



IDENTIFICATION ROLE OF NATIONAL INITIATIVE ON CLIMATE RESILIENT AGRICULTURAL (NICRA) UNDER STUDY ABOUT PRODUCTION AND ECONOMICS OF MAJOR VEGETABLE CROPS IN DISTRICT NAWADA (BIHAR), INDIA

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Abstract

The investigation was carried out by survey method in Kawakol block of district Nawada during year 2012-13. The per hectare total cost of cultivation was analysed and it shows that the highest cost per hectare is valued in potato cultivation (Rs. 52806.45) followed by tomato (Rs. 27755.92), green pea (Rs. 27103.28) and cauliflower (Rs. 24514.89) variable cost directly associated with level of production and share of variable cost (Cost A) was highest of the total cost in case of potato (76.23%) followed by green pea (59.63%) tomato (52.27%) and cauliflower (43.97%). The average yield per hectare of potato, cauliflower, tomato and green pea crops were achieved 226.67 qtl, 184.67 qtls, 184 qtls and 80.67 qtls. The return over per hectare for different vegetable showed that highest net return was obtained for potato (Rs. 62526.88) followed by tomato (Rs. 46944.08), cauliflower (Rs. 32855.11) and green pea (Rs. 31363.39). Input-output analysis reflects that tomato crops is most remunerable among all four vegetable and fetched highest return of Rs. 2.75 on investment of Rs. 1 followed by cauliflower (1:2.35), potato (1:2.19) and green pea (1:1.20) benefit cost ratio.

Key words : Production economics, vegetable crops, farm business income, family labour income.

Introduction

Weather is the instantaneous state of the atmosphere or sequence of states of the atmosphere with time, which can be defined as the condition of the atmosphere at any given time and place, climate on other hand is the average as well as variability of weather conditions prevailing in an area over a long period of time, known also as the statistics of weather. Precipitation, temperature, humidity, atmospheric pressure and wind are the important elements of weather and climate. It is the result of the interaction of four basic physical elements, the sun, the earth, atmosphere, the earth itself and governed by natural factors like geographical position (In terms of latitude, longitude and altitude), distribution of land and water distance from water bodies, surface cover etc. weather and climate are the vital factors determining the nature, condition and pattern of natural resources

(eg. water, soil, flora and fauna) collective expressions of the state of temperature, humidity and precipitation within a year in different seasons as well as in long term basis determine the forms of water, soil farming process and create support system for the floral growth, which in turn regulates the composition of a locality. These natural resources based along with weather and climate determine the way of life of humidity being. Thus, the economic framework and cultural composition of locality Kawakol Nawada, Bihar is also dependent on the weather and climate and hence any significant change in these two key factors has a profound impact not only on natural resources, but also on the entire biosphere.

Increased level of atmospheric carbon dioxide and other green house gases have been identified as the key factor of global climate changes. The most important global environmental challenges being faced by humanity

today. As per IPCC reports, 2013, on an average temperature has increased by roughly 1.53°F (0.85°C) from 1.88°F to 2012. INDIA's weather and climate are mainly governed by her geographical location, surrounding boundary conditions (the Himalayas, the Indian ocean, Arabian sea and Bay of Bengal). Further the various in land and water distribution within the country, altitudinal differences, vegetation type and cover along with the variations of sunshine hours within the country due to its latitudinal and longitudinal extension are dubbed together to divide the country into six climatic zones and agro-climatic zones are facing serious problems of various kinds due to impact of climatic/weather anomalies the country, which clearly indicates probable impacts on the country's economy.

India is the second largest vegetable producer in the world next to China. In year 2011-2012, the total production of vegetable was 112.50 million tones with the area of 19.2 million hectare, which was 98.3 million tones in year 2010-2011 with area of 18.1 million hectare. India ranks first position in production of vegetable pea and cauliflower while it has second position in production of onion, cabbage, tomato and brinjal. In potato production, India has fourth position in the world. In India, vegetable constitutes 9-11% of the total food intake, which is low as compared to United States and Japan. Vegetable has become an integral part of the balanced diet in all sections of the society. A wide range of them can be grown in different seasons of the year. The recommended vegetable consumption per capita per day is 285-290 gram, but availability per capita per day is only around 145 gram in our country. Even this low level does not fully reflect the consumption pattern of rural households of these below poverty line. The per capita consumption level is mainly low due to the low productivity level in vegetable crops. India has made tremendous progress towards increasing the vegetable production still much efforts to be done to meet the recommended dietary allowance for country people.

