Scope for innovation in farmer's field

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Rural farming communities in developing countries are experiencing various challenges related to their livelihoods and food security, the deterioration of natural resources, the adverse impacts of climate change and volatile prices for agricultural commodities. In order to effectively counter these challenges, newer and innovative methods of farming are very much essential.

Innovations play very important roles in production of agricultural commodities as well as in optimizing resource utilization by farmers. Apart from innovations and scientific package of practices developed and transferred from Research and Development institutes, innovations in the form of grass root level technologies and methodologies developed by some of the innovative farmers and rural youth can also considerably benefit the farming communities in a long way.

However, in many cases, such innovative technologies and methodologies are largely confined to some locations. Benefits accrued from such innovative ideas need to be widely shared across the country through suitable dissemination methods. And the scientific talents behind such grass root level innovations need to be encouraged and recognized. Valuable ideas and techniques generated by them largely go unnoticed owing to lack of proper documentation and opportunities for wider dissemination.

It is in this context that during December 2011, the UN General Assembly has declared 2014 to be the International Year of Family Farming and invited FAO to facilitate implementation of the International Year, in collaboration with its partners. Among its initiatives for the International Year, FAO is planning to publish a major study on family farming and agricultural innovation systems (AIS) in 2014 as part of its State of Food and Agriculture (SOFA) series.

Coconut palm, once starts yielding, is a crop that has potential to give higher productivity based on the agro management practices adopted. Hence, it is very much essential to provide congenial conditions for better growth right from the time of planting onwards. Some of the innovative ideas implemented by farmers in their coconut gardens are highlighted here.

A. Soil moisture conservation and irrigation

Understanding the fact that our mother earth is the largest water holding structure, Shri. Gokulakrishnan from Pollachi has taken up appropriate measures to ensure that ground water recharge is enhanced in his coconut garden. He has found that water soaking trenches help water to be retained in the trenches for some time and allow it to percolate down into the earth, thus preventing run off of rainwater. This also helps to prevent soil erosion and loss of fertile top soil, thereby enhancing the fertility of soil. Trenches of size 1m x 1m and convenient length are made in between coconut rows and dry leaves of various trees and coconut leaves etc. are filled up to three-fourth of the trench. This helped water to collect in the trenches to percolate down. According to him,

Trenches taken in between coconut rows and filled with dry coconut leaves

filling the trenches with dry leaves is very much needed, as otherwise, there will be chances of breeding of mosquitoes.

These kinds of trenches may be made in the entire coconut growing area, thereby by making the garden highly fertile. He has planted banana and cocoa in these trenches for additional income.

In many cases, it was found that farmers adopt flooding their coconut gardens. If more quantity of water is given in a short span of time, there is every possibility that most of it is lost by evaporation and deep percolation going below the active root zone of the coconut palms. In case the required quantity of water is given in a precision way, it not only helps to keep the active root zone moist, and the palms to absorb applied water, but also to provide adequate aeration. Shri. Gokulakrishanan is irrigating his coconut palms through pvc pipes tied around the coconut trunk. This type of irrigation helps not only to provide needed quantity of water to each palm, but prevents water loss and enhance yield of coconut palms to the extent of 60% to 70%. Application of fertilizers could also be done through this method by suitably modifying the irrigation system.*For further details contact: Shri. D. Gokula krishnan, Kovil thottam, Chilakampatti, Pollachi, Tamil Nadu.*

Shri. Gowda, from Hassan a teacher by profession, has effectively employed various structures for water percolation in his 'Suvarna Farm'. The coconut trees are planted at a spacing of 9 m x 9 m. He has constructed 2.5 m wide basins along the coconut trees

Irrigating coconut palm through pvc pipe tied around coconut trunk

in a row. These basins, which have percolation ponds between every two-coconut trees, help to preserve water underground. Sapota trees have been planted between two coconut rows in a straight line with the percolation pond. According to Shri. Gidde Gowda, such a structure conserves both soil and water and also helps to preserve the moisture of the soil in the base of the coconut trees. Through this innovative method of cultivation, Shri. Gowda harvests on an average of 150 to 200 nuts per tree in his farm. *For further details contact: Shri. G.S. Gidde Gowda, Suvarna Farm, Brahmadevara Halli, Nittur Post, Hassan 573219, Karnataka.*

B. Integrated farming

Shri. Babu from Alappuzha has developed a novel method of managing his coconut farm for generating higher income through adopting integrated farming practices. He cultivates banana as intercrop in 1.5 acre area coconut garden. He has started intercropping 100 banana plants during 2005. His approach for income generation was through sale of banana leaves. He has cultivated about 1500 plants even. He cuts the tip of banana leaves early in the morning, when the dew of the previous night keeps the leaves clean, free of dust and other impurities, restricting the length to about 30 cm, thus facilitating maximum area for photosynthesis in plants. This, according to Babu, has not at all affected the yield of bunches, and on an average he could harvest bunches weighing 18 kg. Banana leaves is sold to nearby catering units @Re.1 per leaf and he could earn around Rs.2,000 per week.

