

1. Title - Integrated Farming System for Resource poor farmers of Dry land Area

2. Category – “Integrated Farming System” (Agri- Horti- Silvi- pasture)

3. Challenge -

Now a day's climate change is a major concern related to environment safety and sustainability of land productivity. This has become the major area of interest among Scientist, administrator and environmentalist. Day by day the status of soil health is deteriorating which is ultimately causing low crop yield and declining farm income. Majority of the population dependent on the agriculture are having fragmented land holding (of about 1 acre). This inter resulting in obtaining low income from a single enterprise is a challenge. On other hand, Practice of monocrop paved a way for ecological problems such as soil and water pollution, soil erosion Effective management of livestock's.



Gap existing that required the specific intervention

- 1) Introduction of appropriate cropping system and other farm enterprises which in term help initialization farm resources besides improving soil health as well as form income.
- 2) Possibility of increase in fodder production and implementing dairy sector in dryland area to keep a continued track of assured income throughout the year.



Stake for a person community or other grouping of people adopted.

The proposed districts of southern transitional zone of Karnataka (STZ-VII) encompass Hassan, Chikkamagalur, Shivamogga, Mysore, Davangere districts among which Davangere, Shivamogga, Chikkamagalur districts were adopted to implement a typical IFS model in their field considering their available form resources and cropping pattern followed. Lack of crop diversification, monocropping poor mechanization, terminal water stress and the poor marketing infrastructure some of the important area to be tackled in this project for sustained production and efficient utilization of resources.

4) Initiatives

1) Introduction of perennial grasses as a fodder unit in the farm for feeding dairy segment and encouraged the cultivation of azolla. This has been made by providing some of the critical inputs that are essential for fodder production such as rooted slips of variety co-3 (Napier grass) azolla (*azolla nilotica*) and Polythene sheets etc..

2) Replacement of mono cropping pattern by introducing mixed and inter cropping patterns consists of Maize + Red gram (BRG-2) (8:2) & Arecanut + Black gram/ green gram as intercrop in Areca garden.

3) Introduction of pulse crops viz, green gram/ black gram in paddy fallow has improved the soil fertility. The pulse crops grown with adoption suitable improved agro techniques viz, seed treatment with Rhizobium (N-fixed) and P.S.B (P stabiliser) Bio fertilizer and spraying of water soluble fertilizers at 30 Das.

4) Educating farming community about the importance of IFS and its methods of implementation by conducting seminars, Demonstration, field visits, and exposure visits





