

KVKs emphasising on Integrated Farming System models adoption by farmers across different states of India

The declining farm land holdings all over the country has posed a serious challenge to sustainability and profitability of farming as well as imposing threats to food and nutritional security of the nation. With Integrated Farming System (IFS), sustainability and profitability could be achieved with relatively low land requirement as compared to the conventional way of farming. IFS is an interdependent, interrelated and often interlocking production systems based on few crops, animals and related subsidiary enterprises in such a way that maximize the utilization of nutrients, achieve profitable and sustained agricultural production of each component and minimize the negative effect of these enterprises on environment. The IFS models discussed below have proven to be highly successful in their specific locations and thus, may provide ways and means to support farmers to cope up the issues of productivity, profitability, sustainability and environment concerns. The successful models from each state are presented as under.

Andaman and Nicobar Islands

Integrated farming system model (Fish cum duck cum horticulture) in North and Middle Andaman in 1000 m² gave an income of Rs. 29,750 /year. The production from the components were fish fingerlings 4500, duck 62 kg, duck egg 250, duckling 20 nos., spinach 40 kg, Amaranthas -5 kg, coriander leaf 0.5 kg and okra 30 kg. The model is popular in the islands. The model results 14 % increase in income of the farmers in the islands.

Andhra Pradesh

Smt Aligineni Sri Padma, Kotturu Tadepalli, Krishna District Ph: 9441042562, a women farmer maintaining Rice based IFS model with live stock in an area of 5.5 acres. Of which 4.5 acre is under rice, 0.8 acre is fodder crop (Super Napier) and 0.2 acres is under livestock sheds. She is also selling the fodder @ Rs. 5000/- per cent to the neighbor farmers besides feeding 3 buffaloes and 1 cow. She maintains poultry with 200 birds. The total net returns obtains from complete IFS during 2019-20 was Rs. 4.64 lakh . The paddy straw and other bye products are utilized as cattle feed. She is also producing FYM from the cattle dung, urine etc. and apply to the rice fields. The IFS model has been adopted by more than 200 farmers in the Krishna district of Andhra Pradesh.

Arunachal Pradesh

IFS model of 1 ha area comprising of Fishery +livestock (piggery) + Agriculture (Paddy-Toria) +Vegetables (Cabbage, Garden pea, Cauliflower) + Fruits (Pineapple, Papaya) is a very popular model in lower hill ranges of Arunachal Pradesh. The net income generated from different component is Rs 1.52 lakh/year with B:C ratio 2.20 with no external input. Paddy, vegetables and fruits were used for home consumption. The piggery alone generated an income of Rs. 60,000/ year, which was found to be a very successful component.

Assam

Integrated Farming System model of 1.0 ha area with components, viz. Fishery + Horticulture + Agriculture + Duckery has been popularized in flood free plain areas of Assam in farmers' participatory approach with an objective of achieving complementary interaction for raising farm income through efficient utilization of resources. The net return generated from different components in an integrated approach in one year from 1.0 ha area is Rs. 5.10 lakh with the B:C ratio 3.5. The fishery alone provided an income of Rs. 3.10 lakh from 0.5 ha area followed by duckery (120 nos.) and horticulture (0.25 ha) sector. This model was developed on the basis of the recommendations made by Assam Agricultural University, Jorhat.

Bihar

An IFS model was developed at Kairia, Kahalgaon village, Bhagalpur District, Bihar belonging to Sri Vibhu Pandey. The total area of the farm is 0.6 ha and the components are fisheries, livestock, poultry, horticulture, agriculture and nutrient recycling through vermicompost. The highest profitable enterprise is from fisheries (fish production and fingerling production), which is being cultivated in 0.34 ha and the net profit per year is Rs. 2.78 lakh. The livestock enterprise consists of dairy farming (5 cows and 2 calves) and goatry with 25 goats. Poultry enterprise comprises of 50 numbers of ducks and 1000 Broiler chickens. Averages revenue generated from the IFS model is Rs. 22.37 lakh per annum with Rs. 5.99 lakh as net profit.

