ANALYSIS OF ENTREPRENEURIAL CHARACTERISTICS OF VEGETABLE FARMERS IN MATARA DISTRICT

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Abstract

This study attempts to analyse the entrepreneurial characteristics of vegetable farmers in Matara District. Results indicate that majority (74%) of farmers have shown medium level entrepreneurial skills. Further, it shows that majority of farmers possessed medium level innovativeness and farm decision making abilities. Nevertheless, majority were high risk takers and achievement motivators. Therefore, sound training programmes should be organized to develop the entrepreneurial skills of farmers. Community based organizations and officers of farmer organization, extension officers and grass root level institutes viz. NGOs, and Vidhatha centers should play major roles in this regard. Further, individual education, family education, farming income and total income, wealth level of the farmers, training and land productivity were positively correlated with the entrepreneurial skills of the respondents. Poor entrepreneurial development, high labour cost and low labour supply, lack of credit facilities, lack of information, training programmes and poor extension services, and low availability and high price of planting materials were recorded as bottlenecks to develop the entrepreneurial characteristics of the vegetable farmers in Matara District. Therefore, effective entrepreneurial development training programmes are needed to be organized. Sound training programmes should be organized to increase awareness on entrepreneurship. Government with private organizations and NGOs should take the initiative as a partnership for this purpose.

Key Words: *Entrepreneurial Characteristics, Innovativeness, Farm Decision-Making, Achievement Motivation and Risk Taking Ability*

1. Introduction

Majority of rural community in Sri Lanka are occupied in agriculture as their main livelihood. Out of the total Sri Lanka labour force, 2.34 millions are involved in agriculture, which accounts approximately 32.7 percent, (Central Bank, 2008) of the total labour force. Therefore, the government of Sri Lanka is promoting the local agriculture sector with the slogan '*Let us cultivate and uplift the nation*'. In this background, the government allocates large share of it's

budget annually for fertilizer subsides, planting materials, instructions, training programs, TV programs, loans, introduction of new technology and equipment, to the agricultural sector. In Sri Lanka, agriculture is often divided into three main sub sectors such as subsistence agriculture, commercial agriculture and plantation agriculture. Eventhough, the plantation and commercial sectors have developed as commercial ventures subsistence agriculture is far behind them (Gunasena, 2008). In the circumstances, Abeysekara (2009) has pointed out that the efforts made by the government and other private agencies to develop the agriculture sector are not adequate. Further, he has argued that innovations could take various forms including, new ways of thinking, adopting non-conventional designs and strategies, targeting new beneficiaries or geographic locations, introducing new technologies, delivering new products or new interventions, adopting new ways of working and introducing new partners for improving the national agriculture system. On the other hand, this can be summed up as improving the entrepreneur characteristics of the farming community in Sri Lanka.

Entrepreneur is an essential person in any economy. The number of entrepreneurs determine success of each society and economy in any country. Therefore, many developed and developing countries pay attention to support entrepreneurs. Different types of projects and programmes are carried out to improve entrepreneurship in every country including Sri Lanka. However, specific projects and programmes aimed at developing the entrepreneurship among the farmers of subsistence agriculture in Sri Lanka are at a minimal level. Atapattu (2009) argued that one of the important reasons for poor development of agriculture sector was little improvement of entrepreneurship development among the farming community.

It is difficult to find one indisputable definition on entrepreneurship. The evolution of the concept has generated many definitions. Joseph Schumpeter, (1967) described entrepreneurship as a force of "creative destruction" whereby established ways of doing things are destroyed by the creation of new and better ways to get things done. Say explained an entrepreneur as a person who can convert low beneficial economic resources into high beneficial economic resources. He further explained that an entrepreneur changes the natural resources to economic resources in a creative way (Holt,1997). Kaushal, (2008) pointed out that the entrepreneurial characteristics are not inherited by birth. They can be created and identified. The antecedent, incubator organization and environment factors are able to improve entrepreneurial characteristics of any person. Schumpeter, (1967) clarified entrepreneur as an innovator with potentialities of doing new things, as an economic leader, as a chief conducive function in the process of economic development. Rhman, (1997) pointed out that

entrepreneurship is the function that is specific to the entrepreneurs' ability to take the factors of production: land, labour, capital and use them to produce new goods or services.

