

18.1 / 1999

Executive Summary

**EVALUATION OF MANAGEMENT OF SEED SUPPLY IN
OILSEEDS AND PULSES IN MAHARASHTRA**

A. NARAYANAMOORTHY

**AGRO-ECONOMIC RESEARCH CENTRE
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(Deemed to be a University) :
PUNE 411 004**



JULY 1999

Executive Summary

Evaluation of Management of Seed Supply in Oilseeds and Pulses in Maharashtra

A. Narayanamoorthy
Agro-Economic Research Centre
Gokhale Institute of Politics and Economics
(Deemed to be a University)
Pune - 411 004

1. Introduction:

Among the various inputs used by the farmers, seed plays a crucial role in increasing the productivity of crops. It is recognised that use of quality seed helps to increase the productivity of crops up to 20 per cent. Considering the importance of use of quality seeds, both the central and the state governments have been making efforts to supply quality seeds to the farmers. However, even after making many efforts, majority of the farmers have been using their crop produce as seed due to various reasons. As a result, the seed replacement ratio has been very low across different crops in India. The crop produce generally lacks genetic vigour and most of the time they do not positively respond to yield increasing inputs. The use of poor quality seed significantly reduces both the productivity as well as the profit.

Production of quality seeds has increased substantially over the period due to concerted steps taken by the government. Although this has helped the farmers to use quality seeds in many crops, the use of quality seed has not increased uniformly across different crops. Oilseeds and pulses are rich in nutrient content and they also give higher profit per unit of crop output than many cereal crops. The cultivation of pulse crops also contributes to soil fertility through the nitrogen fixing bacteria present in the root nodules. Despite these, the adoption of quality seeds in these crops is low when compared to cereal crops. Although the production of certified seed in pulses and oilseeds has increased substantially in the recent period, it has not reflected in the seed replacement ratio of different crops. Recent studies have indicated that one of the main reasons for the low use of quality seed is the non-availability of seed in time. In many instances, the farmers are also reluctant to use quality seed, even if it is readily available, due to various economic and other reasons. Although studies have reported various reasons for the adoption and the non-adoption of quality seeds, most of the studies have focused only on cereal crops. Studies focusing on the use of quality seeds and its management in the case of pulses and oilseeds are few and far between. Keeping in view these points, in this study, an attempt has been made to study the production, distribution and the adoption of quality seeds in oilseed and pulse crops using both secondary as well as field level data collected from Maharashtra state.

2. Objectives:

1. To find out the demand supply gap in the requirement and availability of seeds of oilseeds and pulses in the state.
2. To find out the reasons for short supply of certified/quality seeds in oilseeds and pulses.
3. To find out the linkages between the breeder seed producing agencies and foundation seed producing agencies in the state.
4. To study whether proper monitoring and evaluation is done to strengthen the chain of breeder seed to foundation seed and from foundation seed to certified seed.
5. To find out the yield difference between quality seeds used farm and other seeds used farm.
6. To asses the farmers' opinion about the supply of quality seed.

3. Methodology:

For this study, two districts namely, Sangli and Amravati from Maharashtra state have been selected. From each district, one block which has both developed as well as under developed villages in terms of use of certified seed in oilseeds and pulses has been identified with the help of Agricultural Development Officer. The two selected blocks are Tasgaon from Sangli district and Daryapur from Amravati district. From each block, three developed villages and two under developed villages in terms of use of certified seeds have been selected with the help of Agricultural Officer of the respective block. As far as the selection of sample farmers is concerned, to cover all the size group of farmers, the farmers have been grouped into five categories based on land holding size such as marginal, small, semi-medium, medium and large. From each district, 30 certified seed used farmers from three developed villages and 20 non-certified seed used farmers from two under developed villages have been selected using random sampling method. Altogether, a total of 100 sample farmers from two districts have been selected for this study. The list of farmers provided by the cooperative societies of the respective villages has been used for selecting certified seed used farmers. The non-certified used farmers have been selected with the help of *Patwari (Talathi)* and extension officials. While the field data have been collected from the farmers for the year 1997-98, the districtwise secondary data pertaining to the period 1990-91 to 1997-98 have been used to estimate the demand supply gap and seed replacement ratio.

4. Findings of the Study:

4.1 Districtwise Distribution of Quality Seeds in Pulses and Oilseeds:

Among pulse crops, gram, tur, moong and udid are considered for the analysis. The growth rate computed for the period 1990-91 to 1997-98 shown that the growth rate of seed distribution is much higher than that of the area growth rate in all the important pulse crops at the state level. Among the pulse crops considered for the analysis, the growth rate of seed distribution is very high in moong followed by udid and other crops.