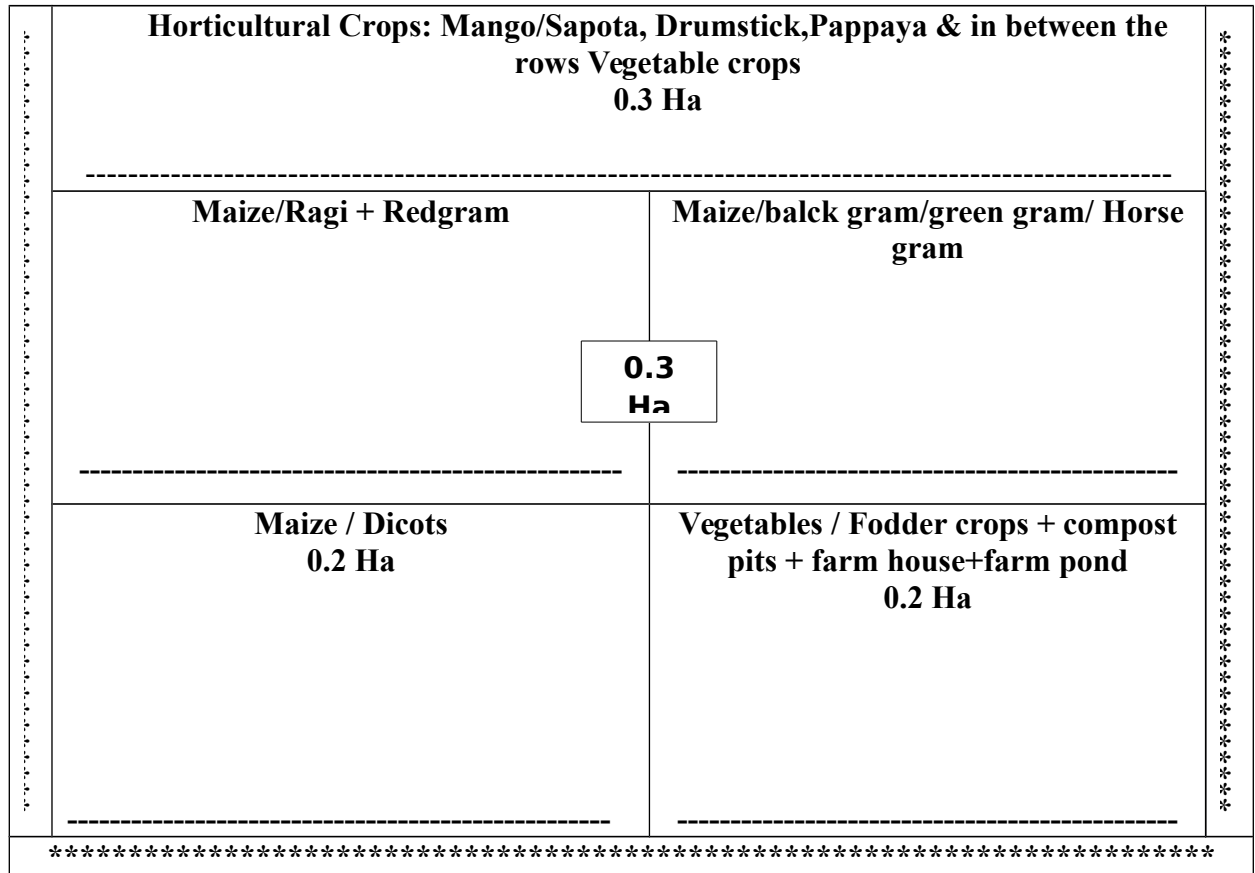
Components of IFS

- 1) Farm house, Kitchen garden and subsidiary enterprises like dairy, Vermicompost, farm ponds, goats and Poultry rearing.
- 2) Agro forestry.
- 3) Sapota Orchard.
- 4) Cropping activity (pulses field crops)





IFS unit at ZAHRS, Shivamogga



----- = **Glycercidia**

***** = **Coconut**

5) Methodologies

The project was implemented in the following villages and research stations.

1) ZAHRS, Navile , Shimoga Dist.	2) ZAHRS, Hiriyr, Chitradurga Dist.
3) ZAHRS, Brahmavara, Udupi Dist.	4) AHRS, Bavikere, Chikmagalur
5) AHRS, Katthalagere, Davangere Dist.	6) AHRS, Honnavile, Shimoga Dist.
7) Cashew Research Station, Ullal, DK	8) Areca Research Station, Thirthahalli, Shimoga Dist.
9) AHRS, Ponnampet, Coorg Dist.	10) ZAHRS, Mudigere, Chikmagalur Dist.
11) Isooru village	12) Kodathalu village
13) Mallenehalli village	14) Nelagattana hatti village.

IFS model for dryland ecosystem for 1 ha area @ ZAHRS, Shivamogga.

1) Along the borders coconut and drumsticks were planted, The bunds were strengthened with Napier grass cultivation.

2) Segment: 1 – Dairy sector
 2-cows
 14- Sheeps
 50- Poultry (Giriraja)

Segment: 2 – Sapota + Banana + Jack fruit

Segment: 3 – Groundnut, green gram, ragi, maize, red gram.

Segment: 4 – Teak wood , curry leaves, fodder + Azolla.

Segment: 5 – Compost + Vermicompost + Biodigester.

Segment: 6 – Kitchen garden + Poly house + shade net.

Livestock are like moving ATM's which can provide monetary income in entire season. The waste materials left after feeding and their dung and dropping are used for preparation of compost which in turn enriches organic matter of the soil and improves soil fertility. The front crops such as jack fruit and Sapota provide extra income from waste lands. Adoption of agro forestry system (silvi-pasture) which in turn provide an assurable income in long run growing vegetables and leafy vegetables in the kitchen garden, shade net and poly house in small scale provide an employment to the family as well as food security.

Income generated from the components of ifs model at ZAHRS, Shimoga

Sl.No	Component technology	Income after intervention, Rs/unit. (estimated)
1	Sapota – 180 plants; regular irrigation introduced	72,000/year, potential
2	Grass on bunds – 1200m; 6 cuttings/year	9000/year
3	Multipurpose trees on bunds (45 trees)	Many indirect benefits+ 10,000/ year
4	Kitchen garden	45,000/year + nutritional security of the family
5	Apiculture – three boxes	2,400/ year
6	Poultry; Girirani -50 birds	30,000/year+ family consumption
7	Composting; three vats/pits	18,000/year
8	Vermi composting	9,000/ year
9	Gobar gas	6,000/ year
10	Nursery – Sapota grafts	4,000/year at present, 80,000/ year is the potential
11	Field crops	10,000/ year
12	Lucerne	6,000/ year
13	Jack trees; 40 no (newly planted).	40,000/year

14	Teak plants 15 year old (90 trees)	90,000 potential at present but not to be encashed now
15	Fisheries 800 sq.m.area tank with water year round	55,000/year
16	Intercrop of drumstick, curry leaf, papaya etc	5,000/ year
17	Two Cows (HF Breed)	78,250/ year
Total of the potential created now		Rs 4,89,650/- year,

Key Results

Out comes

The overall farm productivity from the different enterprises was significantly higher and the model was environmentally eco friendly, Socially acceptable and economically feasible.

