



Integration of farm components- the beauty of coconut homesteads

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Coconut based homesteads are farmer-based Agroforestry systems for meeting local food and livelihood needs in an ecological system approach. ICRAF (1993) defined agroforestry systems wherein perennial trees/palms/crops are cultivated or grown based on spatial or temporal arrangements where ecological and economical interaction benefits the production and carbon storage. Majority of coconut farmers have small and marginal land holdings, being cultivated in contiguous manner. In Alappuzha district, Kerala good number of the households had one or more backyard ponds which are not only water collection and storage mechanism, but

also utilized for natural fish culture and used for household activities. Small holders farming are very much heterogeneous in terms of resources like land, soil fertility, cropping systems, mixed farming, off farm income, social personal traits and such multiple dimensions. Hence arriving to a general module of integrated farming system or coconut based homestead system is rather impossible, since the objectives, modus operandi and the socio personal dimensions warrants customized integration and incentivization. Some of the basic incentivization obtainable through integration in homestead systems is delineated in the ensuing portion.



Aquaponics unit combining crops and water purification



Azolla and fish in artificial pond



Caring poultry satisfies both farmer and birds



Coconut Intercrops

Effective resource utilization

Optimum production of quality and safe fish which is a taste favorite and cheap quality protein source for the state population in general, needs further impetus through intensification of scientific pond fish culture besides marine and freshwater fisheries. Pond fish culture in coconut based homestead system and vegetable in pond banks provide multiple farm products with less cost from small area. Integration of viable traditional knowledge and skills can upgrade mutual benefits from these components. Homestead ponds also act as natural mini reservoirs for collection and storage of rain water, irrigation for crops, drinking water and bathing requirements of animals as well as a natural water based ecosystem unit favoring ecological services. Natural resource management, in the present scenario of climate change assumes importance at macro and micro levels. Homestead system with multiple components like main crops, intercrops, fish culture, livestock, poultry and combination of wood trees and wild weeds catering to the service of the pollinators of the system as well, could be seen as farmer evolved models.

Cost reduction

Adequate and proper investment in farming is of a major concern for the majority of resource poor farmers. In coconut based homestead systems, there is a mutual reuse and recycling of farm products for the households, livestock and the organic waste recycle for fish culture and manure preparation, thus reducing 40 to 60 per cent of the recurring cost and enable inching towards low external input system. Homestead systems are usually one of the best models of family farming among small and marginal farmers of developing and under developed countries. Even though they are not considered as a high income generating units, they are catering majority of the rural and urban families with fresh farm produces having source credibility. The involvement of the family members, contribute not only for the cost reduction but also provides better opportunities for effective time management in farming and social needs as well as in experiential skill development mode through active participation in farming.

Balancing environment and diet needs

Like a balanced diet plate, homestead unit partitioning of the farming space to be planned and managed for balanced resource efficient production of fish, meat, egg, milk, vegetables, oils, fats, fruits,



Fodder as intercrop



Healthy poultry are happy birds



Indbro bown



Natural pond revived for fish farming in coconut homesteads

spices, carbohydrates and the like in a viable mode. Ecological units of farming are thus evolved over long periods of temporal and spatial level of sustainable choices and combinations. These systems ensure balanced diet having diet diversity from minimal food mile to maximum livelihood security. The environment and nutrition are not only the basic needs of human beings, but also for livestock, poultry, fish etc.as well as the natural fauna and flora components having indirect and direct effect on farming. Hence the idea of balancing components needs the consideration of the nature’s balance embracing the principle of macro level inclusiveness.

Sustainable income with low risk

Building of coconut based systems results in natural services, increased production and income from unit area offering low cost efficient choices of reusing, recycling and reducing the use of external inputs. Risk cushioning is ensured in integrated farming systems, but experiences from participatory research indicated for the need of minimum of 0.25 to 0.4 ha or clustering of land holdings under group farming

Coconut homesteads – farming for the home

Homesteads in Malayalam language is “Purayidakrishi” meaning farming in the areas surrounding the house for farm produces to meet the multiple needs of the family members and marketable surplus in an efficient, environmentally sustainable and integrating way for household members. In the scenario of higher population pressure and shortage of cultivable land, the intensification of homesteads is imperative for the nutritional security of farm families. Home gardens around the world had the basic features of multistoried cropping systems and integration of other components including domestic and pet birds/animals with courtyard gardens. These type of systems are known with varied acronyms such as home gardens, agro forestry home gardens, household farms, backyard gardens, compound farms, village forest gardens, mixed gardens etc,. These type of systems warrants promotion through participatory schemes or projects with policy back up, as independent operational farming units, conferring environmental and social benefits besides economical and health benefits. Conservation of biodiversity, natural resources, food in the vicinity ensuring the source and production procedures, enabling ecosystem services, nutrient recycling with reduced soil erosion, are direct and indirect benefits accrued.