In gram, at the state level, while the growth rate of seed distribution is 16.23 per cent, the same is 5.92 per cent in area. Out of 29 districts, 19 districts have achieved over three per cent growth rate in seed distribution and five districts have showed negative growth rate.

In tur, despite a very low growth of area (0.15 per cent), the distribution of seed has increased 13.31 per cent at the state level. Although 17 districts have achieved negative rate of growth in area, the distribution of seed has increased over three per cent in 18 out of 29 districts.

In moong, the growth rate of seed distribution is 40.90 per cent, despite negative growth rate in area (-2.51 per cent) at the state level. At the district level, although growth rate of area is negative in 18 districts, 21 districts have achieved over three per cent rate of growth in seed distribution.

In udid, unlike other pulse crops, not only the growth rate of seed distribution is very high (37.30 per cent) but the area is also increased over four per cent at the state level. Though the growth rate of area is negative in 15 out of 29 districts, most of them are not important in terms of cultivation of udid crop. In seed distribution, except four, all other districts have achieved over three per cent growth rate.

In all the four major pulse crops, although the distribution of seed has increased in almost all the districts, the share of distribution of seed does not match with the share of area across the districts. That is, a wide inequality is observed between the share of seed distribution and share of area across the districts in all the four pulse crops in both TE 1992-93 and TE 1997-98.

In oilseeds, the important crops like groundnut, safflower, sunflower and soyabean are considered for the analysis. At the state level, despite negative growth rate in area under groundnut, safflower and sunflower, the growth rate of seed distribution is impressive except sunflower where the growth rate is only 1.88 per cent per annum. Among the oilseed crops, the growth rate of seed distribution of soyabean is very high (33.87 per cent).

In groundnut, although the growth rate of area is negative in majority of the districts, the rate of growth in seed distribution is over three per cent in all the districts

barring five districts. A wide inequality is observed between the share of seed distribution and the share of area across the districts.

In safflower, while the growth rate of area is negative in 10 out of 26 districts, 18 districts have achieved over three per cent growth rate in seed distribution. Similar to other crops, a wide inequality is noticed between the share of seed distribution and the share of area across the districts.

The growth rate of seed distribution is the lowest in sunflower as compared to other oilseed crops at the state level. While the growth rate of seed distribution is about 27 per cent in groundnut, 33.87 per cent in soyabean and 15 per cent in safflower, it is only 1.88 per cent in sunflower. The growth rate of seed distribution is negative in 8 out of 25 districts including some of the districts where this crop is cultivated extensively. A wide inequality is also observed between the share of area of the crop and the share of seed distribution across the districts.

In soyabean, the growth rate of seed distribution is very high compared to other oilseed crops at the state level. Due to higher productivity and profits, not only the growth rate of seed distribution is over three per cent in almost all the districts but the growth rate of area is also over three per cent in all the districts except two. Importantly, this is the only crop where the growth rate of area, yield and seed distribution is over three per cent in most of the districts.

4.2. Seed Replacement Ratio and Demand Supply Gap:¹

In gram, the seed replacement ratio (SRR) has increased from 1.97 per cent in TE 1992-93 to 3.55 per cent in TE 1997-98 at the state level. Only a few districts have achieved SRR above the state's average. In many districts where gram is cultivated extensively the achievement of SRR is below the state's average.

In tur crop, the SRR has increased from 3.29 per cent in TE 1992-93 to 5.70 per cent in TE 1997-98 at the state level. Except the districts of Nasik and Pune divisions, the SRR of other districts is very low as compared to the state's average. Though the SRR of tur is much better than gram, only seven out of 29 districts have achieved the SRR above the state's average.

The SRR in moong has substantially increased from 2.95 per cent in TE 1992-93 to 12.32 per cent in TE 1997-98 at the state level. The SRR has increased impressively in divisions like Latur, Amravati and Nagpur. However, except nine districts, the SRR of the remaining 20 districts is below the state's average at both time points.

The SRR in udid has increased from 12.42 per cent in TE 1992-93 to 29.01 per cent in TE 1997-98 at the state level. The achievement of SRR in udid is much higher

¹ According to our estimates, there is a relationship between the demand supply gap and the seed replacement ratio. Higher the seed replacement ratio means lower the demand supply gap and vice versa.

than other pulse crops considered for the analysis. Only a very few districts have achieved the SRR above the state's average. Although Konkan division has about seven thousand hectares of area under udid, its SRR is zero or the gap in demand supply is 100 per cent.

