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RESEARCH ARTICLE :

# Extent of adoption of recommended cultivation practices and constraints faced by sweet potato growers in Belagavi district

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**SUMMARY :** The present study was conducted in Belagavi district of Karnataka state. The sample was drawn from the two taluka *viz.*, Belagavi and Khanapur. Thus, 120 sweet potato growers were selected which constituted the sample respondents for the present study. Data were collected by personally interviewing the respondents with the help of pre-tested structured interview schedule in face to face situation. Collected data were tabulated with appropriate tools like frequency, percentage, mean etc. The majorresults of the study were, 46.67 per cent of the respondents belonged to medium adoption category in sweet potato cultivation. In case of specific adoption of recommended cultivation practices, cent per cent had fully adopted the recommended planting method and irrigation interval. Further a greater majority (90.83%) of the respondents fully adopted the recommended June-July planting season,(81.67%) recommended spacing and 70.83 per cent adopted seed rate per acreand 43.33per cent of the respondents partially adopted the plant protection measures against leaf spot disease, followed by non-adoption (36.67%) and full adoption (20.00%), respectively. Lastly three forth (75.83%) of the respondents fully adopted the recommended harvesting time followed by 24.17 per cent of the respondents fell under partial adoption category. Problems faced by the farmers in production were of non-availability of labour, high cost of fertilizers and lack of finance. While price fluctuation, distant market and middlemen exploitation were the problems of marketing in sweet potato cultivation.

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## BACKGROUND AND OBJECTIVES

Tuber plants are the third major food crops next to cereals and legumes and are either a staple or subsidiary food for about one-fifth of the world inhabitants. They supply about 6 per cent of the world's nutritional calories and are vital sources of feed for animals and raw materials for industrial products. Cassava, potato and sweet potato rank among the top 10 food crops in terms of annual production capabilityin developing countries (Nweke, 2004). For many of the world's poorest and undernourished households, tuber plants have long served as

the primary basis of food and nutrition and are usually valued for their constant returns in circumstances where other plants may fail (Scott *et al.*, 2000). In 2013, the major root and tuber plants occupied approximately 65.18 million hectares of area globally generating 836.42 million metric tonnes, 44 per cent of which came from Asia and 7.12 per cent from India (Saranraj *et al.*, 2019). India accounts formost of the vitamins, minerals,antioxidants and dietary fibre of root and tuber crops. They can also play a vital role in mitigating hidden hunger by diversifying their diets.

Sweet potato [*Ipomoea batatas* (L.) Lam] is aherbaceous, warm-weather creeping plant originated from South America belonging to the family *Convolvulaceae* and genus *Ipomoea* which is a storage root plant (Woolfe, 1992). Sweet potato grows best at a temperature of between 24°C and 28°C with an annual rainfall of 700 mm to 1000 mm. It requires about 500 mm of rain during the period of vegetative growth and the rest during tuber development and setting (Woolfe, 1992 and Onwueme and Sinha, 1991). It is also a drought tolerant crop. However, drought that occurs within six weeks after planting or during tuber formation reduces yield critically. Sweet potato does not bear shade. Day length of 11 hours or less 18 promotes flowering while day length longer than 11 hours tends to favour foliar development at the expense of tubers (Woolfe, 1992 and Yayock *et al*., 1988). Short day length with cool temperature of 22°C to 24°C and low light intensity endorses tuber formation. The best soil for sweet potato production is sandy loam. It does not do well in poorly drained and aerated, or saline soils, as such soils tend to retard root tuber development. It grows best at a pH of 6; alkaline soils result in poor yields (Onwueme and Sinha, 1991). Marketing of sweet potato is very complex, as most of the sweet potato growers are unorganized, illiterate and dispersed. They don't have skill and knowledge for selling their produce and enforced to sell their produce instantly at low prices. Additionally, pre- and post-harvest losses, sweet potato weevils (*Cylas* spp.), viral diseases, poor storage methods, lack of processed products, transport problems, unpredictable prices and lack of enhanced cultivars and planting materials are factors that limit sweet potato production. (Andrade *et al.*, 2009). Therefore, many times vegetable growers have resort to distress sale due to uncertain situation in market. With this context, the present study was undertaken with the objective to study adoption of recommended cultivation practices of sweet potato and constraints faced by farmers in Belagavi district.

