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Impact of Village Adoption Programme (VAP) on Production and Income of the Beneficiary Farmers

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Abstract

Krishi Vigyan Kendra, Hassan made an attempt to assess the influence of technological interventions initiated through 'Village Adoption Program (VAP)'. VAP aims at boosting agricultural production, encouraging farmers to practice more scientific farming, making them to understand the technological options thereby uplifting the socio-economic status of farmers. In light of this, a study was conducted by selecting Rampura village of Hassan district under VAP for three years (2019-2022). Initially, majority of the farmers were lacking knowledge on scientific cultivation practices, improved varieties and different scientific production technologies. After KVK intervention and supply of critical inputs,farmers knowledge and adoption in advanced technologies available in agriculture improved. Farmers expressed that, KVK intervention reduced the drudgery in field operations, increased the knowledge on the animals husbandry and scientific management of crop stand by organizing various training programs, capacity development programs, demonstrations and educative extension materials. Simultaneously, their knowledge on backyard nutritional kitchen gardening increased. Conclusively, a noticeable change in farmer's awareness, farmers empowerment and capacity building through demonstrations and training programmes with respect to new technologies and utilization of the existing resources effectively were obseved. Crop diversification through improved varieties integrated with animal component resulted in obtaining maximum productivity and profitability of small and marginal farmers.

Keywords : Village adoption programme, Technological interventions, Awareness, Yield gap and impact

If the village perishes, India will perish too - Mahatma Gandhi. 'Village is defined as the settlement usually found in rural setting. It is generally larger than a hamlet and smaller than a town. Some geographers specifically defined, village as, an area which is having between 500 and 2,500 inhabitants'.

According to University Grants Commission (UGC), every University should have an extension dimension to make advantageous to the non university people. In this connection, State Agricultural University (SAUs), KVKs, ICAR institutes are adopting villages to extend the benefits to them through teaching, research and extension are the three dimensions of Agricultural University.

Village Adoption Scheme will equip and familiarize the people about the socio- economic dimensions of the rural communities, status of sustainable use of natural resources, changing perceptions and aspirations, priorities and innovative effort of the rural communities for sustainable development and inspire the community for self-help to roll out strategies, methodologies, processes to develop sustainably and create cohesive communities where every individual gets equal opportunity to realize his/her potential.

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Through this process, people learn, document the ups and downs which can help them in revising strategies for better training and come up with new models of rural development for replication elsewhere by all stakeholders.

Hassan district has predominant agrarian population whose economic status mostly depends on agriculture and the population lives in its villages. Further, it was a mandatory activity of each KVK under the jurisdiction of UAS, Bangalore to adopt a village for every three years. Therefore, in order to effectuate this, KVK, Hassan district has adopted Rampura village, Channarayapatna taluk, Hassan District for three years from 2019-20 to 2021-22 with a financial support aided by the University of Agricultural Sciences, Bangalore.

The village Rampura, which was untouched by many technological interventions is situated nearly 71 Km away from the KVK. The total population of Rampura is 543 out of which 298 males and 245 females are living in 83 Houses. It is having total geographical area of 208 hectares, out of which the cultivable area is 171 ha and the cropping pattern comprising of cereals, pulses, oilseeds, coconut and Banana. Majority of the farmers were small (56.34%) and marginal (32.60%) farmers whose primary source of irrigation is through bore wells.

The farmers are mainly growing field crops *viz.,* finger millet, maize; pulses such as redgram, greengram, blackgram, field bean, chickpea. The farmers are also growing potato, banana and coconut. The village also possessed nearly 315 milching cows, 25 Buffalos, local goat, sheep and poultry birds. Transport of the agriculture produce was mainly through tractors and tata ace.

Nearly 70 per cent of the population was literates, consisting of graduates, higher, middle and primary educates. This village avails facilities like anganawadi, Govt. Higher Primary School, subsidiary ration shop and Temple. The village is also provided with one water tank which is used for drinking purpose and also provided with dairy. Hence, there is a need to study the impact of VAP on farmer's knowledge and adoption with respect to crop production to know the importance of this programme.

Methodology

An ex-post facto research design was employed for the study to assess the impact of VAP on farmer's knowledge and adoption with respect to crop production and allied enterprises in Rampura village, (2019-20 to 2021-22) of Channarayapattana of Hassan district. The data was collected from the 90 respondents who were continuously benefitted from village adoption programme during 2019-20 to 2021-22. Pre-post method of data collection was carried out. Initial data collection was done before the village adoption programme initiation as a base line survey and second data collection was carried out after the completion of village adoption programme. A personal interview method was used with the help of the constructed interview schedule. The data collected was analysed based on the mean score and frequency.