The SRR of groundnut has increased from 0.70 per cent in TE 1992-93 to 2.16 per cent in TE 1997-98 at the state level. This is the lowest among eight crops considered for the analysis from both pulses and oilseeds. Except a few districts, the SRR of all other districts is below the state's average. Despite of extensive cultivation of groundnut in Pune division, its SRR is much higher than the state's average.

In safflower, the SRR has increased from 7.18 per cent in TE 1992-93 to 13.86 per cent in TE 1997-98 at the state level. Despite of extensive cultivation of safflower in Pune division, its SRR is the lowest compared to all other divisions. Out of 29 districts, the SRR of the 12 districts is above the state's average.

In sunflower, unlike other crops, the SRR has declined from 13.46 per cent in TE 1992-93 to 12.84 per cent in TE 1997-98 at the state level. Although Latur division accounts for around 50 per cent of the total area of the crop, its SRR is one of the lowest in the state. Except nine districts, the SRR of the remaining 20 districts is lower than the state's average.

In soyabean, the SRR has increased from 3.40 per cent in TE 1992-93 to 9.65 per cent in TE 1997-98 at the state level. The rate of increase of SRR is relatively higher in soyabean than that other oilseed crops. Although Amravati division accounts for over 50 per cent of the total area of soyabean, its SRR is one of the lowest in the state. Most of the districts have achieved SRR above the state's average. The districts belonging to Pune division have achieved significantly higher SRR than the state's average.

The regression analysis shows that the factors which determine the SRR vary from crop to crop. While the percentage of irrigated area positively influences the SRR of gram, tur, groundnut, sunflower and soyabean, the same factor negatively influences the SRR of moong, udid and safflower. Similarly, while the rainfall negatively influences the SRR of tur, moong, udid and soyabean, the same variable positively influences it in other crops. Except moong, udid and groundnut, the SRR of the remaining five crops is negatively related with the percentage of crop (respective) area to gross cropped area.

4.3. Evaluation of Seed Production and Distribution in Maharashtra:

Although both the state department of agriculture and the Maharashtra State Seed Corporation (MSSC) have good linkage with the State Agricultural Universities (SAUs) and other seed producing centres, the lifting of breeder seed is less than 100 per cent in all the important pulses and oilseed crops in the state. In pulses, while the percentage of lifting was 65 in *rabi* 1995, the same was about 83 per cent in *rabi* 1997. In oilseeds, this was about 76 per cent and about 43 per cent in *rabi* 1995 and *rabi* 1997 respectively.

This low percentage of lifting is observed across different varieties in both oilseeds and pulses.

Production of foundation seed has increased substantially in both pulses and oilseeds in recent years in the state. However, a wide gap is noticed between the requirement and the availability of foundation seeds across different crops. The shortage of foundation seed is varied from crop to crop and season to season.

Production of certified seed has increased substantially in both oilseeds and pulses in the recent years in the state. However, except a few crops, the availability of seed is lower than the requirement of seed in both 1996-97 and 1997-98. The most affected crops in terms of availability of seed are gram, tur and moong in pulses and safflower, groundnut, sunflower and sesamum in oilseed crops.

The state department of agriculture estimates the variety-wise requirement of seed for each crop by using the average seed replacement ratio of the immediate last three years. The distribution of seed is made against the requirement of seed (which is estimated by the agricultural development officer) of each district. Since the requirement of seed is not estimated by considering the factors like rainfall, changes in cropping pattern etc., the demand supply gap in seed distribution is commonly observed most of the time.

The analysis relating to the availability and the sale pattern of quality seeds in Sangli and Amravati districts shows that while the public sector agencies have sold mostly certified seeds, the private sector agencies have involved mainly in selling truthful seeds.

Because of the proper monitoring and evaluation works done by the state department of agriculture and the Maharashtra State Seed Corporation, the SRR of different oilseeds and pulse crops has increased substantially over the last 16 years in the state. In the recent years, barring groundnut and tur, the achievement of SRR in other oilseeds and pulses is much higher than that of the target given by the Ministry of Agriculture, Government of India.

The followings are the main reasons for the short supply of certified seeds. (a) Shortages in the production of breeder and foundation seeds must have affected the supply of certified seeds. (b) Owing to problems of pests and diseases, the expected production of certified seeds could not be achieved in certain crops. (c) Bad weather and unseasonal rain have often affected the seed production. (d) Due to poor seed replacement ratio in crops like groundnut, both the private and public sector agencies are reluctant to take seed production.

