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# Resource use efficiency of bitter gourd in Konkan region (M.S.)

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**ABSTRACT :** Resource use efficiency of production of bitter gourd (*Momordica charantia* L.) in Konkan region (M.S.) was undertaken with a cross sectional sample of 120 bitter gourd cultivators. The per hectare physical input utilization indicated that, the proportion of family labour days was more (53.50%) than hired labour days (46.00%) with per hectare average of 267.84 labour days. Regarding other inputs Rs.5045.00 of supporting and shading materials, 148.90 kg N, 116.60 kg $P_2O_5$, 19.88 kg $K_2O$, 34.58 q FYM, 637.07 kg mulching materials, and netting materials Rs.1242.40 wire and Rs.1200.00 net and 13.40 hrs/ha of machine labour were used. The Cobb-Doug production function analysis revealed that, the intensive use of seed (kg), fertilizers (kg), irrigation (hrs) and supporting materials had positive and significant influence on production. The co-efficient of determination ($R^2$) indicated that 86.00 per cent variation in bitter gourd production. The functional analysis indicated to reallocate available resources to increase the profit from cultivation of bitter gourd by proper management of available resources and given technology.

**KEY WORDS :** Bitter guard, Resource use efficiency, Marginal value product, Factor cost

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India is the second largest producer of vegetable and accounts for about 15 per cent of the world's production of vegetables. As per National Horticulture database published by National Horticulture Board, India produced 84.41 MT of fruits and 170 MT of vegetables during 2013-14. The area under cultivation of fruits stood at 6.98 million hectares while vegetables were cultivated at 9.21 million hectares which is about 3 per cent of the total area under cultivation in the country.

The vast production base offers tremendous opportunities for export. During 2013-14, India exported fruits and vegetables worth Rs. 8760.96 crores which comprised of fruits worth Rs. 3298.03 crores and vegetables worth Rs. 5462.93 crores. The diverse agro-climatic zones in the country make it possible to grow almost all varieties of fresh vegetables in India.

Bitter gourd (*Momordica charantia* L.) is an important and oldest vegetable crop, having its origin in India. It has been cultivated in India for last 3000 years (Choudhary, 1967). It grows best under condition of adequate rainfall, high humidity and produce best when 1:10 ratio of male and female is used. Maharashtra is bestowed with variety of edaphic agro climatic conditions. Hence, it is suitable for growing a few vegetable successfully, among which, tomato, onion, brinjal, okra, cabbage, chilly and bitter gourd are grown in most of the districts of the state. The share of Maharashtra state in country's area and production is reported to be 6.55 per cent and 5.47 per cent, respectively. The productivity of vegetables in Maharashtra is 16.04 t/ha.

The Konkan region occupies area of about 2,766 hectares under vegetables with a production of about

30,753 tonnes with a productivity of around 14.12 t/ha. Cultivation of bitter gourds is mostly in Raigad, Thane, Ratnagiri districts. Therefore, to understand the economics of the cultivation practices followed by the bitter gourd cultivators, the present investigation was undertaken with following specific objectives:

– To study the existing pattern of resource use in bitter-gourd cultivation.

– To workout resource use efficiency in bitter-gourd cultivation

– To identify constraints faced by farmers during production and marketing of bitter gourd.

## RESEARCH METHODS

The maximum area under bitter gourd cultivation is concentrated in Raigad district of Konkan region and due to nearness to Mumbai Metropolitan Region. Raigad district was selected purposively for the study. The Pen and Panvel tahsils were selected purposively on the basis of maximum area under bitter-gourd cultivation as per secondary data obtained from office of the SAO (Superintending Agricultural Officer), Alibag. A multistage sampling technique was used in this study for selection of bitter gourd cultivators. The final sample consisted of 120 bitter gourd cultivators selected randomly.

