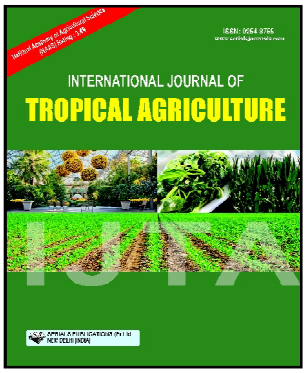

INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at http: www.serialsjournals.com

Volume 36 • Number 2 • 2018

Doubling Farmers Income Following Integrated Farming Approach

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Abstract: Different components of Integrated Farming System (IFS) were established in six farmers field having varying land holding sizes by KVK, Kanker at Kanker distt. These enterprises not only supplement the income of the farmers but double/triple the farm profit from existing of Rs. 55,100/- to 1,65,670/- in 0.60 ha, Rs. 45,980/- to 1,45,130/- from one ha. of land, Rs. 89,100/- to Rs. 2,77,950/- from 2 ha., Rs.3,13,250/- to 4,51,500/- from 3 ha and 87,000/- to 3,92,900/- from 4 ha of land before and after implementation of IFS models. Promotion of Kadaknath poultry breed through backyard rearing for livelihood security of tribal farmers in more than nine distt. of Chhattisgarh has created 1866 mandays/year employment opportunities and tribal farmers are earning Rs. 5,60,000/- from 25 poultry units. Twenty farmers started planting of semialata using drip method of irrigation in 25 acres under State Rural Livelihood Mission under our guidance and getting the profit of Rs. 40,000 to Rs. 50,000/- from an acre of land during single season. During Rabi also, the same vegetables were taken along with radish and even carrot, and again getting the similar profit before inoculation of lac insect in one year old plant. Women Self Help Group (WSHG) is preparing ragi laddoo and supplying to Mai Danteswari temple *as Prasad* due to its special quality and earning Rs. 1.5 lakh annually. Another WSHG under Fulwari programme is supplying ragi malt to the children of *anganbadi*. The SHG have already sold 18 q Ragi malt (Rs. 90 per kg). Nutritional Kitchen Garden in Schools of Kanker district have been established and awareness is created among the school children to grow various vegetables and fruit crops and not only to have fresh vegetables from their school premises to be used in mid day meal but also got an idea to earn profit from the horticulture sector.

Key words: IFS, kadaknath, lac cultivation, minor millets, nutritional garden

INTRODUCTION

Indian farmers are raising crops and livestock together for centuries and for them livestock has been considered the integral part of the system (Sethi, 1991). Integrated Farming System (IFS) is a mix of various farm enterprises where farm families allocate resources in a way so that existing enterprises (crop, livestock, aquaculture, agro-forestry, agri-horticulture and sericulture) may be efficiently utilized in order to enhance productivity and profitability of the farm (Varughese and Mathew, 2009). Low level of farmers' income particularly among the marginal/ small farmers and disparity between income of a farmer and non-agriculture work resulted in Agrarian distress and sharp increase in number of farmers suicides (1995-2004) all over the country due to losses from farming, shocks in farm income and low farm income. This has compelled the policy makers to think beyond food security and give back to our farmers a sense of income security. We need to reorient its interventions in the farm and non-farm sectors to double the income of the farmers by 2022. It requires to raise output through concerted efforts on increasing productivity per unit area, input management, resource conservation, suitable strategies for minimising post harvest crop losses, required value addition and processing to double the income using innovative agricultural and allied technologies. Small holder farmers must try to produce food, feed, fodder, fibre, fuel, etc., on a small piece of land. Under such conditions, one alternative is to integrate more than one enterprise on the same piece of land as conceptualised by the Hon'ble Prime Minister so that the available resources on a farm may be effectively and efficiently managed. The results of more than 15 years of investigation on the development of suitable farming systems for semi-arid tropical situations in Haryana, India, indicate that mixed farming systems of crops and animals are more efficient and remunerative, and generate more employment, than arable farming systems under small land holdings for irrigated and dry land conditions. In the present article, an attempt has been made to combine different enterprises in the farm so that the farm income may be doubled or trippled in less period of time.