Results and Discussion

Socio-Economic Characteristics of Selected Farmers in Adopted Village

It is clear from the Table 1 that more than one third (38.89%) of the farmers were aged farmers (above 50 years) followed by 36.67 per cent of them were middle aged (between 36 to 50 years) and nearly one fourth (24.44%) of the farmers were young farmers. Generally, farmers of young and middle aged group are enthusiastic and will have inclination towards new ideas and zeal to earn more income.

It is evident from the Table 1 that 32.22 per cent of the farmers had primary school education. This may be due to the negligence of parents towards imparting education in their early ages due to their unawareness about the importance of education. Moreover, the family size of the farmer may have direct influence on education of children. More than one fourth of the farmers (31.11%) were having high school level of education, 20 per cent of the farmers were educated upto college PUC level followed by 10.00 per cent of

TABLE 1

Socio-economic profile of the selected famers in adopted village (n=90)

Characters	No.	Per cent
Age (years)		
< 30	22	24.44
31 to 50	33	36.67
> 51	35	38.89
Education		
Degree	09	10.00
PUC	18	20.00
High school	28	31.11
Primary	29	32.22
Illiterate	06	6.67
Type of Family		
Nuclear	63	70.00
Joint	27	30.00
Size of the Family (members)		
1-3	28	31.11
4-6	49	54.44
> 7	13	14.45
Annual Income (Rs.)		
<11,000-24,999	7	7.78
25,000-75,000	51	56.67
>75,000	32	35.55

the farmers were educated upto degree level and 6.67 per cent farmers were belongs to illiterate category. Other contributing reason could be that the rural social environment in which they lived might not have encouraged parents to give formal education to their children.

Further, it is found that, nearly three fourth of the farmers (70.00%) were having nuclear family followed by joint family. Joint family system is the representative family type in rural India since centuries. This is because people in rural India believe in cooperative living and sharing the responsibilities. Agriculture, as livelihood requires large number of hands to cultivate crops. So, the above factor might have given way to the formation of joint families. With respect to family size, more than half of the respondents (54.44%) were having 4 to 6 family members followed by 31.11 per cent farmers having less than 3 members in a family and 14.45 per cent famers had more than 7 family members.

Even though the majority of the farmers perceived agriculture as their main occupation, more than half of farmer's (56.67%) annual income of the family ranges from Rs.25,000/- to 75,000/- category. Followed by 35.55 per cent and 7.78 per cent of farmers belong to more than Rs.75,000/- and Rs.11,000/- to 24,999/- annual income category, respectively. Due to the small sized and uneconomical land holdings, farmers might have less income. Moreover, prevailing drought situation in the area for the past couple of years and the higher dependency on rainfall might have been the reasons for such low income. The family income also includes the monthly income earned through different farm enterprises and the results are in concurrent with the Vivek and Sahana (2021).

Possession of Land, Livestock and House hold Materials

It is seen from the Table 2 that, more than half of the farmers (54.44%) were having a land area less than 2.5 acres followed by 21.11 per cent of farmers were having land area 2.5 acres to 5 acres. Further, 14.45 and 10.00 per cent of the farmers having 5 to 10 acres and more than 10 acres of land respectively.

More than three forth of the respondents possessed cows followed by poultry birds. Dairy enterprise (Cows and buffalos rearing) followed by backyard poultry activities found to be economical subsidiary enterprises generating constant revenue to their family income.

With respect to house hold material possessions, it was found that majority of them were having TV (95.55%) and mobile (83.33%) sets followed by Gas cylinder (78.88%), motor cycle (73.33 %) and pressure cookers (67.77%). Exactly half of the respondents having bicycle. Further, their income level was found to be correlated with their house hold material possession and as such it is impossible for them to

TABLE 2

Possession of land, livestock and house hold materials

(n=90)

Characters	No.	Per cent
Land holding		
Marginal farmers (<2.5 acre)	49	54.44
Small farmers (2.5 – 5 acre)	19	21.11
Medium farmers (5 – 10 acre)	13	14.45
Large farmers (> 10 acre)	9	10.00
*Livestock possession**		
Buffalo	12	13.33
Cow	73	81.11
Poultry	51	56.66
Sheep &Goat	21	23.33
*House hold material possession**		
Television	86	95.55
Bicycle	45	50.00
Motor cycle	66	73.33
Mobile	75	83.33
Gas	71	78.88
Pressure cooker	61	67.77
Housing condition		
Katchha (Straw) house	3	3.33
Tiled house	59	65.56
Pucca (RCC) house	28	31.11

* Multiple responses were obtained

possess much of other materials. Since majority of the farm women belongs to small land holdings, they might not have more house hold materials. Nearly two third of the respondents (65.56%) were found to have tiled houses followed by RCC houses (31.11%). This is primarily due to economic condition of the farm families which in turn determine their standard of living and the results are in line with the Kowsalya (2017).

