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Promoting Agroecology

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**Recycling resources in
agroecological farms**

6 Recycling Resources

Path to sustainable living

Jasbir Sandhu and Shivananda Matapati

Promotion of sustainable agro ecological practices through recycling and reusing of resources not only reduces dependency on external sources, but also minimises waste. On farm diversity results in better nutrition and income while building an autonomy for better living. The story of Laxmi and Shankrappa proves this.



9 Bhoomi Sudha

Recycling biomass for enhanced soil fertility

Bikash Das, Pradip Kumar Sarkar, Mahesh Kumar Dhakar, Sushanta Kumar Naik, Sudarshan Maurya, Priya Ranjan Kumar, Shivendra Kumar, Arun Kumar Singh, B P Bhatt

Farmers in Khunti and Ranchi districts in Jharkhand are benefitting from including biomass yielding plants in their fruit orchards. Mulching of biomass in the plant basins was found to result in significant increase in soil moisture, soil nutrients and organic matter content which is reflected in terms of increased plant vigour and yield.

22 Fuel from farm waste

Anand Karve

Appropriate Rural Technology Institute (ARTI), through their experiments, brought out many new insights in the technology of biogas production. While dispelling the myth that cowdung is essential for biogas production, ARTI's experiments concluded that pure carbohydrates devoid of any nitrogen also yielded biogas in ample quantities. Agricultural waste which mainly consists of cellulose, hemicellulose and lignin was found as an alternative resource in producing biogas.



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A practical model for up scaling

Anithakumari P and Induja S

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.

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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



Traditionally 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



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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