Antecedent factors are genetic factors, family influences, educational choices and previous career experiences. Antecedent influences include many aspects of the entrepreneur's back ground which affect motivations and perceptions, as well as skills and knowledge. It is clear that perceptions, skills and knowledge have been significantly influenced by entrepreneurial characteristics, previous career background and social circumstances of farmers. These factors combine with a personality which is determined to succeed, through attention to detail, in the achievement of success.

Incubator organization factors are geographic location, nature of skills of the person, knowledge acquired, contact with possible fellow founders and experience. The sector, in which the entrepreneur has previously been working, may be extremely influential in entrepreneurship. The location and the nature of the new farmer are also important elements. This represents the concept of apprenticeship and it can be an integral part in the process of shaping an entrepreneurial career. Thus, the part played by incubator organizations is significant.

Environmental factors are economic conditions, accessibility and availability of capital, examples of entrepreneurial action, opportunities for interim consulting and availability of personnel, supporting services and accessibility of customers. Entrepreneurship does not take place in a vacuum and factors external to the individual and organization may make the climate more or less suitable to the birth of a new venture. These combine to influence entrepreneurial activities and degrees of success within certain markets. The debate on the supremacy of different approaches to the development of entrepreneurs continues, and each has its individual chance (Kaushal, 2008).

In the developing countries like Sri Lanka, most of the vegetable farmers never realize their potential or do not utilize appropriate opportunities. It is therefore pertinent to carry out some studies like the present one which could bring to light these gaps and to suggest some appropriate measures for providing required environment and congenial conditions for the growth and development of vegetable farmers as entrepreneurs.

Therefore, this study attempts to analyse the entrepreneurial characteristics of vegetable farmers, to examine impact of socio-economic characteristics for

entrepreneurial skills of farmers, and to identify the issues relevant to them and suggest appropriate measures to improve their entrepreneurial characteristics.

2. Methodology

Waligama, Mirissa, Denipitiya and Ahangama areas in *Matara* District are well known for low country vegetable cultivation. This area belongs to low country wet zone agro-climatic zone and significant numbers of farmers cultivate vegetables as their main crop. Brinjal (*Solanum melongena*), Ladies fingers (*Hibiscus esculentus*), Mae (*Vigna ungaiculata*), Cucurbit varieties (*Trincosanthus cucurmerina, Cucurbita maxima, Benincasa cerriera, Luffa acutangula, Mormodica charantia and Cucumis sativus*), Radish (*Rephanus sativa*), Green Chilies (*Capsicum anum*) and Leafy vegetables (*Centella asiatica, Aiternanthera sessilies, Ipomea aquatica*) are popular among the farmers in these localities. Data for the study were collected from *Mirissa* and *Waligama* DS Divisions in *Matara* District in Southern Province, Sri Lanka. In the *Mirissa* GN Division around 96 farmers grow vegetables such as cucurbits, ladies fingers, egg plants and leafy vegetables. The list of name of farmers prepared by the Agriculture Instructor (AI) in the area was used as a sample frame to select the respondents. Out of 96 vegetable farmers, 50 farmers were randomly selected for sample. Sample portion was nearly 50 percent. Primary data were collected from farmers through personal interview method with the help of structured interview schedule and systematic field observation. In addition, magazines, articles and past survey reports were used for secondary information.

Entrepreneurial characteristics (EB), age, education, sex, income, experience, nature of farming, family size, family background, wealth level, training received, mode of transport, extension contact, information seeking characteristics (ISB), and adoption levels were collected as variables of the study.

General Enterprising Tendency (GET) test and Thematic Appreciation (TA) test can be used to measure the entrepreneurial characteristics of the individuals (Flora *at el.,* 1999.) The GET test was developed as a Likert Scale and compiled in such a way that the respondent could score, self assess and interpret his or her own results. Various entrepreneurial characteristics on different dimensions were taken into care for the development of the GET test scale. Buddhadasa (2003) has mentioned many of entrepreneurial characteristics of effective entrepreneurs. The specific entrepreneurial characteristics were used to develop the GET scale for this study, which consisted of four dimension of entrepreneurial characteristics *viz.*, Innovativeness (I), Farm Decision-Making (FDM), Achievement Motivation (AM) and Risk Taking Ability (RTA). The scale consisted 20 items representing