Distribution of Respondents According to their Knowledge Level

The result presented in Table 3, shows that majority of the respondents (54.44%) in Rampura village belongs to low Knowledge level category followed by 27.78 and 17.78 per cent of the respondent farmers belongs to medium and high knowledge level categories, respectively before the village adoption programme by the KVK. Whereas, after the village adoption programme taken up by the KVK nearly two third (65.56%) of the respondents in the Rampura village belonged to high Knowledge level category followed by 25.56 and 8.88 per cent of the respondent farmers belonging to medium and low knowledge level categories, respectively. This might be due to the reason that before village adoption programme farmers were not aware about the improved varieties, technologies, breeds, mechanization, *etc.,* since village was interior, small and remained untouched by the developmental departments. So, after three years of adoption, there was increase in their knowledge about modern technologies, improved varieties, breeds and other improved aspects in health, education, agriculture and allied sectors. The results were in line with the Hema Sarat Chandra *et. al.,* (2017) and Jeyaseelan (2010).

TABLE 3

Distribution of respondents according to their knowledge level

(n=90)

Category	Before Adoption of village		After adoption of village	
	Percentage	Frequency	Percentage	Frequency
Low	49	54.44	8	8.88
Medium	25	27.78	23	25.56
High	16	17.78	59	65.56
	Mean= 62.13 SD=5.23		Mean= 79.80 SD=7.19	

Distribution of Respondents According to Their Adoption Level

The data in the Table 4 representing that exactly 60.00 per cent of the respondents in Rampura village belongs to low adoption category followed by 28.89 and 11.11 per cent of the respondents belongs to medium and high adoption category categories, respectively before the village adoption programme by the KVK.

TABLE 4

Distribution of respondents according to their adoption level (n=90)

Category	Before Adoption of village		After adoption of village	
	Percentage	Frequency	Percentage	Frequency
Low	54	60.00	16	17.78
Medium	26	28.89	31	34.44
High	10	11.11	43	47.78
	Mean= 59.08 SD=5.01		Mean= 76.51 SD=5.93	

Whereas, after the village adoption programme taken up by the KVK nearly half (47.78%) of the respondents in the Rampura village belongs to high adoption category followed by 34.44 and 17.78 per cent of the respondent belongs to medium and low adoption categories, respectively. Before village adoption programme, farmers were having less knowledge (as per the results in Table 1), that resulted in more number of the respondents belonging to the low adoption category. After the village adoption programme for three years, in the village has helped the farmers to increase their knowledge inturn it gave the confidence to the farmers about modern technologies, improved varieties, breeds and other improved aspects in health, education, agriculture and allied sectors which resulted in the more number of respondents falls to the high adoption category. The results were coincides with the Nagendra babu *et. al,* (2020) and Vijayalakshmi *et. al*. (2017). Policy incentives were found to correlate positively with adoption of decision-making. The availability of funding programs (Zhai and Williams, 2012) and government support and policies (Luthra *et al.,* 2016) were important in tackling barriers and driving adoption of technologies. Similar results were found by Montes De Oca Munguia *et al.,* 2021.

Yield Gap, Constraints Identified and Interventions Planned in Adopted Village

An effort was made to analyze the extent of yield gaps in major and important crops observing constraints and factors contributing to yield gaps. Based on the problems of identification and causes for the constraints, appropriate interventions were planned to reduce the yield gap. According to the data presented in Table 5, there was 25 per cent yield gap in tomato due to leaf curl virus, spotted wilt virus and *Helicoverpa armigera* infestations. The main reason for the yield gap could be because of poor knowledge on availability of resistant varieties. Hence suitable training programmes and demonstrations were planned and executed as a KVK intervention. Ragi was the main crop that was extensively grown by the farmers even though they were not obtaining the desired yield & income due to neck blast and drudgery in field operations for which 36 per cent yield gap was noticed. KVK intervention was to introduce improved varieties of ragi *viz*., MR-6, ML- 365 and GPU-28, to farmers for three years. Redgram was the second major crop wherein farmers rely on this crop for major income and after KVK intervention introduced new varieties (BRG-1 & BRG-2). However, a 32 percent yield gap was noticed which is due to pests and diseases attack as indicated in the Table. 3. In order to minimize the yield gap suitable capacity development programs, method demonstrations, introduction of improved varieties, demonstration of IPDM practices and educative literature were the interventions planned by KVK. However, 21 per cent of yield gap (low milk yield) noticed in dairy animals was mainly due to non-availability of suitable fodder varieties throughout the year. For which introduction of new improved varieties of fodder namely COFS- 31, CO-4, & COFS-29 were planned and implemented. Similar findings were reported by Srivastava *et. al.* (2014) and Chandan and Padaria (2022) on improved fodder scrops *viz*., CO-3 & CO-4 to 1509 farmers resulting in 6.6 per cent increase in milk yield. Similarly, constraints responsible for the yield gap that exists in sericulture and livestock enterprises were also identified and suitable interventions were planned and instigated.