Another innovative approach adopted by Babu is rearing of ducks. The shed is made at a height of 3 m directly over a natural farm pond extending in an area of 22 cents, where pisciculture is practiced. This helps the ducks to experience comfortable conditions inside the shed and always keep it very clean. The faecal matter of ducks inside the shed, when cleaned by washing, drops down into the pond and act as feed for the green plants growing in the pond. Such plants, according to

Babu, help to increase the oxygen content of water inside the pond, thereby provide suitable environmental condition for the fishes to grow. The same pond is also used for the ducks to swim. Azolla cultivation is also practiced by him to serve as feed for duck, fish and poultry birds. As an active member of "Kairali Purusha Swayam Sahayaka Sangham", Babu is a model farmer of the area and could inspire confidence among the other members to venture into agriculture and allied activities. He has won the "Karshaka Sreshta Award-2011" of Alappuzha district, in recognition of his contributions in integrated farming. *For further details contact: Shri. M. Babu, Thekke Kalathattel, Govinda muttom (P.O), Kayamkulam, Alappuzha district.*

Saji in his nutmeg garden

Top worked nutmeg tree

Shri.Saji from Kozhikode has successfully identified a superior clone of nutmeg after 10-15 years of toil from his farm through analytical and innovative observations of 100 seedling progenies raised as mixed crop in his coconut garden for many years. This superior clone with 10 g seed and 3 g mace are highly preferred in market. Compared to the price of Rs. 180 and Rs. 600-750 for seed and mace, respectively for the local varieties, the newer clone could fetch a price of Rs. 260 and Rs. 1,120 per kg. Average weight of seed and mace of this improved variety was found to be 8-10 g and 2.5 to 3.0 g, respectively. He has christened it as "NOVA", after his daughter.

Rearing ducks in shed above the fish pond

With the quality superiority and yield of above 2,000 fruits at the age of 8 years of NOVA, he has successfully converted all low yielding trees in his garden by the method top working, which he has perfected. According to Shri. Saji, the best period of top working is from October-November to get maximum success. Presently, 100 budded nutmeg trees in various groups varying between 1-12 years are available in his garden. He maintains 1-2 male branches at the bottom in most budded trees to ensure better pollination and fruit

set. Shri. Saji has sold more than 1500 grafts in the last 6-7 years in addition to about 2500 bud wood in 5 districts in Kerala covering more than 100 farmers. *For further details contact: Shri. Saji Mathew, Kadukammackel House, Kallanode (P.O), Kozhikode district.*

C. Organic farming in coconut

Shri. Ravi of Eco farm cultivates his coconut garden extending to about 70 acres in an organic way. Some of the palms grown by him belong to the Sri Lankan Dwarf variety. By utilizing the entire organic biomass obtained from the garden, Shri. Ravi prepares vermicompost in the farm itself. Around 10 t vermicompost is produced every month, which is applied @ 60 kg per palm per year. He maintains 75 cattle in the farm for which fodder grass is cultivated exclusively in six acre area in the farm. Coconut leaves are used to put in trenches made in between coconut palms. Coconut harvesting is done once in 45 days through contract climbers. On an average, the productivity is about 180 nuts per palm. He has dug seven tube wells and two common wells in his farm for irrigating the palms. The entire farm is divided into different blocks and irrigation is done for each block separately. Each palm can be irrigated within one hour. Almost all the farm operations are mechanized by Shri. Ravi. *For further details: Shri. Ravi, V Eco farm, Sainthan Palayam, Coimbatore district.*

