

Agri and vege - horti systems with mango in Gangetic alluvial tract of U.P.

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ABSTRACT

Alone Dashari mango cultivation is being adopted by farmhouse holds of U.P. since long time. The mango based agri-horti system with valuable field crops can widely be accepted. On the basis of the suitability of this system, the agricultural scientists have recommended this practice to the farm families of Gangetic alluvial part of U.P. The farm families reside in the central part of U.P. have tested and accepted mango based cropping system. The scientific team of C.S. Azad University of Agriculture and Technology, Kanpur has studied the extent of diffusion of this system under World Bank Aided Project. The farm families of Marhara, Soron, Kashganj, Patiyali, Ganj Dundwara blocks of Etah district adopted the cultivation of wheat, lentil, chikori and oat (green fodder), potato and brinjal in association of mango. Potato, potato+cucurbits, cucurbits after potato, brinjal, vegetable pea, cucurbits after vegetable pea, garlic and onion after potato in association of mango are being followed by farmhouse holds of Sandila block of Hardoi district. Likewise, the farm families of Auras, Miyanganj, Hasanganj, and Safipur block of Unnao district, Kamalganj and Kaimganj blocks of Farrukhabad district and Malihabad and Mal area of Lucknow district followed the wheat cultivation in association of Dashari mango. Inter-cultural operations, water management and manures and fertilizer management of field crops improved the flowering and fruiting of mango. At initial stage, mango gave 20-25 q/ha fruits. Wheat, lentil, chikori, oat (green fodder), potato, brinjal, green vegetables of cucurbits, green pods of vegetable pea, garlic and onion yielded 30, 10, 120, 380, 210, 215, 185, 90, 75 and 260 q/ha, respectively. The mango based cropping systems have maintained cash flow system and improved the standards of living of farm families and created healthy environment for soils, humans and animals.

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Fruit crops *viz.* guava, mango, aonla, ber and citrus are commonly grown in the central tract of U.P. Among these fruit crops, mango is the king of this tract while guava covers the major part of sandy loam and loamy sand group of soils, located at riverside. The alluvial soils of U.P. has deeper depth and is most suitable for the cultivation of garden and field crops, therefore, mango based agri-horti system a viable option. The mango has slow growing nature and it plant at wider space. This provides an opportunity to use the available natural resources.

In younger garden of mango, the field crops can be economically harvested up to 5-6 years and some time 8-9 years. The younger mango trees have little or no adverse effect on growth and yield of field crops. Therefore, well-established mango based cropping systems have been disseminated on the farmers' fields of alluvial soils. The extent of mango based cropping systems and harvested yield levels of different crops have been studied under World Bank Aided Projects.

MATERIALS AND METHODS

The study sites are located in the central Gangetic plain of U.P. The selected blocks of different districts

typically represent soils; climate and socio-economic condition of Agro-Climatic Zone IV and V. The twenty years mean annual rainfall of area is 832 mm. The length of growing period of representative area varies between 120-150 days. The soils of representative area developed over alluvium. The major soils belong to loamy sand, sandy loam and loam and are most suitable for mango based cropping system. No major constraints recorded for the diffusion of mango based agri-horti system. The basic information's of mango based cropping system of selected area have been collected by RRA technique while primary data recorded by PRA technique.

RESULTS AND DISCUSSION

The production technology followed in agri-horti system and yields recorded under mango based cropping system have been reported in Table 1. The important results are discussed below:

Mango:

The farmers of the selected sites planted the Dashari mango at the distance of 8x8 meter in rows under agri-horti system. The farmhouse holds harvested mango fruits by 20.00 –25.00 q/ha, at initial stage from agri-horti

Table 1: Production technology and yields of different crops under agri- horti system