The net income generated from the different component in a one year is **Rs 4,89,650/-** year per hectare with B:C ratio of 3.20. The dairy sector has provided an income of 78,250/ year/ 2 cow with B:C ratio of 3.11, which was found to be a very successful component. There was a good inter relationship has been observed with the components like crop components and dairy component. Thus there will be improvement in soil fertility besides enhancement of crop productivity. The end product of dairy is input for crop component. Cow dung from animal component utilized for production of bio gas that in turn serve the purpose of cooking food for farming family and end product from bio gas can be used in the preparation of vermi compost.

At the farmer's field which was adopted for the IFS model have also paved a significant income to the farmer from which a farmer is satisfied with new pattern of growing crops over his conventional methods. Here are some of the cases that have been studied in the farmer's field of Isooru, Kodathalu, Mallenehalli and Nelagattana hatti villages.

7) CASE STUDIES

Case-1) Shanthakumar , ISURU.

Shanthakumar was a small scale farmer had an area of 3 acres in which he was cultivating paddy, maize crops from which he used to get an annual income of Rs.1,50,300 annually. The income was insufficient to meet his all basic requirements of family & educate his children.

He was taken under this project has a stake hold person to whom we have adopted an IFS model from which he has gained an increment of 33.2% over his conventional method of farming.





Table – 1: Income details of Shanthakumar , ISURU.

1	Existing IFS model	Crop production (kharif and summer) along with dairy.		
2	Bench mark income	Component wise details		
		Component	Yield	Annual Gross income (Rs)
		Paddy	42 q	56,700
		Maize	28 q	33,600
		Milk	2480litre/year	57,040
	TOTAL		1,47,340/-	
3	New components introduced and additional income (estimated)	Kitchen garden	To meet family needs	18,400
		Azolla and Fodder crop	About 15% increase in milk yield	5,840
		Red gram intercrop in maize.	475 kg grain + green pods for home use	21,500
		Increased Paddy yield due to bio-fertilizers	5 q	7,250
		Composting	Applied to fields	Long term benefit
4	Total additional income			50,030/-
5	Total annual income after technical interventions			2,00,330/- (+33.2%)

Case – 2: Manjya Naik, Kodathalu.

Manjya Naik was a farmer from a village Kodatalu which belongs to Davanagere District. He was an illiterate farmer who doesn't have basic education but had a past experience on IFS system & he also adopted many of components but he doesn't continued due to lack of technical knowledge. Then his farm was taken under the project to improve the farm income as well as re-implementing the components that he used to follow earlier. After these interventions his income was raised by 38.2% (35,470).



Table – 2: Income details of Manjya Naik S/O Bhojya Naik, Kodathalu.

1	Existing IFS model	Agriculture & dairy		
2	Bench mark income	Component wise details		
		Component	Yield	Annual Gross income (Rs)
		Maize	44.3 q	48,733
		Groundnut	8.1q	21,060
		Milk	1281 ltr/year	29,463
		TOTAL		99,256/-
2	New components introduced and additional income generated (estimated)	Kitchen garden	To meet family needs	5,560
		Azolla and Fodder crop	About 16% increase in milk yield	4,224
		Red gram intercrop in maize.	460 kg grain + green pods for home use	16,200
		Increased	1.5 q	3,900

		groundnut yield due to bio-fertilizers		
		Composting	Applied to fields	Long term benefit
		Total additional income		35,470
3	Total annual income after technical interventions			1,29,140 /- (+38.2%)

Case – 3: Puttamallappa, Mallenahalli

Puttamallappa is a farmer of Mallenahalli village of Tarikere taluk of Chikkamagalur district. He had an Orchard of Coconut and Arecanut with Groundnut. The income generated from this cropping system was very low & uneconomical. He was guided to go with new HYV of groundnut like GPBD-4 & GPBD-5, use of Bio-Fertilizers to get the higher yields. After the technical interventions his income was raised by 56.40% (Rs.6,70,700).