Methods

A multistage random sampling technique was adopted to select block, village and vegetable growers/farmers. Nawada district consists of 10 development blocks, out of that one block *i.e.* Kawakol was selected purposely for the present study. This block has performed well in vegetable production occupied higher 7.92% area under vegetable than other blocks of district Nawada. A list of all the villages of Kawakol engaged in vegetable cultivation specially (tomato, potato, cauliflower and green pea) was proposed. Out of them, a random

sample of five villages was selected for the study. This village was Majhila, Amarpur, Vidhyasagar, Duthiyad and Godhi Majhila. A list of all vegetable growers/farmers having more than 38.00% area under vegetable crops for each of the selected villages was proposed. The vegetable growers were then categorized into three size groups *i.e.* marginal (0-1 ha), small (1-2 ha) and large (2 ha and above). Out of this list 120 vegetable growers were finally selected randomly from the universe of 5 (five) villages. The number of marginal, small and large farmers were kept in proportion to number falling in each group and each village. The enquiry was conducted by survey method. The primary data were collected from the selected vegetable growers through personal interview. Several visits were made to collect the data with the convenience of respondents taking into account. Secondary data were collected from the different official records of block, district statistical bulletin, department of agriculture Nawada, published magazine, journals and books.

Results and Discussion

Economic and farm business analysis

The highest average yield 326.67 q/ha was obtained through potato followed by 284.0 q/ha on tomato, 284 q/ha on cauliflower and 180 q/ha through green pea crop. The highest net return over the cost among major vegetables came to Rs. 101528.55/ha on potato cultivation followed by Rs. 89896.72/ha on the green pea crop cultivation, Rs. 76844.08/ha on tomato, cauliflower and Rs. 51685.11/ha cauliflower crop cultivation.

Costs and returns analysis of potato crop

The per hectare costs and return analysis of potato crops at different sample farms were computed (table 1). Table 1 reveals that per hectare cost of cultivation of potato crop ranges between Rs. 58737.40 on marginal farms to Rs. 64098.16 on small farms, while it was Rs. 68353.36 on large farms. Whereas per hectare production varied between 310.0 qtls on marginal farms, 360.00 qtls on big farms and 340.0 qtls on small farms. Average gross income, net income, family labour income and farm business income were concluded as Rs. 163335.0, Rs. 101528.55, Rs. 104115.50 and Rs. 113843.58. The input output ratio on sample farm was estimated 1:2.64 and it ranges from 1:2.64 on marginal farm, 1:2.65 on small farms to 1:2.64 large farms.

Cost and return analysis of tomato crop

The per hectare costs and return analysis of tomato crops at different sample farms were computed (table 2). Table 2 reveals that per hectare cost of cultivation of

Table 1 : Per hectare cost and profit for potato crop on sample farms (Rs./ha) rate Rs. 500/q.

| Particulars | Size group of farms | | | Overall average |
|------------------------|---------------------|----------------|----------------------|-----------------|
| | Marginal (0-1 ha) | Small (1-2 ha) | Large (2 ha & above) | |
| Cost - A | 46246.50 | 51705.54 | 56935.3 | 49491.42 |
| Cost - B | 55623.43 | 61735.66 | 67313.36 | 59279.50 |
| Cost - C | 58737.40 | 64098.16 | 68353.36 | 61806.95 |
| Total yield (q/ha) | 310.00 | 340.00 | 360.00 | 326.67 |
| Gross income | 155000.00 | 170000.00 | 180000.00 | 163335.00 |
| Net income | 96262.60 | 105901.84 | 111646.641 | 101528.55 |
| Family labour income | 40639.17 | 108264.34 | 112686.64 | 104115.50 |
| Family business income | 50016.10 | 118294.46 | 1323064.17 | 113843.58 |
| Input-output ratio | 1:2.64 | 1:2.65 | 1:2.64 | 1:2.64 |

Table 2 : Per hectare cost and profit for tomato crop on sample farms (Rs./ha) rate Rs. 400/q.

| Particulars | Size group of farms | | | Overall average |
|------------------------|---------------------|----------------|----------------------|-----------------|
| | Marginal (0-1 ha) | Small (1-2 ha) | Large (2 ha & above) | |
| Cost – A | 22669.32 | 24860.82 | 27144.91 | 24012.56 |
| Cost - B | 32009.22 | 34831.07 | 37408.14 | 33669.69 |
| Cost - C | 35739.03 | 37456.07 | 39073.11 | 36755.92 |
| Total yield (q/ha) | 275.00 | 290.0 | 305.00 | 284.00 |
| Gross income | 110000.00 | 116000.00 | 122000.00 | 113600.00 |
| Net income | 74260.97 | 78543.93 | 82926.89 | 76844.08 |
| Family labour income | 77990.78 | 81168.93 | 84591.86 | 79930.31 |
| Family business income | 87300.68 | 91139.18 | 94855.09 | 89587.44 |
| Input-output ratio | 1:3.67 | 1:3.09 | 1:3.12 | 1:3.09 |

tomato crop ranges between Rs. 39073.11 large farms to 35739.09 marginal farms. Whereas per hectare production varied between 305.0 qtls on large farms, 290.0 qtls on small farms and 275.0 qtls on marginal farms. Average gross income, net income, family labour income and farm business income were concluded as Rs. 1136000.00, Rs. 76844.08, Rs. 79930.31 and Rs. 89587.44, respectively. The input output analysis revealed that tomato crop fetched nearly three times benefit over cost which indicates that tomato is a remunerative vegetable crops. Some other economist also investigated around Bangalore that tomato crop is economical and reflecting high return over cost than other vegetable (Dhinnon, 1987 and Pandit *et al.*, 2007).

