



Growth and Popularisation of Cultivation of Watermelon in Deogarh District, Odisha

Sujit Kumar Nath and K.C. Barik

Krishi Vigyan Kendra, Orissa University of Agriculture and Technology, Deogarh, Odisha, India

Corresponding author: nathsk@rediffmail.com

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Abstract

The present study was conducted in purposively selected Deogarh district of Odisha coming under North western plateau agro-climatic zone. A field survey was undertaken to find out the trend in area, productivity and adoption of technologies in relation to cultivation of watermelon. The experimental yield was found to be 77.25% higher than the district average and 91.4% higher than the farmer's practice. Level of education and caste of the farmers were reported having no significant relationship with the yield of the crop. Higher return was found to be the major reason for popularisation of cultivation of watermelon. Increasing cost of inputs and instability in market prices were found to be the most important drawbacks in commercialisation of watermelon in the study area.

Keywords: Plateau ecosystem, watermelon, adoption, yield, socio-economic, constraints

China, Iran, Turkey, Brazil and United States of America contributes the lion's share of the total 1,04,472,354 m tons of watermelon produced in the world during the year 2011 (Sabo *et al.* 2013). India is at the 25th position in the world watermelon production (FAOSTAT, 2012). The national production during 2011 was about 3,53,500 m tonnes (Lilly, 2013). Odisha state produces 137.3 thousand MT of watermelon annually in 7.3 thousand ha area with a productivity of 18.8 MT/ha and is regarded as a major commercial crop in some of the districts (Mohanty *et al.* 2012). Earlier it was mainly cultivated in the alluvial soils of different river banks of the state. Now besides the deltaic plains of coastal areas, it is also adopted by farmers of many interior, hilly areas of the state like Boudh, Deogarh and Kalahandi districts. The horticultural production statistics of the state (2012) indicates that the crop can also be cultivated successfully in the plateau ecosystems.

Deogarh district, situated at 84°28'- 85°15' East longitude and 21°11'- 21°43' North latitude, comes under the North-Western plateau agro-climatic zone of

Odisha. About 53 per cent of its total geographical area is covered by dense forests, hills and mountain ranges. One-third of the total cultivated area 66,800 ha is irrigated. With the least potential of industrialisation, 92 per cent of the district population lives in villages, dwelling upon agriculture, animal and forest resources. The major constraint faced by the district in agriculture sector is its undulated un-irrigated upland (Nath *et al.* 2012). Though mango (2240 ha), Litchi (590 ha) and sweet orange (410 ha) are the traditional commercial fruit crops here, but they are limited to specific areas and especially belong to medium to big farming categories with land holding of more than 2 ha.

Watermelon has come up as a major horticultural crop in the district since the last decade contributing a lot to its agro-economy. Farmers of different categories have started adopting this crop in their cropping system. Keeping these things above mind, this study was undertaken with some specific objectives. The specific objectives are (i) trends of increase in area and

productivity of watermelon cropping in the district, (ii) technological development in watermelon cultivation in the district, (iii) factors of adoption of watermelon cultivation commercially, (iv) socio-economic factors responsible for commercialisation of watermelon and (v) constraints as perceived by the farmers for commercialisation of the crop.

Database and Methodology

Deogarh district representing North western plateau agro climatic zone of Odisha state was purposively selected for the study considering its highest percentage of area under plateau ecosystem as well as under watermelon cultivation. The area, productivity and adoption of technologies of watermelon were collected from field survey and from different secondary sources. Twenty five watermelon cultivators from each of the three blocks of the district were randomly selected for the study. Data were collected on different aspects of watermelon cropping from the 75 respondents through a semi-structured interview schedule. Perception of farmers on the causes of adoption of watermelon cultivation in their cropping system and their constraints were measured in a scale of 0, 1, 2 scores, allotted to disagreed, partially agreed and agreed respectively and ranked accordingly (Nath and Satpathy, 2006). Constraints were also measured in the same scale and ranked to ascertain the major problems in this enterprise as perceived by the farmers. Correlation between the basic socio-economic profiles and adoption of technologies in the farming was established following the formulae developed by Karl Pearson(r).

Results and Discussions

A field survey in the district (2012) found that watermelon cultivation was started in Deogarh district during early 1980s by a few farmers. Figure 1 shows the increasing trend of watermelon. During the survey it was observed that watermelon was the most popular crop among the marginal, small, medium and big farmers. It was started in river catchment areas. Later on, after commercialisation, the area increased to large acreage of unbounded uplands of the district which had an assured water source up to the month of May. From the year of introduction till the year 2012, changes were observed in the period of cultivation, production procedure, cost of cultivation etc. The yield was also found increased from 60 q/ha (1980) to 189q/ha (2012). The average yield of farmers' traditional practice (FY), district average yield (DY) and yield of the experiments (EY) done by Krishi Vigyan Kendra, Deogarh of the last

three years is mentioned in Fig. 3. It shows that the experimental yield was 91.4% and 77.2% more than the farmer's practice and district average respectively. It indicates that the average yield of the farmers' field could be increased with proper scientific interventions. 2800ha (2012) since its introduction.