Shri. C.M. Mohammed's 4 ha farm with its multi-cropping pattern and processing of farm produce and value-added marketing of outputs have great relevance in the contemporary agriculture situation where many farmers stumble in the market place. Shri. Muhamad prepares various kinds of organic manures in the farm itself. EM-2 and EM-5 solutions, needed for keeping the plants healthy are prepared by Muhammad himself. He has found that spraying diluted EM solutions help protecting plants against pest attack. A preparation made by using eggs of local breed of poultry, lime and jaggery also help to improve plant growth. Their innovative approaches in maintaining their coconut garden has brought them the Karshakasree Award (2008). *For further details contact: Shri. C.M. Mohamed and Smt. Shakeela Mohamed, Mandayappurathu Chundan Veedu, Tirur, Malappuram district.*

Shri. Suryanarayanan from Palakkad cultivates 18 acres of coconut farm by adopting organic farming practices for almost 20 years by now. Weeds are allowed to grow to a height of about 75 cm, and then they are beaten down. Coconut fronds are placed over the weed layer and allowed to decompose. This practice is done two times each year. In this manner, it is experienced that different types of grasses add P and leguminous plants add N and other species of weeds add K to soil. Since sunlight is not falling directly on soil surface, this method will also prevent loss of soil moisture in the coconut garden. He has also adopted placing coconut husk in the field, and over a period of time, the entire garden is completely covered. This practice also helps conservation of soil moisture and prevents soil temperature build up and soil loss through erosion during heavy rainy period. The innovative mind of Shri. Soorya Narayanan was suitably rewarded with the Kera kesari award (2004-05) of the Govt.of Kerala. *For further details contact: Shri. K. K. Soorya Narayanan, Kakkattil House, Mamkurissi, Mankara, Palakkad district.*

At a time when some of the coconut farmers removed coconut palms for cultivating rubber, Shri. Dominic from Kozhikode did not follow their footsteps, but went ahead with new planting of coconut. He gave a wider spacing of 12 m

Weeds beaten down for decomposition

Shri. Dominic in coconut garden, which gives yield three years after planting

for the planting in new area to accommodate intercrops at a later period. He used JCB for making pits of 3 m diameter and 1m deep. Though higher cost was incurred, he felt it necessary to make such pits to enable coconut seedlings to establish faster and start yielding early.

Shri. Dominic used his own seedlings for planting in a small mound made on the top of filled up pits. Though the regular practice is to use one year old seedlings for planting, he used those seedlings which were first sprouted in the nursery (i.e about 90-100 days after sowing of seed nuts). Adopting regular agro management practices like manuring and providing irrigation right from the first year of planting has resulted in early flowering (during the third year of planting)and yielding of such palms. The pits are widened by cutting the sides every year and the plants start yielding by the time the pits are sufficiently widened.

Only organic manures are applied in the entire farm. Manuring is based on the yield potential of each palm, more manure for higher yielding palms. During April-May, 40 kg vermicompost or dried cow dung is applied for each palm. As second dose during October, 5 kg mixture of bone meal, ground nut cake and neem cake is applied. This is alternated with the application of ash and tea-waste collected from various hotels nearby. The husk placed in the palm basin is pushed to the outer during SW monsoon period (which facilitates root proliferation) and placed back after application of second round of manures during October. This also prevents drying up of roots during drier months.

Shri.Dominic also follows mixed farming in his coconut garden by raising cows, poultry, goat, duck and fish. Cow dung is used for making biogas as well as for applying to crop plants. He is cultivating colocasia in the basins of a few coconut palms near to his house. He adopts a novel method of harvesting of colocasia. The harvesting is not done by uprooting the plant completely, but rhizome is harvested as and when required, thus retaining the plant in the basins for future need.

He is the president of Haritha Coconut Producers' Society, Anakkampoyil, registered with the Coconut Development Board. He is the recipient of Kera Kesari award of Government of Kerala (2009-10) for his innovative approaches in coconut cultivation. For further details contact: *Shri. M. M. Dominic (Pappachan), Mannukuzhambil Veedu, Anakk ampoyil (PO), Thiruvampady, Kozhikode district.*

Shri. Sajeev 43, a business man cum farmer from Thrissur district maintains his coconut farm by adopting scientific methods of farming, his emphasis being on organic cultivation. He follows mixed farming and also grows a variety of fruit plants in his garden. As the coconut plants were planted in a filled up area, the basic soil fertility was very poor. In order to improve the fertility level, Shri. Sajeev adopted intercropping elephant foot yam in his coconut garden. The innovative approach was filling each pit with lot of organic manure as cow dung and composted coir pith before planting the yam, which helped to improve the nutrient supplying capacity of soil. He maintains around 450 yielding coconut palms which include Malayan Yellow Dwarf, Chowghat Green Dwarf and D x T hybrid palms. He harvests on an average 130 to 140 nuts from each palm. *For further details contact: Shri. Sajeev Antony, Aynikkal House, Kundoor (P.O), Mala, Thrissur district.*