The selected sample of bitter gourd cultivators were classified according to the area under bitter gourd vegetable crop cultivation to study the effect of farm size on productivity and profitability of bitter gourd. The stratification was carried out as given in the Table A.

The empirical evidences from previous studies suggested that amongst the many mathematical function log linear form of Cobb-Douglas type of production function is the most appropriate one for estimating the resource productivity and resource use efficiency. The following form of Cobb-Douglas production function model was used.

Function: $Y = b_0 x_i^{bi} e^u$

where,

Y = Per farm yield of bitter gourd (q)

$b_o$ = Intercept term or Constant

$x_i$ = Explanatory/ Independent variables

bi = Regression co-efficient of respective variables

$e^u$ = Error term

$X_1$ =Human labour (days)

$X_2$ = Machine (hrs)

$X_3$ = Fertilizer (kg)

$X_4$ = Irrigation (hrs)

$X_5$ = Seed (kg)

$X_6$ = Supporting material (kg)

$b_1$ to $b_6$ = Production elasticity (Regression co-efficient) of respective resources ($X_1$ to $X_6$)

In this functional form 'Y' is the dependent variable and $X_1, X_2, X_3, X_4, X_5, X_6$ are independent variables were considered on per farm basis. The regression co-efficients obtained from this function are also called as elasticity of production. The sum of co-efficient of regression *i.e.*, $b_1$, $b_2$, $b_3$, $b_4$, $b_5$ and $b_6$ indicate returns to scale.

### Estimation of MPP and MVP :

The MPP of different input was estimated by taking 1st order partial derivative of output (Y) with respect to concerned input appearing in production function.

$$Y = b_0 x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} e^u$$

MPP of $x_1$ is

$$Dy/Dy_1 = b_0 b_1 x_1^{b1} x_2^{b2} x_3^{b3} x_4^{b4} x_5^{b5} x_6^{b6} e^u$$

$$\frac{Dy}{dx_1} = bi \frac{\overline{Y}}{\overline{Xi}}$$

*Marginal physical product (MPP):*

$$MPP_{xi} = bi \frac{\overline{Y}}{\overline{Xi}}$$

where,

$dy/dx_1$ = MPP of $X_1$ input

$b_i$ = Production elasticity's of $i^{th}$ input

$\overline{Y}$ = Geometric mean of output

$\overline{Xi}$ = Geometric mean of $i^{th}$ input

*Marginal value product (MVP) :*

$MVP_{xi}$ = Price per unit of output.

**Table A : Stratification of sample bitter gourd cultivators**

| Sr. No | Category | Stratification | Range of area under crop | No. of farmers |
|---|---|---|---|---|
| 1. | Small (S) | Mean – 1/2SD0.2963-0.1408=0.2259 | Upto 0.22 ha | 42 |
| 2. | Medium (M) | Between Mean -1/2 SD and mean + ½ SD0.2963-0.1408 and 0.2963+0.1408 = 0.22 to 0.36 | 0.22 to 0.38 ha | 44 |
| 3. | Large (L) | Above mean +1/2 SD0.2963 + 0.1408= above 0.3667 | 0.38 ha and above | 34 |
| | Overall(O) | | | 120 |

*Marginal factor cost (MFC) :*

MFC = Price per unit of the input.

**Resource use efficiency:**

After estimating the MVP, the resource use efficiency of different resources will be judged with the help of MVP to factor price (Px) ratio under,

MVP/MFC = 1 Optimum use of resource,

MVP/MFC < 1 Excess utilization of resource,

MVP/MFC > 1 Underutilization of resource

## RESEARCH FINDINGS AND DISCUSSION

The composition of cultivators (Table 1) indicated that, out of 120 bitter gourd cultivators 42 (35.00%) belonged to small group, 44 (36.60%) to medium group and 34 (28.30%) belonged to large group on the basis of area under bitter gourd vegetable. The average area under bitter gourd cultivation was 0.16 ha, 0.29 ha and 0.48 ha, in small group, medium group and large group, respectively. The average area under bitter gourd cultivation was 0.31 ha for the sample cultivators.

