions tones of food grain annually by the year 2030. Therefore the demand for food is increasing. There is also an increasing pressure on land which demands farmers to identify crop – with high productivity, more food per unit area and unit time, short duration, fits nicely into multi cropping system (increasing the cropping intensity & productivity) and labour intensive. Potatoes easily stand out from among the group of crops because of the distinct advantages it possess as compared to other crops.
Due to trends towards lower tariff and non-tariff barriers many developing countries have recently become integrated towards potato trade. Research by CPRI and CIP has suggested that potato will increase its economic importance in the food market for developing countries in the decade ahead. Potato production is shifting from European base to Asian and developing countries.
The increases of potato production in developing countries were as follows:

- 1961—63 → 24 million tones
- 1994 ---96 → 85 million tones

(Scott & Cocia 1996)

In this period world production increased slightly from 265 to 275 million tones. The output of Europe also dropped by 50 million tones in the same period.
The impact baseline projections have estimated that out of the total increase in demand of 79 million tones of root and tuber crops in Asia by 2020, some 48 million tones will be contributed by potato (Pandey, Sarkar and Singh 2006). According to high demand and production (HDP) growth scenario, almost 80 % of the additional potato output in developing countries will be realized in China and India. (Scott, Rosigrant and Ringles 2000). This shows that in developing countries higher potato production and consumption would help to sustain food nutrition security, reduce the need of imports of cereals and save precious foreign exchange (Pandey, Singh and Sarkar 2005).
India is third largest producer of potatoes producing 25 million tones and contributing 7.5 – 8% of the world produce. Potato was primarily produced for domestic
consumption, but there has been a surplus since 1970. The average yield of India is higher than the world average.

- World average $\rightarrow 16.5$ ton / hectare.
- India average $\rightarrow 19.0$ ton / hectare.

But average yield of European countries like Netherland, Germany, U.K and France is 40 ton / hectare. Different commercial varieties of Indian potatoes are released by CPRI from time to time. Kufri Sindhuri, Chandramukhi, Jyoti, Lauvkar, Dewa, Badshah, Bahar, Lalina, Swarna, Megha. Jawahar and Sutlej are the main varieties. These varieties are adaptable to different region of India. The two main varieties popular in West Bengal are Kufri Jyoti and Kufri Chandramukhi, Kufri Ashoka can replace Kufri Chandramukhi in West Bengal. Not all the above mentioned varieties are produced specifically for processing. CPRI has developed two new potato varieties specifically for processing, Kufri Chipsona 1 and 2. Recently released Kufri Chipsona 3 and Kufri Himalaya have all the properties of processing i.e. dry matter content and reducing sugar. It has a yield higher than all the earlier varieties released and also possess good resistance to late blight (devastating disease).

Non availability of quality seed materials is the main cause for poor quality, small potato size and poor yield of the major varieties in West Bengal. At present breeder seeds are produced by CPRI and the same is been distributed to various state government and nodal agencies for the further three stages of multiplication, before being distributed among the farmers. But in actual the situation is somewhat different. Although the seeds are distributed by CPRI, it does not go for three times multiplication and only 10% of the potato area is planted annually with certified seeds.

The Government views, the use of TPS (True Potato Seeds) to solve the problem of shortage of quality seed. TPS is investigated by CIP for potential application in India. The fundamental attraction of TPS is it breaks the various constraints like low multiplication rate, problem of disease control and high cost of breeder seed. But the main thrust area should be to make these seeds available to the small farmers, who still use the traditional method of using seed sized tubers of the previous harvest resulting in varying seed quality and constant degeneration of yield because of the attack of various diseases and building of virus in the seed stock. On the other hand procurement of breeder seed becomes quite expensive when storage, transport and handling cost are added to it.
The storage system is also done in both traditional methods and in cold storages. The traditional methods include pit and room storage. Cold storage is the most popular method of storing and 90% of the capacity of the total cold storage in India and West Bengal are for potato. In spite of that the present cold storage capacity is inadequate resulting in 20 – 30% post harvest loses. There are other infrastructural problems in cold storage – satisfactory environmental conditions, proper control of disease causing organism, enzyme and insects, control of sprouting in tuber during storage, maintaining potato firmness to prevent black spot, maintaining optimum temperature and humidity. These causes sprouting or accumulation of reducing sugar, leading to the tubers to be unmarketable and unfit for processing.