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TABLE 5

Yield gap, constraints identified and interventions planned in adopted village

Crop / Enterprise	Problem / Constraints	Causes	Yield gap (%)	Interventions Planned
Tomato	Severity of spotted wilt virus, leaf curl virus &*Helicoverpa*	Lack of knowledge about resistant varieties and climatic conditions	25	Training & Demonstrations
Ragi	Neck blast and drudgery in field operations	Non- availability of resistant varieties and climatic conditions and lack of improved tools & equipment's	36	Introduction of improved varieties, and demonstrations
Red gram	Fusarium wilt, *Helicoverpa* and *Maruca*	Predominance of wilt in the region, Poor management practices against *Helicoverpa*and *Maruca*	32	Introduction of new and improved varieties
Banana	Panama wilt and Pseudostem weevil	Poor management practices against Pseudostem weevil	23	Front line demonstration
Mango	Leaf hoppers, Powdery Mildew, Fruit Fly and intercultivation operations	Improper application of chemicals	09	Demonstrationof IPDM practices and extension literatures to create awareness
Dairy	Low milk yield	Non availability of improved fodder crops& poor nutrition	21	Introduction of new and improved high-yielding fodder varieties
Sericulture	Drudgery & Low yield	Non adoption of mechanization Low yield due to diseases	13	Method Demonstrations and Frontline demonstrations
Livestock	Low productivity in livestock keeping	Chicks suited for backyard poultry are not readily available	18	Introduction of improved breeds
		Due to poor nutrition during rearing, fail to put on weight		
		Non-availability of improved new breeds in sheep and goat		

Extension Activities Conducted to Create Awareness and Up-Scale the Technologies in Adopted Village

Situation analysis for extension activities was conducted to create awareness and upscale the technologies in the adopted village. The results revealed that a great majority of the stakeholders were lacking knowledge about improved varieties, IPDM practices and production technologies. In order to uplift their, socio-economic status and to create awareness on different practices followed in crop improvement programs. Later, KVK, Hassan has come up with new initiatives, to begin with and to understand the mindset of stakeholders, conducted group discussions to create awareness and the importance of Agriculture, involving 86 farmers during the year 2019-2020 and encouragingly the stakeholder participation number increased to 162 in the year 2021-2022, cumulative details are presented in the Table 6. Similarly, KVK conducted four capacity-building training programs involving 343 stakeholders in last three years. The main focus of agricultural research and extension was technology generation and dissemination. The number of technologies developed and introduced into the supply chain is important. At best, impact is assessed by the total numbers of adopters and increase in yield and income (Laura German *et al*., 2006 and Desai *et al.* 2014), obtained by the farmers. Method of demonstration on soil sampling technique and a series of lectures on the importance of soil sampling had increased the interests of farmers thereby increasing the participation (103) and programs (02). Comparably, majority of the farmers had marginal and small land holdings, had led them to practice animal husbandry (Dairy) as a profitable subsidiary occupation. Hence, along with the main involvements, animal health camps were organized involving the veterinary department and around 407 animal health checkup was carried out as an KVK intervention. Apart from this, exposure visits were also organized to advance stakeholders knowledge on integrated farming system and other important agricultural components which in turn promoted self-help groups to generate their own income and employment opportunities. Additionally, efforts were made to enhance various stakeholder enterprises *viz.*, by investing in different critical inputs that would gain additional income to farmers through increase in productivity. Due to all the above activities conducted under the adopted village programme, the knowledge and adoption of the farmers in the adopted village increased significantly.

