



Farmer led gross root level entrepreneurial initiatives for sustainable sugarcane production system in Tamil Nadu, India

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Abstract: The major objective of the study was to explore the rural entrepreneurial initiatives and its socio- economic impact among the sugarcane farmers across Tamil Nadu. Exploratory surveys, Focused Group Discussions (FDGs) and case study methods have been adopted. A total of seven successful entrepreneurial activities initiated by cane farmers, across different districts of Tamil Nadu were selected, purposively. The study revealed that entrepreneurial initiatives accomplished the needs of farmers and these either were developed by farmers themselves or with collaboration of sugar factories. Among seven entrepreneurial initiatives; 'two wheeler sprayer', 'tractor mounted sprayer', 'trichogramma production' and 'Agricultural Service Provider (ASP)' were initiated by the sugar factories under the Entrepreneurship Development Programme (EDP) in participatory mode. The other initiatives viz., organic jaggery powder and trash based vermi-compost production were initiated by farmers themselves. Budchip settling production was practiced by individual farmers as well as promoted by factories in participatory mode. It is also found that all seven entrepreneurial initiatives are profitable and sustainable. Further, the study found that the production cost for 1 cc trichogramma is Rs. 16 and selling cost is Rs. 23/cc, thus farmer getting a net profit of Rs. 7/cc of *Trico* card. In case of budchip settling production, total cost incurred for production of one settling is around 60-85 paisa. Selling cost of one-month old settling is Rs. 1.25. Thus, a farmer gains a net profit of 40 paisa per settling.

Keywords: Profitability, Social benefits, Social entrepreneurial initiatives, Sugarcane production system, Sustainability

INTRODUCTION

Gross root level entrepreneurial initiatives were ever sustainable with the social and economic system of the local people. Modern and outside driven technologies help better in augmenting the productivity, as compared to the local knowledge; but in the long run, the system faces more negative consequences and immense challenges. Promotion of entrepreneurship in rural area is a major step to increase economic development. Rural entrepreneurship is a purposeful activity initiating, promoting and maintaining economic growth. Rural entrepreneurship is not new to our culture. What it needs today is to nurture this spirit and instil it in the present and coming generations of both men and women. (Smitha *et al.*, 2015). Identifying and promoting the entrepreneurial activities in rural area is one of the challenging task for government and policy makers. So, it is better to focus on various innovations developed by the local people and/or farmers at the grassroots, that is, at the field level, before it is too late (Ram Datt, *et al.*, 2014). An alternative view is that local knowledge is a valuable and under-used resource, which can be studied, collected and incorporated into development activities. Neither of these views, though, is entirely satisfactory because of the static view of knowledge implied (Chambers *et al.*, 1989; Warren,

1991; Long and Long, 1992; Scoones and Thompson, 1994 and Karpagam *et al.*, 2014).

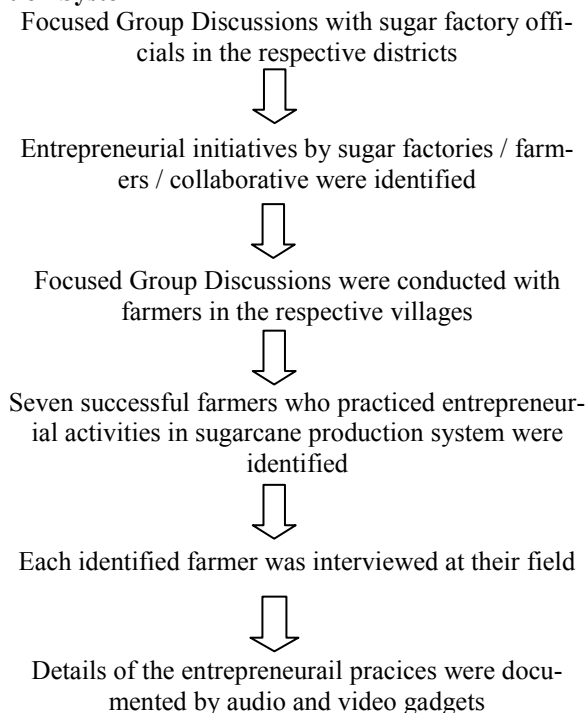
It is interesting to note that there are several novel rural entrepreneurial initiatives were taking place in sugarcane production system. Sugarcane is the next best cash crops then cotton. There are 46 sugar mills are involved in sugarcane cultivation in Tamil Nadu alone. Though the area under sugarcane in Tamil Nadu varied widely from 2.3 lakh hectares to 3.9 lakh hectares over the years in the new millennium (2000-01 to 2011-12), the productivity has almost been stabilized at around 105 tonnes/ha during this period (Ramasubramanian and Karpagam, 2014). Problems of stabilised productivity and decreasing remunerative cane prices leads for other allied entrepreneurial initiatives in sugarcane production system. According to Kishor Bhanushali, developing entrepreneurs in agriculture will solve several problem viz. (a) reduce the burden of agriculture, (b) generate employment opportunities for rural youth, (c) control migration from rural to urban areas, (d) increase national income, (e) support industrial development in rural areas, (f) reduce the pressure on urban cities, etc. But in reality; if local farmer initiating a new venture; it is always subjected for large hue and cry by the research system. But, most of the grass root level initiatives generally go unnoticed. However, these initiatives fail at commercialization and dissemina-