System	Planting distance of mango (m)	Planting distance of companion crops (cm)	No. of rows of companion crops in two rows of mango	Plant stand of companion crops	Yield (q/ha)	
					Mango	Companion crops
Mango+wheat	8x8	22.5	27	77	20-25	30
Mango+lentil	8x8	30.0	20	74	20-25	10
Mango+potato	8x8	50.0	12	75	20-25	210
Mango+brinjal	8x8	60.0	10	72	20-25	215
Mango + vegetable pea	8x8	30.0	20	75	20-25	90 (green pods)
Mango+cucurbits	8x8	200.0	3	75	20-25	185
Mango+onion	8x8	15.0	40	75	20-25	260
Mango+garlic	8x8	15.0	40	75	20-25	75
Mango+chikori	8x8	Broadcasting	-	75	20-25	120 (green stage)
Mango+oat	8x8	Broadcasting	-	75	20-25	380 (green fodder in two cuttings)

system, which was equal to the yield of mono cropping of mango.

Mango + food grain crops:

Wheat cultivation in the inter spaces of mango was noted in most of the places but lentil cultivation has seen in the Marhara block of Etah district. Wheat sown at the distance of 22.5 cm. and adjusted 27 rows in between two rows of mango. The 77% adjusted plant stand of wheat yielded grains by 30 q/ha. Some of farm families sown the wheat crops by broadcasting method and harvested at par grain yield of wheat. The lentil was planted at 30 cm apart and 20 rows adjusted in between two rows of mango. Lentil gave 10 q/ha grain yield at the plant stand of 74 %.

Mango + vegetables:

Mango+potato, mango+potato+cucurbits, mango+potato-cucurbits, mango+potato-onion, mango+garlic, mango+vegetable pea, mango+vegetable pea-vegetables and mango+brinjal agri-horti systems are being followed by the farm house holds. Potato planted at the distance of 50 cm apart and adjusted 12 rows between two rows of mango. The 75 % adjusted plant stand of potato gave 210 q/ha tubers yield. The farm families raised the onion crop in mango+onion and mango+potato-onion cropping systems. Onion planted in 40 rows at 15 cm apart in the inter spaces of two rows of mango. Onion yielded 260 q/ha bulbs at 75 % plant stand. In Kaimganj, Marhara, Soron, Kashganj, Patiyali, Ganj Dundwara and Sandila block, the farmers planted the cucurbits at 50-75 cm apart on every fifth ridge of standing crop of potato. Under this system 75 % plants stand of cucurbits adjusted by farmers. The cucurbits yielded by 185 q/ha without any

loss of tubers yield of potato. Some farm families also planted the cucurbits after harvesting of potato. The cucurbits planted at 200x50-75 in pits or channels. The adjusted 75 % plant stand of cucurbits gave 275 q/ha. The farmers of Kashganj, Marhara, Soron, Patiyali, Ganj Dundwara, Kaimganj and Sandila blocks raised the vegetable pea for green pods. The vegetable pea planted at 30 cm apart between two rows of mango and adjusted 75 % plant stand in 20 rows of vegetable pea. Vegetable pea gave 90 q/ha green pods. Brinjal planted at 60 cm apart in 10 rows and adjusted 72 % plant population in the inter spaces of two rows of mango. Brinjal yielded by 215 q/ha fruits yield.

Mango + garlic:

Farmers raised the garlic under this agri-horti system. The 75 % plant stand adjusted in 40 rows by planting at 15 cm apart. The farmers harvested 75 q/ha bulbs from the inter spaces of mango.

Mango + chikori:

Chikori is an industrial crop and it spread on farmer's fields of Marhara block of Etah district. The farmers broadcasted the seed of chikori in the inter spaces of mango rows after leaving the distance of 0.5-1 meter in both sides of mango rows for easy management of both crops. The 75 % adjusted plant stand of chikori yielded by 120 q/ha green roots and leaves.

Mango + green fodder:

The farmers of Etah district raised the oat in young mango garden for green fodder. After leaving of 0.5-1 meter space in both sides of mango rows farmers broadcasted the oat seeds. The farmers' harvested 380

q/ha green fodders from oat in two cuttings at 75 % plant stand.

The farm families of the selected sites maintained their good standard of living by mango based agri-horti system. The cash flow of these farm families found in excellent manner due to rearing of graded buffaloes and crossbred cows and disposal of vegetables throughout the year. The mango base cropping system has synergistic effect on the yields of mango and companion crops.

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