TABLE 6

Extension activities conducted to create awareness and up-scale the technologies in adopted village

Activity	2019-20		2020-21		2021-22		Total	
	No of Programs	No. of farmers	No of Programs	No. of farmers	No of Programs	No. of farmers	No of Programs	No. of farmers
Group Discussions	107	07	122	06	178	11	407	24
Capacity Building (Training programs / Demonstrations)	212	31	285	33	312	41	809	105
Soil Sampling Demo	62	01	74	01	103	02	239	04
Animal Health Camps	86 (Animals)	01	95 (Animals)	01	162 (Animals)	02	343 (Animals)	04
Exposure visits	49	01	82	02	53	01	184	04
Follow-up visits	203	31	216	39	317	41	736	111
Total	719	72	874	82	1125	98	2718	252

Impact of Village Adoption Activities on Crop Production and Income Generation

In order to know the impact of the village adoption programme area under improved varieties, yield and income generation parameters were taken into consideration during data collection and analysis.

It is evident from the Table 7 that before the village adoption porgramme, the farmers were growing old finger millet varieties like Indaf-7 and GPU-28 in an area of 62.50 ha with the average yield of 20.50 q/ha, whereas after the VAP Programme, farmers are now cultivating improved finger millet varieties like ML-365, KMR-301 and KMR-630 in an area of 84.00 ha with the enhanced yield of 23.75 q/ha and With the total cash inflow of Rs.39,90,000/- to the village after the VAP as compared to Rs.25,62,500/- before VAP.

In the same pattern, before the VAP, farmers were growing old varieties of Redgram (BRG-1), fodder (Co-1), local varieties in Horse gram, Field bean, Cowpea, Niger and castor. Also farmers were practicing monoculture fish and local bird's cultivation before the VAP, this resulted in lesser area coverage, lesser yield and less total cash inflow to the village.

Whereas, after the VAP, the KVK has introduced the improved varieties like BRG-2 & BRG-4 in Redgram, PHG-9 in Horse gram, HA-4 in Field bean, KBC-9 in Cowpea, KBN-1 in Niger and ICH-66 in castor, composite fish cultivation (Rohu, Catla and Common carp in the ratio 4:1:1), improved fodder variety COFS-31 and Giriraja breed in poultry. This has resulted in increased area coverage in all crops, increased yield to an average of 31.90 per cent as a whole and increased total cash inflow of Rs.85,05,851/- as compared to before VAP (Rs.52,88,368/-) to the village. The results are on par with the Manjunath *et. al.* (2019) and Sadvi *et. al.* (2020).

Village adoption is one of the most effective ways of showcasing the benefit of advanced technologies through effective transfer of technology within the stipulated period of adoption. It is a key to demonstrate the benefits of agro - ecological technologies as a model for adoption for upliftment of rural economy. In this regard, ICAR-KVK, Hassan has adopted Rampura village of Channarayapatna taluk.

Crop demonstration, input distribution, technology assessment, integrated rural development programmes, transfer of technology through meetings,

TABLE 7

Impact of village adoption activities on crop production and income generation

(n=90)

Crops	Area (ha)		Yield (Q/ha)		Total Production (Q)		Total income (Rs.)	
	Before	After	Before	After	Before	After	Before	After
Finger Millet	62.50	84.00	20.50	23.75	1281.25	1995.00	2562500	3990000
Redgram	07.00	08.50	11.25	14.30	78.75	121.55	393750	607750
Horse gram	09.50	12.80	06.50	08.75	61.75	112.00	216125	392000
Field Bean	08.00	10.40	06.80	08.20	54.40	85.28	228480	358176
Cowpea	10.20	12.90	07.25	09.20	73.95	118.68	295800	474720
Niger	01.50	02.00	03.20	04.25	04.80	08.50	38400	68000
Castor	01.75	02.25	08.75	10.50	15.31	23.62	88812.5	137025
Fodder crops	03.75	04.50	128.20 ton	148.30 ton	480.75	667.35	1346100	1868580
Fish	02.00	07.50	07.40	10.16	14.80	76.20	118400	609600
Poultry Birds	85.00	255.00	01.70 kg/bird	03.20 kg/bird	144.50	816.00	50575	97920
Total cash inflow							5288368	8505851

Integrated farming system, integrated pest and disease management, capacity building programmes, health campaign, seed production programmes, method demonstration, integrated nutrient management and diagnostic field visits were undertaken to fulfil the objectives of village adoption. This led to farmer's upliftment due to increase in awareness on crop productivity and income which ultimately resulted in the improvement of their socio-economic status. Such efforts need to be scaled up to bring up more villages under the ambit of improved farm technologies. With the concerted efforts of farmers, scientists of KrishiVigyan Kendra and line department's, Rampura village has become a model village in terms of adoption of new technology, knowledge on improved practices, processing, marketing and better income generation by the farmers.

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