tion stages for lack of support from formal systems. Thus, extension research needs to work with both formal and informal R&D set up, so that research for development becomes a reality (Chnadra *et al.*, 2014). Keeping the importance of entrepreneurship development in agriculture and the paradigm shift from ‘primary to secondary agriculture’, Indian Council of Agricultural Research (ICAR) focused on development and establishment of agri-incubators, a new concept in the Indian agriculture expected to develop entrepreneurship in a big way. There are several initiatives taking place in rural area to develop entrepreneurs but still it needs to explore widely. Accordingly, keeping all these afore mentioned issues in view, a study was conducted on ‘grassroot level social entrepreneurial initiatives’ by the sugarcane farmers across Tamil Nadu, wherein, special emphasis was given on the ‘social benefits’ of such initiatives.

MATERIALS AND METHODS

As the study demands “case study” method was employed for this purpose. The research team surveyed 10 districts of Tamil Nadu viz., Tirunelveli, Karur, Erode, Theni, Pudukkottai, Coimbatore, Villupuram, Perambalur Thanjavur, and Ariyalur, to explore the grassroot entrepreneurial initiatives in sugarcane production system. Identifying the farmers practicing entrepreneurial activities is a difficult task felt by the research team. Therefore, several Focused Group Discussions (FDGs) were arranged with sugar factories

Methodology adopted for documentation of the entrepreneurial initiatives in Sugarcane Production System



personnel and farmers to identify the resourceful farmers who practice any innovative entrepreneurial practices in sugarcane production system. By using the deliberations, individual farmers were identified. The cases were selected purposively on the basis of the available data on the Sugarcane Breeding Institute, and the primary data collected from the focused group discussion with respective sugar factory personnel and the farmers group at the grass root, etc. Only such entrepreneurial initiatives were selected for this study, which were related to sugarcane production system. The farmers were interviewed in their respective farm filed with the help of an interview schedule. The interview schedule was semi structured and contains more questions about the details of the cases and economics of the entrepreneurial activities.

RESULTS AND DISCUSSION

The selected cases have its own scope, potential and limitations, hence all the cases were analysed for its scope, potential and limitations. Further the farmers’ profile characteristics have also been studied. All the “Cases” were discussed with its’ background, description, cost benefit analysis, social benefits. Further, Institutional interventions and support which required to upscale the initiatives has also been discussed.

Case-I: Organic jaggery powder – a value added business venture: (Individual farmer’s initiative)

Shri. Anthonisamy from Puliangudi of Sivagiri Taluk, Tirunelveli district thought of producing Organic jaggery powder. Organically grown sugarcane was crushed and juice was extracted. The extracted juice was filtered and boiled without adding any chemicals. After removing the scum, the juice was further condensed till it becomes semi-soild and removed from the furnace. The semi-solid paste was cooled in a wide pan and scraped using wooden ladle to prepare organic jaggery powder. This finding has been supported by the study conducted by Nain *et al.* (2002) and they reported that jaggery production was a major traditional enterprise in sugar cane producing areas. At times, jaggery making was profitable to cane producers, than supply to sugar factory. The cost of sugarcane was the major cost item in jaggery production. The investment in jaggery processing units was found to be profitable.

Case-II: Sugarcane based vermi-compost for organic agriculture L: (Individual farmer’s initiative)

Shri. Gopalakrishnan, a farmer from Panikampatty village of Karur district produce sugarcane trash based vermi-compost for the past five years. Sugarcane trash, pressmud, cow dung, neem leaves, molasses and other farm wastes are spread on the floor in layers and *Azospirillum* and *Phosphobacterium* are sprinkled over it. The heap is allowed for twenty days for decomposing. After 20 days, earthworms are released and watered at three days intervals to maintain adequate moisture. After 2-3 months, compost will be ready. The

Table 1. Social Economic Significance of the findings of novel sugarcane based gross root level entrepreneurial initiatives.

