

Original Research Article

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## Adoption of Integrated Rice-Fish Farming System by Farmer of Ramchandrapuram

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### ABSTRACT

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Paddy is important cereal crop of Andhra Pradesh state, particularly East and West Godavari is considered as Rice bowl of Andhra Pradesh. It is cultivated under wide range of soils and climatic conditions. It is grown in black soils as well as heavy clay loam soils. In East Godavari district total rice production area is 4.23/ha. The major varieties grown in Ramchandrapuram mandal are MTU-1010, PLU-1100. More than 70% of the Indian farming community own less than one hectare of land. They belong to the category of small and marginal farmers. Such farmers feel that, except going for a single cropping system (like Paddy in canal irrigated lands, Groundnut in rainfed areas) there is hardly any possibility of trying new practices or methods for farm improvement. To address the needs of sustainable farming of such small and marginal farmers, an integrated farming model has been developed with low cost. The model emphasize the significance of four important sectors i.e., Agriculture, Fisheries, Horticulture and Animal Husbandry thus highlighting the concept of integrating one with another in assuring better yields and results to farmers who are eking their livelihood in these sectors. This model has been tried out in the field of the beneficiary farmer Sri G. Venkateswara Babu Rao, resident of Kapavaram village & mandal of Ramchandrapuram block, East Godavari District.

### Introduction

Though the practice of rice-fish farming differs from country, they all follow the same principle of utilizing or recycling farm resources for production. The major differences in these farming systems are mainly the variations in the field design, species composition, stocking density, sizes, crops, crop rotation etc., usually three types of field designs which included the shallow trench system within the rice field as seen in

Philippines, Indonesia and China; pond refuge adjacent to rice field at one side and deep water rice field system are practiced in India. In these systems, different types of land modifications are done for keeping and rearing the fish. In Eastern Indian states, mainly pond refuge and trench system of rice-fish farming is following whereas broad bed-farrows system is popular in the Andamans. The state of Andhra Pradesh is known as "RICE BOWL OF INDIA", but now it's CHATTISGARH who have taken the place of Andhra Pradesh.

The only reason behind that is the less income and high investments are obtaining from sole rice crop in their fields, so many farmers in these states especially the farmers who belong to districts of East Godavari and West Godavari which are predominantly called as “RICE BOWL OF ANDHRA PRADESH”. These districts have a high source of water availability from river GODAVARI so the farmers are leaving traditional agriculture and converting their fields into fish ponds and obtaining huge profits from it, but these is the scenario of a decade before in those districts right now these fish ponds are converting into “INTEGRATED RICE AND FISH FARMING SYSTEMS”, which not only became a profitable adaptation but also a forward step for utilization of resources and also a component of promoting “Blue-Green revolution”.

## **Materials and Methods**

### **Locale of study**

The present study was carried out in Ramchandrapuram mandal in East Godavari district of Andhra Pradesh state as this is one of the major paddy growing areas of East Godavari district. About 0.16 lakh hectare area is under paddy crop in this district.

### **Selection of Mandal**

There are 60 mandals in East Godavari district. Out of 60 mandals in East Godavari district, selection of Ramchandrapuram mandal is selected as ATMA Block manager of this mandal is promoting and guiding back farmers to adapt this integration method as income generation and sustainable farming.

### **Case study of farmer who have adopted integrated rice-fish farming system**

The calculation of “Integrated Rice-Fish Farming System” of Sri Gundapaneni.

Venkateswara Babu Rao who have started IRFS in his field area of 1.7 acre from June, 2016 – April, 2017 under the supervision of Pakalapati. Ramababu (Block Technology Manager) of ATMA of Ramchandrapuram mandal of East Godavari district of Andhra Pradesh.

### **Farm details**

**Name of the farmer:** Gundapaneni.

Sri Venkateswara Babu Rao

**Field area:** 1.7 acres; 1 acre for RICE, 0.5 acre for Fishes Trench.

**Paddy varieties:** RP Bio 226, RNR 15048.

**Fish varieties:** Grass Crap -

Ctenopharingodonidella

Catla - Catla catla

Rohu - Labeorohitha

**Horticulture plants:** Banana, Papaya, Coconut

**Livestock:** 2 Murrah Buffaloes

### **Operations undertaken in fishes trench**

While weeding in rice field and after completion of that weeding process we will apply 200kg/acre of GANIJAMRUTHAM.

In order to assure the level of bacterial development in fishes trench we need to increase level by applying Fermented Butter Milk/Thati Kallu/Jeevamrutham @ 6 Lt/ Spray.

### **Vermicompost (100kg)**

Pseudomonas (1lt) + Phosphobacteria (1lt) + Azospiru

### **Feeds for fishes**

Litter of Hen: 25 Kg/ 3 Days

Rice Bran : 25 Kg/ 3 Days

Ginger Paste: 2Kg/ 2 Months

Raw Turmeric Paste: 2Kg/ 4-6 Months

### **Organic supplements for field jeevamrutham required items**

Cow Dung - 5 Kgs  
Cow Urine - 5 Lts  
Water - 20 Lts  
Handful of Soil - Forest Soil/Bunds Soil  
Gypsum/Lime - 50 gms

### **Methods of preparation**

Mix the cow urine and gypsum in 20lts of water in which 5kg cow dung is tied up in a cloth bag was kept for 12hours to soak, stir the contents in mean intervals.