There are well defined linkages between the various agencies involved in seed production. Despite this, the targets of seed production could not be achieved mainly due to natural factors such as hot weather, erratic rainfall and pests and diseases. Whenever shortage occurs in seed supply, concerted efforts have been made by the respective

agencies to overcome the shortages by increasing the production of seed or by importing from other states, if available. In the event of nonavailability of seed from other states, the farmers were advised to use their own seed or shift to any other suitable crops.

4.4. Use of Quality Seeds - Analysis of Sample Farmers' Data:

There is no much difference in the average land holding size between the adopters and the non-adopters of quality seeds in both Sangli and Amravati districts. However, the status of irrigation of the sample farmers is the not the same between two districts. In Sangli district, while the irrigated area to total cultivated area is 100 per cent in the adopters group, the same is about 75 per cent in the non-adopters group. In Amravati district, irrigated area is completely absent in both the adopters and the non-adopters groups.

In Sangli district, although the cropping pattern of the adopters group is slightly varied from the non-adopters group, both the groups of farmers have used 27 to 29 per cent of their cultivated area for pulses and oilseeds. Marginal and small size group of farmers have allotted more area for pulses and oilseeds as compared to large size farmers in both the adopters and the non-adopters groups.

In Amravati district, since the crops are cultivated under rainfed conditions, pulses and oilseeds together accounted for about 40 per cent of the cultivated area in both the adopters and the non-adopters groups. The proportion of area allotted for oilseed crops is very less as compared to pulse crops in both the groups of farmers. As in the case of Sangli district, marginal and small farmers have allotted relatively higher proportion of their area to pulses and oilseeds than the large size of farmers.

In sourcewise use of seed, in groundnut, while 75 per cent of the farmers belonging to the adopters group have purchased seed from the government shops (including cooperatives societies), 25 per cent of the farmers have purchased seeds from the private traders. In the non-adopters group, about 86 per cent of the farmers have used own seed and the remaining 14 per cent of the farmers have obtained from other farmers.

In soyabean, about 80 per cent of the adopters have purchased seed from the government shops and the remaining farmers have purchased from the private traders. In the non-adopters group, while about 57 per cent of the farmers have used own seed, the remaining farmers have purchased seeds from other farmers.

In tur, about 81 per cent of the farmers belonging to the adopters group have purchased seeds from the government shops and the remaining farmers have purchased from the private traders. All the farmers belonging to the non-adopters group have used their own seeds.

In gram, in the adopters group, about 77 per cent of the farmers have purchased seeds from the government shops and the remaining farmers have purchased from the

private traders. In the non-adopters group, while 75 per cent of the farmers have used their own seeds and the remaining farmers have obtained from other farmers.

As far as the quality of seed is concerned, about 78 per cent of the farmers have used certified seeds and the remaining farmers have used truthful seeds in Sangli district where groundnut and soyabean are considered for the analysis. Similarly, in Amravati district where tur and gram are considered for the analysis, about 79 per cent of the farmers have used certified seeds and the remaining farmers have used truthful seeds. All the truthful seeds used farmers have purchased seeds from the private traders. Majority of the farmers who purchased seeds from the private traders have expressed their dissatisfaction about the quality of seeds.

There is no variation in seed price between the government shops and the private traders in all the four crops namely groundnut, soyabean, tur and gram in both the districts. The seed prices of both the government and the private shops are also matching with the prices fixed by the Maharashtra State Seed Corporation. However, many farmers have reported that the private traders try to increase the price of seed when scarcity arises for seeds. The price of other farmers' seed is much less than that of the government and the private shops, especially in tur and gram.

The sample farmers have cultivated very few varieties in each selected crop. In groundnut, while all the farmers belonging to the adopters group have cultivated *Phule Pragati*, about 93 per cent of the farmers have cultivated the same variety in the non-adopters group. Similarly, in soyabean, about 93 per cent of the farmers from both the adopters and the non-adopters groups have cultivated *JS-335* variety. In tur, the main varieties cultivated by the sample farmers are *Maruti* and *Asha*. About 59 per cent of the farmers have cultivated *Maruti* in the adopters group and almost an equal percentage of farmers have cultivated *Maruti* and *Asha* in the non-adopters group. In gram, *Chaffa* is the main variety followed by *G-12* and *G-17*. About 88 per cent of the farmers in the adopters group and about 62 per cent of the farmers in the non-adopters group have cultivated *Chaffa* variety. Most of the varieties cultivated by the sample farmers are not only popular in the sample villages but also all over Maharashtra state. The farmers have selected the crop varieties mainly using their own as well as the co-farmers' experiences.