Chhattisgarh

An IFS model comprising of crop + backyard poultry + goatry + vermicompost + Azolla + fish + duck + piggery was developed by KVK, Kanker, Chhattisgarh in Kulgaon village in

1.5 ha area. An area of 0.8 ha was allotted for crop component (rice, maize sequence, and vegetables), 0.2 ha for fish pond, 0.1 ha for piggery and 0.1 ha for goats (including fodder area). About forty poultry birds (Kadakhnath) were maintained in the poultry shed constructed in farm. From this model, gross income is Rs. 1.89 lakhs and net income of Rs. 1.13 lakh is achieved. Employment generation of 826 man days is realised from this model which is highly efficient. Conservation, preservation and utilization of farm bio-mass including non-conventional feed and fodder resources is also achieved from this IFS model.

Delhi

Sh. Satyawar, resident of village-Daryapur Kala, North West district, Delhi-110039, has developed his farm as a Model 'Integrated Farming System' in 8 ha area. The components of his IFS include Crops (Wheat and Paddy), Vegetables (Rabi and Kharif), Dairy unit (Gir & Shaiwal cattles), Bee keeping unit (10 boxes), Vermi-compost (200 m²), Nursery Raising (Rabi vegetables- cauliflower, onion, Kharif vegetables, Marigold, Zaid Vegetables- under low cost protected structure, early vegetables-cucurbits). He earns Gross returns of around ₹ 45.00 Lakhs with Net returns of ₹ 32.50 lakhs annually.

Goa

Horticulture cum livestock cum apiculture based IFS was developed at the farm of Shri Vinod Gopal Barve, Satode, Valpoi, Sattari, Goa. The total area of the IFS model is 6 ha and it comprises of Arecanut – 6000 nos., Banana -2000 nos., and Black pepper – 3000 nos. Nutmeg – 05 nos. and Cinnamon – 02 nos. as the main components. There are 4 indigenous cows which is mainly used for production of organic manure. In addition, there are 8 Honey Bee boxes in the farm. Average annual production from this model are Areca nut - 12.9 t, Banana – 135 t, Black pepper - 4.7 t, Coconut – 3,00,000 nuts, Organic manure – 03 t, and Honey – 15 kg. The net income per annum from this model is Rs. 40.77 lakhs (6.80 lakh/ha)

Gujarat

Horticulture cum fishery based IFS model was developed at a farmer's farm belonging to Shri Ashok Bhai Patel of Soldhara Chikhali village; Navsari District, Gujarat. The total area of the IFS is 3.20 ha. Under horticulture enterprise, intercropping of turmeric and mango is done with 159 mango plants under 1.2 ha area. Fishery is comprised of 2 ha area with cage culture of Pangasius sp. fish and IMC cultivation with 7000 fingerlings. Average annual income realised from IMC cultivation is Rs. 2.5 lakhs and the net profit from cage culture of Pangasius sp. is Rs. 3.75 lakhs. Other components consists of 12 cows and 50

numbers of Kadaknath poultry under livestock enterprise which generates annual income of Rs. 1 lakh and a vermicomposting unit capable of producing 7.5 tons rich vermicompost per year which generates an annual average income of Rs. 20,000.00. Value addition of finger millet and apiculture (25 bee boxes) is also available which generates an income of Rs. 2.3 lakhs per annum.

Haryana

Ms. Amarjeet Kaur, resident of village- Adhoyi, District-Ambala (Haryana), aged 32 years and Graduate, has developed her farm as a Model 'Integrated Farming System' in 5.5 ha area. The components of her IFS include Crops (Wheat, Rice, Sugarcane), Vegetables (Onion, Potato) and Dairy (Fodder & Buffaloes). She earns Gross returns of around ₹ 9.50 Lakhs with Net returns of ₹ 6.50 lakhs annually.