D. Value addition

After retirement as Deputy Tahsildar from the revenue department, Shri. Sebastian from Kasaragod district served as the National Vice President of INFAM, championing for the cause of farmers. The innovative invention of Shri.Sebastian is the production of wine from tender coconut named "tender coconut wine". The ingredients are tender coconut water or tender coconut water and its soft kernel mix collected from farm fresh tender coconuts of seven months ripe or less, and various other ingredients. Tender coconut wines need a fermentation period of 10-28 days. For optional fortification, Shri. Sebastian adds cashew apple alcohol or any such alcohol. As garden fresh tender coconuts are devoid of wild yeas

and bacteria, the wine made of it, will be automatically pure and natural. The tender coconut wine is devoid of any artificial agents and can be the purest drink as it does not even contain natural water as found in other wines. The wine is also highly healthy, hygienic and nutritional beverage.

Shri. Sebastian, recipient of Kera Kesari award of Government of Kerala for 1998-99, has got an Indian patent (No.209015) for developing the coconut wine from tender coconut and tender coconut water during August 2007, which is the first time in the world that any one is getting such a patent. His patent application is being processed by European Union, the US, Canada, Indonesia and the Philippines. *For further details contact: Shri. Sebastian P, Augustine, Palamattom (P.O), Bhumanadi, West Eleri, Kasaragod district.*

Shri. Thomas George a 50 year old "farmer-scientist" from Chemperi of Kannur district. The most important product he has invented is coconut-milk curd, which is under the patenting process after being registered for patent in 2008. Coconut-milk curd looks and tastes like milk curd and yet contains all the health benefits of coconut milk. He is presently attempting to make ice cream and vinegar from coconut milk. Unlike Neera, also called Sweet Toddy or Palm Nectar, which is the sap extracted straight from the coconut palm inflorescence by skilled workers, according to Shri. Thomas, the coconut-milk variant can be made in the kitchen and is expected to be a boon for coconut growers and neera lovers. *For further details contact: Shri. Thomas George, Chemberi, Kannur district*

D. Coconut climbing devise

Though the need for a more convenient and long-lasting solution to the problem of coconut tree climbing was felt by many, the innovative approach of a farmer in Chemberi made a revolution in the field. Shri. Joseph Appachan's family had been in coconut farming business for generations. This innovative farmer thought ahead of his time and foresaw the shortage of coconut climbers. In 1984, the innovative mind of Shri. Appachan, along with his 20-year-old son, imagined a machine that could make coconut tree-climbing easy and self-sufficient. Together, they developed the 'coconut tree climbing device'. Over time, this father-son duo managed to turn this invention into a full-fledged product.

Appachan's son further patented many modifications to the device. With the support from various organisations including the National Innovation Foundation, the coconut tree-climbing model has become instantaneously popular in villages across south India. Even though many modifications to the original machine have been done by many agencies, the old model is very much preferred by most of the coconut climbers, amply showcasing the wide acceptability of the innovation by an ingenious farmer. Coconut Development Board through its "Friends of Coconut Tree" programme has also popularised the Chemberi coconut climber. *For further details contact: Shri. M.J. Joseph Appachan, Chemberi, Kannur district*

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Path cleared for legal status for CPFs

Coconut Development Board had formed farmer collectives at grass root level called Coconut Producers Societies (CPS) comprising of 40 to 100 farmers. CPSs are registered entities under Travancore Cochin Literary and Scientific Societies Act 1956 in South and Central Kerala and under Indian Societies Act 1860 in Malabar region. As a further integration, 15-25 CPSs were associated to form Federation of CPSs called Coconut Producers Federation (CPF). CPFs had been envisaged to be registered entities under Charitable Societies Act but registration was not done at the respective district registrar offices due to the lack of clarity in the membership of CPF.

The Travancore Cochin Literary Scientific and Charitable Societies Act defines the member as a person. Since CPSs are members of CPF and are association of farmers, ambiguity hindered registration of CPF. Coconut Development Board took up the matter with Inspector General, Registration, Government of Kerala and have obtained approval from the Inspector General, Registration for CPF.

Inspector General, Registration has clarified vide GO. No. 20411/E2/2012 dated 10.10.12 of Government of Kerala that 'Person' shall include any company or association or body of individuals, whether incorporated or not.