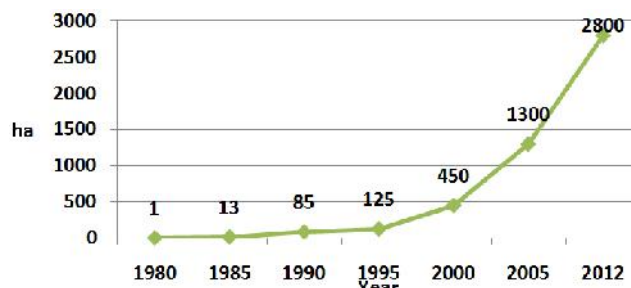


Fig. 1. Horizontal growth of watermelon area in the district



Fig. 2: Trend of productivity (q/ha) of watermelon in the district

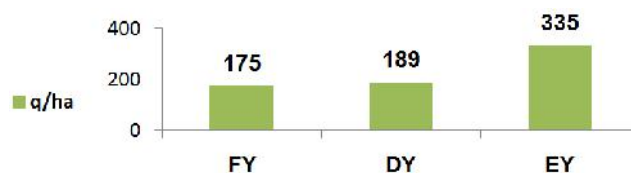


Fig. 3: Yield performance of watermelon in Deogarh district

The causes for adoption of watermelon as a viable agro-based enterprise were studied from the selected farmers. Economic aspects were found as the major factors for the large scale cultivation of the crop. During the study, it was also observed that farmer to farmer extension and the pro-active roles played by the traders facilitated the growth of the watermelon area in the district besides the assistance of the government and non-government organisations. As an employment generating and livelihood support enterprise, watermelon cultivation was found instrumental in providing employment to the farm families in the post kharif rice cropping period. The high investment, more input requirement and risk involved in it were discouraging farmers in adoption of the enterprise. But the market driven mode of cultivation had encouraged more number of farmers in adoption of a new enterprise instead of traditional pulse cultivation during rabi and

post-rabi periods. This study corroborates the findings of Akudugu and Dadzie (2012).

Table 1: Factors perceived by farmers in adoption of watermelon cultivation

N = 75

| Sl. No. | Factors | Rank |
|---------|--------------------------------------------|------|
| 1. | Better marketability | II |
| 2. | Highly remunerative | I |
| 3. | Less insect pest menace | VII |
| 4. | Input consumption is less | IX |
| 5. | Less duration | IV |
| 6. | Less risk | VI |
| 7. | Low investment | VIII |
| 8. | No extra skill is required for cultivation | V |
| 9. | Self-engagement during the leisure period | III |

Commercialisation of the cultivation led to refinement and inclusion of latest technologies. Table 2 refers the incremental changes in adoption of various latest technologies by the farmers in watermelon cultivation. Marketing opportunities were created accordingly after introduction of the new crop. It was found during the study that after the interventions of

regulated market committee (RMC) through its national tender process and commission agent system, the fruits of the district were marketed in many parts of India as well as in Nepal.

Yield of watermelon is dependent upon certain selected socio-economic traits of the growers. The views of 75 watermelon growers were taken and compared with their yield performance. The yield was categorised as high (>300q/ha), medium (200-300q/ha) and low groups (<200q/ha). It was observed that scientific orientation of farmers, their cosmopolitanness and watermelon cultivated area were found positively correlated with the yield obtained, while caste, family type, total land holding had no significant correlation with the yield. Age was found negatively related with yield obtained by the individual farmer which indicated young farmers were producing higher yield by adopting the latest technologies. It supports the findings of Yusuf *et al.* (2013) who had found that age determines one's ability to perform tedious and rigorous works in watermelon cultivation like carrying knapsack sprayer in the back. Adeoye *et al.* (2011) from their study reported that level of education contributed positively towards technology efficiency of the farmers though in this study the relationship found insignificant.

