Chapter-IX

Summary & Suggestions For Policy Implication
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**SUMMARY & SUGGESTIONS FOR POLICY IMPLICATION**

9.1 Introduction:

Potato is the world's fourth important food crop after wheat, rice and maize owing to its great yield potential and high nutritive value and accounts for nearly half of the world's annual output of all root and tuber crops. Thus, with an annual global production of about 300 million tonnes, potato is an economically important staple crop in both developed and developing countries.

In India during 2007-08, Potato was produced in an area of 1.48 million hectare with a production of 22.09 million tonnes and has emerged as the third largest potato producer in the world. Potato production in India is projected to double by 2020\(^1\). However, potato productivity in India (14.9 ton per ha.) is comparatively very low as

\(^1\) Agricultural Statistics at a Glance, 2009
compared to European countries and USA, i.e. 30-40 tonnes/ha.

In Uttar Pradesh potato is grown in 5.05 lakh ha with a production of 11.1 million tonnes. It plays an important role in the state's economy and well-being of the farmers. Although potato productivity in the state rank third next to Gujrat and West Bengal, there is still a wide gap between the actual (21.97 tonnes/ha) and potential yields (40-45 tonnes/ha).²

In the changing economic scenario, implementation of world Trade Organizations rules i.e. liberalization policies have enhanced the further scope to reap the gains of world market through exports and hence, adding more foreign exchange to national exchequer by potato crop. Potato, being a labour and capital intensive, short duration, high value crop having widespread popularity and access to global market, its inclusion in multiple cropping sequence increases the cropping intensity, thereby increase production and value per unit area and

²Agricultural Statistics at a Glance, 2009
time. Hence there is sufficient scope to increase area, production and productivity of this crop.

India has made remarkable progress in potato production since independence. Yet the country still cannot absorb excess potato production mainly due to lack of required infrastructure for storage, transport, marketing and utilization.

In order to open up the new yield and income possibilities on the farms, one needs detailed information on the level and distribution of farm resources, their utilization pattern and the production and income levels. This is essential for identification on structural weakness needing amelioration. Similarly information on cropping pattern, cost and returns from different crop on farms of different size is essential for evaluating the scope of introducing new crop production technologies in the area.

The main aim of the present study, broadly speaking is to understand the economy of farmers who have taken potato crop as a commercial crop. On the basis of the evidence gathered, it is further intended to suggest ways and means for accelerating the process of
commercialization with potato crop in the case of farmers under ordinary conditions and as well as if condition is similar to Auraiya district.

Thus, this study will provide the basic information covering all segments of economic activities of those farmers who are growing potato for marketing and storage purposes, in respect of resource use, productivity levels, income and employment. The findings of the study would also be a great significance to the Policy Makers, Economist, Extension Workers, research workers, bankers, and business communities to formulate plans for all round economic development of the farmers.

Keeping in view the importance of potato crop in agricultural economy of the country, state as well as in the study area, the present study entitled "A Study of Economics of Production and Marketing of Potato in Uttar Pradesh with Special Reference to District Auraiya" was undertaken with the following objectives:

9.2 Objectives:

The specific objectives of the study were the followings
1. To study structure of farms by size of farms.
2. To workout cost and returns in potato cultivation by size of farms.
3. To estimate of marketable and marketed surplus and identification of the factor affecting the surplus.
4. To study the pattern of disposal of the produce and estimation of cost of marketing and efficiency of marketing.
5. To examine the constraints of production and marketing of potato.

Based on the objectives of the study an effort was made to make a comprehensive review of the relevant literature with a view to build up the needed theoretical orientation and also to develop an appropriate conceptual model for the present study. The theoretical framework thus structured, specified the purpose of the study and also highlighted the academic and applied importance of the research design and methodology developed and adopted for the study.

9.3 Hypotheses:

The thesis has sought to test the following hypotheses
✓ The productivity, cost of production and incomes per unit of area is not dependent on the size of farm.
✓ The marketable and marketed surplus of potato is not affected significantly by the size of farms, production, family size and price of the potato.
✓ The efficiency of various marketing channels is not different.

9.4 Research methodology:

The present study entitled is confined to Auraiya district, accounts for over 8 per cent of the country's potato output. The sampling process in this study consists of three stages viz. selection of blocks, selection of villages and selection of sample cases. To study the marketing of potato one main market /mandi and market functionaries working in the mandi were also selected.