Although India is the third largest producer of potatoes in the world, and fourth in area cultivated, its export is negligible compared to the world export. The highest exporter is Netherland, followed by France, Germany, Belgium, and Canada. India’s share is quite negligible being less than 0.5% in quantity and 0.3% in value. Even the export quantity is quite negligible compared to the country total production which ranges from 0.3% to 0.45%. There are number of reason for this. The main constraints lies in the quality of the produce, and also inability to meet the sanitary and phytosanitary standard of the importing countries mainly European. However, our quality of seed and ware potatoes especially of West Bengal have already meet the standards of the SAARC and other South Asian countries and some of the varieties have already been accepted in some of our neighbouring countries. But in spite of this, we are unable to capture of the total demand of these countries, as export have become quite price competitive and the fluctuation in domestic wholesale price has made export sometime non remunerative. There has been recurring gluts in the past two decades and export has come into force only during these years of gluts or low potato price years as a crisis management tool (Khurana, Paul and Rana 2004).

India had exported potato to fifty one countries in the last 11 years (1994-95 to 2004-05) in different forms. But only nine countries have been regular importers, although in varying quantity.

These nine countries are Nepal, Sri Lanka, Maldives, Malaysia, Mauritius, Saudi Arabia, United Arab Emirates, and Singapore. Even export to these nine countries is quite less compared to their total import. Therefore there lies immense opportunity to meet this uncatered demand. Export in these countries have their own advantages with respect to quality acceptance, similarity of growing season transit time and
freight cost. SAARC and south East Asian Market are the target market of seed and ware potatoes where as European countries U.S.A, Canada have a great potential for processed potatoes. There have been no long-term policies of Government for potato export except the recent establishment of Agri-export zones. There are other constraints in export like the non tariff barriers, high transportation cost, lack of end-to-end cold chain facilities, lack of proper infrastructure and lack of knowledge of prevalent international norms which has made India an unreliable supplier in the international market.

India has a surplus production after meeting the consumption. One of the method of disposing of the surplus production is giving an increasing attention towards the processing sectors. India processes less than 0.6% of the annual production (Marwara and Sandhu, 1999), percentage varying from state to state. The consumption of processed product is anticipated to increase with growing urbanization and rising income, which is substantially contributing to change in life style accompanied by a corresponding change in food habit. Processed potato at present mainly comprises of potato chips both in organized and unorganized sectors which contributes to a large share in the salty food industry. Dehydrated potato products is the best and most popular processed potato products having its own advantages of ready to make recipe where quality passes to the end user. It is also packed for dry storage eliminating the need for premium freezer space.

The profitability of potato crop is largely determined by the costs of production market prices and the marketable yield after discounting the post harvest loses. Even after considerable increase of productivity and area, the net returns to farmers have decreased. It has been analyzed that an annual growth of 3% will lead to a shortage whereas growth exceeding 8% will induce gluts (Singh, 1999). Although huge production and lack of cold storage facility is the primary causes of the economic loss to farmers, it is also caused by the inelastic demand. The per capita consumption of potato is 14.8 / kg / head / yr in India which is one of the lowest in the world. (Paroda, 1999). This is because in India potato is consumed as a complementary vegetable rather than as a staple food. There are also lots of misconceptions about potato for causing obesity. Potato’s biological value of protein can be compared to milk and egg. Potato contains 382 calories per 100grm weight, where as in wheat (whole) and rice (Raw milled) it is 397 and 371 calories respectively. The fat contents of potato is
0.4% per 100 gram of dry weight, which is lesser than wheat (1.7%) and rice (5.8%). Therefore there remains a lack of mass education on the nutritive value of potato in a developing country like India where population continues to grow. The increase in the per capita consumption will not only take care of the surplus production but also the increasing demand for food as most of the population suffers from malnutrition.