### **Utilization**

Sprinkle this composition on the seeds which are ready for sowing as a part of seed treatment allow them to dry under shady area, such treated seeds will sprout in a healthy manner and will prevent seed borne diseases.

### **Ghana Jeevamrutham required items**

Cow Dung - 10 Kgs  
Cow Urine - 2-5 Lts  
Jaggery - 2 Kgs  
Pulses Flour- 2 Kgs (except Soya and Ground nut)  
Forest Soil / Soil at Bunds- 2 Kgs

### **Method of preparation**

All the components are mixed well using cow urine and that mixture was spread thoroughly as thin layer in a shady area. The mixture is allowed to dry for 7days and then dried layers are finely powdered.

This fine powder can be stored for 6months in a bag and can be used when required. This finely grounded powder is sieved in field area as this serve as a supplement for micro and macro nutrients

### **Neemasthra required materials**

Cow Dung - 2 Kgs  
Cow Urine - 10-15 Lts  
Neem Leaves - 10 Kgs  
Water - 200 Lts

### **Method of preparation**

10 Kgs of Neem leaves are grounded as paste and it was mixed in 200 lts of water. To that mixture add 10-15lts of urine. Finally add 2Kgs of Cow Dung and mix it with stick. This mixture was kept aside for 4-5 hrs by covering it with lid. This mixture is well stored and used at regular time intervals for better maintainance of crop.

### **Results and Discussion**

#### **Case study of integrated rice-fish farming system adopted by farmer of Ramchandrapuram of East Godavari District**

This model has had its impact in two ways.

Firstly, better conservation and use of on-farm natural resources thus establishing natural ecosystem.

Secondly, this model has been able to generate money surplus every month in addition to family consumption.

Conservation and utilisation of on-farm natural resources - maintaining ecological equilibrium.

#### **Soil moisture conservation**

Bunding done across the slope, both on the boundaries and around the paddy plot reduced the speed of water flow, thus enabling moisture retention. The vegetation on the bunds helped in stabilising the bunds, preventing soil erosion besides providing fodder and green manure (Table 1).

**Table.1** Case study of integrated rice-fish farming system adopted by farmer of Ramchandrapuram of East Godavari district

SNo	Crop details	Paddy RP BIO 226 (kharif)	Paddy RNR 15048 (Rabi)	Banana	Papaya	Coconut	Red gram	Fish (Grass crap, Catla, Rohu)	Dairy	
1	Preparation of land/trench	2000	1500	0	0	0	0	2500	0	6000
2	Seed/sampling	250	350	660	1200	1080	14	2100	0	5654
3	Nurseries labour & transplantation labour	5100	5000	500	500	1200	300	0	0	12600
4	weeding	3400	2900	0	0	0	0	0	0	6300
5	Manure/feed	1000	800	350	100	0	0	0	0	2250
6	Pests & diseases	600	600	0	50	0	100	500	0	1850
7	Cost of irrigation									24200
8	Interest on working capital									4414
9	Rental value of own land									5500
10	Depreciation									594
11	Interest on fixed capital									5066
12	Land revenue									800
13	Insurance									2500
14	Inputed value of family labour									1500
15	Harvest of crop /fish	1200	1200	0	0	0	200	3000	0	5600
16	Others	0	0	0	0	0	0	1000	18000	19000
17	Yield	938	825	540	1840	180	20	3300	26	
18	Unit cost(Rs)	22	30	35	10	20	130	120	60	
19	Gross income(Rs)	<b>20636</b>	<b>24750</b>	<b>18900</b>	<b>18400</b>	<b>3600</b>	<b>2600</b>	<b>396000</b>	<b>75600</b>	<b>560486</b>
20	Total expenditure									70268
21	Net profit									
22	Cost A									63268
23	COST B									68768
24	COST C									70268
<b>Gross Income</b>		560486								
<b>Total Expenditure</b>		63268								
<b>Net Profit</b>		70268								
<b>Cost Benefit Ratio</b>		1:7								

The farm pond is at the lowest point on the field and the excess water which would have otherwise gone waste gets collected in the small pond. The harvested water is used for irrigating horticulture crops.

### **Soil fertility**

The crop residues on the bunds and the animal wastes have been the major source for composting manure. Thus the soil fertility was managed by lowering chemical inputs and more of organic farm litter.

### **Income generation**

Livestock rearing started with two Murrah, Jersey breed buffaloes. The Murrah breed buffalo produced 6 litres milk per day. These will substitute the milk requirement by family members.

### **Other farm enterprises**

Pisciculture is one of the main activity that yielded incomes by raising fish in the trench. The farm pond served both as a nursery pond for spawn to be stocked well as a watershed to collect excess water and rain water.

### **Other benefits**

Over a couple of months, besides the above mentioned benefits, the farm family can benefit from production of fruits from horticulture plants. They can serve nutritional needs and also provide some cash income. These types of enterprises provide labour for the family over the entire year.

Productivity, Profitability, Potentiality or sustainability, Balanced food, Adoption of new technology, Saving energy, Meeting fodder crises, Solving fuel and timber, Environmental safety, Recycling, Income round the year, Employment generation, Agro-industries, Increasing Input efficiency.

The model depicts a fine blend of all the farm enterprises where in each and every component feeds into the other, thus making efficient utilization of products, by-products and also wastes generated on the farm. Multi-cropping systems always gives higher returns than Mono crop as such it can be replicated in other parts of the district and across the state based on the feasibility of the water source.

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