Out of all the 7 blocks of Auraiya district, Ajitmal, Bidhuna and Sahar blocks occupied about 20. 19 and 18 percent of the total area under potato in the district. Out of these top three blocks two blocks Bidhuna and Sahar were selected randomly.
From the list of all the villages of selected blocks 5 villages from each block were selected randomly.

All the potato growers in the selected villages were categorized into three strata i.e. (1) Size-group I up to 1 ha. (2) Size group II 1 to 2 ha and (3) Size group III - above 2 ha. and ultimate sampling units (potato growers) were selected according to probability preparation to the total number of farmers falling in each category fixing the probability to give samples of 100 farmers.

The study is based on the primary information, collected from selected farmers for the year 2006-07 through survey method with the help of pre-tested schedules and questionnaires. The data were subjected to simple tabular analysis. Arithmetic mean; Frequency and percentage were used to analyze the empirical data. Standard cost and income measures were used to estimate farm profits.

9.5 **Research Findings:**

The findings of this study have been summarized below revealed by the study about the different aspects of the subject matter covered within the scope of the study.
9.5.1 Socio-economic structure of the sample farms:

1. Average area owned by size group I, II and III of potato growers was 0.73, 1.65 and 4.26 ha., respectively, with an average of 2.21 ha.

2. Overall average size of family came to about 7 members per family, in which 2.63, 2.02 and 2.65 were male, female and children respectively.

3. Per family average number of male, female and children workers was 2.06, 1.35 and 1.36 respectively. The adult male and female workers in the family were 2.47 and 1.62 respectively. The total adult workers in the family were noticed to be the highest (4.66) in case of the size group II.

4. The overall number of dependents per household came to 2.93, 1.93 and 2.13 in the family of farm size group I, II and III respectively with an overall average of 2.53 dependents per family.

5. On an average, 95.86 per cent cultivated area was under irrigation. It varied from 93.69 per cent on farm size group-I to 97.12 per cent on size group-III.
6. Private tub-wells and pump-sets irrigated about 70 per cent of the total irrigated area, while 16.50, 6.05 and 7.11 per cent shared by canal, Government tub-wells and other sources, respectively.

7. Fixed capital constituted 14.25, 5.79, 2.42 and 1.74 per cent on farm machinery & implements, livestock, farm building and irrigation structure, respectively.

8. The highest proportionate investment on farm implements & machinery i.e. 18.63 per cent was noted on farm size group-I, whereas it was the lowest being 11.25 per cent on III size group of farms.

9. On an average total live stock maintained by the potato growers of farm size group-I, II and III was 5.42, 11.11 and 14.75 respectively with an overall average 8.41 animals per farm.

10. Per hectare average number of animals varied inversely with the size of farm while per hectare number of milch animals was found more on size group II followed by Size group I and III.

11. On an average, paddy accounted for the highest being 26.38 per cent to total cropped area, followed by 15.61.
13.58, 10.28 and 7.80 per cent under early Potato, late potato, wheat and urd/mung, respectively.

12. On an average cropping intensity in case of size group I, II and III came to 204.25, 201.04 and 197.56 per cent respectively with an overall average of 202.52 per cent.

9.5.2 Cost and Returns:

1. Total per hectare cost of cultivation of early potato, on average, came to about Rs.40022.35 per hectare. It showed an increasing trend with the increase in the size of farms.

2. Among the different inputs used in the cultivation of early potato different inputs to total cost of cultivation of early potato, seed cost accounted for the highest being 31.19 per cent, followed by human labour, manure and fertilizers, rental value of land, irrigation, bullock labour and machine charges accounted for 20.60, 8.98, 18.74, 5.49, 1.38 and 7.53 per cent, respectively.

3. Total cost of cultivation of late potato, on average, came to Rs.48683.95 per hectare which varied directly with the size of farms.
4. Among the various inputs used in the cultivation of late potato, seed cost accounted for the highest share in the total cost being 24.78 per cent, followed by human labour, rental value of land, manure and fertilizers, machine charges, irrigation, bullock labour, occupied 17.59, 15.41, 7.42, 6.23, 4.88 and 0.99 per cent of the total cost, respectively.