West Bengal is the second largest producer in India contributing to more than 30% of the total production. The cold storage capacity is almost half of the total produce, leaving, an huge amount of surplus after consumption. Potatoes are stored at a low temperature of 2 - 4 degree in cold storage, where glucose starts accumulating. This turns the potato black and thereby unfit for processing. Slightly higher temperature can prevent this but then in high temperature sprouting starts which again makes the tubers unfit for processing. Thus maintenance of proper cold storage temperature for healthy tubers is a constraint for potato development. The post harvest loses are around 20 to 30% and 10% of the produce is wasted as unmarketable fresh in the field while harvesting. There has been a recurrent glut in the past two decades and farmers had face life and death questions by selling their produce at half of the remunerative price. Lack of proper disease and disorder control techniques hampers steady production of potato. Cost of controlling these diseases are also very high and not within the affordability of small marginal farmers. Hoarders preserve potato with an aim to create artificial crisis. The production, area and yield of potato in West Bengal show an increasing trend. The average yield is greater than that of India’s average. Due to its short duration and compatibility of its cultivation with other crops, it has been a useful component in multi-cropping system (Praharaj, Khurana, Paul and Lal, 2006).

The whole sale price fluctuates throughout the year. It is being very low in the harvest season, increasing to a level and remains steady for a period of 4 month from mid May to September, after which it reaches its peak in the last months of the year. Kolkata and Haldia are the two ports of West Bengal having adequate infrastructure. The export from West Bengal is quite nominal compared to its production. Export has been mainly to three countries Malaysia, Maldives and Singapore in the last five years from both the ports. There has been years when potato exported was nil in either Kolkata or Haldia port. The export was restricted to mainly ware and seed potatoes.
Potatoes for processing are not exported, as they are not of international standard. Procurement price of export quality potatoes are also sometimes not competitive. There has been a rapid change taking place in the industrial scenario in West Bengal and it is no longer considered to be a backward state. The state now ranks fifth in the country in terms of the potential to attract foreign direct investment (FDI). The greatest advantages of having an industrial base in West Bengal are the availability of skilled labour, low attributes cost, relatively low cost of living, proximity to South East Asian countries and industry friendly atmosphere.

Bengal export policy is to stress on agri business after a long wait. As a result, the state will fetch greater allocation from the Government of India's export Assistance grants, under the newly introduced ASIDE as an end-to-end approach, focusing on specific product. AEZ have also come up in Hooghly and Howrah district of West Bengal.

Foreign investors are now showing interest in investment in agri-business in West Bengal. The concept of contract farming has already become popular in few states in India like Punjab and Maharastra. There have been many success stories in India like Pepsi Co., ITC, and Reliance Industries in contract farming.

Pepsi co's Frito lay started its food processing plans in 2004 in West Bengal. At the beginning the raw material was being sourced elsewhere. But later they worked closely with the small farmers having land of 1 – 1.5 acre and developed West Bengal specific agro economic practices, farm practices improved and there was a difference in crop health. The farmer's have also been benefited by receiving inputs at discounted price, increased earnings and also getting lower loan cost from District Co-operative Banks and also private sector like ICICI Bank.

But there still remain controversy in West Bengal regarding contract farming as some see it as capitalist penetration of agriculture for capital accumulation and exploitation of the farming sector. Even most of the small-scale farmer are still not convinced about the mutual benefits of contracts farming and have the fear of exploitation.

Thus as Indian farmers and at the same time potato growers in West Bengal is in distress and are facing life and death situation, contract farming is one way of giving a better price for the produce.
6.3 Suggestion

