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Tiwari Rekha
Scientist (Home Science), Krishi
Vigyan Kendra, RVSKVV,
Ujjain, Madhya Pradesh, India

Tomar DS
Scientist (Agronomy), Krishi
Vigyan Kendra, RVSKVV,
Ujjain, Madhya Pradesh, India

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Edamame cultivation: An opportunity to income generation for doubling the income of farm women

Tiwari Rekha and Tomar DS

Abstract

India as a developing nation, is home to almost 1.35 billion people, and is also a significant contributor to the world's poverty and health problems, providing a clear target for global initiatives against hunger. To enhance the economic condition of rural families Krishi Vigyan Kendra (RVSKVV) Ujjain (M.P) conducted an On Farm Testing in the adopted cluster area of the KVK, Ujjain. Edamame was introduced to farm women for fresh consumption in Green stage. Vegetable soybean is similar to its grain counterpart – it is the same species, but harvested earlier, when pods are bright green, yielding bigger, sweeter seeds Results reveal that edamame is new in Malwa region hence there could be a key intervention in doubling the income of farm women.

Keywords: edamame, vegetable soybean. farm women and doubling the income

Introduction

Economically, Madhya Pradesh is one of the poorest states in India. Roughly speaking, one in every three persons in the state lives below the poverty line. There are about 5.3 million families below poverty line. In case of education it was observed by that overall literacy rate in the State recorded by 2011 Census is 70.6% (Male 82%, Female 65%). The gap of 21.6% points recorded between male and female literacy rates in 2001 Census has fallen to 16.7 percent point in 2011 (Anonymous, 2007) ^[1]. Education is the essence of life. The women status in all terms is not satisfactory in Madhya Pradesh. The female population of the state is 49 % of the total population of the state the state is being regarded as one of the state having gender disparity in literacy rate. This education level further creates economic problem in the family. Due to the low literacy rate the farm women are unable to move for good job instead of that they were compelled to take the job opportunity in the unrecognized sectors and compel to earn less wages as compare to men folk. It is also quite true that economy of our country is depend on agriculture as near about 70-75 percent were depend directly or indirectly. If we see the cropping pattern in Madhya Pradesh soybean is the main Kharif crop hence it is known as 'Soybean State'. Production is quite good but from the economic point of view it not sufficient to boost the income of farm families. As per the Tomar *et al.* (2013) ^[15] Madhya Pradesh is the soybean state of India as it is a leading region in soybean production both in terms of area and productivity (70 and 64 per cent respectively) covering 4.8 million ha and producing 1,120 kg/ha and soybean production in Ujjain District accounts for approximately 10 per cent of the state area for soybean. Hence, there is quite bright chance to introduce the edamame (Green Vegetable) in the farm community as a substitute of traditional soybean (Singh *et al.* 2017a; Singh *et al.* 2017b; Singh *et al.* 2017c; Singh *et al.* 2018; Tiwari *et al.* 2018; Tiwari *et al.* 2019a; Tiwari *et al.* 2019b; Kour *et al.* 2019; Singh *et al.* 2019) ^[6-14]. The production is quite good and in terms of money it is profitable. By keeping some objective viz the general information of farm families, economic condition and feed back of the farm families and edamame was introduced first time in Ujjain District.

Materials and Methods

Selection of the village: Selection of the site is very important for success of any study.

Correspondence

Tiwari Rekha
Scientist (Home Science), Krishi
Vigyan Kendra, RVSKVV,
Ujjain, Madhya Pradesh, India

Keeping that in mind the PRA technique was utilized. Krishi Vigyan Kendra, Ujjain conducted the PRA for ascertaining the problem, need and solution through group approach. Accordingly, those who were interested to cultivate the vegetable crop were selected from two villages namely Chintaman Jawasiya and Kalyanpura of Ujjain block in year 2017-18.

Awareness Campaign: On campus and Off campus training programmes were conducted regarding the edamame which can be consumed in the green form very much like green peas based on the problem cause diagram prepared during PRA. First the sensation and curiosity was developed among the farm women regarding utilization of Edamame vegetable soybean in daily diet. In both training programme the awareness campaign about the vegetable soybean was discussed among the farm women.

Selection of the Sample: Based on the intrinsic feeling of farm women in the training programmes. Exclusive, 10 farm women were selected for conducting the On Farm Testing on Edamame- vegetable crop at adopted cluster area of Krishi Vigyan Kendra (RVSKVV) Ujjain (M.P.). Total 10 plots of Vegetable soybean were demonstrated on the field.

