Chapter VII

CONSTRAINTS IN PULSE PRODUCTION
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Of all the food crops in India, production of pulses has remained stagnant. Depending upon the climate factors, the pulse production has been of fluctuating for more than 3 decades. This has been primarily due to the non-availability of high-yielding, disease-resistant varieties. Another major cause for the low yields is that pulses are grown under deficit moisture with poor management practices. The major causes for low production of pulses in India are ecological factors, lack of appropriate pulse - production and post - harvest technology, basic research and socio-economic constraints alongwith non-availability of quality seed in the required amounts.

Constraints to production:

1- Ecological factors –

At present about 90% area under pulse cultivation in the study area is rain fed. Furthermore than 50 percent of the area under pulses is planted in the post-rainy (Rabi) season, largely on limited soil moisture. It was presumed that with increasing irrigation potential in the area more and more area under pulse cultivation will be brought under irrigation. There has not been any increase in irrigated area under pulse cultivation which continues to remain around 11.67 percent.
Management of soil moisture is crucial in the case of rainfed technology. This involves various operations, like-grading, land shaping, drainage, erosion control methods, individual field contours etc. Such measures involve community and group action, but effective field-extension services to motivate such an action are inadequate.

High temperature and moisture stress greatly increase flower drop and bud abortion. These cause considerable reduction in yield in major pulses. Frost and low temperature during the night cause heavy damages to Rabi pulses particularly to chickpea, whereas continuous rain invites more insect pests and diseases both in kharif and Rabi.

Because of their capacity to withstand adverse soil moisture conditions, pulse crops have become the crops of the poor resource base cultivators having large unirrigated lands in the study area.

2- Non-availability of high yielding varieties –

Since ages pulse crops have been cultivated under rainfed conditions in marginal lands with low-input management in the study area. As a result, they have evolved in such a way that even under extreme unfavorable situations they produce small quantities of seeds. In the process, genotypes of different pulses have got themselves adopted for the purpose of survival, fixing their genetic at lower yield levels.

Pulse crops in general have poor harvest index (HI). Improvement in the HI in cereal crops in the recent years has resulted in very high yields. In pulses the HI ranges from 10 to 20 as compared to 40
and above in wheat. Mixed cropping of pluses with other crops is an improvement agronomic practice in Chitrakoot Dham area of the state. Here we could have two situations: (i) The pulse crop completes its life-cycle before the second crop enters the active growth phase or (ii) The pulse crop enters the active growth only after the subsidiary crop has completed its life-cycle. Although, a number of improved varieties of different pulse crops have been recommended, yet they have not become popular among the farmers in the study area mainly due to lack of a systematic seed multiplication and distribution Programme.

3- Lack of proper agronomic management –

Because pulses as a group can utilize the limited soil moisture and nutrients better than cereal crops, they are grown in areas which are left out after satisfying the demands of cereals and other cash crops. However, pulse crops also do respond to soil moisture and other inputs and hence the need for appropriate practices in the study area.

4- Poor management conditions -

The concept that pulses can grow and produce better yields on marginal lands without any inputs and management is not correct. Being protein-rich crops, pulses require more energy input per unit of production as compared to cereals. But on the contrary they are grown under conditions of energy starvation in poor yields in the study area.
5- **Non-availability of efficient rhizobium culture** –

In general, rhizobium culture is the cheapest input with high cost benefit ration. Symbiotic nitrogen fixation takes place very effectively if the natural relationship is established between the legume cultivar and its specific strain of rhizobium. However, use of rhizobium culture is not getting popular among the farmers of Chitrakoot Dham because unlike fertilizers, the specific culture of desires quality is not readily available in the market.

Many times spurious cultures are supplied to the farmers which are not effective and the farmers lose faith in using rhizobium culture.

6- **Improper sowing time** –

The time of sowing makes a big difference in the production of pulses. The pulses are generally sown after the completion of planting of other crops and thus, they get the last preference and priority in sowing schedules. The late sowing not schedules. The late sowing not only results in poor growth but also makes them prone to high incidence of insect pests, diseases and to adverse temperatures at the ripening stage. All these factors individually reduce the yields drastically.

7- **Inadequate seed rate** –

Adequate plant population makes a big difference in yield. Farmers in the study area generally do not follow the recommended
seed rate. For example, the farmers have been using 10 to 15 kg seed/ha as against the required rate of 20 to 25 kg seed/ha in green gram, black gram and pigeon pea. As such the plant population on the farmers' fields is very sparse, and this is one of the major causes of low yields.