Himachal Pradesh

Sh. Parma Ram Choudhary, a progressive farmer of village Chhatar, PO Jugahan Sundernagar district Mandi (HP) has been practicing Integrated Farming System in his one-hectare land holding. He is practicing Crop production (cereals & vegetables), Dairy, Natural farming, Mushroom, Sericulture, small scale flour mill, terrace farming etc. and his average annual net returns to the tune of Rs. 2.46 lakh from his one ha land. He has been a role model for other small farmers and has also been awarded with ICAR Jagjivan Ram Abhinav Kisan Puraskar (Zone 1) and many other awards at national and state level.

Jammu & Kashmir

S. Jaswant Singh resident of Village Rajbagh, Tehsil Hiranagar, district Kathua has established an integrated farming system in an area of 10 acres. He is having orchard of Litchi & citrus on an area of 3 acres, also having backyard Poultry. He is also maintaining dairy unit consisting of five milch animals. He is also having well established gohar gas plant, low cost vermicomposting unit, Mushroom unit, small fish pond. He is utilizing his 9 acres of land for cultivating basmati rice and wheat. On one acre, he is raising seasonal vegetables and fetching good returns apart from satiating his domestic consumption. From remaining area he is taking maize and improved seasonal fodders. With improved IFS approach, his net income is Rs. 1.73 lakh per ha.

Jharkhand

An IFS model comprising of cereal crops (improved variety of rice as well as indigenous rice like *Bhutku*), vegetable crops, flowers and ornamental crops, fisheries, goatry (10 goats), poultry with 50 Hens (Divyayan Red and Kadaknath), 30 Ducks (Khaki Campbell) and dairy with 10 cows for milk production has been established by progressive farmer Sri Gandura Oraon, hailing from Gurgurjari Block– Mandar, District– Ranchi in an area of 5 acre. The IFS model is also equipped with a Custom Hiring Centre. The average annual net profit from the IFS is Rs. 7.8 lakhs per annum and the farmer has guided several other farmers in the district in implementing a similar kind of IFS model.

Karnataka:

IFS model for dry land ecosystem in 1 ha area comprising (1) coconut and drumsticks along border, Napier grass cultivation on bunds; Sapota + Banana + Jack fruit Segment; Groundnut, green gram, ragi, maize, red gram. Segment; Teak wood, curry leaves, fodder + Azolla; Compost + Vermicompost + Biodigester; Kitchen garden + Poly house + shade net and (2) Dairy; 2-cows 14- Sheeps 50- Poultry (Giriraja) was popularised in Karnataka. The net income generated from the different component in one year is Rs 4.90 year per hectare with B:C ratio of 3.20. The dairy sector generated an income of Rs. 78,250/ year/ 2 cow with B:C ratio of 3.11, which was found to be a very successful component. This model was developed by UAHS, Shivamogga and popularised in the state of Karnataka.

Kerala:

Coconut based integrated farming system models established through farmer participatory process, including technological interventions for diversification of cropping system appropriate to the local community as well as subsidiary enterprises for income generation. The interventions included (a) intercropping with various crop species (cash and food security crops) aiming at year-round farm income, (b) subsidiary enterprise comprising of animal husbandry component, (c) product diversification and value addition of coconut and intercrops as well as (d) recycling of waste biomass through vermicomposting. Significant improvement in income was achieved through crop and enterprise diversification by improving the share to the extent of 83 per cent compared to the income from coconut alone, it was up by 195 per cent when subsidiary enterprises like rearing of livestock and value addition were also considered. These models are developed by CPCRI and popularised in the state of Kerala.

Madhya Pradesh

Agriculture based IFS model (1ha) comprising of maize, soybean & wheat and horticultural crops okra, brinjal and chilli along with kadaknath rearing has been promoted for livelihood among small holding farmers (Rs 2.35 lakh/year). Likewise, IFS model consisting of crops + vegetable + buffalo + poultry + goatry + vermicomposting components generated net income Rs. 2.27 lakh from one hectare area in a year.

