

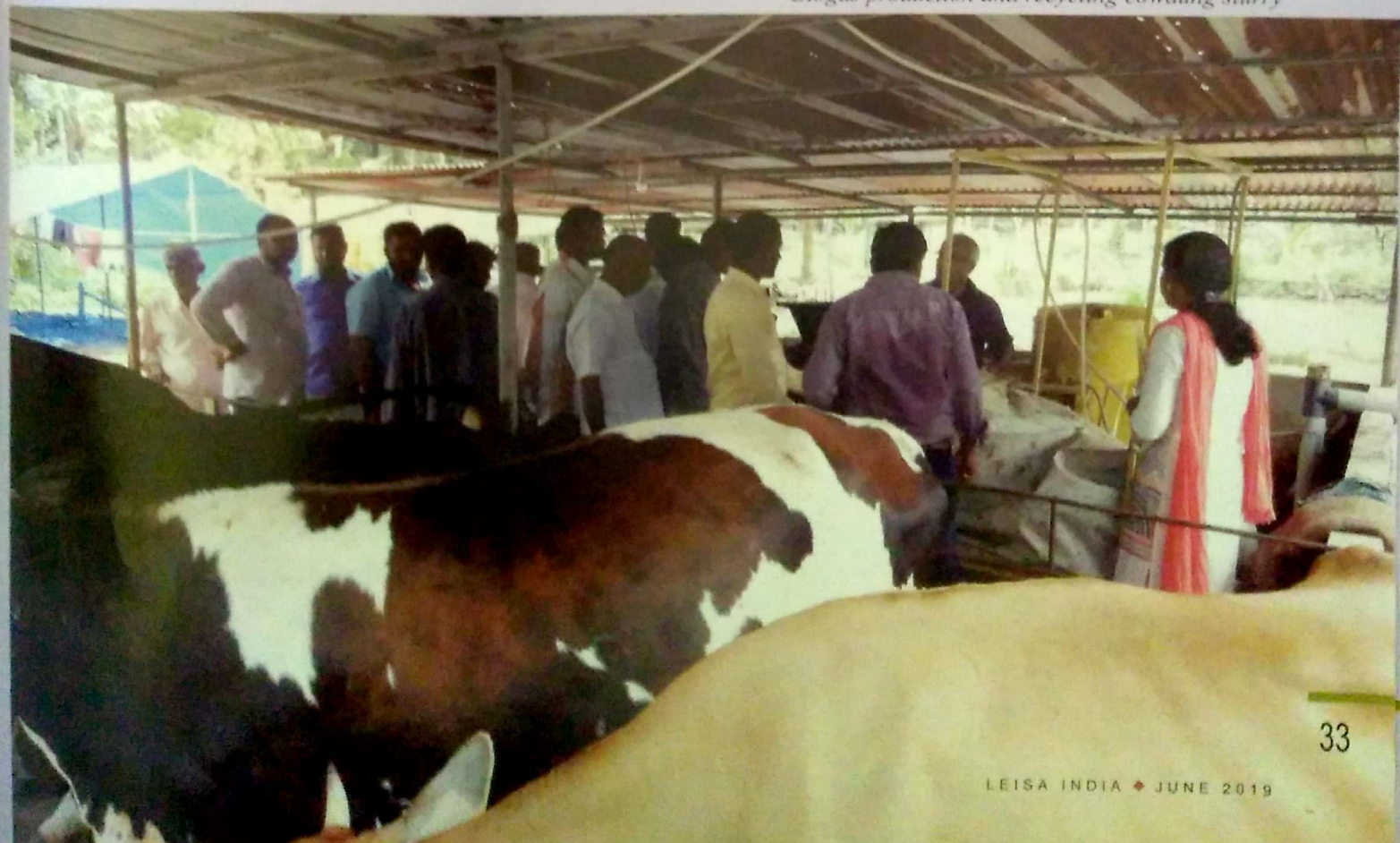
# Recycling for resource efficiency

## *A practical model for up scaling*

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Systematic recycling and value addition of organic farm residues could make the farm more productive and self reliant. Contributing in several ways, recycling resources will also enable farmers to provide ecological service. Resource recycling attains greater importance in ensuring climate resilience, especially for the small and marginal farmers.

*Biogas production and recycling cowdung slurry*





**T**raditionally farmers have been recycling and reusing resources. Women farmers in small homesteads are especially good and innovative at recycling of farm resources. They utilize the farm residues as fuel wood, cow dung for making fuel or for nutrition garden, the edible kitchen wastes for dogs and cattle, other kitchen wastes to compost pits or will be applied in coconut palm basins. When the household mostly depends on their own farm for food and other needs, it is a zero waste and fully recycled system. Such farms are simply handed over by generations as a way of life.

