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Ayapan farming: New dimension of income generation through medicinal crop farming

Ayapan farming is gaining popularity among the tribal farmers for large scale production in Habibpur of Malda district. Ayapan is botanically identified as *Eupatorium triplinerve* and has high medicinal value. Cultivation of this crop was adopted by the farmers of Habibpur region for its high income and less gross expenditure. The farmers engaged in production of this medical plant earned income of ₹7.42 lakhs per ha in 5 years from less irrigated land with less expenditure and physical labour. Therefore, similar land with no or very less irrigation facilities can be converted into Ayapan plantations for sustainable income, because marketing of this product is comparatively easy due to its high demand.

AYAPAN is botanically identified as *Eupatorium triplinerve*. It is an evergreen perennial plant having high medicinal value. The plant has its origin from South America. It is commonly an ornamental plant and bears long and slender leaves which are used to make herbal medicinal extracts. Even though the leaves are rich with medicinal principles, whole plant is used in therapeutics. It is used to control bleeding of open wounds and blood clotting. The leaves and stem are indicated in bloody diarrhoea, bleeding piles, stomach ulcer bleeding or other parts of the body.

Eco-friendly Agro Development Society, Habibpur, Malda have started to promote Ayapan cultivation for large scale production and marketing of the product through the society. The society has encouraged more than 150 farmers to cultivate this medicinal plant in their own land.

Ayapan plant

Classification

Ayapan is botanically identified as *Eupatorium triplinerve* which belongs to Order Asterales, Family Asteraceae and Genus *Ayapana*.

Chemical composition and uses

The plant yields many chemicals such as cineol, alpha-phellandrene, alpha-terneol, ayapanin, ayapin, borneol, coumarin, sabinene, umbelliferone, etc. Additionally, vitamin C and carotene are also found in this plant. Further, an important bio-chemical extract of the plant Hemarin is used to make anti-tumour medications. Crude leaf extracts of this herb show potent anti-microbial activity. Essential oil obtained from the leaves bear anti-tumour effects. The leaves also show anti-helminthic and anti-oxidant properties.

Precautions

As Ayapan is highly recommended to prevent bleeding, it should be avoided among patients using blood thinner. The leaves contain a highly aromatic chemical known as coumarin which has blood thinning and anti-coagulant properties. People on blood thinner can develop an increased risk of bleeding or stroke in such cases. The herbs have a highly laxative effect because of which many people may develop diarrhoea or vomiting with its use.

Crop production

The plant can be planted all-round the year but it is preferably done before the onset of monsoon (i.e. May-July) so that maximum growth can be achieved. In

Ayapan field

normal case, the crop needs to be irrigated at least thrice in between February to April depending on duration of dry spell or less rainfall. As the crop is used as medicinal plant, use of fertilizers or any other chemical is strictly prohibited. Only farmyard manure is used for its growth at the rate of 75 q/ha/year during, before, and after onset of monsoon. The plant generally needs 4 months to grow to a length of 6 inches. But, during the 4th month or at a length at 6 inches, pruning is done so that more branches can come out of the plant. Again, in the 6th month, the next pruning is done for better yield. It is generally 5 years duration crop as the crop yield gets reduced after 3rd year of production. So, it is better to harvest fully in 5th year and start a new plantation.

Harvesting

The plants once planted can grow to a height of 6 cm in 3 months. The plant can be harvested thrice in a year depending on the growth. The harvesting of the crop is generally done when the plant grows to a length of 5-6 inches.

Drying and storage

The stems with leaves were simply cut and sun-dried, and stored in a dry place before marketing. About 1 kg of dry cut leaves are obtained from 5 kg of green cut after sun drying.

Marketing

The marketing of the crop was done among the members of the society by the Eco-friendly Agro Development Society, which actually cultivates the crop and buys back the harvested crop for marketing. Later, the society markets the harvested crop after sun-drying at a proper time under guidance from Malda Krishi Vigyan Kendra, Uttar Banga Krishi Viswavidyalaya to get the best price for the processed crop. The live plant, is used for ornamental purpose as well as a medicinal plant and is available at the online marketing site @ ₹200-600, but online marketing is still to be done for higher marketability of the crop by the society.