In Kerala as in any other parts of the world, these home gardens remain relevant and critical to the local food and economical security through its functional and structural diversity. The structural diversity is reflected in the multispecies, multistoried cropping system with perennial tree species in the upper layer, tubers, banana etc., in the second

layer and annual spices, vegetables etc., in the third ground level with maximum resource use efficiency in harnessing solar energy, nutrition, moisture and water. The functional diversity includes meeting needs of food, fuel, timber and organic residues and medicines. Livestock and poultry rearing with sufficient space for natural flora and fauna reflects the wisdom and insight of the foresightful farmers of yester years. We can observe that subsistence level traditional farming styles and commercial homestead gardens are practiced by farmers.

Reducing wastage and pooling homestead resources

An attitude change is needed for proper use of seasonal and traditional fruit crops in coconut gardens through grading, marketing and processing for long term storage and usage, which is being wasted at present. The crop combinations itself is a proof of bio diversity preservation at village level. Research and extension programs may reorient and redefined to evolve efficient individual and social models of integrating technological interventions of research-based recommendations at system basis, mechanisms for pooling farm produces, setting up rural marts for marketing them as fresh and green products as well as processing units for activating value chains. But several studies showed that market led consumption determines the pattern of production behavior in homesteads. When the households are not depending farming for livelihood, they tend to buy from markets rather than cultivating on their own. Commercialization of cropping with shift from coconut to rubber, paddy cultivation land conversion for non-agricultural purposes etc are the case of shifting of households from farming to commercial ventures, eroding the very essence of home gardening citing low marketable surpluses, very high labor charges and scarcity in getting skilled laborer. Usually, households do not consider the

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savings in income reducing the consumption expenditure compared to market value and also the indirect savings in medical expenses through consuming safe food.

Conscious Consumption – Green dream

Consumption of fresh food with zero food mile are energy saving and sustainable moving away from utmost consumerism replacing consumers with producers.

The agricultural production in homesteads, immediately around the home, observed /nurtured by the farm family and use of food produced as well as collected or foraged from the nearby areas leads to nutrient self-sufficiency, to a certain extent. Some of the key actions are resorting to technologies or methods for converting organic wastes from farming and kitchen, as manures. The recycling and reuse in homesteads involve livestock, fishes as well as birds, insects and small animals in the ecosystem. Cultivating culture and habits of this sort needs individual attitude change, conscious energy consumption along with social empowerment, participatory natural resource conservation and roles in shaping policies at local and macro levels.

Reskilling community members in agriculture and consumer transition habit changes the consumerism towards positive behavior. The home gardening system, teaches us the importance of nature friendly harvesting of water, solar energy, nutrients and natural factors to transform them as food, medicines, flora and fauna systems. Designing the land space which is a continuous learning and relearning process is the basis of developing an ecosystem based homestead farming management. A green dream of conscious consumption can be made a reality through technology based integration of component resources, finding niches of resilience, addressing climate change through continuous observation and analysis based experimentation.

Integration and incentivization – Case of homestead remodeling

Sri Sivaprasad is an educated rural youth who is determined to reinventing his destiny through farming based on integration of coconuts, inter/mixed crops, livestock, poultry and fish culture. The incentivization is through recycling organic wastes

as manure, conversion of food and fish wastes to high content low cost protein through using black soldier flies, fuel and digested organic manure from biogas unit and production of layer birds chicks of indigenous breeds for larger adoption among farmers. Other incentives being derived is upgraded social acceptance, reinventing his role as a master trainer, strengthening linkages with research and extension agencies, active role in farmer producer organizations, effective time management, providing responsible farm products for conscious customers and obtaining awards and accolades for his innovative farming ventures.

Intensive fish culture through Bio Floc method- potential and problems

The young farmer Sri Sivaprasad who is an active participant and partner of ICAR CPCRI Farmer FIRST program (FFP), resides in Ward 16 of Pathiyoor panchayath, Alappuzha district, Kerala (FFP implementation location) own 0.75 acres of land holding where he is practicing coconut based homestead system. The dream choice after his tenure in gulf region was embracing and intensifying the integrated farming system in his inherited land from his father who was a very successful farmer also. The challenge was to decide on logical and feasible investment to derive decent income from farming choices. The first move he made was to invest in bio floc system of intensive fish culture investing more than 20 lakh for the units. Thorough training he obtained and the venture rolled on with confidence. But the realization that the break even point could be reached only over time period and the challenges in marketing fresh water quality fish competing with the traditional consumer choice of marine fishes at low cost was really challenging and a painful learning. Recurring cost of bio floc in terms of uninterrupted daily electricity consumption, difficulty in getting reliable quality fingerlings in adequate quantity and difficulty in marketing led him to adopt technologies and social innovations for thriving them. Unlearning and relearning the techniques of bio floc culture, utilizing solar energy, trying locally preferred fishes and linking with fish fingerling producers were some of the adaptive measures tried by this young farmer. The fish culture unit was named as 'MURNI Hi tech Fish Farm' meaning pure in Malay language which was started for providing safe, fresh and quality fishes organically cultured and free of any chemicals to the consumers.