1. Pre harvest Management

Potato is a high input, high output, high-risk crop. The positive responsiveness of the crop to high quality inputs of seeds, fertilizers, pesticides and labour, motivates the farmers to use these inputs at a higher rate than other crops. Potatoes have a high productivity per hectare, a short growing period and higher returns per day compared to other crops. But in the present scenario input use efficiency is decreasing and as a result the farmers are compelled to use inputs at higher rates. This affects the cost of production without proper return to the farmers. Therefore there is a requirement of choosing those varieties, which are more responsive to lower input cost. Proper multi-cropping system should be followed, that would make more efficient use of the crop residue. The residual inputs of the potato crops can also be used in the proper multi-cropping program, thereby minimizing environmental degradation. Jute as an inter-crop is popular in some of the districts of West Bengal. Though this crop is not much profitable according to the growers, but the crop residue acts as an excellent fertilizer for potato crop. Organic manures, composts, bio-fertilizers and integrated pest and disease management are some of the low cost farming practices, which might be advocated to increase sustainability of the potato production system in West Bengal. Seeds, which accounts to 40% of the cost of production also play a significant role. Non-availability of quality seeds in the main cause for poor quality, small potato size and potatoes unfit for processing. This problem can be overcome by using TPS seeds as good quality seeds to the farmers. It has proved to be a highly productive planting material for raising commercial crops. But these seeds should be made available to even the small growers through state agencies, district and village co-operatives. The selection of seed varieties should not only be based on market demand but also susceptibility to potato late blight, a fatal disease, which causes maximum damage to the crops. None of the varieties currently produced in West Bengal meet the industrial requirement for chips making. Processed varieties potatoes have higher yield but high cost of inputs, which normally are not viable to be produced by the small farmers, until they form co-operatives or participate in contract farming. Potato is a labour intensive crop and comparatively low cost labour is available in West Bengal.
2. Post harvest management

This is one of the most significant areas, as post harvest losses accounts for 20 – 30%. At the time of the harvest around 10% of the potato tubers are wasted in the field, being cut by mishandling. These are unmarketable fresh, which are at present either consumed immediately by the household members or left to rot. These can be converted to dehydrated potatoes. This can be done in the cheapest way by individual farming families using solar energy (as in Gujarat and Maharashtra). In addition these dehydrated products have a large shelf life as can be packed for dry storage.

Greater consideration should be given toward post harvest storage system. As potatoes are harvested from October to March, storage is both necessary to regulate the supply of table potatoes to the market and minimize gluts and thereby reducing distress to the producers. Potatoes are stored both in indigenous, non-refrigerated methods and cold storages in West Bengal. Potatoes can be stored in the traditional method up to June before monsoon breaks. The advantage of this method is that, it is cheap and minimum investment is required. The materials are locally available for storing and the method is readily acceptable by the farmers. As post harvest loss from traditional method of on farm storage is quite high depending on the method and the region, the potatoes must be sold within a period of 6 – 8 weeks, which is the average dormancy period before it starts sprouting. This would give a high remunerative return to the farmers by saving in premier cold storage costs.

The cold storage capacity is quite inadequate in West Bengal and after de-regulation of the state government; cold storage costs have increased, adversely affecting returns to the producers. There is an immediate necessity for increasing not only the number of cold storages, but also the proper location should be identified for construction which would have an optimum distance from the crop point. Regular government inspection should be done for controlling the malpractices of certain cold storage owners of charging higher than the fixed rates, fictitious space booking, creating artificial crisis and monitoring whole-sale price. The operating system of the cold storages in West Bengal should also be improved by providing satisfactory environmental condition of temperature and humidity, controlling disease causing organisms, enzymes and insects, controlling sprouting in tubers during storage and maintaining potato firmness to prevent black spot.
3. Marketing and consumption pattern

Potatoes are marketed in West Bengal following the normal five level channel of Producer → Cold Store → Commission agent → wholesaler → Retailer. The profitability primarily is determined by cost of production, marketable yield (after the post harvest loses) and market price. West Bengal comprises of primarily small farmers having a cultivated area of 1-2 acres. This is due to the law of inheritance and succession and pressure of increasing population. These small farmers do not have a direct access to the market, and depends upon the middleman. The farmers can have a better return on their produce through participation in contract farming and Amendment of APMC Act in West Bengal.