5. Within the different farm size groups, machine charges, irrigation, manure and fertilizers, plant protection measures and overhead charges varied directly with the size of farms, while the reverse trend was observed in case of human labour, bullock labour, seed and rental value of land.

6. Per hectare overall total cost of cultivation (C2) of early potato came to about Rs.40022, which was estimated to be about Rs. 39360, Rs. 40425 and Rs. 41787 on farm size group-I,II and III respectively. The cost of cultivation of early potato per hectare under all cost concepts varied directly with the size of farms.

7. Overall per hectare total cost (D) of potato (late) came to about Rs. 53552 which was estimated to be about Rs.
52170, Rs. 54617 and Rs. 56820 on I, II and III farm size groups respectively. In the cultivation of late potato all the costs in cost concept vary directly with the farm size.

8. Per hectare overall production of Early potato was 176.52 qt., which was as high as 183.45 qt. on farm size group-III and as low as 173.35 qt. on size group-I. The yield varied directly with the size of farm.

9. Overall cost of production of early potato was estimated to be Rs. 249.40 per quintal, it was found to be the lowest on size group-II, attributed to the low cost of cultivation and comparatively higher yield.

10. Although the yield of early potato was the highest on farms size group-III but due to the higher cost of cultivation the cost of production was the highest i.e. Rs. 250.56 / qt.

11. Overall input/output ratio with respect to cost C2 was 1:1.75, being 1:1.73, 1:1.77 and 1:1.78 on I, II and III farm size groups respectively.

12. Per hectare average production of late potato was 257.56 qt and was varied directly with the size of farm.
13. Overall gross income of late potato was estimated to be about Rs. 70798 per hectare which varied directly with the farm size.

14. Output input ratio in the cultivation of late potato on I, II and III farm size groups was estimated to be 1.34, 1.30 and 1.32 respectively.

15. Comparatively less per hectare net income, farm business income and family labour income in case of II farm size group was mainly due to the less production and higher cost of cultivation.

16. Overall operating ratio was higher in case of cultivation of late potato indicates clearly the inputs used in the cultivation of late potato were higher than that of early potato.

17. Fixed ratio was the same for early and late potato implies that same set of fixed capital was used in both the crops.

18. The value of gross ratio reveals that the total expenses incurred are Rs.0.57 and Rs.0.17 per rupee of gross income in the cultivation of early and late potato respectively.
19. Per rupee of capital investment the net income as well as gross income was higher in the cultivation of late potato as compared to early potato.

20. Overall input-output ratio for Maize-Potato (early)-Potato (late) was the highest being (1:1.62), followed by Sugarcane Ratoon (1:1.60), Maize-Potato (early)-Wheat (1:1.43), Sugarcane Planted (1:1.42) and Paddy-Potato (late)-Urd (1:1.41).

21. The study reveals that Maize-Potato (early)-Potato (late) crop rotation is more profitable than all other crop rotations prevailing in the study area.

9.5.3 Marketing of potato:

1. Average production of early potato came to 78.04 qts per farm, varied directly with farm size group attributed to the area under early potato.

2. On an average 12.63 quintals early potato was utilized for home consumption, wage payments, seed, gift, losses etc.

3. Overall marketable surplus worked out to be 65.41 quintals per farm, which constituted 83.82 per cent of the total production. Proportionate marketable surplus
of early potato showed an increasing trend with size of farm.

4. On an average nearly 9 and 2 per cent production of late potato was utilized for home consumption and wage payments while 16.71 per cent was retained for seed. 2.12 per cent gifted out and 0.87 per cent was damaged.

5. Overall marketable surplus of late potato is worked out to be 73.65 quintals per farm, which constituted 69.21 per cent of the total production.

6. Marketable surplus of late potato showed an increasing trend with the size of farms.

7. Overall more than 54 per cent marketable surplus of early potato was sold on the farm gate to the retailer (19.31%), whole seller (13.58%), village merchant (12.81%) and consumer directly (8.33%).

8. Within the different farm size groups, I and II group of farmers, due to immediate requirement of cash money to meet their current needs such as to fulfill family expenditures and to repay the debt etc., sold maximum
portion of their marketable surplus of early potato just after the digging.

9. The marketing cost paid by the producer and retailers through channel-I was 6.33 and 2.17 per cent of the consumer's price respectively and retailer earned Rs. 120 from the sale of one quintal of early potato.