1. Establishment of Integrated Farming System (IFS) in farmers field

The farmers at present concentrate mainly on crop production which is subjected to a high degree of uncertainty in income and employment to the farmers. In this contest, it is imperative to evolve suitable strategy for augmenting the income of a farm. IFS is the integration of various agricultural enterprises *viz*., cropping, animal husbandry, fishery, forestry etc. have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labour employment. IFS is established in several farmers field by Krishi Vigyan Kendra, Kanker in different size of land holding where agriculture, horticulture and allied enterprises were combined to increase working hours, provide employment opportunities for maximum period, minimise the risk and double/triple the farm profit from existing of Rs. 55,100/- to 1,65,670/- in 0.60 ha, Rs. 45,980/- to 1,45,130/- from one ha. of land (Table 1), Rs. 89,100/- to Rs. 2,77,950/- from 2 ha., Rs.3,13,250/- to 4,51,500/- from 3 ha and 87,000/- to 3,92,900/- from 4 ha of land before and after implementation of IFS models (Table 2). Ramrao et al. (2006) also reported IFS with two bullocks + one cow + one buffalo + 10 goats along with poultry and duck was the most beneficial system for the marginal farmers in rainfed regions of Chhattisgarh in Central India. It was observed that crop + dairy + goat farming followed by crop + goat farming had the maximum potential (Singh and Sharma, 1987).

2. Promotion of Kadaknath poultry breed through backyard rearing for livelihood security of tribal farmers

Backyard poultry rearing of *Kadaknath* bird is an ancillary activity which have tremendous potential

Table 1
Economic of IFS model at farmers field (0.50-1.00 ha.)

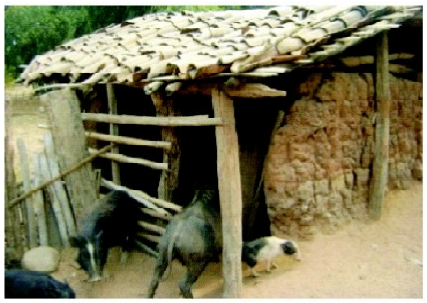
Name of farmers	*Components of IFS*	*Land holding*	*Income per annum (Rs.)*	
			Before	*After*
Santosh Kawde	Rice - vegetable + backyard poultry + piggery + goatry + vermi compost	0.6	55100	165670
Chait ram	Rice + Vegetable + vermi composting + Poultry + Goatery + Piggery + Azola	1.0	45980	145130

Table 2
Economic of IFS model at farmers field (2.00-4.00 ha.)

Name of farmers	*Components of IFS*	*Land holding (ha.)*	*Income per annum (Rs.)*	
			Before	*After*
Ghasiya ram	Rice + vegetable + fish + backyard poultry + goat + vermi compost + azolla	2.00	81,000	1,95,400
Suresh salam	Rice + vegetable + Poultry + Fishery + Goatery + Azola	2.00	89,100	2,77,950
Manku ram Kange	Rice + vegetable + backyard poultry + goat + piggery + vermi compost + azolla	2.00	1,41,000	2,57,250
Suklal	Rice-chickpea + backyard poultry + fish + piggery + goatry + azolla	2.00	91,600	1,56,600
Vijay Mandavi	Rice - vegetable + fruit orchard + fish + poultry + vermi compost	3.00	313250	4,51,500
Jagdish Shori	Rice - vegetable + fruit orchard + lac cultivation + animal husbandry + vermi compost	4.00	87000	3,92,900








to raise the farm income. It is a indigenous disease resistant breed and having much medicinal values such as low fat percentage, low cholesterol, high protein content and wide adoptability. Farmers preferred this breed for rearing in their backyard. With an objective of providing quality breed of poultry bird Kadaknath, this breed was brought from KVK, Jhabua (M.P.) in 2012-2013 and a hatchery unit (500 egg capacity) was established in 2013-14 at Krishi Vigyan Kendra, Kanker. The hatchery unit was further expanded during 2015-16 with 5000 egg capacity to produce 12,702 chicks and 30,761 chicks in 2015-2016 totalling 50,463 chicks in the period of three years and provided to the farmers in 19 districts of Chhattisgarh covering 32 blocks 256 villages and 463 beneficiaries (Table 3) for backyard rearing during 2015-16. Twenty five poultry units of 100 birds each have been established by farmers in the district and 25 units in other districts for rearing Kadaknath chicks. From 25 poultry units, 1866 mandays/year employment is generated and receipt of Rs. 5,60,000/- is obtained. Kadaknath poultry birds have now been spread from Jhabua of M.P. to several states of the country (Table 4). Tribal farmers generally rear Desi poultry breed in their backyard system resulting in low selling price, but farmers are now attracting towards rearing of Kadaknath poultry bird which is resistant to disease and very much liked by them. Sale of eggs and male bird for meat purpose is the main source of income. These birds lay 90 to 120 eggs in a year and average annual income is Rs. 1200.00 per year per birds by rearing Kadaknath breed. The district administration of Dantewada is so impressed with this activity and funded 100 units of Kadaknath poultry birds each having 300 birds and linked for its marketing to Hyderabad firm. Integration of non-crop enterprises like poultry + mushroom production + vermicomposting was sustainable system giving maximum net return and additional employment under rainfed conditions (Barik *et al.,* 2010).