Maharashtra

A Horticulture based IFS model was developed at the farm of Shri Jaykishan Ramdas Shinde hailing from Varudi village of Jalna District, Maharashtra. The total area of the farm is 1.30 ha. Under horticulture enterprise crops grown are pomegranate (564 plants: 0.60 ha); sericulture enterprise consists of mulberry (5500 plants: 0.40 ha with 0.02 ha sericulture shade); fisheries (4000 numbers of fish) with farm pond (0.20 ha), goat shade (0.02 ha: 20 goats), poultry (100 birds: 0.02 ha), 5 animals (0.02 ha), farm house (0.02 ha), vegetables and pulses with adoption of organic farming. The average net profit per annum from the IFS calculated over the last 3 years is Rs. 6,33,000.00 from 1.30 ha (Rs. 4.71 lakhs/ha). This model has been replicated to 80 farmers in the state with 35 adoptions in Jalna district itself.

Manipur

IFS model having the components of Piggery, poultry and Agriculture (Paddy-vegetable cropping sequence) is being established on the farm of Shri Shamjetsabam Premchand Singh, hailing from Nongpok Lourembam village of Thoubal District, Manipur in an area of 0.875 ha area. Paddy followed by winter vegetables is grown in the farm for self consumption only in an area of 0.125 ha. The net income from poultry (boiler: 1500 birds/batch) from 0.50 ha area is Rs. 4.35 lakh/ annum while the annual net income from piggery unit of 0.25 ha area is Rs. 2.85 lakhs. The average annual revenue generated from this model is Rs. 7.20 lakhs/ annum and it has been successfully replicated in 10 other locations in Thoubal district alone and started replicating in districts of the state.

Meghalaya

A successful IFS model comprising of poultry cum fishery cum horticulture with vermicompost was established at Dobogre village of South Garo Hills District, Meghalaya in a farm belonging to Shri Jolitha Ch. Marak. The poultry housing is indigenously constructed over the fish pond using locally available bamboo and it is capable of housing up to 30 adult Vanaraja breed of chickens. Vermicomposting is done on the banks of the pond and

vermicompost which is being supplied as input in turmeric and surplus is being sold. The total area of the IFS model is 0.13 ha and the average annual return is Rs. 1.25 lakh/ annum. This model has been replicated and adopted by many farmers in the state.

Mizoram

A livestock cum fishery cum horticulture based IFS model was developed at a farm in Darlak Village belonging to Smt. Lucy Laldusaki. The total area of the farm is 1.25 ha. The components are fisheries with 2 ponds with piggery units in 0.75 ha and Dragon fruit cultivation in 0.5 ha area. The average annual return is Rs. 6.55 lakh and this model has been replicated in clusters under DFI villages in the district.

Nagaland

A fruit based IFS model was developed at Thipuzu village belonging to Shri Sevohu Chuzho. The total area is 0.7 ha and the components are piggery, poultry, Kiwi and persimmon along with a low cost polyhouse which acts as a nursery for kiwi and persimmon saplings along with some other vegetable crops under horticulture enterprise. The average net annual return realized from this model is Rs. 3.12 lakh/ year.

Odisha

An Integrated Fish-Dairy-vegetable system of farming has been established in Tareipatapur village of Chatrapur block of Ganjam District in the state of Odisha in an area of 4.24 ha. The model consists of fish pond (1.60 ha), fish seed rearing pond (2.40 ha), vegetables (0.24 ha), dairy and horticulture (vegetables). Total income from the IFS is Rs.5.11 lakh per annum from different components like fish seed rearing was (Rs. 2.51 lakh) vegetables (Rs. 72,000.00), fish culture (Rs.1.35 lakh) and dairy (Rs. 53,000.00).