The production and productivity are the important economic indicators deciding the profitability of crop and farm. The group-wise details of sample farmers regarding production and productivity of bitter gourd are shown in Table 1.

The Table 1 showed that, at overall level the productivity of bitter gourd was 82 q/ha. The group-wise productivity of the per farm was worked to be 83.00 q, 82.00 q and 80.00 q for small, medium and large farm size, respectively. It was also observed from the table that, at small size farm the average farm production of bitter gourd was 13.30 q while in case of medium size of farm group the average production of bitter gourd was estimated to 23.80 q, whereas it was estimated to 38.40 q production at large size farm.

However, at overall level the average production of bitter gourd was observed to be 26.45 q from 0.31 ha area, therefore, from the table it is indicated that, the production of bitter gourd has direct relationship with farm size and input use.

The group-wise per hectare input utilization for bitter gourd is presented in Table 2.

It was observed from the Table 2 that, at the overall level 267.84 man-days human labourers were utilized for per hectare cultivation of bitter gourd, out of which 155.37 human days and 112.47 human days were found to be male and female, respectively, however, out of the total labour man-days 117.72 man-day were hired labour, and remaining 150.12 man-days were family labours. Similarly at overall level the per hectare machine use was 13.40 hrs, fertilizer utilized was 148.90 kg of N, 116.60 kg of $P_2O_5$, 19.88 kg of $K_2O$. The FYM use was 34.58 q/ha along with that of 637.07 kg of mulching material. The per hectare netting material utilized for supporting of bitter gourd vine was estimated to 11.29 kg of wire and 13.30 kg net. More or less similar pattern was observed in different groups for input utilization in accordance with production level.

The relationship between per farm inputs in production of bitter gourd, was studied by employing Cobb-Douglas type production function, independent variables identified were human labour days ($X_1$), machine hrs ($X_2$), fertilizer kg ($X_3$), irrigation hrs ($X_4$), seed kg ($X_5$), supporting materials kg ($X_6$) and dependent variable as production of bitter gourd (Y). The estimated production elasticities (regression co-efficient) of input factors is presented in Table 3.

It is observed from Table 3 that, at the overall level, the regression co-efficient for fertilizer (0.426), irrigation (0.582), seed (0.125) and supporting materials (0.186) were positive and statistically significant at 5 per cent level. and for human labour days (-0.157) machine hrs (-0.012) were negative and non-significant. The co-efficient of determination ($R^2$) was estimated to 0.86 this indicated that, 86.00 per cent of variation in the bitter gourd production explained by identified input variable included in the function. The sum of elasticity co-efficients was 1.1512, which was more than one indicated increasing return to scale.

**Table 1 : Production pattern and productivity of bitter gourd on sample farms**

| Sr. No. | Category | No. of farmers | Avg. area per farm (ha) | Avg. production per farm (q) | Productivity (q/ha) |
|---|---|---|---|---|---|
| 1. | Small | 42 (35.00) | 0.16 | 13.30 | 83.00 |
| 2. | Medium | 44 (36.67) | 0.29 | 23.80 | 82.00 |
| 3. | Large | 34 (28.33) | 0.48 | 38.40 | 80.00 |
| 4. | Overall | 120 | 0.31 | 26.45 | 82.00 |

Figures in parenthesis are percentages to total

In case of small size farm, the regression co-efficients for fertilizer (0.3025), irrigation (0.5608), seed (0.2165) and supporting materials 0.036 were positive and statistically significant at 5 per cent level, and for human labour days (-0.2160) machine hrs (-0.1623) it was negative and non-significant. The co-efficient of determination ($R^2$) was estimated to 0.75 this indicated that, 75.00 per cent of variation in bitter gourd production explained by identified input variable included in the function. The sum of elasticity co-efficients was 1.1705, which was more than one indicated increasing return to scale.