Table 3
Number of chicks of Kadaknath poultry birds supplied by KVK, Kanker to different districts of Chhattisgarh and Jammu & Kashmir

Year	*No. of district covered*	*No. of block covered*	*No. of villages covered*	*No. of chicks supplied by KVK*	*No. of beneficiaries*
2014-15	7	12	25	7000	70
2015-16	17	25	75	12702	127
2016-17	19	32	156	30761	296
2016-17(Jammu-Kashmir)	01	03	03	50	120
Total	44	72	256	50,513	613

Table 4
Spread of Kadaknath poultry birds from Jhabua to several states of the country

Production Year	*No. of chicks*	*States receiving chicks from Jhabua*
2014-15	32,665	**M.P.:** Jhabua, Alirajpur, Dhar, Indore, Ujjain, Badwani, Gwalior, Shivpuri, Sivani, Sagar, Sehore, Chhindwara, Devash, Jabalpur, Khargone, Betul
2015-16	29,582	**Chhattisgarh:** Kanker **Rajasthan:** Udaipur, Jaipur, Banswara, Churu, Sikar, Sri Ganganagar
2016-17	23,657	**Maharastra:** Pune, Nagpur, Dhule, Usmanabad, Wardha U.P. , Gujarat, Haryana, Kerala



3. Lac cultivation

It is an important activity to enhance farmers income. Lac Insect (*Laccifera lacca*) inhabits on Ber, Palas and Kusum and Semialata. Lac cultivation is a source of livelihood for the tribal peoples in their villages at doorstep. Chhattisgarh State is the second largest producer of raw lac in the country. Major lac producing distt. in Chhattisgarh are Korba, Kanker, Rajnandgaon, Bilaspur, Raipur, Durg, Janjgir-Champa, Surguja, Dhamtari, Mahasamund and Bastar. Lac cultivation on *Flemingia semialata,* a quickly and fast growimg shurbs in backyard is increasing and popularizing in the state.Twenty four villages have been selected for Lac cultivation, in which 10 villages (100 Kusum trees) were selected for the inoculation of brood Lac. Brood Lac obtained from 100 trees is used for the inoculation of 24 villages in Dantewada district. Use of 60 mesh nylon net, use of Brood lac @5Kg (Kusum), 2-3 Kg (Ber) and Spray of Ethofenprox 10EC @ 2ml/li +Carbendazim 1gm/li of water at 30-35 and 60-65 days of inoculation was found to be best in enhancing the yield by 54.92 %, minimizing the insect attack by 50.47 to 62.16% and increasing the income of Rs. 2560/- per tree compared to control i.e. Rs. 1357/- per tree of Kusum. Lac cultivation on Semialata is planned for 75 acres in 2016-17. KVK, Kanker, Korba and Jagdalpur have produced 75,000 seedlings of Semialata in their KVKs and ready for planting in 75 acres during 2017-18 in the farmers field in 75 acres.

At Kanker distt., 20 farmers started planting of semialata using drip method of irrigation in 25 acres under State Rural Livelihood Mission under our guidance. During monsoon season, they were getting hardly 8,000-12,000/- profit from an acre of land by growing traditional paddy crop but when they planted semialata, they also grew vegetables like tomato coriander, cowpea, chilli in between the rows on ridges as well in between the plants of semialata and got the profit of Rs. 40,000 to Rs. 50,000/- from an acre of land during single season. During Rabi also, the same vegetables were taken along with radish and even carrot, and again getting the similar profit before inoculation of lac insect. This way, semialata along with vegetable is doubling or tripling the income of the rural farmers in a year. It has shown to be a very remunerative enterprise and other farmers who are not in the project are also adopting this model in their farmers and earning the handsome profit.