Small family farms are designed for utilizing the resources to the maximum and appropriately, by integrating various components on the farm, to meet the family needs and income. Such recycled farms transform into eco friendly farms, multiplying the beneficial effects. Recycling of farm resources reduces input costs, enables low reliance on external inputs, improves quality of produce and ultimately ensures farm sustainability under climate change conditions.

### The initiative

Small and marginal land holdings invariably adopt livestock/ poultry components also if depending on farming for livelihood sources. ICAR-CPCRI is implementing the farmer FIRST (Farm, Innovation, Resources, Science and Technology) program of ICAR at Pathiyor panchayath, Alappuzha district, Kerala state since 2016, among 1000 farm families. The average land holding size of the farmers was 0.32 ha and livestock units ranged from one to 30 based on the capacity to invest and manage.

Participatory Rural Appraisal (PRA) was conducted for participatory analysis of social assets, time utilization, problems and causes, timeline of farming practices,

**Rice gruel water is reused for spraying in banana for fruit growth and to vegetables for pest management**

wealth ranking etc. The major problem and concern of livestock farmers found, was the disposal of animal wastes from their small farms. Sri.Gopalakrishna Pillai, Kottinattu Bunglavu opined that *"the semisolid cow dung of 30 cows, urine and shed washing face hurdles in maintaining hygienic condition both for animals as well as the family in home surroundings. Moreover since more than 200 liters of milk is being directly marketed from my home unruly odour emanating from the animal wastes reflects on the quality of milk production and the acceptability by the consumers"*. Also, neighbours were complaining and the local self governments imposed certification for pollution control for these units.

It is to solve these concerns, ICAR-CPCRI under the farmer FIRST Program (FFP) of Indian Council of Agriculture (ICAR) evolved a practical model. The recycling of animal residues was addressed in multipronged manner.

1. An analysis of the nature of the cow dung (semisolid to loose texture) and quantity to manage per day including cow urine and shed washing done.
2. Farmer participatory experiments planned and conducted with cow dung slurry and cow urine to be used in vermicomposting units, utilizing coconut organic residues and farm wastes.
3. Shade drying of cow dung as a marketable organic product.
4. Recycling of urine and shed washing for fodder grass and vegetable cultivation.
5. Biogas units for cooking gas production.

### Ways of Recycling

Mr. Gopalakrishna Pillai owns one acre of homestead farm. The farm consists of 30 cows and calves, vegetables grown organically in 200 grow bags and fodder grass units. The farm is lush with organic manure/urine and has two vermicomposting units of 5-6 tons capacity annually, one homestead pond for fish farming, biogas unit, hydroponics fodder unit and coconut trees with intercrops like tubers, spices etc.

Coconut based farming system offers 80-100 kg of organic residues from one fully grown coconut palm and from inter/mixed crops depending upon the crops/ farm components. ICAR-CPCRI technology of



vermicomposting of coconut organic residues was adopted. Along with coconut organic matter like chopped coconut fronds, other organic parts of coconut, residues of inter crops like fodder, tubers/spices, banana, vegetables are also added.

Mrs. Usha his wife manages the application of cow dung slurry in vermicompost units, collection of farm residues like cow shed feed wastes/dry fallen leaves of the homestead trees like mango, jack etc and assists in preparation of cow dung urine mixture for vegetable cultivation. She says, "vermicomposting unit helped us to reduce the organic bulk by 60-70 percent. Besides maintaining hygiene in the homestead, recycling is necessary in homesteads where the farm family & the farming components co-exist".

The ash obtained from the kitchen and the fish wastes are also incorporated in the coconut palm basins directly. On an average, 10-12 kg of ash is obtained weekly. Sprinkling of ash on coconut seedlings every weekend is done which serves as a prophylactic measure for pest and disease for management in the initial stages.

Also, rice gruel water is reused for spraying in banana for fruit growth and to vegetables for pest management. The women are the major recyclers of weeds. Fresh or ripened leaves of banana/jack tree are fed to the goats, cows and poultry on a daily basis. Backyard poultry serves as recycler unit of food wastes, fish wastes and the paddy wastes in homesteads. The recycled farm residues are in turn providing fresh vegetables or eggs in the homestead.

Mr. Gopalakrishna Pillai, reiterated that "transportation and use of bulk fresh cow dung faces low demand, incurs high labour charges for handling and faces disposal problem due to accumulation, especially during the monsoon/ rainy periods. Through vermicomposting, I could add value to cowdung. By

recycling, I am producing vermicompost for farm use as well as selling the surplus". The shade dried cow dung is in much demand among marginal land holders and part time farmers of cities/ towns, fetching Rs.12 per kilogram to the farmer. Mr. Gopalakrishna Pillai also earns by selling vermicompost to the tune of 5-6 tons per year.

Gopalakrishna Pillai supplies 200-300 liters of milk every day directly from his homestead. Also, this farm family vouches for the tasty, nutritious and farm fresh vegetables around their house through recycling of cow urine, cow dung and biogas slurry.