FFP interventions with farmer participation

The interventions of Farmer FIRST Program was the rejuvenation of coconut palms in the homestead with integrated root (wilt) disease management practices and the yield could be improved by 48 percent over three years. Other components were the introduction of desi cow and demonstration of HYV of fodder such as CO 5 of TNAU and Susthira from KAU. Both the varieties are well preferred by the animals and amenable to multiple cuts. The organic wastes from the cowshed is being recycled for the growth of the fodder. Intensification of intercrops with ICAR IISR Pragati turmeric, tubers such as amorphophallus, colocasia and tapioca, vegetables (amaranthus, snake gourd, local leafy vegetables etc), sesamum (TMV 4 (TNAU) for family needs and market surplus also. The pest problems, button shedding posing constraints in timely adoption of management practices due to changing climate situations according to him. The pressing demand is to evolve resilient strategies to overcome climate change impact in crop loss and perpetuating new problems through farmer participatory and field oriented research actions. The quality conscious customers and the improved standard of living of society demands for more protein rich diet such as meat, egg and milk produced organically and naturally. ICAR CPCRI FFP interventions of introduction of indigenous and improved breeds like Giriraja, Indbro Brown, Kadaknath, Kairali, Aseel, Gramapriya and Gramajyothi. The demand and market of eggs are very encouraging and additional income ensured through production of quality layer chicks of these breeds using semi automatic egg incubator. This will enable the rural women and farmers with sub marginal land holding size also to grow poultry birds either in cages or in terrace cages designed without hampering roof strength as adopted by several farmers of the FFP panchayath. The preference for eggs of indigenous breed is to be utilized through ensuring production factors and source credibility as in his homestead unit.

The egg weight of the birds in the initial period was improved over time and the eggs are fetching premium price due to the ensured quality.

Technologies for reducing cost and being organic

The reuse and recycling of cowdung and urine of desi cow reduced manure cost for fodder, coconuts and intercrops. Cow urine based natural pesticides



Sivaprasad in biofloc fish unit

are being used in vegetables for organic farming in his homestead. The organic wastes obtained from Bio floc unit is being recycled for basin management of coconut palms and found to be improving the yield of vegetables considerably. The field experiments are in progress regarding the use of bio floc fish wastes. The fish wastes with blood content after primary cleaning and cutting while marketing posed problems of insects, rats and foul smell of decaying. The problem was solved by adopting biogas unit for production of gas for kitchen purpose thus reducing cost of cooking gas and bio slurry as manure for crops.

Cost of fish and poultry breed is a real concern of farmers due to its very high cost and the regular increase in the price. Balancing market price of farm produce with the escalating price of critical inputs force farmers either towards low level of management or discontinue the units. FFP could intervene and introduced azolla growing in artificial pond which could be used as a very quality feed for livestock, poultry and also fishes. Utilizing black soldier flies (BSF) is trendy among farmers who are management conscious, both the farm components as well as organic wastes conversion. Under FFP we tried the low cost unit of BSF among 20 farmers and Shri Sivaprasad is one of them. The food wastes, fish and vegetable wastes can be converted to high quality protein feed as larvae of BSF using this simple technique. The result of these components are visible in the very agile, active and healthy stand of the poultry birds in his farm. Hence planning and incorporating appropriate technologies which are simple and purposive leads to viable management options according to this enterprising farmer.

Fish farm school- an innovation in homestead

A farm school is a practical learning location for experiential learning through self teaching as

well from an expert farmer in the very raw fields of adoption for any farming techniques. Learning by observation, being with the techniques and practicing them develop the finer skills and practical tacit knowledge. The fish farm school set up in FFP of ICAR CPCRI in his homestead consisted of biofloc fish culture by the farmer himself, artificial pond with fish and azolla growing, natural pond with fish culture suitable for that ecosystem integrated with vegetable cultivation in banks and small aquaponics unit demonstrating the potential of fish cum natural cleansing of recycled water utilizing plants. Commercial viability of homesteads could thus be improved incorporating additional components and refining techniques based on the experience and practical wisdom of the farmers.

Small is beautiful and offers to be productive

Integration of farm components are not only the choices of the farmers but meeting the needs of the family and the society with responsibility. Small and marginal land holdings could be well planned and designed to be more productive, diverse, organic and commercial to a certain extent. The total pooled production of farm components in these homesteads are potential future towards food sovereignty ensuring safe and balanced diet for the future. The imperatives of the present time demands everyone to be farmers or meet at least a portion through their own farming, whether through homesteads as in rural areas, terrace gardening in urban and urban farming points for social agriculture can lead to environmental services also. The agricultural research needs reorientation towards technology packages with varieties/breeds, small machinery, less labour intensive, low external input social farming innovations. Attracting the younger generations towards farming as a choice of hobby and spiritual experience and natural indulgence of green habits needs attention of policy makers.

The homesteads are models and innovations evolved through generations offering resilience and hope for solving several present day farming woes in general. It offers customization, rural and urban choices of combinations, spatial and temporal dimensions and as ecological units of environmental salvation. The science, philosophy and spirituality of homesteads providing and sharing spaces and basic needs of the farm family , society and the nature also is of utmost importance and of high level of responsible satisfaction. ■