Socio-economic Characteristics	Organic Jaggery powder	Trash vermi-compost	Bud chipping production	Agricultural Service Provider	Tricho production	Two wheeler sprayer	Tractor mounted sprayer
	<p>Demand for organic jaggery and its value added products are getting momentum since we people gives more importance for organic products in the health ground.</p>	<p>Vermi-compost is an integral part of organic agriculture. In recent time FYM based rare resources due to dwindling cattle population. Hence, trash based vermi-compost is one of the best alternative.</p>	<p>Government of Tamil Nadu promoting bud chipping production under Sustainable Sugarcane Initiative (SSI) scheme because of its advantages over conventional sett planting. It opens up huge demand for bud chipping settling production.</p>	<p>High labour Scarcity leads good scope for ASP. Small and marginal famers can able to go for mechanisation on rental basis. Therefore, farmers need not purchase the high investment machineries for cultural operations for their own.</p>	<p>Due to increasing climate change, pest problem in sugarcane is increasing many folds. It demands the necessity of Bio-control agent for pest management in sugarcane cultivation.</p>	<p>It is very useful for application of insecticide, micro nutrient and weedicides. Small and marginal farmers can utilise the provision in nominal amount on rental basis and need not purchase high cost sprayer etc.,</p>	<p>Large scale application of agro chemicals is possible by this initiative.</p>
Scope and Utility	<p>This initiative is more compatible with cane farmers since jaggery is one of the traditional menu in the Indian food habits. Waste trashes can be effectively utilised as vermi compost manure and trash also available freely.</p>	<p>Instead of using two budded setts, use of budchipping will be easy and economically viable.</p>	<p>Mechanised operations through ASP are more comfortable for cane farmers; since, the cultural operations can be carried out easily and timely. Since, ASP from the local area, it is very much comfortable for the farmers to contact him at any time.</p>	<p>Bio-control agents are ecologically compatible. Since, it is locally available from the factory side and it is to take up the operation on time.</p>	<p>Operating two wheeler mounted sprayer from one field to other field is very compatible because of it can be operated as two wheeler. Therefore Travelling time and drudgery of carrying the spraying equipments are also nullified.</p>	<p>For spraying agro chemicals, labour requirement is more, since this initiatives makes all the operations into easy and compatible with lesser cost.</p>	
Compatibility							

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<p>Production cost of one kg jaggery powder including the cane cost may be around Rs.30. Farmer sells one kg jaggery @ Rs. 75, whereas, the normal rate of one kg jaggery in the commercial market is around Rs. 50. The advantageous cost is due to value added as organic product.</p>	<p>Total cost incurred for production of one settling is around 60-85 paise. Selling cost of one month old settling is Rs. 1.25. Thus he gains a net profit of 40 paise per settling.</p>	<p>Renting cost per unit operation for Improved Land Preparation (ILP), planting, weeding, earthing up is Rs. 5200, 6000 and 1500/acre, respectively. After becoming ASP, the farmer could do a business turnover of about Rs.5-6 lakh/year.</p>	<p>The production cost for 1 cc is Rs. 16 and selling cost is Rs. 23/cc, thus farmer getting a net profit of Rs. 7/cc of <i>Trico</i> card. Based on farmer's estimation, if he sells 2000 cc/ month, the net profit may be around Rs. 14,000.</p>	<p>Cost of decrepit scooter is around Rs. 4000, pump and spray lance cost is around Rs. 10,000 and fitting charge is around Rs. 3000. Thus the total investment is around Rs.17,000 to design the device. An entrepreneur can spray minimum of five acres per day and spraying charges is Rs.250/acre. Thus, he earns a minimum of Rs. 1250/day. The expenditure for fuel and input may be around Rs. 500/day, hence the net profit may be around Rs. 750/day for the entrepreneur.</p>	<p>The entrepreneur has to get work for a minimum of 20 acres/day. Then only it will be more profitable. During the peak season he is able to cover 30 to 40 acres/ day, but, during off-seasons it is very difficult to operate to full potential.</p>
<p>Economic benefits</p>	<p>All the stakeholders viz, entrepreneur, farmers and sugar factories get benefit out of it. Entrepreneur can earn profit out of it, sugar factories receiving settlements on time to distribute to other farmers and the farmers get good seed material at nominal cost on time.</p>	<p>For ASP, it is an additional income with regular agricultural income any they acting as a Para Agricultural Extension Service Provider in rural area. For sugar factories, timely completion of field operations becomes easy and cane reaches the factories on time for crushing. Farmers can complete all cultural practices on time at nominal rate. Therefore, the practice not only promotes rural entrepreneurship, but also, leads for greater social benefits.</p>	<p>In recent times bio-control methods are getting momentum among farmers, since the insecticide costs are higher. This initiative has several social benefits since it replacing the insecticide to greater extent and protects the soil from heavy use of insecticides.</p>	<p>Sugarcane cultivation predominantly undertaken by small and marginal farmers but all the farmers are not able to purchase all the equipments requires for agro chemical application. In this condition, two wheeler mounted sprayer is taking care of agro chemicals application in sugarcane cultivation at nominal cost.</p>	<p>This innovation is helpful for application of agro chemicals. All the stakeholders viz, entrepreneur, sugar factories and farmers get benefit out of it. First one, can earn profit from the business. Factories can complete large scale micro nutrient application and agro chemical application within the stipulated time and farmers can completed the farm operation on time.</p>
<p>Social benefits</p>	<p>Trash based vermi-compost is a good alternative for FYM. Otherwise farmers opt for firing the trash in the field and it produces serious environmental hazard. Hence, this initiative is effectively utilising the waste trash and protect the environment to the greater extent.</p>	<p>'consumers' gets quality organic product as well.</p>	<p>This initiative not only helps the entrepreneur to earn good profit but also several labourers are getting works out of this cottage industry. Ultimate stakeholder 'consumers' gets quality organic product as well.</p>	<p>Sugarcane cultivation predominantly undertaken by small and marginal farmers but all the farmers are not able to purchase all the equipments requires for agro chemical application. In this condition, two wheeler mounted sprayer is taking care of agro chemicals application in sugarcane cultivation at nominal cost.</p>	<p>This innovation is helpful for application of agro chemicals. All the stakeholders viz, entrepreneur, sugar factories and farmers get benefit out of it. First one, can earn profit from the business. Factories can complete large scale micro nutrient application and agro chemical application within the stipulated time and farmers can completed the farm operation on time.</p>