Except tur, none of the sample farmers belonging to the adopters group has followed recommended seed rate in other crops. In groundnut, majority of the farmers have used less than 30 kg/acre of seed rate as against the recommended seed rate of 35 kg/acre. In soyabean, as against the recommended seed rate of 30 kg/acre, majority of the farmers have used seed rate of 25 kg/acre. In gram, majority of the farmers have used seed rate of 20-22 kg/acre as against the recommended seed rate of 28 kg/acre. The farmers have expressed that higher price of seed is the main reason for not following recommended seed rate.

The analysis relating to the requirement and the availability of seeds shows that there is no demand supply gap in seed in any of the crops considered for the analysis. Since the area used for the cultivation of pulses and oilseeds is less, the sample farmers

could get the required quantity of seeds. However, due to non-availability of seeds in government shops, some of the farmers have purchased seeds from the private traders. Some of the farmers have also visited the cooperative societies several times to get the required quality and quantity of seeds.

In groundnut, the cost of cultivation (cost A_1) of the adopters group is 2.17 per cent less than that of the non-adopters group. In soyabean, the cost of cultivation of the adopters group is higher by 12.47 per cent than that of the non-adopters group. As in the case of groundnut, in tur, the cost of cultivation of the adopters group is 3.40 per cent less than that of the non-adopters group. In gram, as in the case of soyabean, the cost of cultivation of the adopters group is higher by 9.09 per cent than that of the non-adopters. However, in all the crops, the percentage of material inputs cost² to total cost of cultivation is higher for the adopters group than that of the non-adopters group.

The analysis of productivity of crop shows that except groundnut, the productivity of other crops is substantially higher for the adopters group than that of the non-adopters group. This is also true across different size of farmers groups. In soyabean, while the average productivity difference is about 24 per cent between the adopters and the non-adopters, the same is about 18 per cent in tur and about 29 per cent in gram. In tur, although the cost of cultivation of the non-adopters group is relatively higher than that of the adopters group, it does not reflect in the productivity.

Since the seed quality varies with the source of seed, an attempt has been made to find out the productivity differences by the source of seed. Although the farmers have reported that the quality of seed purchased from the government shops is better than other sources, it has not uniformly reflected in the productivity of different crops. In the adopters group, while the productivity of tur and gram is marginally higher for the users of government seeds, this is not true in the case of groundnut and soyabean. Similarly, in the non-adopters group, there is no uniform trend in the productivity of crops between the own seeds used farm and other farmers' seeds used farm.

The profit³ of the adopters group is substantially higher than that of the non-adopters group in all the crops except groundnut where the profit is same for both the groups of farmers. For soyabean, the profit difference is about 32 per cent between the adopters and the non-adopters group whereas the same is about 43 per cent in tur and about 63 per cent in gram.

The farmers' perception for adopting quality seeds in oilseed and pulse crops does not vary much between Sangli district and Amravati district. About 76 per cent of the farmers in Sangli district and about 70 per cent of the farmers in Amravati district have expressed that they have used quality seeds mainly for getting and higher yield and good germination.

² Cost of material inputs includes cost of seed, fertilisers, manure and pesticides.

³ This is farm business income (gross value of production minus cost A_1).

In the non-adopters group, about 50 per cent of the farmers in Sangli district and about 35 per cent of the farmers in Amravati district have expressed that since there is no significant difference in the productivity of crops between the farm using certified seeds and other seeds, they have not used certified seeds. Besides this, about 35 per cent of farmers in Sangli and about 65 per cent of the farmers in Amravati district have expressed that nonavailability of seeds and higher price of seeds are the main reasons for not adopting certified seeds.

As far as the farmers' opinions about the supply of quality seeds are concerned, in the adopters group, about 30 per cent of the farmers in Sangli and 43 per cent of the farmers in Amravati have expressed that they could not get seed in time. Besides this, about 23 per cent of the farmers in Sangli and about 13 per cent of farmers in Amravati have expressed that the truthful seeds should not be allowed to sell. The opinions of the non-adopters about certified seed and its supply are relatively different from the adopters group. About 20 per cent of the farmers in Sangli and about 40 per cent of the farmers in Amravati have expressed that the seeds are not available in time. From both the districts, about 20 per cent of the farmers have expressed that the prices of quality seeds are very high.