## RESOURCES AND METHODS

The study was conducted in Belagavi district of Karnataka during the year 2018-19. Belagavi district was purposively selected for the study considering the highest area under sweet potato cultivation. In the present investigation, *Ex-post facto* research design was employed. Out of ten taluks, two taluks *viz.*, Belagavi and Khanapur were purposively selected, because they had maximum number of sweet potato growers. From each taluk three villages were selected and from each village 20 sweet potato growers were selected randomly. Thus, the total sample size constitutes 120 respondents for the study. The data were personally collected using pre-tested structured interview schedule. Collected information was analysed using appropriate statistical tools like frequency, percentage, mean, standard deviation and correlation.

## OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summerized under following heads:

### Adoption of recommended sweet potato cultivation practices:

The result in the Table 1 indicates 46.66 per cent of the respondents belonged to medium adoption category, followed by 30.00 per cent and 23.33 per cent of the respondents belonged to high and low adoption categories, respectively. Probable reason for the farmers to be in medium adoption category might be due to the medium knowledge possessed by sweet potato growers, since knowledge limits action of individuals, as it is pre-requisite for any individuals to either adopt or reject a practice.

The outcomes obtained in the Table 2 revealed that cent per cent of the sweet potato growers did not adopt the recommended varieties of horticultural university (V-6, V-12, H-41 and H-42, Vikram and Shree Bhadra or Shree maha). The reason behind this is that cent per cent of the respondents adopted local varieties and farmers might not aware about the other recommended or improved varieties and also, they might be getting good yield from the local verities and are easily available at local level.

Looking in to the method of planting, cent per cent of the respondents fully adopted the recommended ridge and furrow method of planting. Further a greater majority (90.83%) of the respondents fully adopted the recommended June-July planting season, and hardly (9.17%) of the respondents partially adopted the planting season. Probable reason for this is that, the method of planting which was ancestral method and none have tried to adopt the other methods like planting on mounds and raised bed.

In case of spacing slightly above three forth (81.67%) of the respondents fully adopted the recommended spacing pattern followed by 18.33 per cent partial adoption. Further 70.83 per cent of the respondents fully adopted the recommended seed rate per acre, whereas 29.17 per cent of the respondents partially adopted the recommended seed rate per acre. Possible reason for this may be, most of the farmers interpreted that these were the very important practices and may affect the yield directly upon non adoption.

In case of nutrient management nearly three fifth (57.50%) of the respondents fully adopted recommended FYM, while 22.50 per cent partially adopted. Whereas three fifth (60.00%) of the respondents fully adopted chemical fertilizer application, followed by only 30.83 per cent adopted partially. Important reason behind may be attributed that the respondents were aware of chemical fertilizers and FYM and the common tendency existing amongst farmers is that, application of chemical fertilizer and FYM would increase the sweet potato yield.

Further cent per cent respondents fully adopted the recommended irrigation interval. whereas, 42.50 per cent partially adopted plant protection measures against sweet potato weevil followed by slightly near to the two fifth (39.17%) not adopted and only 18.33 per cent of respondents adopted fully. While 43.33 per cent of the respondents partially adopted the plant protection measures against leaf spot disease and only 20.00 per

**Table 1: Overall adoption level of respondents with respect to recommended sweet potato cultivation practices (n=120)**

| Category | Frequency | Per cent |
|---|---|---|
| Low (<13.65) | 28 | 23.33 |
| Medium (13.66-14.83) | 56 | 46.66 |
| High (>14.84) | 36 | 30.00 |