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<p>The farmers continuing the enterprise in profitable manner. Market facilities required to sell the products. The initiative may be replicated to the other area with institutional support to promote in to large scale.</p>	<p>Demand for vermicompost is more in present day. Hence, the institution may promote this initiative by bulk purchasing the manure and selling to other farmers who are in need of manure.</p>	<p>Already Tamil Nadu government is promoting the budchip settlements under the Sustainable Sugarcane Initiative (SSI) scheme. Hence large scale dissemination of this initiative is under pipe line.</p>	<p>Sugar factories in the respective area are promoting the ASP concept. The structural arrangement between three stakeholders can be made explicit.</p>	<p>Trichogramma plays a major role in sugarcane package of practice. Government of Tamil Nadu providing subsidy for the same and sugar factories also providing support for the entrepreneurs.</p>	<p>This initiative is promoted by sugar factories in the respective areas. Hence other institutional support is needed for up scaling the initiative for the benefits of small and marginal farmers.</p>	<p>This initiative also promoted by sugar factories. Since it needs higher investment. Banking sector can extend their loan facilities to the entrepreneur.</p>
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Institutional intervention and up-scaling

upper portion of the heap is collected and stored and the lower portion is sieved to separate earthworms. The benefits of sugarcane based vermicompost production is supported by the recent study conducted by Kumar *et al.* (2010) demonstrated that the compost produced by pre-decomposing of by-products of sugar processing industries (Sugarcane trash and bagasse), with efficient microbes (composting) followed by vermicomposting point towards the feasibility of an integrated system of vermicomposting to produce nutrient rich vermicompost.

Case-III: Budhip settling as a small scale business venture: (Individual & Participatory initiative by sugar factory and farmers).

Shri. Mohanraj from Ramapuram village of Thalavadi Taluk in Erode District of Tamil Nadu produces settlings and sells to sugar factory on contract basis. The buds are scooped from cane by bud chipper and placed in pro trays filled with coir pith. The filled trays are placed one above the other and covered with gunny bags for a week. After a week, the sprouted buds with trays are transferred to green net houses and kept for three weeks with regular watering. Thus, the settlings are ready for transplanting within a month. The effectiveness of the budchip settling has been reported by several researchers. Biksham Gujja and Natarajan (2013) reported that sustainable sugarcane initiative (SSI) also known as “Chip bud technology” involves removal of buds from cane and raising nurseries results in drastically reduce the seed cane requirement, about 4-6 t/ha compared to conventional method of planting.

Case-IV: Agricultural service provider - ASP: (Participatory initiative by sugar factory and farmers).