Table – 3: Income details of Puttamallappa S/O Puttappa, Mallenahalli

1	Existing IFS model	Horticulture, dairy and poultry.		
2	Bench mark income	Component wise details		
		Component	Yield	Annual income (Rs)
		Coconut	6300 no.	75,600
		Arecanut	52q	17,68,000
		Banana	12q	26,400
		TOTAL		18,70,000/-
3	New components introduced and additional income generated (estimated)	Kitchen garden	To meet family needs	5200
		Groundnut new variety	2q	5,200
		Improvements to irrigation system	System modified	Long term benefits
		Multi-storied cropping in areca	Established	Long term benefit
		Composting	Applied to fields	Long term benefit
		Total additional income		6,70,700/-
4	Total annual income after technical interventions			18,80,400/- (+56.4%)

CASE – 4; Chittayya, Nelagethanahatti.

He was one of the resource poor farmer belong to the village Nelagethanahatti of Chithradurda Dist. Who use to cultivate Onion, Ragi as mono-crops from which he use to obtain an income of Rs.2,11,900. After the technical interventions his income was raised up to 43.3%.

Table – 4: Income details of Chittayya, K. C. S/O Chinnayya, Nelagethanahatti.

1	Existing IFS model	Crop production, Horticulture and sheep rearing.		
2	Bench mark income	Component wise details		
		Component	Yield	Annual income (Rs)
		Onion	145 q	1,16,000
		Ragi	35 q	68,250
		Sheep	25 sold	1,00,000
		TOTAL		2,84,250/-
3	New components introduced and additional income generated (estimated)	Kitchen garden	To meet family needs.	5200
		Castor as intercrop with onion	8q	12,000
		Fodder slips	Minor benefit	2,000
		Composting	Applied to fields	Long term benefit
		Total additional income		91,550
4	Total annual income after technical interventions			3,03,450/- (+43.3%)

Success story of Mr.Durgappa Angadi

Life has come a full circle for this 43-year-old farmer from Shivamogga district.

Mr. Durgappa Angadi of Sasaravalli village of Shikaripur taluk was contemplating suicide, unable to repay a loan of ₹ 9 lakh 30 months ago. His crops had failed consistently. Today, he has not only become a successful farmer, but has also become an ambassador of integrated farming. Recalling his difficult days, Mr. Durgappa says it was a programme on television that was the turning point for him. It portrayed a small farmer from Kolar district earning huge profits from just two acres of land through integrated farming. “This gave me new hope as everyone around me was saying farming was a loss-making venture,” says Mr. Durgappa. He met experts to learn about integrated farming. “Within months, my experiment with integrated farming began and I harvested a bumper yield by growing ivy gourd,” he recalls. He was able to repay the entire loan within 18 months.

And then he decided to spend the rest of his life on instilling confidence among small and marginal farmers that farming is still a profitable venture. He now takes up organic farming on two and half acres of land and earns an average annual income of about ₹5.25 lakh. Apart from growing half a dozen horticultural crops and vegetables, he also takes up apiary and dog breeding. University of Agricultural Sciences-Bengaluru’s alumni association, which comprises about 10,000 agricultural graduates, has now chosen four innovative farmers, including Mr. Durgappa, to become its ambassadors of integrated farming. Emphasising that integrated farming was the only method to make farming a financially sustainable, Mr.Gowda said the association has popularised the concept by holding workshops at the fields of the innovative farmers.

He also remembered how University of Agriculture and Horticultural Sciences, Shivamogga helped him from past days. He said that the crop seminars, input distribution programmes and other valuable programmes arranged by our RKVY team had not only helped him and also his village members which created a ray of hope among the farmers. Here are some plates showing the work done by our IFS Farmer Durgappa Angadi and our University team.





Durgappa Angadi is also appeared in televisions like Dooradarshana programme entitled as Annadata and in TV9 kannada in a programme named **Jai Ho Raita**. So many news papers published his success with regards to integrated farming system (above said programme and publications are enclosed in a CD)

Lessons Learned

Through utilization of farm resources available in the dryland area we can produce a stable and sustained income to a farm family by adoption of appropriate IFS model in their farm.

We noticed that there was a reduced utilization of external inputs such as pesticides, fertilizers etc., which was deteriorating soil health. It was replaced with use of organic manures and bio fertilizers through introduction of IFS.

Food security and balanced nutrition can be generated from kitchen garden. Thus it improved the family health and reduced the family maintenance cost and purchase of chemically produced products from the market. Moreover IFS emphasis on stable and assured income as well as environmental sustainability through skillfull management of all the components.