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## Integrated farming system in Tripura

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### Abstract

Farming plays an integral part in the Indian economy and its constituted state including Tripura. Tripura is the third-smallest state after Goa and Sikkim in the country with an area of 10, 491.69 sq. Km and is bounded on the north, west, south and southeast by Bangladesh, whereas in the east, it shares a common boundary with Assam and Mizoram. Various Agriculture development programmes in the state started from the 2<sup>nd</sup> Five Year Plan onwards although some preparatory efforts were initiated during the 1<sup>st</sup> Five Year Plan period. Before 1950, the developmental activities of Agriculture, Animal husbandry and Fisheries were being looked after centrally by Agriculture through a small set up headed by one Superintendent. Subsequently, Animal husbandry and Fisheries were separated from Agriculture. Agriculture is the backbone of Tripura's Economy as it provides employment to nearly about 51% of the total workforce in the state. In recent times, efforts were made to develop low cost farming systems by adopting Integrated Farming System (IFS) suitable for Tripura conditions.

**Keywords:** Farming, agriculture, animal husbandry, fisheries, integrated farming system, Tripura

### Introduction

Integrated Farming System (IFS) is a sub system of a high level land use system like a village or a watershed which include crop production, raising livestock, fishery, poultry, bee keeping etc. on a particular farm. Literal meaning of integrated is to combine two things in such a way that one becomes fully a part of the other. Integrated Farming System (IFS) is an independent, interrelated often interlocking production systems based on few crops, animals and related subsidiary enterprises in such a way that maximize the utilization of nutrients of each system and maximize the negative effect of these enterprises on environment.

### Primary goals of IFS are

1. Maximization of yield all component enterprises to provide steady and stable income at higher levels.
2. Rejuvenation/amelioration of systems productivity and achieve agro ecological equilibrium.
3. Control the built-up of insects-pest, diseases and weeds population through natural cropping system management and keep them at low level of intensity.
4. Reducing the use of chemical fertilizer and other harmful agrochemicals and pesticides to provide pollution free, healthy produce and environment to the society at large.
5. Increasing in natural resource use efficiency by early recycling of nutrients.
6. Mitigation of negative impact of agriculture or livestock on environment.

The following Integrated Farming Systems suitable particularly for hilly regions of the North Eastern Region are explained below in a concise manner:

### Integrated Fish cum Pig farming

A scientifically sound and economically viable production system integrating pig husbandry with fish culture has been evolved for Tripura conditions. The pig sites are constructed on the pond and the pig manure (faeces and urine) are directly drained into the pond. The pig dung acts as excellent pond fertilizer and increases the biological productivity of the pond water and consequently also increases the fish production. The fish also feed directly feed on pig excreta which contain 70% digestible food for the fish. No supplementary fish feed or pond fertilizer is required in this system. The expenditure on fish culture is drastically reduced as the pig excreta acts as substitute to fish feed and pond fertilizer which accounts for 60% of the input cost in fish culture.

### The system has obvious advantages

- The pig dung acts as excellent pond fertilizer and raises the biological productivity of the pond and consequently increases fish production.
- Some of the fishes feed directly on the pig excreta.
- No supplementary feed is required for the fish culture.
- The pond dikes provide space for erection of animal housing units.
- Pond water is used for cleaning the pigsties and for



**Fig 1:** Pig rearing near the pond embankment

bathing the pigs.

- The system cannot be adopted in all parts of India due to religious consideration but it has special significance in the North Eastern Region as it can improve the socioeconomic status of weaker rural communities, especially the tribals who traditionally raise pigs at their backyards and fond of fish eating, they can take up fish-pig farming easily.

### Integrated Fish cum Duck Farming

Raising ducks over fish ponds fits very well with the fish polyculture system, as the ducks are highly compatible with cultivated fishes. The system is advantageous to farmers in many ways:

- Ducks fertilize the pond by their droppings when given free range over the pond surface. Ducks have been termed as manuring machines for their efficient and labour-saving method of pond manuring, resulting in complete saving on pond fertilizer and supplementary fish feed.
- Ducks keep water plants in check.
- Ducks loosen the pond bottom with their dabbling and

help in release of nutrients from the soil which increase pond productivity.

- Ducks aerate the water while swimming, thus they have been biological aerators.
- Duck houses are constructed on pond dikes, hence no additional land is required for duckery activities.
- Ducks get most of their total feed requirements from the pond in the form of aquatic weeds, insects, larvae, earthworms, etc. They need very little feed, and usually farmers normally give kitchen wastes, molasses and rice bran, for the purpose.



**Fig 2:** Duck rearing near the pond embankment

### Integrated Chicken cum Fish Farming

Chicken raising for meat (broilers) or eggs (layers) can be integrated with fish culture to reduce costs on fertilizers and feeds in fish culture and maximize benefits. Chicken can be raised over or adjacent to the ponds and the poultry excreta recycled to fertilize the fish ponds. Raising chickens over the ponds maximizes the use of space, saves labour in transporting manure to the ponds. Fish-poultry integration is

done in two ways:

- One way is to install the coops directly over the pond surface so that the droppings fall directly into the pond.
- The other way is to make deep litter poultry coops and recycle it into fish ponds daily @ 50 kg/ha.

The deep litter system is generally preferred because as compared to poultry droppings, the fully built up litter has

about three times high manurial value. Normally, 500 to 600 birds are needed to meet the fertilizer requirements of 1.0 ha pond.

Important points for chicken rearing:

- Dual purpose poultry birds are of good choice for Integrated Poultry cum Fish farming.
- Brooding should be done in separate shed.
- It is better to use deep litter system of management instead of construction slatted floor over the pond.
- Follow the vaccination and deworming schedule.
- Don't allow formation of cake in litter-turn atleast once a day.
- Use separate shoes to enter to the shed.
- Provide good laying nest to get clean egg.
- Discourage visitors to the farm.
- Maintain 14 hour light and 10 darkness schedule for layer.
- Provide enough calcium to layer.
- Maintain good record of egg production and other farm records.



**Fig 3:** Integrated Fish cum Chicken farming

### **Integrated Fish cum Goat farming**

Integrated farming of fish and goat is consisting of the culture of fish associated with the husbandry of goat near the pond embankment in such a way that the wastes are directly drained into the pond. The floor and the drainage line of the goat house is made in such a way that the shed wash is diverted into the pond directly in the case of small amount or collected into a small tank in the case of large amount. The goat droppings need time to decompose and hence it is necessary to give enough time to compost it before using in the pond.

Goat is known as the poor man's cow and they are reared by small and marginal farmers for their domestic needs as well as additional income generating unit. Wherever convenient they can also include a fish pond, which may differ in size.

### **Integrated Fish cum Cattle farming**

The amount of excreta of cattle is the greatest and most stable. Cattle dung, urine as well as washing of cattle shed have good manurial value. The waste cattle fodder can also be utilized as fish feed. The cattle shed can be constructed on the widen embankment of fish pond itself, so the waste and washing are directly drained into fish pond. 5-6 cattle is sufficient for 1.0 ha pond.

### **Conclusion**

There are always integrations at different levels in the existing

family farming system practiced by the small holding farmers in the region. Inculcation of scientific approach like integrated precision farming in management of different components will not only improve resource use efficiency in existing production system but will also help to climb up a step towards sustainability of small holder family farming production system in future by mitigating its negative on environment through proper recycling of nutrients.

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