Punjab

Sh. Narinder Singh, a resident of village Ajjowal of district Hoshiarpur is one such pioneer farmer adopted IFS model. He owns 6 acres of land. He is cultivating wheat, potatoes, sugarcane, capsicum, turmeric and agro-forestry. He has backyard poultry and five milch animals as well. He is following organic ways of cultivation of different crops *i.e.* self prepared bio-fertilizers & bio-pesticides for seed treatment, growing vegetable nursery in cow's dung cake, inter-cropping of pulses in cereal, inter-cropping of onion as trap crop/

border crop, light traps, straw mulch, etc. On an average he earned Rs. 4.37 lakh per ha from various raw and processed products.

Rajasthan

Smt. Shanta Patel W/o Sh. Suresh Patel, Resident of Village-Mada Temba, Post-Dungarpur, Tehsil-Dungarpur, District - Dungarpur (Rajasthan) has developed her farm as a Model 'Integrated Farming System' in 6 ha area. The components of her IFS includes Vegetables (Tomato+ Coriander+Spinach; Brinjal+ Coriander; Cauliflower+Beet root+Radish), Spices (Turmeric +Coriander), Crops (Soybean, Black gram, Paddy, Rabi Maize, Wheat and Gram) and Dairy (Cows and Buffalo). She earns Gross return of around ₹ 14.50 Lakhs with Net returns of ₹ 10.00 lakhs annually.

Sikkim

The livestock based IFS models were popularised in farmer's field in 1.0 ha area. The Jalkund driven IFS model comprises (a) various crops like maize and spices crops (Ginger) aiming at year round farm income, (b) sequential vegetable production (04 crops/year), zero till cultivation of garden pea, cole crops and potato, (c) recycling of waste biomass through vermicomposting (vermibed), (d) agro-forestry system included napier grass cultivation on bunds of the terraces, fodder trees (Nebaro + Barhar) and large cardamom, (e) subsidiary enterprises comprising of livestock (01 dairy cow + 05 goats) and poultry (20 Vanaraja poultry). The net income generated from the different enterprises is Rs. 2.40 lakhs / year with the B:C ratio of 4.1. This model was developed by ICAR-NOFRI.

Tamil Nadu

A successful IFS model is available in the farm of Mrs Geetha w/o Murugaiyan, Kadambankurichi village of Karur block and district. She is farming in 2 ha area with annual income of Rs. 7.76 lakh. The major crop components and the annual income obtained from those units are: Red gram 0.25 ha (Rs 55000), Drumstick 0.5 ha (Rs 110300) , brinjal 0.25 ha (Rs 12500), mango 0.2 ha (Rs 49500), Gingilley 0.10 ha (Rs 30500), banana 0.25 ha (Rs 80000), Coconut 0.40 ha (Rs 95000), fodder 0.25 ha (Rs 64000) inter cropping with coconut. Animal component includes 16 dairy animals (annual income Rs 193000), 34 goats (Rs 41500), 20 sheep (Rs 23500) and desi bird unit (Rs 28500 /200 nos). She has a small biogas unit; composting pit through this she has utilized around 149.32 MT of manure for producing biogas and manure for her fields. This model was spread to 13 farmers in our district.

Telangana

Sri. B. Raju farmer of Gummakonda village, Nagarkurnool district, Telangana state adopted IFS system in one hectare area comprising of diversified cropping systems (0.78 ha) + horticulture (0.14 ha) + dairy (2 buffalos) + goat (11 no's) + Poultry (0.1 ha) + boundary plantation (Moringa, 50 plants). Through this system farmer is recycling the resources among five components to derive maximum benefits from his land. The system is accruing net returns ranges between Rs 14,160 (September) to 42,000 (April)/ha/month. The system is accruing the total income of Rs. 3.13 lakh with annual expenses of Rs.80, 000/- and net returns of Rs. 2.33 lakh per annum. A total of 24 farmers of the Nagarkurnool district have adopted this model.

Tripura

An IFS unit comprising of livestock cum agriculture and horticulture was established at Uptakhali village of North Tripura District, Tripura belonging to Shri Surajit Das. The total area of the IFS is 1.05 ha, having the components of Livestock (Dairy, Poultry, Duckry), Agriculture (mostly paddy) and Horticulture (varied vegetable crops). The annual gross return from the IFS is Rs. 9.17 lakh with an average net return of Rs. 4.6 laks. This model has been replicated to 18 other locations/farmers in North Tripura district alone.