four dimensions which were assessed by using Likert scale. The scale innovativeness consisted three positive and negative statements; altogether six items, which were measured by adopting five point Likert scale (+2 = "strongly agree" -2= "strongly disagree"). The scale of FDM consisted six statements which were measured by using three point Likert scale (+1 = "agree" -1= "disagree"). The scale of AM also consisted four statements which were measured by applying three point Likert scale (+1 = "agree" -1= "disagree"). Similarly, RTA was also measured by using four statements with three point Likert scale (+1 = "agree" -1= "disagree"). Factor analysis was done to identify the validity of the items. Based on results of the factor analysis, appropriate items were taken to calculate the entrepreneurial characteristics of the respondents. The responses obtained from the respondents were then multiplied by the scale values of respective items and summed-up to obtain the final score of entrepreneurial characteristics of the individual respondent. Hence, categorizations such as low, medium and high were done based on the range. The adopted method to measure the socio-economic variables are illustrated in Table 1.

Rogers and Shoemaker, (1971) had developed the procedure to measure the adoption level on package of practice (POP). It was calculated by applying the concept of adoption index. Calculation formulae (i) is as follows.

Adoption index = (Adopted practices / Total practices in package)x100 .....(i)

By considering the level of the house, either permanent house with tile floor, brick and cement wall, tile or asbestos sheets or temporary house, and material availability such as radio, television, telephone (mobile or land), basic furniture for their house and availability of bicycle, motor cycle or any other as a family vehicle were considered in order to develop the wealth index. Value such as 3, 2, 1or 0 was assigned based on the availability of wealth items which were indicated above. Finally, categorizations such as poor, medium and high were done based on the range.

Moreover, data were analyzed using descriptive analytical tools such as standard deviation, mean, percentage, and table. In addition, statistical methods such as Person Product Movement and Kendall's tau-b nonparametric correlation tests were also used to analyse the data. The Person Product Movement and Kendall's tau-b nonparametric correlation coefficient was defined in the equation (ii) and (iii) respectively. Its value varies from minus one to plus one. If the value is zero there is no relationship between two variables.

$$r = \frac{\Sigma XY - (\Sigma X)(\Sigma Y)/N}{\sqrt{[\Sigma X^2 - (\Sigma X)^2/N]\,[\Sigma Y^2 - (\Sigma Y)^2/N]}} = \frac{Cov\,(X, Y)}{SD\,(X)\,SD\,(Y)} \quad \ldots\ldots(i)$$

Where,
r = Correlation coefficient, X= Socio economic variables Y= Entrepreneur characteristics and N = Number of observations, (Majumdar, 2002).

$$r = S / (0.5N(N-1) \ldots\ldots\ldots\ldots\ldots\ldots (iii)$$

Where,
r = Correlation coefficient, S= Sum of the inversion at each ranks and N = Number of observations, (Majumdar, 2002).

Table 1: Variables and Their Empirical Measurements

Variable	Measurement
Age	Chronological age in completed year
Sex	Male or Female
Education	Grade
Family education	Family education index
Family size	Number of family members
Land size	Hectare (ha)
Experience	Number of years engaged in farming
Cropping intensity	Plant density per unit of land per year
Productivity	Kg / ha
Income	Monthly income (Rs)
Nature of farming	Full time / Part time
Wealth condition	Wealth index
Training received	Number of trainings received
ISB	ISB index
Adoption level	Adoption index

3. Results and Discussion

3.1 The Entrepreneurial Characteristics of Farmers

Entrepreneurship stands as a vehicle to improve the quality of life for individuals, families and communities and to sustain a healthy economy and environment. Entrepreneurial characteristics are the factors that are required for a best entrepreneur. Buddhadasa (2003) has mentioned many characteristics of effective entrepreneurs. Out of all these characteristics, four major dimensions like innovativeness, achievement motivation, risk taking and farm decision making were considered. Innovativeness is the exploitation of new things. Vegetable farming is a highly risky and competitive farming system. Against this background, innovative ideas are required to survive in the system. Adopting to new innovations and innovative practices are prerequisites for a profitable vegetable farming. The mean value of innovativeness of the respondents was 4. Majority of vegetable farmers (70 %) were in medium innovativeness category. None of them and 30 percent of them have recorded in the low and high innovativeness categories, respectively. It brings home the fact that majority of farmers were in high to medium level innovativeness. Another important characteristic of a good entrepreneur is significant ability to bear high risks. Risk taking is the ability to bear the unfavourable result due to sudden change. The vegetable farming is a high risk venture because it is highly vulnerable to many risks *viz.* climatic risk, pest and diseases risk and price and marketing risk. Therefore, taking logical decisions is a very important requirement for vegetable farming. Farm decision making is the ability to make correct decisions quickly at the correct time by considering the available information.