10. The marketing cost paid by the producer, village merchant and wholesaler and retailers in the marketing of early potato through channel-II was about 6.33, 1.67, 1.50 and 5.50 per cent of the consumer's price respectively.

11. Producer's share and margin of the village merchant, wholesaler and retailer in this channel was nearly 62, 3.83, 2.33 and 16.67 per cent of the consumer's price respectively. Major portion of the marketing cost was incurred on the packing material which costs Rs. 32 per qt to the producer.

12. In the marketing of early potato through channel III (Producer-commission agent – wholesaler – Retailer-Consumers) the producer, commission agent, wholesaler and retailer paid marketing charges of Rs. 64, Rs. 4.00,
Rs. 9.00 and Rs. 33.00 per quintal respectively and shared 58.33, 2.67, 4.00 and 16.67 per cent of the consumer’s price as their margin.

13. In the marketing of late potato through channel-I (Producer- Retailer- Consumers) during pre-storage period, producer and retailer had to spend Rs.38 and Rs.13 as marketing cost. The producer’s share and margin of the retailer was estimated to be 67 and 18 per cent of the consumer’s price.

14. Producer’s share in the consumer price for the late potato during pre-storage in the marketing channel-II (Producer - Village merchant - wholesaler - Retailer - Consumer) came to about 55 per cent, while wholesaler and retailer earned the margin of Rs.9 and Rs.48 respectively in the sale of one quintal of late potatoes.

15. In the marketing of late potato after storage, producer, wholesaler and retailer spent marketing cost of Rs.155, Rs.11.00 and Rs.33.00 in the channel-III respectively which was 17.22, 1.22 and 3.67 per cent of the consumer’s price. The producer’s share and margin of the wholesaler and retailer in this channel was nearly
71. 2 and 6 per cent of the consumer’s price respectively.

16. In channel IV of marketing of late potato producers themselves carried their produce to the distant markets after storage. The marketing cost spent by the producers was about 12 per cent of consumer’s price out of which packing, transportation and commission accounted for 2.46, 8.46, 1.15 and 3.46 per cent of the consumer’s price respectively. The producer’s share in this channel was 77.15 per cent of the consumer’s price.

17. In channel –V, forwarding agent/wholesaler purchased potato from the producer at cold store and forward to the distant markets. After spending Rs. 62.00, Rs.6.00 and Rs. 33.00 forwarding agent, wholesaler and retailer earned a margin of Rs. 24.00, Rs.12.00 and Rs.80.00 per quintal respectively. Producer’s share and cost incurred by producer in this channel was 72.54 and 11.47 per cent of the consumer’s price respectively.

18. Total marketing cost per quintal of early potato came to be highest in channel-III, followed by channel-II and I. respectively. Total marketing cost was the highest in
channel-III, due to presence of large number of intermediaries and vice-versa in channel-I.

19. In case of late potato the total marketing cost during the pre-storage period came to about 15 and 26 per cent of the consumer's price in channel-I and II, respectively.

20. Marketing cost of late potato during post-storage period came to the highest in channel-V, followed by channel-III and channel-IV, respectively.

21. Although during post-storage period the total marketing cost was the highest in channel-V but the proportionate share of total marketing cost to the consumer's price was higher in channel-III due to lower consumer's price.

22. In all the marketing channels, out of total marketing cost, producer has to pay the highest marketing cost per quintal because of higher price of packing material and cost of storage.

23. In the marketing of early potato the producer's share in the consumer's rupee was the highest in channel-I followed by channel-II and III.
24. Among all the marketing intermediaries the margin of retailer was found the highest in all the channels of marketing of early potato.

25. The producer's share in the price paid by the consumers was found the highest *i.e.* 77.15 per cent in channel-IV during post-storage period followed by channel-V (72.54%).

26. Among all the middlemen in the marketing of late potato retailer earned comparatively more margin of profit than others in all the channels of marketing of late potato.

27. Although the marketing efficiency of early potato was higher in channel-I, due to absence of intermediaries and lower marketing cost but this channel has its own limitations therefore it is not so common. Marketing efficiency was the lowest in channel-III.

28. Marketing efficiency of late potato was the higher in channel-I, when producers directly marketed late potato without storage.

