DISCUSSION
A field experiment was conducted for two consecutive Rabi seasons of the year 1994 and 1995 to study the effect of planting method and potassium fertilization. The main object of the present investigation was to develop technology package for augmenting the productivity of potato cultivar-Kufi Chandramukhi. The salient results of investigation presented in the preceding chapter on these aspects have been critically examined and discussed here in the light of works reported by various scientists working within the country or abroad.

Response of Potassium -

Potassium plays an important role in the maintenance of cellular organisation by regulating the permeability of cellular membrane and keeping the protoplasm in a proper degree of hydration by stabilizing emulsions of highly colloidal properties. Potassium is also known for enhancing the size flavour and colour of some vegetables and increasing the disease resistance in plant. It helps to overcome the influence of adverse weather condition, inadequate aeration, improves water utilization, reducing transpiration, co-efficient at high temperature. It is further required in carbohydrate metabolism and translocation, nitrogen metabolism and protein synthesis as well as regulation of cell sap concentration,
stomatal movement, cell expansion and water regulation in enzyme activations.

**Percentage of Emergence Count**

Percent emergence of potato plant at both stages (30 and 70 DAP) was not affected by potassium application. This was mainly due to planting well sprouted tubers. This is in conformity with the findings reported by Verma and Grewal (1979); Krishnappa (1990) and Dandekar et al. (1991).

**Biometrical Parameters**

Effect of potassium gave positive response on height of the plant during both the years of experimentation. Maximum height of plant was recorded under 180 Kg K₂O/ha at both the stages of plant growth (35 and 70 DAP). The increase in height of plant with potassium might be due to translocation and accumulation of photosynthates which depends on chlorophyll pigments. Krishnappa and Shivashankar (1981) have also reported that increasing of more height might be due to increased cell division and cell elongation of the plant. Similar finding was also highlighted by Sharma and Singh (1988); Gupta (1992) and Khalak and Kumarswamy (1992) who had also reported that potassium influenced the plant
height at all the stages of growth as compared to plants
where potassium was not supplied.

An examination of data showed that the number of
haulms per hill significantly differed by application of
potassium levels up to 60 Kg K₂O/ha during both the years
of investigation at both the stages of plant growth (35 and
70 DAP). Similar finding have been reported by Ghosh and
Gupta (1973) and Grewal (1975) who had observed that potato
as crop needing very huge amounts of potash continuously
throughout the crop period to get normal growth of the plant.

Increasing levels of potassium significantly
increased the number of levels per hill upto 180 Kg K₂O/ha
during both the years of investigation at both stages (35
and 70 DAP). The increase in number of leaves per hill due
to stem elongation number of laterals and total number of
leaves and surface per plant to be greater at higher ferti-
"lization as reported by Ghose and Gupta (1973).

Increasing levels of potassium also indicated
favourable response towards increase of fresh and dry weight
of plant per hill upto 180 Kg K₂O/ha. The trend of increase
in fresh and dry weight of plant due to more accumulation of
photosynthates which depends on chlorophyll pigments. Potassium is an important constituents of chlorophyll. Similar finding have been reported by Singh (1967) who had observed that application of potassium at planting increased fresh weight of shoot and roots.

**Tuber Yield and Its Attributes**

Effect of potassium application found significant response on different grades of tubers. The maximum yield of 'A' grade tubers per hill and per plot obtained under 180 Kg K\(_2\)O/ha (Table 15 and ) which was significantly superior over other lower levels of potassium during both the years, but yield of 'B' grade tubers per hill and per plot (Table 16 and ) did not significantly increase due to potassium application during both the years. However, maximum yield of 'C' grade tubers per hill and per plot (Table 17 and ) were recorded under control plots. These results have been found due to higher levels of potash fertilization produced more yield of ware size tubers and considerably reduced the yield of seed tubers. This may have occurred due to the fact that potash has affected the size of the tuber, by increasing cell division, cell elongation and translocation of more food materials from leaves.
to tubers. The results are in close conformity with the findings of Krishnappa and Cowda (1979) and Maity and Arora (1980) who had reported that potassium application resulted significantly higher production of 'Ware' size tubers and produced tubers with higher mean weight similar findings were also highlighted by Sharma and Singh (1988) and Krishnappa (1990).

Increasing levels of potassium increased the number of 'A' grade tubers per hill up to 120 Kg K₂O/ha in 1993-94; whereas during 1994-95 the significantly more number of 'A' grade tubers per hill were recorded under 180 Kg K₂O/ha. However, number of 'A' grade tubers per plot significantly increased up to 120 Kg K₂O/ha during both the years. Response of potassium were observed on number of 'B' grade tubers per hill during 1993-94. The number of 'B' grade tubers were increased with increasing level of potassium. Application of 60 Kg K₂O/ha significantly increased the 'B' grade tubers per hill in comparison to control plot. While in the second year the response of potassium application on number of 'B' grade tubers per hill were found to be insignificant. However, the production of 'B' grade tubers per plot were not affected by potassium application during both the years of field trial. The maximum number of 'C' grade tubers per hill and per plot were obtained with application of 60 Kg K₂O/ha and it was decreased at higher levels. The large portion of ware-sized
tubers is due to favourable influence of potassium which might have caused higher rate of synthesis of Carbohydrates and its rapid translocation towards the tubers. These results are tallies with the finding of Krishnappa (1990); Trehan and Grewal (1991) and Gupta (1992).