Similarly, on the medium size farm, the regression coefficients for fertilizer (1.099), irrigation (0.482) and

**Table 2 : Per hectare physical input utilization for bitter gourd cultivation**

| Sr. No. | Particulars | Unit | Small | Medium | Large | Overall |
|---|---|---|---|---|---|---|
| 1. | Hired human labour | | | | | |
| | Male | days | 56.02 | 70.16 | 90.20 | 72.25 |
| | Female | days | 20.10 | 45.73 | 75.00 | 45.47 |
| | Sub total | days | 76.12 | 115.89 | 165.20 | 117.72 |
| 2. | Family human labour | | | | | |
| | Male | days | 124.03 | 85.00 | 40.69 | 83.12 |
| | Female | days | 90.76 | 70.00 | 35.20 | 67.00 |
| | Sub total | days | 214.79 | 155.00 | 75.89 | 150.12 |
| 3. | Total human labour | | | | | |
| | Male | days | 180.05 | 155.16 | 130.89 | 155.37 |
| | Female | days | 110.86 | 115.73 | 110.20 | 112.47 |
| | Total | days | 290.91 | 270.89 | 241.09 | 267.84 |
| 4. | Machine labour | hrs | 11.56 | 13.65 | 15.00 | 13.40 |
| 5. | Supporting poles | no | 1800.00 | 2000.00 | 2255.00 | 2018.00 |
| 6. | Netting materials | | | | | |
| | Wire | kg | 9.23 | 11.45 | 13.21 | 11.29 |
| | Net | kg | 11.23 | 13.25 | 15.52 | 13.30 |
| 7. | Fertilizer | | | | | |
| | N | kg | 135.12 | 146.42 | 165.41 | 148.90 |
| | $P_2O_5$ | kg | 100.52 | 120.26 | 130.61 | 116.60 |
| | $K_2O$ | kg | 15.36 | 20.15 | 24.15 | 19.88 |
| 8. | Farm yard manure | q | 30.23 | 35.12 | 38.41 | 34.58 |
| 9. | Seed | kg | 6.70 | 7.70 | 8.70 | 7.70 |
| 10. | Mulching materials | kg | 710.15 | 620.61 | 580.45 | 637.07 |
| 11. | Plant protection | lit | 0.60 | 1.00 | 1.50 | 1.00 |

**Table 3 : Elasticities of co-efficient of input for production of bitter gourd**

| Sr. No. | Particulars | Production elasticity | | | |
|---|---|---|---|---|---|
| | | Small | Medium | Large | Overall |
| 1. | Human labour (days) | -0.2160 (0.090) | -5.121 (4.399) | 0.1505 (0.001) | -0.157 (0.011) |
| 2. | Machine hrs. | -0.1623 (0.011) | -1.066 (0.592) | 0.018 (0.034) | -0.012 (0.009) |
| 3. | Fertilizer (kg/ha) | 0.3025 (0.041) | 1.099* (0.267) | 0.266* (0.006) | 0.426* (0.018) |
| 4. | Irrigation hrs | 0.5608* (0.2101) | 0.482* (0.064) | 1.119* (0.521) | 0.582* (0.014) |
| 5. | Seed (kg/ha) | 0.2165* (0.1025) | 1.437* (0.213) | 0.0561* (0.018) | 0.125* (0.012) |
| 6. | Supporting materials (kg) | 0.036* (0.002) | -0.618 (0.418) | 0.082* (0.006) | 0.186* (0.054) |
| | Intercept | 2.15 (0.195) | -5.12 (4.399) | 11.49 (2.334) | 21.56 (9.817) |
| | Returns to scale | 1.1705 | 1.3102 | 1.223 | 1.1512 |
| | $R^2$ | 0.75 | 0.81 | 0.78 | 0.86 |

Figures in the parenthesis indicate standard error of regression co-efficient
*indicates significance of value at P=0.05

seed (1.437) were positive and significant at 5 per cent level. The regression co-efficient for human labour (-5.121), machine hrs (-1.066) and supporting materials (-0.618) were negative and non-significant. The co-efficient of determination ($R^2$) was observed to be 0.81 this indicated that, 81.00 per cent of variation in bitter gourd production explained by identified input variable included in the function. The sum of elasticity co-efficient was 1.3102, which was more than one indicated increasing return to scale.