4. Finger millet

It is known as Ragi and is the strength of Dantewada distt., grown by 79% tribal population in an area of 10,000 ha and only next to rice. Dantewada has enormous potential for ragi to explore for its processing, value addition and marketing. Fifteen recipes/processed products have been standardized by KVK, Dantewada (Table 5). WSHG is preparing ragi laddoo and supplying to Mai Danteswari temple *as Prasad* due to its special quality and earning Rs. 1.5 lakh annually. Another WSHG under Fulwari programme is supplying ragi malt to the children of *anganbadi*. The SHG have already sold 18 q Ragi malt (Rs. 90 per kg).



Table 5
Different ragi products/recipes standardized at KVK, Dantewada incorporating other ingredients

SNo.	*Name of Ragi products*	*Ingredients*
11.	Multi-grain /Composite flour	Cleaned finger millet seed (30%) and cleaned wheat seed (70%)
22.	Ragi malt weaning food	Sprouted finger millet seed (70%) and sprouted green gram seed (15%) and chickpea sprouted seed (15%)
33.	Ragi laddoo	Flour of finger millets, chickpea and wheat, Rawa of Wheat, molasses/sugar, Ghee, Cardamom, Mawa, Dry nuts.
44.	Ragi cake	Flour of finger millets & wheat, milk powder, dry fruits, soda, vanilla, accence, katri, baking soda sugar.
55.	Ragi anrasa	Flour of finger millets & Rice, sesamum, dry coconut, molasses.
66.	Ragi Shakkarpara	Flour of finger millets & wheat, rawa of wheat, sugar and clarified butter.
77.	Ragi Papchi	Flour of finger millets & wheat, sugar and clarified butter.
8.	Ragi Cookies	Flour of finger millets & wheat, soda, salt, baking powder, caraway, clarified butter.
9.	Ragi Donuts	Flour of finger millets & wheat, milk, baking powder, soda, sugar, milk maid.
10.	Ragi Khurmi	Flour of finger millets & wheat, sesamum, refined oils, molasses, groundnut.
11.	Ragi Murku	Flour of finger millets, gram & rice, chilli powder, salt, caraway & sesamum.
12.	Ragi Sev	Flour of finger millets, gram & rice, chilli powder, salt, caraway & sesamum.

5. Establishment of Nutritional Kitchen Garden in Schools of Kanker district

KVK scientists have designed an ideal kitchen garden which comprised of vegetables, fruits like banana, papaya and drumstick etc. for fulfilling the daily requirement of a family. It was tested in KVK farm, then replicated in 15 residential Schools of tribal areas of Kanker district. The district collector highly appreciated this work and provided the fund for further replication of this unique model in the schools. Residential Schools (Ashram) situated at village level was selected for replication of kitchen gardening model. Season wise vegetables and fruit plants (papaya, drum streak, Jack fruit) were planted scientifically in this Kitchen Garden. The warden of Ashram school maintained daily record of production. Due to establishment of kitchen garden model in schools of Antagarh block, fresh and organic vegetable were made available to the students. They learnt how to grow the vegetables and fruits and created awareness about farming among the children's of the school. Along with the learning, they also saved Rs. 12000/- per school within six months. Besides, seasonal vegetables

perennial vegetables and fruits (Jackfruit, Drumstick, and Papaya, Banana, Guava) were also planted which were the regular source of income and nutrition as well. The Chief Secretary, Govt. of Chhattisgarh was highly influenced to see this model in schools and instructed all the district collectors to adopt this model in all schools of the state wherever the schools have compound wall, source of irrigation and are residential. This model has now become very popular in 124 residential schools of Chhattisgarh and these schools are following it to produce quality vegetables and fruits to consume themselves in mid day meal to solve the problem of under nutrition/malnutrition. Based on this work, KVK, Kanker got Mahindra Samraddhi Agri India Award (Winner) by Shri Radha Mohan Singh, Unio Agriculture Minister, Govt. of India in Feb., 2017.

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