Economics

Economic analysis is one of the important aspects for viability of any project or programme. The higher net income of any crop production always depends on higher selling rate or lower expenditure. From 1 ha of land, about 45-50 q of green plant and leaves can be harvested on normal production in the 1st year and in subsequent years, i.e. 2nd and 3rd year, production usually increases. But, there is certain drop in production in 4th and 5th year, therefore is better to harvest it fully in 5th

Ayapan leaves

Sun-dried leaves

Stored leaves

Table 1. Economic analysis of cultivation of Ayapan (per ha)

Year	Crop yield (q/ha)	GE (₹)	GI (₹ in lakhs)	NI (₹ in lakhs)	B:C ratio	Rate of return
1st	9	0.80	1.26	0.46	1.58	0.57
2nd	12	0.23	1.68	1.45	7.30	6.30
3rd	12	0.24	1.68	1.46	7.00	6.08
4th	10	0.26	1.40	1.14	5.38	4.75
5th	10	0.27	1.40	1.13	5.19	4.19
Total	**53**	**1.80**	**7.42**	**5.64**	**4.12**	**3.13**

Note: GE, Gross expenditure; GI, Gross income; NI, Net income; B:C ratio, GI/GE; Rate of return, NI/GE.

year and start a new plantation. The gross expenditure is calculated on irrigation, labour for weeding, harvesting, farmyard manure, etc. The market rate of dried plant was about ₹130-140 per kg. The analysis of cultivation of the Ayapan by Mr. Mridha in 1 ha of land is given in Table 1. It can be seen that crop yield was less and gross expenditure was comparative higher in the 1st year of cultivation. Production was comparatively higher in 2nd and 3rd year of cultivation but it reduced in 4th and 5th year of cultivation. The B : C ratio for 5 years was 4.12 and the rate of return was 3.13 for Ayapan cultivation per ha.

SUMMARY

Ayapan cultivation has shown a new dimension of income generation where availability of water resources is not very easy. The area under Ayapan farming is growing at a large scale in the regions having low irrigation facilities. Economic analysis of the crop and assured marketing has encouraged many farmers in adopting Ayapan cultivation in the region. Further, more farmers got motivated for its cultivation due its higher benefit cost ratio and higher rate of return.

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ICAR-Central Institute of Cotton Research (CICR) IFS Model for enhancing farm income





Rainfed monocropping systems have low yield and lead to low income. Crop diversification is a choice available to increase productivity as well as farm income. Therefore, an Integrated Farming System (IFS) model was developed at ICAR-CICR for rainfed cotton-based system for central India. Firstly, a diagnostic survey was done to identify farmers' choice, resource availability, demand in the local market and compatible enterprises. The results of the IFS model (2017–21) showed that pigeonpea intercropped in cotton (6:2 ratio) in one-acre recorded seed-cotton yield of 823 kg and pigeonpea grain yield of 152 kg. In another one-acre area, soybean was cultivated in *kharif*, followed by chickpea + mustard during the *rabi* season. Soybean produced 864 kg grain yield, while, in *rabi* 1,060 kg chickpea and 75 kg mustard were harvested. The remaining area (0.5 acre) was allocated to goatery, vegetables, fruits, water-harvesting pond and fodder unit. Goatary (Usmanabadi) unit of size 9+1 could earn a net return of ` 15,812 with an employment generation of 120 man-days. A poultry (Giriraja) unit with 100 birds in two batches, realized a net profit of ` 65,614 over the year. The horticulture component in IFS yielded a net profit of ` 29,134. This component included fruits (custard apple, papaya) and vegetables (French bean, bhindi, tomato, gourd group vegetable). Overall, one-ha IFS model produced 70.2 q/ha cotton-equivalent yield with a B:C ratio of 1.95. In one year, 3,020 kg feed, 1,590 kg fodder, and 2.50 tonnes manure were produced in the system and were used as input for different enterprises. Water harvested in 20×20 m^2 pond was used for life-saving irrigation in *rabi* and vegetable crops. The ICAR-CICR IFS model for 1 ha, could generate 492 man-days during the one-year cropping season.




Source: ICAR Annual Report 2021-22