It is observed from the Table 3 that, on the large size farm, the regression co-efficient for fertilizer (0.266), irrigation hrs (1.119), seed (0.0561) and supporting materials (0.082) were positive and statistically significant at 5 per cent level. The regression co-efficient for human labour (0.1505), machine labour (0.018) were positive but found statistically non-significant. The coefficient of determination ($R^2$) was estimated to 0.78 this indicated that, 78.00 per cent of variation in bitter gourd production explained by identified input variable included in the function. The sum of elasticity co-efficient was 1.223, which was more than one indicated increasing return to scale.

The study revealed that, intensive use of seed (kg), fertilizers (kg), irrigation (hrs) and supporting material (kg) increase in use of these resources had positive and significant influence on production. This revealed that, the crop had further advantage to enhance productivity by expanding use of critical inputs.

The resource use efficiency was studied with the help of MVP to factor price ratio ($P_x$) to see whether the input resources employed in the production of bitter gourd have used efficiently, or otherwise. The results of this analysis are presented in Table 4.

It is seen from the Table 4 that, among the inputs used for production of bitter gourd, at the overall level, the MVP to factor price $P_X$ ratio were more than one for fertilizer (36.4212), irrigation hrs (496.73) and supporting materials (17.7093) which have positive and significant influences indicated under utilization of these resources in cultivation of bitter gourd. Whereas, the MVP to $P_X$ ratio was less than one for human labour days (-0.0628),

**Table 4 : Efficiency of resources of use in bitter gourd production**

| Resources | Size of farm | MPP | MVP | Factor price ($P_x$) | MVP/$P_X$ Ratio | Level of res.used |
|---|---|---|---|---|---|---|
| Human labour days ($X_1$) | S | 0.0060 | 13.174 | 200 | 0.0658 | Excess utilization |
| | M | -0.00099 | -2.0391 | 200 | -0.0101 | Excess utilization |
| | L | 0.0081 | 17.415 | 200 | 0.0870 | Excess utilization |
| | O | -0.0060 | -12.567 | 200 | -0.0628 | Excess utilization |
| Machine labour hrs ($X_2$) | S | -0.0195 | -42.402 | 350 | -0.1211 | Excess utilization |
| | M | -0.2054 | -421.173 | 350 | -1.2033 | Excess utilization |
| | L | 0.02092 | 44.988 | 350 | 0.1285 | Excess utilization |
| | O | -0.0022 | -4.6711 | 350 | -0.0133 | Excess utilization |
| Fertilizer kg ($X_3$) | S | 0.07948 | 172.248 | 6.7 | 25.7086 | Under utilization |
| | M | 0.32566 | 667.607 | 6.7 | 99.6429 | Under Utilization |
| | L | 0.0717 | 154.306 | 6.7 | 23.030 | Under utilization |
| | O | 0.1180 | 244.022 | 6.7 | 36.4212 | Under utilization |
| Irrigation hrs ($X_4$) | S | 0.2190 | 474.786 | 25 | 18.991 | Under utilization |
| | M | 0.4307 | 883.003 | 25 | 35.32001 | Under utilization |
| | L | 1.4598 | 3138.77 | 25 | 125.550 | Under utilization |
| | O | 6007.958 | 1241.84 | 25 | 496.73 | Under utilization |
| Seed kg ($X_5$) | S | 0.01300 | 28.1824 | 1600 | 0.01761 | Excess utilization |
| | M | 0.10502 | 215.295 | 1600 | 0.13455 | Excess utilization |
| | L | 0.0040 | 8.6018 | 1600 | 0.00537 | Excess utilization |
| | O | 0.0084 | 17.566 | 1600 | 0.01097 | Excess utilization |
| Supporting materials kg ($X_6$) | S | 0.0028 | 6.1350 | 2 | 3.0675 | Under utilization |
| | M | -0.06102 | -125.083 | 2 | -62.541 | Excess utilization |
| | L | 0.008581 | 18.449 | 2 | 9.2246 | Under utilization |
| | O | 0.01713 | 35.418 | 2 | 17.7093 | Under utilization |