8- Defective method of sowing –

Generally pulses are sown by broadcasting method in the study area. This practice results in uneven distribution of seeds that creates a lot of problems in adopting essential agronomic practices such as weeding, interculturing, spraying and harvesting. Also, a large proportion of the seeds are eaten away by birds and a portion of the seeds fail to germinate because of the lack of adequate moisture at the soil surface.

9- Weed infestation –

Because of their inherent slow growth at the initial stage, pulse crops suffer due to infestation of weeds. Depending upon the duration of the crop, the critical period for weed competition in the pulses varies from 20 to 45 days after sowing. If weeds are not controlled during this period, marked crop losses ranging from 30 to 50 percent in chickpea, 50 to 70 percent in green gram and black gram and as high as 90 percent in pigeon pea have been recorded in Chitrakoot Dham division of U.P.
10- Losses due to diseases and insect pests —

Pulses in general are susceptible to a large number of diseases and insect pests which cause heavy losses. Though three are several diseases which attack pulse crops, the major diseases are wilt, blight and grey-mould in chickpea, wilt, stem blight and sterility-mosaic in pigeon pea, yellow-mosaic, powdery-mildew and leaf spot disease in green gram, black gram and cowpeas. For yield stability and wider adaptability of genotypes, it is essential that varieties with multiple resistances to these major diseases are identified, adopted and popularized. Such multiple-resistant varieties are wanting among the pulse crops.

11- Basic research factors —

An intensive multidisciplinary approach for the improvement of pulse crops in India started in 1965 with the initiation of the All India Pulse Improvement Project by the ICAR, in collaboration with its various institutes and state agricultural universities. However, emphasis was only on the production aspect, consisting of disciplines of breeding, agronomy, pathology and entomology. Basic research was completely missing, and unfortunately a similar situation continues till today. Although 20 years of intensive research programme has led to the development of innumerable better yielding varieties, yet their impact on pulse production has only been marginal.

However, the major constraint to pulse production in the study area as well as in the country is the lack of genotypes with higher—
yield potential on farmers' fields. Cultivates in hand exhibit lower productivity, non-synchronous flowering/fruited, non-responsiveness to good management, non-suitability to various cropping systems, complete or partial absence of genetic resistance to major diseases and pests.

12- Socio-economic factors –

The socio-economic constraints of pulses largely emerge from the interaction of agro-climatic factors, farming systems and the characteristics of the pulse crops themselves. Pulses not only constitute an important component of the food chain of the self-providing farmers in the study area alike other parts of the country but they also offer important and low cost options for the purpose of fertility management, risk diffusion and utilization of deficient land resources because of their ability to withstand soil moisture stress conditions which other crops are not able to. However, despite their important function, pulses have only subsidiary status as catch crops or mixed crops around major food and commercial crops in the total farming systems with the farmers. The subsidiary status of pulses in traditional farming systems is reflected through the pattern of limited allocation of resources to these crops.

Yet another major socio-economic factor which prevents farmers from taking up pulse cultivation is because the majority of the farmers are at the poverty level, and own very small holdings. The first priority of the small and marginal farmers is to grow enough cereals for his own consumption so as to keep himself away from market.
borrowings and purchases. He can live without pulses but not without cereals.

**Suggestions:**

**Strategy for increasing pulse production** –

Pulse crops with very wide agro climatic adoption exhibit largest variation in form, genotype, yield and response to extrinsic environmental factors, while some of the varieties withstand well under low temperature, some thrive well in tropics. Similarly, the varieties also differ in their requirement for fertilizer. Keeping the above facts in view, the strategy for increasing the pulse production in the study area may be as follows:

(i) Development of high yielding varieties with early maturity which may be grown under better management condition as pure crop.

(ii) Improvement in the plant type specially suited to the intercropping /mixed cropping.

(iii) Evaluation of varieties which may give better and stable yields under rainfed/restrained irrigation condition.

(iv) Development of high yielding varieties for salt, sick soils.

(v) Standardization of effective and economic plant protection schedules and organization of plant protection measures on mass scale to control the insect, pests and diseases.

(vi) Development of disease resistant varieties.
(vii) Strengthening of the input resource mobilization programme especially for the production and distribution of good quality seed.

(viii) Encouraging moong and urd cultivation in summer season after harvest the wheat and mustard crops.

(ix) Intensive pulses area should be located and efforts should be made to make available all the inputs on the pattern of intensive area district programme.

(x) To convince the farmers of the benefit of adoption of improved technology available large scale demonstration should be undertaken in all the important pulse crops growing areas especially in command ones. In drier tracts, farmers may be given education for one or two protective irrigation at critical stages of plant growth.

(xi) Adequate training programme of the field workers at all the levels may be conducted so as to transfer the existing production technology.