Uttar Pradesh

Sh. Ram Ji Kaushik S/o Lt. Vishnu Kinker Kaushik, Vill.: Pataura kalan, District Lalitpur has established an IFS model in 1.0 ha area consisting of components like Fisheries, livestock (2 buffaloes, 1 cow, 5 goat, 10 ducks and 20 chicken), Agriculture (Wheat-Black gram) and vegetable crops (Cauliflower, Onion, tomato, bitter gourd, bottle gourd etc) in an area of 0.12, 0.08 ha, 0.60 ha and 0.2 ha, respectively. He earns net income of Rs 3.21 lakh per annum from his IFS and from milk alone he earns 1.40 lakh followed by agriculture (Rs. 0.565 lakh).

Uttarakhand

In order to get new vistas for better utilization of resources, additional income, self employment, enhanced productivity and sustainable soil health; Sri Manoj Singh Bharda S/o Sri Kesar Singh Bharda, village Kansyari, Garur, district Bageshwar adopted IFS model. The model includes field crops & pulses, vegetables including protected cultivation & nursery

raising, Dairy unit, Fodder production, Fisheries, Backyard poultry, Mushroom, Vermi-pits and Biogas. Currently he is fetching net return of Rs 3.06 lakh per ha.

West Bengal

Horticulture–Fishery based IFS Model in the low-lying areas of farmers’ field has been developed by the KVK South 24 Pargans (Nimpith). At present, there are 1347 no. of such IFS models are available in the farmers’ field. One such IFS model in an area 0.47 ha area comprising of Fish pond (0.12 ha), Duck, Poultry, sheep (4 numbers), Cow (3 no.), Compost unit (0.05 ha) and vegetables like Bitter gourd in *kharif*, Chilli, Ladies Finger , Elephant foot yam, Potato, Bottle gourd etc. The net income generated from this model in one year is Rs. 1.22 lakh with B:C ratio of 3.10.

IFS models popularized by KVKs

Name of ATARI	State	No. of KVKs having IFS Unit on its farm	No. of IFS Units established at farmer's field
ICAR ATARI, Zone-I, Ludhiana	Punjab	12	63
	Himachal Pradesh	7	72
	Uttarakhand	3	30
	Jammu & Kashmir and Ladakh	7	78
Total		29	243
ICAR ATARI, Zone II, Jodhpur	Rajasthan	38	570
	Haryana	6	110
	Delhi	0	13
Total		44	693
ICAR ATARI, Zone-III, Kanpur	Uttar Pradesh	25	199
Total		25	199
ICAR ATARI, Zone IV, Patna	Bihar	17	287
	Jharkhand	11	155
Total		28	442
ICAR ATARI, Zone V, Kolkata	Andaman and Nicobar Islands	1	66
	Odisha	11	92
	West Bengal	12	6945
Total		24	7103
ICAR ATARI, Zone VI, Guwahati	Assam	8	138
	Arunachal Pradesh	2	13
	Sikkim	5	14
Total		15	165
ICAR ATARI, Zone-VII,	Manipur	11	457

Barapani	Meghalaya	3	73
	Mizoram	8	27
	Nagaland	6	12
	Tripura	7	43
Total		35	612
ICAR ATARI, Zone VIII, Pune	Maharashtra	40	1892
	Gujarat	21	214
	Goa	2	31
Total		63	2137
ICAR-ATARI, Zone IX, Jabalpur	Madhya Pradesh	35	330
	Chhattisgarh	20	180
Total		55	510
ICAR ATARI, Zone X Hyderabad	AP	18	85
	Telangana	11	45
	Tamil Nadu	20	667
	Puducherry	2	4
Total		51	801
ICAR ATARI, Zone XI, Bangalore	Karnataka	14	551
	Kerala	9	279
Total		23	830
Grand Total (All India)		392	13735