MPP: Marginal physical product, MVP: Marginal value product, res: - Resources

machine hrs (-0.0133), seed in kg (0.01097) indicated excess utilization of these resources in cultivation of bitter gourd.

It was observed on the small size farm, among the inputs used for production of bitter gourd, the MVP of $P_X$ ratio were more than one for fertilizer kg (25.7086), irrigation hrs (18.991) and supporting materials (3.0675) which have positive and significant influences indicated under utilization of these resources in cultivation of bitter gourd. Whereas, the MVP to $P_X$ ratio was less than one for human labour days (0.0658), machine hrs (-0.1211), seed in kg (0.01761), indicated excess utilization of these resources in cultivation of bitter gourd.

In case of the medium size farm, among the inputs used for production of bitter gourd the MVP of Px ratio were more than one for fertilizers kg. (99.6429) and irrigation hrs (35.32001) which have positive and significant influences indicated under utilization of these resources in cultivation of bitter gourd. Whereas, the MVP to $P_X$ ratio was less than one for human labour days (-0.0101), machine hrs (-1.2033), seed in kg (0.13445), supporting materials (-62541) indicated excess utilization of these resources in cultivation of bitter gourd.

On the large size farm, among the inputs used for production of bitter gourd the MVP of $P_X$ ratio were more than one for machine labour hrs.(25.7086), irrigation hrs (125.550), fertilizers kg. (23.030) and supporting materials (9.2246) which have positive and significant influences indicated under utilization of these resources in cultivation of bitter gourd. Whereas, the MVP to $P_X$ ratio was less than one for human labour days (0.0870), machine labour (0.1285) and seed in kg (0.00537) indicated excess utilization of these resources in cultivation of bitter gourd. This indicated that, farmers in the study area were lacking in commercial attitude in the cultivation of bitter gourd and they have to reallocate their available resources to increase the profit from cultivation of bitter gourd by proper management of resources.

A general opinion of cultivators about constraints in production and marketing of bitter gourd was taken. The reactions of bitter gourd cultivators are given in Table 5.

**Table 5 : Constraints in production and marketing of bitter gourd at producer's level**

| Sr. No. | Constraints | Small (n=42) | Medium (n=44) | Large (n=34) | Overall (n=120) |
|---|---|---|---|---|---|
| **Production** | | | | | |
| 1. | High cost of manures and fertilizers | 38 (90.40) | 30 (68.10) | 20 (58.80) | 88 (73.30) |
| 2. | Non-availability of human labour in harvesting time | 18 (42.80) | 28 (63.60) | 27 (79.40) | 73 (60.80) |
| 3. | Lack of knowledge about fertilizer dose | 20 (47.60) | 22 (50.00) | 19 (55.80) | 61 (50.80) |
| 4. | Incidence of pests and disease | 19 (45.20) | 24 (54.50) | 23 (67.60) | 66 (55.00) |
| 5. | Lacking knowledge about high yielding varieties | 32 (76.10) | 34 (77.20) | 25 (73.50) | 91 (45.80) |
| **Marketing** | | | | | |
| 1. | Lack of market information | 35 (83.30) | 38 (86.30) | 28 (82.30) | 101 (84.10) |
| 2. | High cost of transport | 30 (71.40) | 33 (750) | 25 (73.50) | 88 (73.30) |
| 3. | Low price offered by market intermediaries | 36 (85.70) | 36 (81.80) | 28 (82.20) | 100 (83.30) |
| 4. | Multiplicity of market charges | 26 (61.90) | 31 (70.40) | 25 (73.50) | 82 (68.30) |