29. The marketing efficiency during post storage period was higher than pre-storage period except channel-I. Besides
higher storage cost and marketing cost, the consumer's price in the market was high in post-storage period in comparison to pre-storage period.

30. Marketing efficiency declines with the increased number of intermediaries in the channel and vice-versa in the marketing of early as well as late potato. Hence, the hypothesis 'The efficiency of various marketing channels is not different' has been rejected.

9.6 **Suggestions for Policy implication:**

1. Efficiency shifters such as high quality seeding material, irrigation facilities and technology adoption need thrust and support. The farmers must be supported to shift to a competitive cost regime through technology and economic support. The policies for enhancing efficiencies and thus competitiveness of potato have to be implemented with a sense of urgency.

2. Credit enables a farmer to extend his control over ownership of resources. In a liberalized trade scenario, the need for credit to meet technology requirement is quite high. As there is considerable unmet demand for agriculture credit, it is recommended that credit flow
should be substantially enhanced at low rate of interest for the farmers.

3. Farmers are generally resource poor, have low propensity to absorb losses and therefore they need to be protected against risk. For this purpose, risk management strategies such as 'contact farming' as a tool for farm support should be adopted on a wider scale.

4. The state government should plough back market fees for market development, hold regular elections of market committee and create cleaning, sorting, grading and packaging facilities in villages and allow traders to buy in the villages by declaring these places as sub-yards.

5. A massive campaign of publicising and sensitization of key stakeholders (farmers, traders, processors and consumers) should be launched by the Government.

6. Rural Uttar Pradesh is electronically unconnected, though country's software achievements are remarkable. To enable both the producers and the sellers to have access to information on demand.
availability and type of brands, size of package, expected time of supply and also day to day prices. There is an urgent need to extensively promote information technology (IT) in agricultural marketing.

7. Co-operative marketing societies for sale of produce in mandis and in villages should be popularized for the benefits of the farmers.

8. Making available authorized shopping place on various sub-urban areas to rural market functionaries.

9. The arrangements for adequate storage facilities in the rural area and at market level are necessary for reducing the loss in profit from the sale of output.

10. Inappropriate input-mix or lack of precision farming is the consequence of lack of education and knowledge amongst potato producing farmers. Greater efforts should be made to spread information, education, communication and knowledge on relative importance of inputs and other sound farming practices.

11. The major potato growing states should arrange advance forecasting of area under potato and plan to
divert the potatoes to the deficient areas or by export to avoid glut situations and price crashes in the markets.

12. There is a need to establish and promote new processing units, net houses/protected cultivation for minimum use of insecticides, organic farming, refrigerated vans, cold storage facilities, modern storage and packing centers, more cargo space and pesticide residue testing laboratories. These should be a close linkage between exporters and producers of exportable surplus. Moreover, it is necessary to have a proper survey of foreign markets as to their requirements of quality/types of crops and accordingly enter new markets with suitable varieties.

13. The integration between agricultural education and actual cultivation in the field should be increased.

14. With economic liberalization, globalization, and the WTO, policies should be carefully drafted to see that the private sector, through contract farming and other methods, encourages small-scale farmers to grow quality vegetables. The Government should assist in the development of markets, move forward with vegetable
fairs to attract foreign buyers, and create more awareness of the importance of safe vegetables in diets. The ministry of agriculture and the ministry of food processing industries should jointly organize such initiatives.

15. The Government should encourage partnerships between research institutions, agricultural and engineering universities, NGOs and private industries to address constraints and link vegetable farmers to national and international markets.

16. Level of awareness, training, demonstration of right kind of farming practices enhances performance of farmers. Hence, Emphasis should be laid on transfer of research from ‘laboratories to land’.

17. The Government should assist small-scale units to come up with attractive brands and creative labelling of products with safety assurance, which the international and domestic buyers can rely on. The Government should encourage women entrepreneurs to take up vegetable production, processing and marketing.

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In recent past, indiscriminate use of fertilizers, water and chemicals in potato crops has threatened the environment and ecological balance. Hence, to increase production, protect environment and soil, increase profitability, reduce residual effects of chemicals on potato, it is imperative to undertake research activities on potato production technology including organic farming, integrated nutrient management, integrated pest management including bio-control and residual effects of chemicals, post harvest technology and development of export oriented varieties.