Potassium application has also showed remarkable influence on total tuber yield (Q./ha.) (Table 18) which was increased up to application of 180 Kg K₂O/ha. Trend was almost similar during both the years of investigation. The increase in tuber yield was due to higher synthesis rate of carbohydrate and its rapid translocation towards the tuber. Other reasons might be due to medium potash fertility status of the experimental plot. This finding gets full support from the observations of Sharma and Singh (1988); Trehan and Grewal (1991) and Sharma (1992) who had also observed higher yield with potassium application.

Quality Attributes -

Total soluble solids estimated in potato tubers have been presented in Table-19. The application of potassium increased T.S.S. content in tuber up to 180 Kg K₂O/ha. Increase in T.S.S. in potato tuber may be as a result of efficient translocation of food materials. Similar results were obtained by Singh and
Dhankar (1989). They worked on Onion and found that T.S.S. was increased when 100 Kg K$_2$O/ha was applied in Onion crop.

With regard to specific gravity of potato tubers (Table 20) application of potassium had no significant influence on the specific gravity of tuber similar results were also obtained by Yadav and Tripathi (1972) and Maity (1977) from I A.R.I. and observed that specific gravity was not affected by the varying levels of potash from 0-150 Kg K$_2$O/ha. The potassium application significantly influenced dry matter and starch percentage of potato tuber. The maximum values of these parameters were recorded under 60 Kg K$_2$O/ha and increasing levels of potassium application showed adverse effect on dry matter and starch percentage. The increase in tuber dry matter and starch percentage may be as a result of efficient translocation of food material to tubers which very well corresponded with higher tuber dry matter and starch percentage. This might be mainly due to higher levels of potassium application which have increased the water content in the tubers and thus ultimately the dry matter and starch content was reduced. Another reason is that chloride favour the formation of insoluble starch in the leaf and oppose the migration of soluble sugars from leaf to tubers and this restricts the formation and accumulation of starch. The above results are also supported by Sharma (1978) Verma and Grewal (1979).

Application of higher levels of potassium significantly increased the percentage of moisture in tubers. Maximum percentage of moisture were recorded under 120 Kg K₂O/ha. This might be mainly due to higher levels of potassium application which have increased the water content in the tubers.

Effect of Planting Method -

Percentage of Emergence Count -

The percent plant per unit area did not differ significantly due to different treatments. Thus, different planting method had no effect on percentage of emergence and final plant stand in the present study. The reason is obvious that sprouted tubers are planted which provided favourable condition for germination.

Biometrical Attributes -

Significantly taller plants were recorded under border ridge technique than regular continuous planting method reason might be due to availability of congenial atmosphere and better root development in the porous soil on planting of border ridge method. Besides, it may also be mentioned that due to better root development the absorption of nutrients, including micro-
nutrients were also abundance. Thus it is logical to mention that the height have increased under border ridge technique. These results were also supported by Jorgensan (1977) and Banchor and Dhond (1980).

Significantly more number of haulms and compound leaves were recorded when planting was done by border ridge technique than regular continuous planting method.

It becomes obvious with the above discussion that height might quite have increased logically due to some other reasons such as due to exposure of plant. Due to liberal utilization of solar energy maximum photosynthetes were manufactured they have ultimately affected the number of haulms as well as number of leaves per hill. These results tallies with finding of Schepers and Simba (1976).

**Tuber Yield and Its Attributes**

Response of planting method on number and weight of tubers per hill and per ridge was found to be favourable in plants grown in border ridge technique produced more tubers than regular continuous planting method. The probable reason for better yield in ridge technique might be that tubers are dependent on traits of growth parameter and as the growth parameters are enhanced as
explained earlier the favourable and tangible impact might have certainly affected production of tubers. Thus the number and weight of tuber per hill was increased in border ridge technique method of planting. Similar findings have been reported by Dzuba et al. (1976) and Jorgensan (1977).

Response of planting method on 'A', 'B' and 'C' grade tubers per plot and total yield Quintal/ha was found to be beneficial for the total yield Q/ha and yield of 'A' and 'B' grade tubers per plot increased in border ridge technique planting method. However, yield of 'C' grade tubers was not affected under the influence of planting method. Under border ridge method over traditional method it was noticed that 'A' and 'B' grade tubers were found better in term of number and tuber yield. The reason is quite obvious that tubers developed under border ridge technique utilized full of Rhizosphere and soil which was also pulverised and loose during tuber development. Besides, the competition of plant with regard to nutrients available was also not there and favourable atmosphere was also utilized by the plants. Thus the production 'A' and 'B' grade per plot was increased in this method. The reason for increased yield of tubers Q/ha in border ridge method is quite conspicuous that all the growth attribute as well as yield contributing characters were increased which have certainly furnished the favourable
impact towards better tuberization of potato plants which ultimately increased the yield. The results tallies with the findings of Dzyuba et al. (1976), Jorgensen (1977) and Dhond (1980).

**Quality Attributes**

Since the uniform application of potassium and all the cultural operation as and when require were given with all the treatments and therefore, the quality or parameters might has not been affected.