Costs and returns analysis of green pea crop

The per hectare costs and return analysis of green pea crops at different sample farms were computed (table 3). Table 3 reveals that per hectare cost of cultivation for

vegetable green pea crop ranges between Rs. 32855.01 on marginal farms to Rs. 41858.13 on large farms, Whereas per hectare production varied between 210.0 qtls on large farms, 195.0 qtls on small farms and 160.0 qtls on marginal farms. Average gross income, net income, family labour income and farm business income were concluded as Rs. 126000.0, Rs. 89896.72, Rs. 92930.05 and Rs. 100434.48, respectively. Input output ratio on sample farm was estimated 1:3.49 and in varied between 1:3.52 on large farm, 1:3.50 on small farms and 1:3.40 on marginal farms.

Costs and returns analysis for cauliflower crop

The per hectare costs and return analysis of cauliflower crops at different sample farms were computed (table 4). It is obvious from the above table that per hectare cost of cultivation of cauliflower ranges between Rs. 32503.81 on marginal farms to Rs. 35939.07 on large farms. Whereas per hectare production varied

Table 3 : Per hectare cost and profit for green pea crop on sample farms (Rs./ha) rate Rs. 700/q.

| Particulars | Size group of farms | | | Overall average |
|------------------------|---------------------|----------------|----------------------|-----------------|
| | Marginal (0-1 ha) | Small (1-2 ha) | Large (2 ha & above) | |
| Cost – A | 23377.35 | 27034.98 | 30644.55 | 25565.52 |
| Cost - B | 29121.32 | 36244.98 | 40926.88 | 33069.95 |
| Cost - C | 32855.01 | 38998.56 | 41858.13 | 36103.28 |
| Total yield (q/ha) | 160.00 | 195.00 | 210.00 | 180.00 |
| Gross income | 112000.00 | 136500.00 | 147000.00 | 126000.00 |
| Net income | 79144.99 | 97501.44 | 105141.87 | 89896.72 |
| Family labour income | 82878.68 | 100255.02 | 106073.12 | 92930.05 |
| Family business income | 88622.65 | 109465.025 | 116355.45 | 100434.48 |
| Input-output ratio | 1:3.40 | 1:3.50 | 1:3.52 | 1:3.49 |

Table 4 : Per hectare cost and profit for potato crop on sample farms (Rs./ha) rate Rs. 500/q

| Particulars | Size group of farms | | | Overall average |
|------------------------|---------------------|----------------|----------------------|-----------------|
| | Marginal (0-1 ha) | Small (1-2 ha) | Large (2 ha & above) | |
| Cost – A | 9431.91 | 21762.95 | 24414.07 | 20339.88 |
| Cost - B | 27549.81 | 31719.95 | 34687.07 | 29891.09 |
| Cost - C | 32503.81 | 34164.95 | 35934.07 | 33514.89 |
| Total yield (q/ha) | 275.00 | 290.00 | 310.00 | 284.00 |
| Gross income | 82500.00 | 87000.00 | 93000.00 | 85200.00 |
| Net income | 49996.19 | 52835.05 | 57065.93 | 51685.11 |
| Family labour income | 54950.19 | 55280.05 | 58315.93 | 55308.91 |
| Family business income | 73068.09 | 65237.05 | 68585.93 | 64860.12 |
| Input-output ratio | 1:2.54 | 1:2.55 | 1:2.59 | 1:2.54 |

between 310.0 qtls on large farms, 290.00 qtls on small farms and 275.00 qtls on marginal farms. Average gross income, net income, family labour income and farm business income were computed Rs. 85200.00, Rs. 51685.11, Rs. 55308.97 and Rs. 64860.12, respectively. Average input output ratio on sample farm was obtained 1:2.54 and varied between 1:2.59 on large farm, 1:2.55 on small farms to 1:2.54 marginal farms.

Conclusion

The economic analysis of the four major vegetable revealed that potato crop is most productive and profitable vegetable crop on the front of total yield (326.67 q/ha) among all four vegetables while tomato crop proved best economical and remunerative crop on per unit investment front by fetching 3.09 times return over cost among all four vegetable crops evaluated in the study area. So, it is suggested to the farmers to allocate their input resources on tomato first then potato to generate more economical

and productive benefit in the study area.

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