

Ratoon Pigeon Pea

An alternate source of income for rainfed farmers

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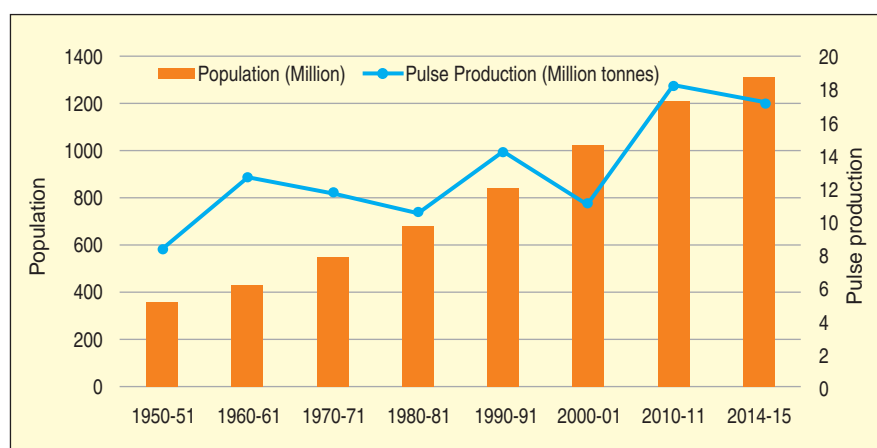
WORLDWIDE, 11.5% (1.5 billion ha) of cropland area is rainfed. These regions cover about 40% of the world's land area and host nearly 40% of the world's population. Further, about 70% of the world's staple food continues and will continue to be harvested from rainfed areas, since the scope for further expansion of irrigation is limited due to growing competition for water and the high investment cost. The rainfed agriculture may play a major role in India's food security and sustainable economic growth as 55% of net sown area of India comes under rainfed lands spread over 218 districts in the states of Punjab, Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. Rainfed crops account for 48% area under food crops and 68% of the area under non-food crops.

Rainfed areas suffer from various biophysical and socio-economic constraints affecting the productivity of crops and livestock. In this context a number of economically viable rainfed technologies have been discussed. These include soil and rainwater conservation measures, efficient crops and cropping systems matching to the growing season,

suitable implements for timely sowing and saving of labour, integrated nutrient and pest management. In rainfed region, crop diversification is one of the viable option to achieve poverty alleviation through food security by overcoming the problems of land degradation and climatic aberrations. Diversification of agriculture has shown several important benefits besides ecological advantages. Benefits of crop diversification are likely to be (i) availability of wide range of crops / products; (ii) enhanced profitability through alternative crops; (iii) reduced pest problems through diversified rotations (iv) even distribution of labour throughout the

year (v) reduced risks from weather aberrations by different planting and harvesting times (vi) renewable resources of high value products by introducing new crops.

Under rainfed condition, pulses are one of the major grown crops in marginal to sub-marginal lands. Pulses are source of supplementary protein and often regarded as poor's man meat. They provide energy, essential minerals, vitamins and several compounds considered good for human health. India is the largest producer and consumer of pulses. Despite being the world's largest pulse producer, there is still a huge shortage of pulses. Pulse production was marginally increased from 8.41



India's pulse production and population growth since independence (drawn from IIPR, 2016).

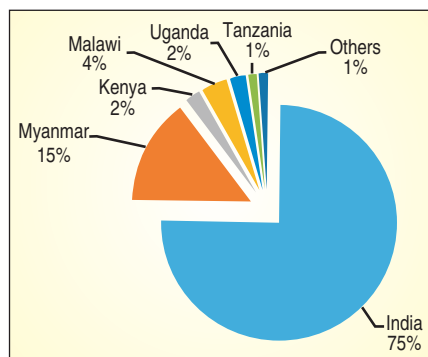
Nearly 50% of the total rural workforce and 60% of livestock in the country are concentrated in the dry districts. But uncertainty in production due to fluctuations in total rainfall and changes in its distribution, decrease in relative productivity in rainfed lands etc. affect the livelihoods of many poor and marginalised farmers. Therefore, upgrading rainfed agriculture promises large social, economic and environmental paybacks, particularly in poverty reduction and economic development.