Introduction of Technology: In the OFT Edamame – vegetable soybean variety Karune was introduced to the farm women. This variety was identified under AICRP Project by University Agricultural Sciences Bengaluru vide state release committee of Karnataka.

Specification of the variety:

Plant type: Erect, semi-determinate, bushy and robust.

Seed size: Extra Bold Seed

Colour: Attractive light green colour

Seeds /pod: Usually 2 seed /pods.

Pods: Smooth, non-glabrous and having no pubescence

Beany flavor: Absent, hence acceptable from consumption point of view

Utility: Substitute of green peas (Specially in Kharif season)

Production: Three times better than traditional soybean.

Multiple marketing: (i). Whole plants, (ii). Pod only and (iii). bean only.

Whole plants: Fresh beans are harvested by cutting the entire plant at about two inches and bunching stalks together in groups of four to six plants. The top leaves and small damaged pods are removed, while whole plants with leaves, pods, stems, and roots are packed in bundles or in wooden boxes or cartons. This form is considered the most desirable and brings the highest prices, since Japanese consumers believe this method best preserves pod quality.

Pod only: Marketable pods are removed from the stalks and packed and marketed in plastic net bags. To maintain freshness, speedy harvesting and packaging is crucial.

Bean only: Beans are shelled and marketed fresh or in frozen form.

Preference to Edamame-Karune: Due to the better production, rich in nutritional and medicinal use this Karune was purposely selected for demonstration to minimize the malnutrition and to enhance the economic condition of the farm families. Being a source of complete protein, edamame can help to maintain muscle mass. It is a good source of folate and vitamin K which are important for a healthy heart. It basically consists of mono and polyunsaturated fatty acids and

omega-3 and omega-6 fatty acids. All these fatty acids are known to be beneficial for heart health and so, they can reduce the risk of heart disease and hence a better substitute of protein as compared to meat and in turn enhances cardiovascular benefits as it contains significant amount of dietary fiber, which helps to lower the level of cholesterol in the body. Edamame contains calcium important for the growth of strong, healthy bones and teeth, maintains bone density. Soy protein and fiber helps to control hunger by giving a sensation of fullness (Holly Born (2006) [4]).

Nutritional Composition of Edamame

The nutritional aspects as per the Tak Kimura (2015) [5] are given below:

Nutritional Composition of Edamame

Nutrient	Quantity	Nutrient	Quantity
Calories (k.Cal.)	125.0	Phosphorus(mg)	180.0
Protein(g)	12.1	Iron(mg)	2.7
Carbohydrates(g)	13.1	Sodium(mg)	5.0
Fat(g)	3.6	Vitamin A(μ g)	130.0
Ash(g)	1.7	Vitamin U1 (mg)	0.31
Calcium(mg)	9.3	Vitamin C(mg)	40.0

Use of Edamame: Edamame Karune can be consumed as a snack, a vegetable dish, used in soups or processed into sweet. As a snack, the pods are lightly boiled in salted water and then seeds are squeezed directly from the pods into the mouth with the fingers. It can be also utilized in the form of roasted, boiled, by making curry and chutney and so on. Hence, edamame is economically better due to its multiple use in the daily diet.

Production of the Edamame: Karune: Production of the edamame- Karune was assessed in terms of economic and by calculating the B: C ratio. Net profit is also taken in to consideration because as compare to the traditional soybean the edamame is better in terms of production. The farm women also interested in doubling the income of family by adopting the diversification in soybean variety.

Feed Back: A questionnaire was prepared to assess the acceptability of the edamame in different form of consumption. All the points were covered which are required for the acceptance by mean of consumption and by mean of market point of view. The five points scale was used which lies from liking to disliking.

Results and Discussion

Personal information of the farm women as depicted in the table 01 reveals that 3 women were in the age group of 30-40 whereas 7 women were dwelt in more than 40 years' age group. As regards to the education maximum (50%) women were educated up to 06 -10 standards followed by 40 per cent up to 5th standard and only one farm woman was illiterate. Nobody was graduate. It means in the rural area the education of the farm women is not so good it requires some more attention towards the girls' education. In case of family system, it was also observed that 40 per cent lived in the nuclear family system and 60 percent still have their emotions attached with the joint family. It was clear that in the rural area joint families still has its existence as a mechanism of social security. The economic condition of the farm women was average earning bread and livelihood with great efforts. Almost half of the respondents earned up to 2 lacks whereas

40 per cent could earn 1.5 lacks and only 10 per cent had a liberty to expend 2 lacks per annum at their disposal. Here, the picture was clear that to raise the economic condition of the farm families the crop diversification in terms of adopting the new varieties / crop in the field without disturbing their routine pattern.