Shri. R. Raja is a farmer from Anthrapatii village acted as an Agricultural Service Provider (ASP) for sugar factory in his area. Machineries are hired out to take up agricultural operations in other farmer’s field. There is a tripartite agreement between farmers, sugar factory and ASP. The ASP will carry out all the farm operations from preparatory cultivation to transport of harvested cane to the factory. Sugar factories debit the cost to the ASP’s account by reception of receipts signed by the farmers and the same amount is deducted from the concerned farmer while paying cane price to the farmers. There are several support has been rented by sugar factories to the cane farmers. Todkari (2012) concluded that Shri Sant Damaji Co—operative sugar factory adopted various agricultural service providing activities viz., supply of molasses, supply of good quality seeds and other labour welfare programmes.

Case-V: Tricho card production - a small scale business venture: (Participatory initiative by sugar factory and farmers).

Shri. Karuppaiyan from Balaviduthi village undertakes *Trichogramma* production under the entrepreneurship development programme of a sugar factory in the area. The parasitoids are multiplied in the medium which

has the mixture of 2.5 kg pearl millet seed, 100 g groundnut powder, 5 g dry yeast and 5 g sulphur. With this mixture, half cc rice moths (*Corcyra cephalonica*) are released and kept for 45 days in closed condition. The emerged adults are collected in the test tube and released into a chamber for laying eggs. Eggs are collected in a tray and exposed to ultra violet light in UV chamber to kill the host embryo but at the same time, permit parasitization.

Case-VI: Two wheeler mounted sprayer – an entrepreneurial initiative: (Participatory initiative by sugar factory and farmers).

Shri. S. Angappan from Vallipattu village has converted a old scooter into an effective sprayer by placing a tank in the pillion seat and attaching pump to the scooter's engine and used as a petrol engine operated sprayer. The spraying lance is around 100 metres long, so it can easily cover long distances as well. The pump inlet is connected to a pesticide container.

Case-VII: Tractor mounted sprayer – an entrepreneurial opportunity: (Participatory initiative by sugar factory and farmers).

Shri. Senthilkumar from Sarakadu village has converted a old tractor into an effective sprayer by placing two 1000 litres capacity tanks in the trailer. Two separate spraying lances of around 600 feet each are attached with each tank. One hp pump fitted nearer to the driver's seat and attached with the tractor engine. When the tractor engine is on, the pump will be switched on and sprayer can be operated. Since, spraying lance has 600 feet length, it can be operated from faraway places and can cover long distance as well.

Socio-economic significance of the findings: The study found that all the seven grass root level entrepreneurial initiatives were demand driven and successfully meet out the needs of the local farmers. Further, the initiatives were not only beneficial for the farmers who initiated but also it beneficial for society as whole.

Conclusion

The investigation on this research issue is a maiden attempt to explore grass root level entrepreneurial activities in sugarcane production system. The study revealed that different entrepreneurship initiatives opened up avenues for social scientists to promote community based ventures and to develop entrepreneurship in sugarcane based cropping system. In case of budchip settling production; both the stakeholders viz, farmers and factories gets benefit out of it. Farmers can earn money thorough the business and the factories are getting settlings on time to distribute to the other farmers in the area. In another case 'vermicompost' production; it is an integral part of organic agriculture. Majority of the farmers are not able to take up the vermicompost production for their own requirement, as it requires more time and labour. But farmers are ready to apply vermicompost in their field

if they get it on cost basis. Even, they are ready to pay Rs. 7000-8000/ tonne. Hence, this entrepreneurial avenue have greater scope for further exploration. Several societal problems in sugarcane cultivation viz. labour scarcity (two wheeler and tractor mounted sprayer), depletion of natural resources (vermicompost production), stakeholder conflict management (Agricultural Service Provider), human health deterioration (Organic jaggery powder), ill effects of pesticides (Tricho card production) were addressed by the these entrepreneurial initiatives. Among the seven initiatives, bud chip settling production and tricho card production are directly supported by the Government of Tamil Nadu and other five initiatives were still in localised confined stages. Therefore, Government and other institutional support are needed for further out-scaling of the initiatives for larger benefit of the society. The study also found that the grass root level entrepreneurial initiatives needed lesser investment, greater utility, more social benefits (localised benefits are more) and higher sustainability compared to modern high investment entrepreneurial ventures. When these initiatives are recognised by the institution and government then it leads for holistic rural development through sugarcane cultivation. This study has been opened new vistas of extension research apropos 'novel sugarcane based grass root level entrepreneurial initiatives' in our country.

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