Mean=1 SD=1.40

**Table 2: Adoption of specific recommended cultivation practices by the sweet potato growers (n=120)**

| Sr. No. | Recommended cultivation practices | Full adoption | | Partial adoption | | Non-adoption | |
|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % |
| 1. | Recommended variety | | | | | | |
| | V-6 | | | | | | |
| | V-12 | | | | | | |
| | H-41 and H-42 | | | | | 120 | 100.00 |
| | Vikram | | | | | | |
| | Shree Bhadra/shreemaha | | | | | | |
| 2. | Method of planting-Ridge and furrow method | 120 | 100.0 | - | | - | |
| 3. | Season of planting- June-July | 109 | 90.83 | 11 | 9.16 | 0 | 0 |
| 4. | Spacing-30×60cm | 92 | 76.66 | 22 | 18.33 | 6 | 5.00 |
| 5. | Seed rate 22000/acre | 85 | 70.83 | 35 | 29.16 | 0 | 0 |
| 6. | FYM-4ton/acre | 69 | 57.50 | 27 | 22.50 | 24 | 20.00 |
| 7. | Chemical fertilizers-75:50:75 | 72 | 60.00 | 37 | 30.83 | 11 | 9.16 |
| 8. | Irrigation interval -7-8 days | 120 | 100 | - | | - | |
| 9. | Plant protection against sweet potato weevil-Melathion | 22 | 18.33 | 51 | 42.50 | 47 | 39.16 |
| | 50EC in 1 litre of water | | | | | | |
| 10. | Plant protection against leafspot disease-Mancojeb | 24 | 20.00 | 52 | 43.33 | 44 | 36.66 |
| 11. | Harvesting time-4-5 months | 91 | 75.83 | 29 | 24.16 | 0 | 0 |

cent of them had fully adopted. Lastly three forth (75.83%) of the respondents fully adopted the recommended harvesting time followed by 24.17 per cent of the respondents fell under partial adoption category. Probable reason behind the full adoption of irrigation is that sweet potato is *Kharif* crop and cultivated in June-July month. During this months, the study area Belagavi receives assured rainfall regularly which helps the sweet potato growers to get the benefit of rain, farmers make use of this rain water and conserve in farm pond and with the help of open wells they irrigate timely. Reason behind the partial and non-adoption of the control measures for pest and diseases is due to low incidence of the pest and diseases and suppose in case of incidence, the extent of damage and crop loss is negligible. Also, reason behind the correct harvesting is that, sweet potato is highly perishable in nature and some are partially adopted the recommended harvesting time due to non availability of labour in time. The findings are similar with the studies of Ashokkumar (2011) and Chetan (2011).

Karl Pearson's correlation was carried out between the adoption level of recommended cultivation practices by the sweet potato growers and their profile characteristics.

An insight of correlation analysis results from the Table 3 depicts that out of ten independent variables studied age (0.263) and farming experience (0.265) exhibited positive and significant relationship at one per

**Table 3: Relationship between profile characteristics of sweet potato growers with their adoption level on recommended cultivation practices**

**(n=120)**

| Sr. No. | Independent variables | Adoption |
|---|---|---|
| 1. | Age | 0.263** |
| 2. | Education | 0.112 |
| 3. | Land holding | 0.065 |
| 4. | Farming experience | 0.265** |
| 5. | Extension contact | 0.186* |
| 6. | Mass media exposure | 0.127 |
| 7. | Social participation | 0.020 |
| 8. | Economic motivation | 0.197* |
| 9. | Risk orientation | 0.020 |
| 10. | Cosmopoliteness | 0.082 |