Table 1: Personal information of the farm women. (N=10)

Particular	No of Respondents	Percentage
Age (yrs)		
20-30	00	0.00
30-40	03	30.00
Above 40	07	70.00
Education		
Illiterate	01	10.00
1-5 standard	04	40.00
6-10 Standard	05	50.00
11-12 standard	00	00.00
College	00	00.00
Family Type		
Joint	06	60.00
Nuclear	04	40.00
Annual Income (family)		
80,000/- to 1,00,000/-	00	00.00
1,00,000/- to 1,50,000/-	04	40.00
1,50,000/- to 2,00,000/-	05	50.00
Above 2,00,000/-	01	10.00

Table 3: Method of Consumption the edamame –Karune

Farm women's practice F1	Recommended Practice R1
Only for oil purpose	Paratha/ puri (using leaves) Vegetable/ curry purpose/ Boiled/ Roasted/ Chutney etc.

Types of consumption patterns of vegetable soybean was given in the table 3. The farm women were consuming the field crop soybean in the form of edible oil whereas the vegetable soybean can be consuming in fresh form only at the green stage. The multipurpose use of vegetable soybean was given in the table that it could be used in the form of boiling,

roasting, green lives could be used for making Paratha and puri and the main purpose of that vegetable soybean was to consume in the form of fresh vegetable just like green peas. It can be stored in the dry form and utilize it as the other beans are utilized.

Table 4: Economic stability through edamame –Karune

Crop	Cost of cultivation / ha	Production qt/ha	Gross Return /ha	Net return/ha Rs	B:C (Gross return/Cost of cultivation)
Field Soybean	27000	15.0	52,500	25,500	1:1.94
Edamame	31500	65.0	1,30,000	98,500	1:4.12

Sale rate: Field Soya @ Rs 35/kg; Vegetable soya @ 20/kg fresh pods

Table 5: Feed back of the farm women regarding edamame-Karune

Parameters	Feed Back of the respondents
Color	Fresh green color
Appearance	Attractive appearance
Texture	Soft
Size	Bold size
Taste	Easily acceptable just like green peas
Overall appearance	Good
Market facility	Awareness is required it will be easily acceptable by the consumer for eating purpose and it can be sale easily
Opinion about the vegetable Soybean	Good for health, economic, enhance the health status as well as economic condition also. Introduction of the vegetable soybean in the market can attract the consumer.

The main impact of the study was concluded in the form of feedback which was depicted in the table 5 based on the farm women's response. The fresh green color and its bold size was attractive and due to that quality it can be easily

Table 2: Details of OFT (On Farm Testing).

Particular	FP	RP
Name of the vegetable	Soybean (Field Crop)	Vegetable soybean –Karune
Quantity of seed	500 gm	500 gm
Area m ²	50	150
No. of pods / plant	22	64
No of plants / line	1640	350
Production qt/ha	15.0	65.0 fresh pods
Use	For oil purpose	Fresh consumption as vegetable.

Note: FP-Farm women's Practice, RP- Recommended Practice

In the table 2 the detail of the On Farm Testing was given. The new soybean vegetable variety- Karune was introduced to the farm women under the KVK mandate activity On Farm Trial. The bold seed vegetable soybean was first time sown by the farm women at their field hence only 500 gm seeds were provided by the Institute to farm families. The area was also small for the vegetable soybean. It was observed that on an average 52 pods were found on one plant and 55 plant/ line. The sowing method was slightly differing than the other field crop of soybean. This soybean was sown by dibbling method with presoaking 2-3 hours. The vegetable soybean was used for consumption in multifarious way like roasting, boiling, vegetable etc whereas the ordinary soybean was not consumed by our farm families except in the form of oil.

acceptable in the market if somebody will cultivate it for the economic point of view. The taste of the bold seeded vegetable soybean was just like green peas so it can be easily acceptable in the market for commercial purpose also. In the market the awareness should be create regarding the vegetable soybean for consuming in the form of fresh podding stage. Thus the introduction of the new vegetable soybean can be minimize the malnutrition problem and also enhance the economic condition of the farm women because of its medicinal value, its appearance, new sensation in the market for new vegetable which can be substitute of the green peas in the Kharif season. By using the crop diversification method farm women can cultivate the edamame and earn money just double.

Conclusion

In a country like India where the majority of the population having low purchase capacity, living in rural and semi-urban areas. In such condition Edamame offers a ray of hope. In

Madhya Pradesh, there is golden opportunity for the farm families for doubling the income in agriculture sector just by adopting the new variety edamame and some precautions while cultivating the new crop will definitely boost the income of the farm community. Edamame provide net profit just more than double.

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