For improving the supply of certified seeds, in the adopters group, about 43 per cent of the farmers in Sangli district and about 46 per cent of the farmers in Amravati district have suggested that the supply of quality seeds can be improved significantly if the seeds are allowed to be sold only through the government agencies. Over one fourth of the sample farmers belonging to the non-adopters group have suggested that the sale point should be near the village. The farmers have suggested that regular checking on private traders is essential for improving the supply of quality seeds.

5. Policy Suggestions:

1. Although gram and tur are the two most important pulse crops of the state, the seed replacement ratio of these two crops is very low as compared to other pulse crops. As a result of this, the productivity of these crops is low as compared to many states. Therefore, considering the importance of these crops, the state department of agriculture can take special steps to increase the seed replacement ratio in these crops to increase the productivity (Attention: Department of Agriculture, Government of Maharashtra).

2. Groundnut is the most important oilseed crop of the state accounting for about 25 per cent of the total oilseeds area. However, its seed replacement ratio is abysmally low compared to other major oilseed crops. As a result of this, the productivity is also very low in many districts as compared to the state's average. The farmers are reluctant to use certified seed in this crop due to higher price of seed. Therefore, the state government may reduce the price of seed keeping in view the importance of this crop in oilseeds production (Attention: Maharashtra State Seed Corporation, Government of Maharashtra).

3. Owing to various reasons, the lifting percentage of breeder seed is low in most of the oilseed and pulse crops in the state. This could be one reason for the wide gap between the requirement and the availability of foundation seed across different varieties of oilseed and pulse crops. The shortage of foundation seed has also affected the availability of certified seed in almost all oilseed and pulse crops. Timely lifting of breeder seeds is very important for increasing the production of foundation as well as certified seeds. Therefore, the state government can strengthen the linkages between the producers of breeder seed and foundation seed to avoid shortages in seed production (**Attention: Department of Agriculture and Maharashtra State Seed Corporation, Government of Maharashtra**).

4. The private traders are mainly involved in selling truthful seeds. Most of the sample farmers were not happy with the germination of truthful seeds. Therefore, the state seed corporation may take appropriate measures before the distribution of truthful seeds. If possible, the sale of truthful seeds can be completely stopped (**Attention: Maharashtra State Seed Corporation, Government of Maharashtra**).

5. The sample farmers have expressed their concern about the business practices of the private traders. The private traders not only try to increase the price of seed when scarcity arises but also do not clearly tell the quality of seed (whether certified or truthful) to the farmers. Moreover, they do not give receipt to the farmers while purchasing seeds. Therefore, as suggested by the sample farmers, the government authorities can frequently check the private traders to control their undesired business practices (**Attention: Department of Agriculture and Maharashtra State Seed Corporation, Government of Maharashtra**).

6. Majority of the sample farmers have reported that they do not get the required quantity as well as quality of seed in time from the government shops. Since both oilseed and pulse crops are cultivated as rainfed crops, any delay in sowing will affect the germination and subsequently the productivity. Therefore, the state department of agriculture and the state seed corporation may make all necessary steps to distribute the seeds in time (**Attention: Department of Agriculture and Maharashtra State Seed Corporation, Government of Maharashtra**).

7. Presently, the requirement of seed for each variety of crop is estimated by using the average seed replacement ratio (sale pattern of seed) of three years. Since this procedure does not take into account the weather factors, rainfall, changes in cropping pattern and market price of crops, the estimates are not accurate most of the time. As a result, the demand supply gap in seed distribution becomes common phenomenon every year. There is a need to improve this procedure. Therefore, the above mentioned factors may be considered while estimating the requirement of seed for each crop (**Attention: Ministry of Agriculture, Government of India, New Delhi and Department of Agriculture, Government of Maharashtra**).

8. Except tur crop, none of the sample farmers belonging to the adopters group has followed recommended seed rate in other crops. It is not very different for the non-

adopters group as well. This could be one of the reasons for the low productivity in oilseed and pulse crops. Therefore, since the use of recommended seed rate is very important for achieving higher productivity, the extension agencies may create awareness among the farmers through wide publicity with the help of modern media (**Attention: Department of Agriculture, Government of Maharashtra**).

9. Since the seed quality is good in the depot managed by the Maharashtra State Seed Corporation, the farmers directly want to buy seed from it. Therefore, as suggested by the sample farmers, the MSSC can open a counter in each *taluka* headquarters for selling seeds on temporary basis just two months before starting of the sowing season (**Attention: Maharashtra State Seed Corporation, Government of Maharashtra**).