Potatoes are consumed as a vegetable in West Bengal, rather than a staple food as in European countries. Potato consumption per capita in India is 14.8 kg / head / year which is one of the lowest in the world (Paroda, 1999). However the consumption pattern is comparatively higher than the Indian average in West Bengal as, it is almost consumed daily in most of the house hold as a vegetable. But in spite of this it is not a part of the traditional diet. There is a great deal of misconception within the consumers regarding the nutritional value of potato. It is very rich source of starch and though it is consumed mainly for its calorific value, it also contains significant amount of protein and minerals. Its fat content is much less than the fat contents of wheat and rice, yet potatoes are blamed for causing obesity. Potatoes can be dehydrated by inexpensive traditional methods, which would not only reduce moisture content but also weight. This would further make packaging, handling, storage and transportation cheaper. Dehydrated potato is easy to use as an ingredient in various snack foods and also domestic use in table. This would save consumer from the otherwise tiresome job of selecting, buying, washing, cleaning, peeling and cooking. This can also be used in baby food, soups, bakery and confectionary. This can be used instead of wheat flour and be a cheaper choice. Therefore in a country such as India and also in a state like West Bengal where there is widespread poverty and malnourishment, there is an immediate need to educate the masses on the nutritional value and encourage greater consumption, which can also be a cheaper alternative.
4. Amendment of the APMC Act, 1952

Organized marketing of agricultural commodities has been promoted in the country through a network of regulated market. Most of the state government has enacted legislations (APMC Act) to provide for regulation of agricultural produce market. The purpose of state regulations of agricultural markets was to protect farmers from the exploitation of intermediaries and traders and also to ensure better prices and timely payment of the produce. But over a period of time these markets have acquired the status of restrictive and monopolistic markets, providing no help in direct and free marketing, organized retailing, smooth raw material supplies to agro-processing. Hence exporters, processors and retail chain operators cannot procure directly from the farmers as the produce has to be directed through regulated market and licensed traders. In the process the cost increase enormously and the farmers end up getting a low return on investment. This monopolistic practice and state controlled markets have prevented private investment in the sector.

In order to provide efficiency into the marketing system large investment is required from the private sector for the development of post harvest and cold chain infrastructure nearer to the farmer’s field. This would drive growth, employment and economic prosperity to the potato farmers in West Bengal. But for this a regulatory policy environment is required. Policies should be implemented for processing material directly from the farmer’s field. An effective linkage should be established between farm produced potatoes and the retail change and food processing industries. Accordingly the ministry has suggested certain amendments of the state APMC Act for deregulating the market system to promote investment in marketing infrastructure. The Ministry of Agriculture also formulated a model law on agricultural marketing for guidance and adoption by the state government. This would facilitate pledge financing, direct purchasing, future trading and export. Several states have initiated steps for amending the APMC Acts. Some 14 states have amended the Agricultural Produce Marketing Committee (APMC) Act. In West Bengal reforms to APMC Act have not been done though administrative action has just been initiated. Therefore there is an immediate need of amendment and reforms of the act in West Bengal, where the model legislation would provide for establishments of private markets, direct purchase centers, consumer / farmers market for direct sale. This would also develop public private partnership in the management and help in the development of potato market in West Bengal.
5 Processing Sector

West Bengal being one of the largest procedures of potato in India has huge surplus after storing and consumption. The state has been witnessing excess production for the past several years, which often forced farmers to sell the crop below the remunerative price. The price in some years crashed to Rs. 2.00 – 2.50 per kg which is half the remunerative price. One way to take care of the excess production and keep the price stable is to transport the commodity in bulk to other states. This needs state government initiatives. Potato is a semi perishable item and has a shelf life of 9 – 10 days. Therefore proper handling of production surplus if not done immediately, there would be no either alternative but to leave them to rot. The current processing sector in the state has just started developing. According to S.K. Pandey, director of the Central Potato Research Institute, most of the potato varieties in the country is unfit for processing. The present varieties produced in West Bengal are not fit for processing. Therefore in order to supply raw materials to the organized sector, the right variety and acceptable farming techniques have to be adapted. But this would somewhat not be possible on individual farmer basis as most of the farmers are small farmers having less than 1 hectare of land and also have lot of financial obligations. This system can only be developed by the entrepreneur’s farmer contract basis.