Sri. Gopalakrishna Pillai, a banker turned model farmer, has more than 100 visitors every day. The model of integrated farming system and the recycling of farm wastes as valuable compost, green fodder, pond fishes, vegetables and fruits are the learning models they imbibe from here. The women folks are happy that the vegetables obtained can be freshly picked and the storage period of cucurbits is enhanced in this type of cultivation. Any household could convert the organic wastes of their household, to tasty leafy vegetables / vegetables easily by the members of the home, through recycling as liquid manure, solid manure, vermicompost etc.

Mr. Gopalakrishna Pillai was awarded the best farmer of the panchayath for following organic cultivation practices.

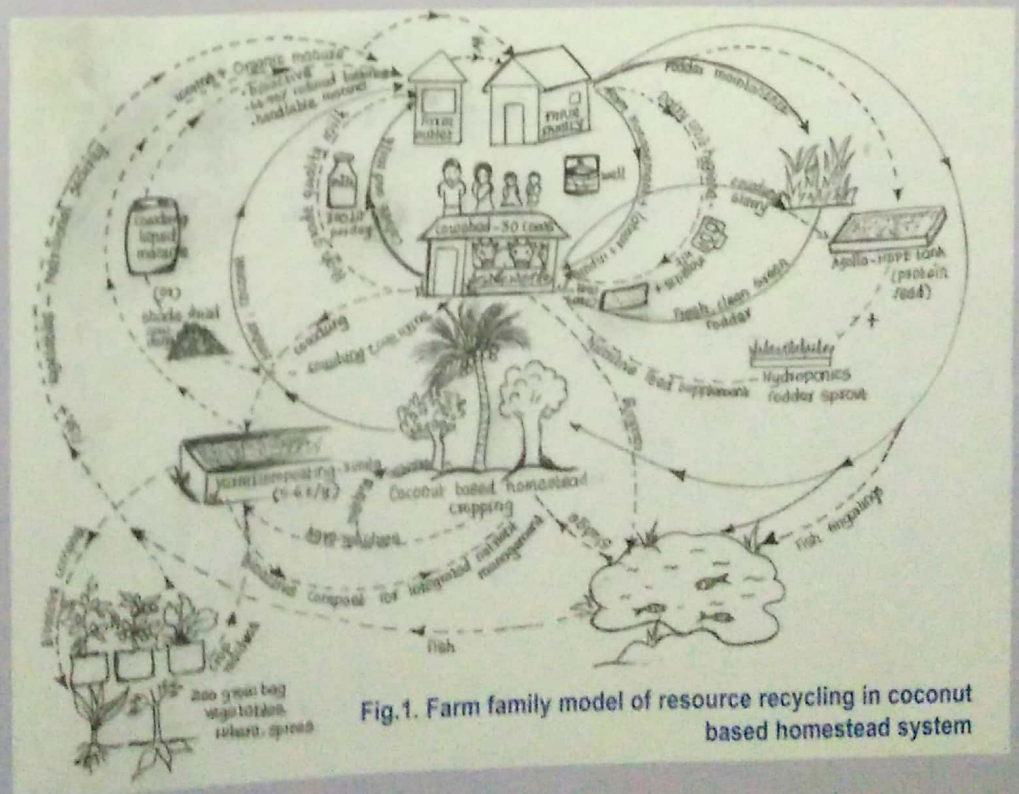


Fig.1. Farm family model of resource recycling in coconut based homestead system





*Women recycling farm residues for tuber planting*

His farm is a dynamic example for efficient resource recycling and self reliant farming.

### **Up scaling as a social model**

The resource recycling model has been adopted by 15 homesteads in the panchayath. Farm residue recycling cum value addition units will be set up and the farmers will adopt integrated farming systems. Mr. V. Prabhakaran, Pathiyoor grama panchayath President is very confident that the fifteen young farmers including seven women, will be successful in recycling resources and also be able to get some income from the initiative. He says, *“efficient and scientific recycling of farm residues in decentralized manner in a panchayath could enhance the motivation levels for production of safe, tasty and nutritious food in the rural areas. Women farmers could play a greater role in this for recycling the local resources. We are now advising them to recycle weeds and other farm residues obtained in MGNREGS activities, back to the soil by directly incorporating, instead of burning them”*.

Systematic recycling and value addition of organic farm residues could make the farm more productive and self

reliant by providing essential nutrients to the soil. Vermicomposting enables bio suppression of microbial pathogens along with enriching soil of beneficial microbes. Composting also makes free form of nutrients available to crops refining itself as an odour free sweet smelling natural product. The biogas production in anaerobic condition utilized as bio fuel helps to reduce the direct release of green house gases in farms. Contributing in several ways, recycling resources will also enable farmers to provide an ecological service earning green money. Overall, resource recycling attains greater importance in ensuring climate resilience, especially for the small and marginal farmers.

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