Table 2: Changes occurred in cultivation procedures along time

| Parameter/ Year | 1990 | 2000 | 2005 | 2012 |
|------------------------------------|--------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Sowing | Sowing in main field | Sowing in main field | Sowing in the main field in raised bed | Sprouted seeds sown, gap filling with poly thene sprouted seedlings |
| Seed treatment | No seed treatment | Bavistin (carbendazim) only | fungicide | Fungicide + bactericide |
| Fertilising | Only NPK fertilisers without soil testing | Only NPK fertilisers without soil testing | NPK+ micro nutrients spraying without soil testing | NPK granular and soluble fertiliser with micro nutrients application both in basal and spraying without soil testing |
| Growth hormones | No application of hormones | Hormone application sporadically | Hormone application once | Multiple hormone application and spraying of urea |
| Insect pest and disease management | Application of low dose of a very few pesticides | Application of monocrotophos, chloropyriphos in higher doses | Application of pesticides indiscriminately | Application of neo-pesticides indiscriminately in higher doses |
| Variety | Open pollinated | Open pollinated | Open pollinated and a few hybrids | Hybrids only |
| Number of cultivated varieties | 2 | 5 | 8 | 14 |
| Marketing | Local market by farmers | District headquarter and neighbouring districts by local traders | Interstate marketing with help of RMC | Remote northern and western states of India and Nepal |

Table 3: Correlation of some socio-personal traits of farmers with the yield of the crop

| Sl. No. | Traits | r value |
|---------|------------------------|-----------|
| 1 | Age | -0.3258** |
| 2 | Education | 0.1025 |
| 3 | Caste | 0.076 |
| 4 | Family type | 0.1291 |
| 5 | Land holding | 0.0086 |
| 6 | Farming experience | 0.2316* |
| 7 | Scientific orientation | 0.3359** |
| 8 | Watermelon area | 0.3824** |
| 9 | Cosmopolitaness | 0.3127** |

*Significant at 5% level

**Significant at 1% level

Table 4: Constraints perceived by the watermelon cultivators in its commercialisation

N = 75

| Sl. No. | Constraints | Rank |
|---------|---------------------------------------|------|
| 1 | Poor quality production | XIII |
| 2 | Pest and disease problems | XI |
| 3 | Lack of crop insurance | V |
| 4 | Inadequate credit facilities | VII |
| 5 | Timely fertiliser unavailability | XII |
| 6 | Lack of storage facilities | IV |
| 7 | Value addition of the produce | XIV |
| 8 | High transportation cost | III |
| 9 | Poor marketing facilities | X |
| 10 | Instability in market price | II |
| 11 | Non-availability of adequate manpower | VIII |
| 12 | Increase in the cost of inputs | I |
| 13 | Inadequate irrigation facilities | IX |
| 14 | Uncertainty in weather condition | VI |

The constraints faced by farmers for its large scale adoption and popularisation are mentioned in table 4. It was observed from the above table that increasing the cost of inputs like hybrid seeds, fertilisers, pesticides and human labour were the major constraints of the watermelon cultivators. Fluctuating market price of watermelon in subsequent years was the second most important constraint faced by the farmers. Though the government sponsored cooperative body, RMC was playing a crucial role in attracting the traders for a competitive market, it was not able to fix the price of the produce. High transportation cost was also found a major constraint which ranked third among the constraints. Studies of Adeoye *et al.* (2011) strengthens

these findings as they reported that 54.2 per cent of watermelon cultivators agreed on high transportation cost being their major problem. Watermelon, being a perishable item, could not be kept for a long duration in farmer's condition. Lack of proper storage facilities sometimes was compelling farmers to sell their produce in lower rate. This was found to be the fourth major constraint. Value addition of the produce was found as the least important constraint for commercialisation. During the survey, it was noticed that the farmers were not aware about the value addition of watermelon which could add more values to their produce as reported by Baloyi (2010).

This scored the lowest rank. Farmers did not perceive Fertiliser availability and pest problems as major problems. During the survey it was observed that they were more concern of their cost than their availability. Quality consciousness was found lacking in most of the farmers. Quality was not a parameter for the farmers while growing of the crop till the year, 2000. During discussion it was found that farmers were not aware of the grading, storing, sugar content, colour and lustre of the produce as well as residual toxicity in them. It came in the minds of the farmers when an attempt of RMC to export the produces abroad was not materialised due to failure in passing the safe residual toxic level. Uncertainty in weather condition like heavy rainfall, hail storm, cyclone etc. causes loss to watermelon crop. Such type of apprehensions and lack of insurance were also major factors against popularisation of the crop.

Conclusion

Watermelon cultivation has come up as a viable enterprise in this left wing extremist (LWE) affected hilly district of Odisha state. Village youths have adopted this enterprise commercially and made it a viable, prestigious, self-employed agro-based profession by exporting their produce to many of the states of India. The horizontal and vertical growth of this commercial crop has opened up a new dimension of profitable farming in the plateau eco-system of Odisha. It values much for the socio-economic development and livelihood support for the inhabitants of such an under developed district. Farmers of other districts coming under this plateau eco-system are also started cultivating which increases the cropping intensity and strengthens the agro-entrepreneurship in the state. Government should provide instant crop insurance coverage, credit facilities, and explore the possibilities of processing industries as an initiation of confidence building measures (CBMs) among the farmers.

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