million tonnes in 1950-51 to 17.38 million tonnes in 2014-15 in comparison to population increase from 361 million to 1311 million for the same period. As per an estimate, pulse requirement for the year 2030 is projected to 32 million tonnes as population is expected to touch 1.68 billion. Therefore, there is urgent need of low cost technological intervention alongwith crop diversification in rainfed areas to fulfill the pulse requirement of the nation.

Rainfed agriculture in India is characterized by low and uncertain returns. Low input farming systems have a niche in these areas, which can potentially improve and stabilize crop production for resource constrained stakeholders. Intercropping is one of the recommended cropping systems for rainfed areas with growing of two or more than two crops simultaneously in a same piece of land with a fixed row ratio and the crops, which do not compete for resources. Cultivation of short duration and long duration crops together for better productivity and economic returns has been the practice since ages.

Pigeon Pea—An ideal intercrop for rainfed region

Pigeon pea is an ideal intercrop for most rainfed crops and extensively grown throughout the tropics, subtropics and warmer equatorial regions of India, East Africa, and Central America between 30° N and 30° S latitude. The major production area is located in India, Myanmar,



Worldwide distribution of pigeon pea production (Drawn from Sardana *et al.* 2010)



Luxuriant growth of ratoon Pigeon pea (*Cajanus cajan*)

Kenya, Malawi, Uganda, and Tanzania.

Pigeon pea is the second most important pulse crop after the chickpea in India. As an intercrop along with sorghum in 1:1 ratio in a research trial, it grew extremely well in the subsequent season as a ratoon (second season growth) crop. Apart from biological insurance against crop failure, roots of pigeon pea are able to break the hardpan in the sub-surface layer of black (clayey) soils. Demand for input by a ratoon pigeon pea crop is limited. Further there is no need for land preparation or planting. Thus, cost of land preparation is not incurred. One or two intercultural operations may be needed for moisture conservation. Established pigeon pea crop grows quickly on minimal rainfall. Further, fertilizer requirement is also quite low.

The previous season leaf litters itself act as mulch in conserving moisture during rainy days and also increase the organic matter content during subsequent decomposition. It is estimated that approximately 1200-1300kg of leaf litters /ha from pigeon pea alone was added into the soil in every season. This in turn helps in enriching nutrient content in the soil during organic matter decomposition. Study conducted by the ICRISAT showed that pigeon pea adds 8-16 kh nitrogen/ha; 2-2.5 kg phosphorous/ha and 13.5-24 kg potassium/ha as leaf fall drop. Dry season leaf fall of pigeon pea also helps suppress weeds. Results indicated that application of FYM increased sorghum grain yield in intercropping system by 8-10% in

the first year. However, the residual effect of FYM application greatly helped in the growth of second year ratoon pigeonpea. It was observed that approximately 660 and 780kg/ha pigeon pea grain yield during first and second season respectively was observed. This was 10-18% higher than previous season yield. Application of 5-10t/ha FYM increased yield by 33% during first season and 37% in second season.

Intercropping of pigeon pea either with sorghum or maize will be more remunerative to resource poor farmers in the rainfed region. However, ratoon pigeon pea shows promising option for resource poor farmers.

SUMMARY

The pigeon pea crop not only enriches soil through its nitrogen fixing capacity but also adds soil organic carbon through its higher leaf litters. In addition to main crop yield, additional yield of ~660 and 780-kg/ha pigeon pea grain yield was recorded during first and second season, respectively. This was 10-18% higher than previous season yield. Moreover, application of 5-10t/ha FYM increased yield by 33% during first season and 37% in second season. Therefore, ratoon pigeon pea is a potential alternative to be used as an intercrop in low input rainfed farming systems of semi-arid India.

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