



Intercropping-Pigeon pea with groundnut enhancing productivity and income of small farmers-A success story

RP Singh¹, AK Singh², VP Singh³ and RK Singh⁴

¹Senior Scientist and Head, Krishi Vigyan Kendra, West Champaran-II, Bihar

²SMS-Agronomy, MGKVK, Pipiganj, Gorakhpur, Uttar Pradesh

³SMS-Animal Science, MGKVK, Pipiganj, Gorakhpur, Uttar Pradesh

⁴SMS-Agriculture Extension, MGKVK, Pipiganj, Gorakhpur, Uttar Pradesh

Introduction

Agriculture plays a significant role in most of the developing countries including India. But due to the increased population and development of urban clusters along with industrial growth, the shrinkage in the availability of land for farming because of its non-agricultural uses. Among these, intercropping ensures multiple benefits like enhancement of yield, environmental security, production sustainability and greater ecosystem services. Intercropping is growing of two or more crops simultaneously on the same piece of land with a definite row pattern. The main concept of intercropping is to get increased total productivity per unit area and time, besides equitable and judicious utilization of land resources and farming inputs including labour. Pigeon pea [*Cajanus cajan* (L.) Millsp.] is an ideal pulse crop of rainfed tropics and sub-tropics due to its high nutritive value and ability to survive various biotic and abiotic stresses. Thus, it has continued to be cultivated on marginal land mostly under rainfed situation where the risk of crop failure is very high. Groundnut (*Arachis hypogaea* L.) being a legume and oilseed crop their seeds contain high oil (45%), 26-28 % protein, 20% carbohydrates and 5 % fiber. Pigeon pea and groundnut (short duration and short statured crop) intercropping arrangement increases total land productivity, provides more types of food and profits while conserving and sustaining the environment through enhancement of soil fertility by biological nitrogen fixation. Pigeon pea is also suitable for intercropping with groundnut because of its slow growth in the first two months and only starts rapid growth when groundnut approaches maturity.

Gorakhpur district is a part of the North Eastern Plain Zone of Uttar Pradesh. The soils of district are alluvial, calcareous and salt affected. The district has a large number of streams, ponds and rivers, which brings tremendous flood during the rainy season and miseries to the human and animal

population. The average annual rainfall is about 1320.9 mm but it varies in various part of the district. The maximum and minimum temperature varies from 48 to 04 °C. This makes agriculture the most important profession of people. One day a progressive farmer Shri Sudama Singh, village Sihorwa, Post Sihorwa, block-Jungle kaudiya came in contact with the scientists of the KVK. He said that “we grow 2 to 3 acre of pigeon pea crop as mixed cropping with groundnut and maize (broadcasting method) but productivity and profitability is quite low”. Thereafter KVK’s scientists have analyzed the main cause of low production of pigeon pea and other mixed crops viz. use of non-descriptive old mixed variety and undescriptive variety of pigeon pea, no use of fertilizer, no use of weed management, use of broadcasting method, no seed treatment, higher seed rate, indiscriminate use of insecticide.

KVK intervention

In view of above facts, MGKVK Gorakhpur selected to Mr. Sudama Singh under frontline technology demonstration during 2018-19 for increasing productivity of crop and income of farmers. The KVK has intervened through varietal replacement with intercropping such as line sowing of high yielding pigeon pea variety NA-2 + Groundnut (var. Dh-86) other crop management practices i.e., fertilizer (DAP 100 kg/ha) + weed management (Imazethapyr@ 2 ml/liter water at 25 DAS) + pod borer management by application of Emamectin Benzoate 5% SG @ 0.4 g/liter of water at 50% flowering and at 50% pod filling stage in pigeon pea crop and production/protection practices was also followed in groundnut crop under real farming conditions. He sown pigeon pea crop with groundnut (2:4) in the first week of July. Regular field visits were also made by the Subject Matter Specialists-Agronomy under the leadership of Senior Scientist and Head of KVK.

Output

Mr. Sudama Singh adopted the recommended production and protection technologies of pigeon pea and groundnut as per suggestion of KVK scientists. He harvested 12.80 qt/ha and 10.40 q/ha yield of pigeon pea and groundnut respectively which was more over farmers practices (pigeon pea grown as traditional practices like broadcasting method and non-adoption of other proper package and practices). Economic gains such as per unit expenditure, gross income, net return and BCR were recorded of Rs. 32900/ha, Rs. 110960/ha, Rs. 78060/ha and 3.37, respectively.

Outcome



Pigeon pea and groundnut is the important kharif pulse and oilseed crop of the district. The pigeon pea variety NA-2 and groundnut variety Dh-86 has been disseminated in 50 villages of the district in area of approximately 175 ha. The outcome of the trial inspired the farming communities to replace their old mix and non-descriptive varieties with resistance high yielding varieties which are being cultivated. They also aware about other package and practices of intercropping with pigeon pea. Favorable benefit cost ratio is explanatory for economic viability of the demonstration and convinced the farmers for adoption of intervention imparted. Mr. Singh is very happy due to improvement in their farm income and set forth example for others.

Impact

The partner farmers and neighboring farmers were fully convinced with HYV of pigeon pea with intercropping of short duration and short statured crop like groundnut. Farmers becoming aware that intercropping is one of the most important cultural practices for pest management. Intercropping in pulse crops has indicated benefits in terms of economic returns on an average of 20-25 per cent increase in net profit mainly resulting reduces incidence of insect pests. Farmer's confidence improved with KVK scientist to have face to face discussion and facilitated sharing of knowledge with experiences. Intercropping with pigeon pea encouraged the partner and neighboring farmers to act their farm work in a more systemic and specific manner and also reducing plant protection input/other input costs and providing various environmental benefits. If pigeon pea grows with short stature crop like groundnut that created space for free movement of operator/machine during spraying of ecofriendly pesticides for pest management and tall variety of pigeon pea (var. NA-2) to provide support to conserve natural enemies and function as live perches for predatory insects i.e., wasp, coccinellids, chrysopa, ladybird beetle, spiders, dragon fly, preying mantid, robber fly and bird like black mayana, blue jey etc.





Intercropping/Skip method of sowing (Pigeon pea + Groundnut)