* and ** indicate significance of values at P=0.05 and 0.01, respectively

**Table 4 : Constraints faced by the sweet potato growers in production and marketing** **(n=120)**

| Sr. No. | Production constraints | Very much | Some what | Not a problem | Total score | Rank |
|---|---|---|---|---|---|---|
| 1. | Non-availability of labour in time | 111 | 09 | 0 | 231 | I |
| 2. | High cost of fertilizers | 102 | 15 | 03 | 219 | II |
| 3. | Lack of finance/ credit facility | 24 | 92 | 04 | 140 | III |
| 4. | High cost of plant protection chemicals | 09 | 40 | 71 | 58 | IV |
| 5. | Problem of pest and diseases | 05 | 35 | 80 | 45 | V |
| 6. | Inadequate irrigation facilities | 0 | 06 | 114 | 06 | VI |
| | **Marketing constraints** | | | | | |
| 1. | Fluctuation of pricein market | 115 | 05 | 0 | 235 | I |
| 2. | Markets are far away | 93 | 27 | 0 | 213 | II |
| 3. | Exploitation of middle man | 87 | 33 | 0 | 207 | III |
| 4. | No organised market system for sweet potato | 85 | 35 | 0 | 205 | IV |
| 5. | High transportation cost | 60 | 30 | 30 | 150 | V |
| 6. | Lack of market information | 11 | 82 | 27 | 104 | VI |

*****Multiple responses

cent level of significance with adoption of recommended cultivation practices. Age and farming experience is significant because it is a natural fact that as the age increases farming experience also increases as a result more adoption of recommended cultivation of practices takes place which increases self-confidence and improves decision making capacity which in turn helps in adoption of new technologies. Further economic motivation and extension contact showed positive and significant relationship at five per cent level of significance. This is because as the extension contact increases adoption also increases as it increases the knowledge as well as keep updated with new technology and make the farmer to adopt improved practices. While, farmers tend to get more profit. So, adoption of recommended cultivation practices tends to increase the production which in turn increasing the profit. The variables which did not show significant relationship were education, land holding, mass media exposure, social participation, risk orientation and cosmopoliteness. The results are in conformism with the observations of Manjunath (2010) and Mbanaso *et al*. (2012).

**Constraints faced by the sweet potato growers in production and marketing:**

The result in the Table 4 revealed that, non-availability of labour in time ranked 1st because sweet potato cultivation requires more labours for operations like land preparation, planting, earthing up and weeding followed by high cost of fertilizer ranked 2nd which is due to high consumption for vegetable crop like sweet potato. lack of finance and credit facility ranked 3rd due to rules and regulations associated with accessibility of loan. Further high cost of chemicals ranked 4th because as pesticides are necessary for plant protection and to maintain crop health. Problem of pest and disease ranked 5th which is a minor problem where sweet potato weevil is a minor pest damages the tuber and lastly inadequate irrigation facility ranked 6th as rain is the only major source of irrigation for them and also there were no borewells/ pump sets for alternate irrigation.

The cursory look in to Table 4 also revealed marketing constraints of sweet potato growers. The problem of fluctuation of price ranked 1st because of supply and demand factor. Markets are far away ranked 2nd due to distance of market from the village, exploitation of middleman ranked 3rd, this might be due to the fact that markets are far away that forced them to sell their produce to middlemen. Most of the respondents sold their produce to middleman. Further lack of organized market system for sweet potato ranked 4th as trade is not according to agreed rules and procedures. High transportation cost ranked 5th due to far distance of the market to Khanapur respondents and also lack of market information ranked 6th as it is a minor marketing problem. The results get the support of findings of Raghavendra (2005) and Pottappa (2008).

**Conclusion:**

It is clear from the study that, cent per cent of the respondents did not adopt the recommended verities. Hence the concerned department should take care that recommended varieties to reach the farmers to replace the local varieties. Further more than two fifth of the respondents partially adopted plant protection measures against sweet potato weevil and respondents partially adopted the plant protection measures against leaf spot disease. The concerned department may take up awareness camp and method demonstration to popularize the sweet potato cultivation practices. While majority of the respondents faced a problem of non-availability of labour in time and price fluctuation. So the government need to fix the minimum support price for sweet potato to help the problem of selling the produce at distress sale to overcome the problem of middlemen in the market.

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