There is a great opportunity of development in unorganized sector, where chips can be manufactured using local raw materials in small scale factories. Co-operative Banks can extend credit to entrepreneurs who manufacture value-added agricultural products in small scale. Entrepreneur and women co-operative can be engaged to develop small-scale unit for manufacturing value-added Potato items. At present potato chips is the most popular processed product in the unorganized sector. Dehydrated potatoes can be manufactured by using surplus produce and unmarketable fresh, on individual household basis and can be supplied in local markets and retail outlets.

6 Exports

In spite of the huge production base in West Bengal export have been quite negligible in the past decade. The main reason is lack of government policy and initiatives. State efforts come in force only during glut years. The export mainly depends upon the efforts of individual importers. Proper demands of the importing countries are not identified as mentioned by the exporters who were interviewed during the survey. The demand estimation is provided by APEDA. Therefore exporter needs to have agents abroad for identifying and estimating the demand of the export market. Developing
buying houses of importing country or direct marketing channel of the exporters would not only facilitate export but also give the right export price.

Cost of procurement of export quality potatoes is another hurdle in export. The price of materials procured from cold storage is higher as it is channelised through intermediaries and traders, which increases the cost of produce. A direct procurement from the crop point can prove to be beneficial not only to the exporters but also give better return to the farmers.

There is a great potential of export to the SAARC countries from West Bengal due to its acceptance in variety and similarity in growing season. The cost estimation done has proved import from West Bengal to be quite competitive. The competitiveness would further improve if the potatoes are procured at a lower cost. The processed potato sector should mainly concentrate on Europe and Middle East where demand of processed potatoes mainly potato flakes has been growing continuously.

A target has to be set for export to these countries and regular supply irrespective of the fluctuations in production has to be maintained to make India one of the reliable suppliers in international market.

This target export can best be achieved by a private public participation approach. The public sector should be involved in preparation of suitable policies and attract entrepreneurs. It should make such projects viable by providing financial, fiscal and physical support and incentives. The private sector would set up international class processing facilities and also post harvest and post harvest processing infrastructure. Functions and responsibilities of government organization would be to provide R & D for improving quality and yield of potatoes and development of good planting materials. They would also provide support for adoption of good agronomical practices, extension and training. The AEZ with the same objectives has been initiated in West Bengal. The objective should be to provide remunerative returns to the farmers on a sustained basis by improved access to exports. Specific export zones for table and processed potatoes should be identified and end-to-end development for export should be provided.
7. Contract farming

The huge business opportunity and agricultural reforms had created a huge trend towards contract farming. Contract farming involves farmers cultivating crops under buy-back agreement with a company or agency. Contract framings lead to a savings of 20 – 30 % for a company according to Pepsico India Holdings. If such savings are shared usually with the farmers, it leads a doubling of income to the farmers. Due to supply chain efficiency the consumers too could save on the spending on food. But generally the interest is more on the buyer side than on the seller because most of the small farmers have the fear of their land being under threat in such process, although contract farming is based only on a better price for the produce. In a state like West Bengal contract farming has great potential where small and even marginal farmers can no longer remain competitive without access to modern technologies and support. In West Bengal Pepsico’s Frito lay division has been highly successful with its processing plant. The farmers are also benefited and highly satisfied compared to their traditional method of cultivation.

There are many success stories of contract farming in other states of India. This success cases would encourage, the producing and consuming community to take positive steps towards mutual benefits in specific and development of West Bengal agriculture in general. Contract farming can sustain and be more beneficial in long run if the initiative comes from the buyers.

Therefore the farmers need to be educated on the benefits of contract farming. Contract farming can be developed not only with the processing units but also with the retail giants, as retail marketing is in boom in West Bengal.
6.4 Scope for further research

Post harvest issues such as trade and processing are entering a critical phase and demand for processed product is certain to increase. An in-depth study can be done to identify the non traditional areas in West Bengal for growing export quality potatoes. A study can also be done to evaluate state Government specific approach for promotion of potato export from West Bengal keeping in mind the export policies. Further studies can also be done for identifying the quality parameters and demand potential for the target countries and the international norms. Study can be also being done for the consumer perception of rural as well as the urban areas of West Bengal regarding the consumption of potato as a staple food rather than a vegetable.