**Table 6 : Suggestions for production and marketing of bitter gourd at producer's level**

| Sr. No. | Suggestion | Small (n=42) | Medium (n=44) | Large (n=34) | Overall (n=120) |
|---|---|---|---|---|---|
| **Production** | | | | | |
| 1. | Govt. Should ensure supply of fertilizer at reasonable rates | 33 (78.5) | 32 (72.7) | 24 (70.5) | 89 (74.10) |
| 2. | The Department of Agriculture should arrange training for control of pests and diseases | 35 (83.3) | 36 (81.8) | 26 (76.4) | 97 (80.80) |
| 3. | The University should develop low cost technologies of production | 30 (71.4) | 33 (75) | 27 (79.4) | 90 (75.00) |
| 4. | Provide the knowledge about high yielding verities | 34 (80.9) | 35 (79.5) | 28 (82) | 97 (80.80) |
| **Marketing** | | | | | |
| 1. | Govt. Should provide marketing subyard for wholesaler adjacent to the producing area | 34 (80.9) | 36 (81.8) | 29 (85.2) | 99 (82.50) |
| 2. | Providing market information through media | 36 (85.7) | 33 (75.0) | 27 (79.4) | 96 (80.00) |
| 3. | Check malpractices followed by intermediaries | 30 (71.4) | 34 (77.2) | 26 (76.4) | 90 (75.00) |

It is observed from Table 5 that, the 73.30 per cent growers had stated that, the cost of manures and fertilizers was high as a constraint in production of bitter gourd. 60.80 per cent growers stated that, non-availability of human labour in harvesting time, 55.00 per cent stated about incidence of pest and diseases as a constraint in production of bitter gourd. Whereas 45.80 per cent farmers stated that, lack of knowledge about high yielding varieties as a constraint in production of bitter gourd.

It was seen from the Table 5 that, Out of 120 sample respondent, 84.10 per cent respondent reported that lack of market information, However, 83.00 per cent, 73.30 per cent and 68.30 per cent respondent were reported that, low price offered by market intermediaries, cost of transport was high, multiplicity of market charges as constraints during marketing of bitter gourd, respectively.

The questions were asked to the bitter gourd cultivators to suggest remedies on the constraints, which they faced. The frequency distribution of respondent according to suggestion made by them is given in Table 6.

It is observed from the Table 6 that, from the suggestion regarding production of bitter gourd, the 80.80 per cent farmers suggested that; Agriculture department of state should arrange training for control of pests and diseases, which have the adverse effect on production of vine, 80.80 per cent respondent suggested that, Agriculture Department of State should provide the knowledge about high yielding varieties of bitter gourd, 75.00 per cent respondents suggested that, Dr. B.S.K. K.V., Dapoli provide the low cost production technologies for minimizing the requirement of labour. 74.10 per cent farmers suggested that, Govt. should make necessary arrangement for supply of fertilizer at reasonable rates through PACS.

The suggestion regarding marketing of bitter gourd, were collected and presented in Table 6. It is seen from table that the majority of farmers 82.50 per cent suggested that, marketing sub yard should be adjacent to producing area for avoiding cost of transport, 80.00 per cent farmers suggested that, provide the information about market through all means of media from different sources of market information. 75.00 per cent farmers suggested that, Govt. should check malpractices followed by intermediaries in market area. More or less similar results were obtained by Gadre (2000); Kahlon and Kapur (1968); Nahatkar and Pant (1984); Rajmony *et al*. (1985); Talathi *et al*. (2002) and Venkateshwarlu *et al*. (1977).

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