The mean value of risk taking ability was recorded as 2.44. It was further observed that a large majority (92%) of vegetable farmers have shown high level of risk taking ability (Table 2). The susceptibility for pest and disease and the price fluctuation are higher for vegetables. None was reported in the low level of risk taking ability. Farm decision making was the third important dimension. Around 11.38 was recorded as mean values for farm decision making. The findings in the Table 4 illustrates that majority of respondents were in the medium level of farm decision making. It was recorded as 72 %. Eight percent and 20% were in low and high level farm decision making, respectively.

Achievement motivation is the process of arousing and sustaining goal directed behaviour. Motivation toward achieving the goal is very important to become a good entrepreneur. On the other hand, achievement motivation is the desire to reach a certain goal. Most of vegetable farmers are small scale farmers and their

desire is to increase their economic level. They prefer to cultivate new varieties to get a good yield. Vegetable farmers' mean value of achievement motivation was 2.64. Other important point was majority of respondents (94 %) were in high achievement motivation category, (Table 2). This provides the picture of stability with regard to the innovativeness, RTA, FDM and AM ability of the farmers.

Total entrepreneurial characteristics were measured by summing up the sub total of earlier discussed four dimensions. With regard to the total entrepreneurial behaviour of vegetable farmers, majority (74%) were in medium level. Low and high level categories were recorded as 10 and 16 percent, respectively, (Table 2). Sandika (2009) has found the entrepreneurial behaviour of the mushroom farmers in *Matara* district. According to his findings, majority of growers have shown medium to high entrepreneurial behaviour category. Majority were in medium category with respect to innovativeness, farm decision-making and risk taking ability. These facts however reveal that, there is high potential to develop the vegetable farmers as entrepreneurs.

3.2 Socio-economic Characteristics

The findings in the Table 3 illustrate the socio-economic situation of the vegetable farmers. Age of the respondents has been classified into young (below 35), middle (35 to 55) and old (55 year). Majority (66%) of respondents were in old category followed by 34 % in middle age. Nevertheless, none of the farmers reported as young category. This result may be due to transfer of younger generation from agriculture and their negative attitudes on the profitability of agriculture sector. Young blood has more potentials and energy to develop entrepreneurship in the agricultural sector. This may negatively affect the development of entrepreneurship in the agricultural sector because of the deviation of younger generation from the agriculture sector. Therefore policy makers and other relevant authorities should take appropriate promotional techniques to attract the young group to the sector.

Majority of vegetable farmers were females (Table 3). It was observed at 56 %. Most of the males were employed in fishing in *Mirissa* area and they were unable to participate in vegetable cultivation. Therefore, females were engaged on vegetable farming in this area. The correlation analysis test (Table 5) shows that the sex ($r=0.255$, $p<0.05$) was significantly influential in entrepreneurial skills of vegetable farmers. It means that male farmers have shown relatively high entrepreneurial skills when compared to the female farmers. Against this background, appropriate training programmes need to be organized by focusing on the female farmers in the area.

Table 2 - The Comparative Study of Entrepreneurial Characteristics of Farmers

N = 50

Entrepreneurial Characteristics	Percentage
Innovativeness	
Low (< -4.8) Medium (-4.8 to+ 4.8) High (>+4.8)	0% (0) 70% (35) 30% (15)
Risk taking ability	
Low (<-1.3) Medium (-1.3 to +1.3) High (> +1.3)	0% (0) 8% (4) 92% (41)
Farm decision making	
Low (<-5) Medium(-5 to +5) High (> +5)	8% (4) 72% (36) 20% (10)
Achievement motivation	
Low (<-1.3) Medium(-1.3 to+ 1.3) High (>+1.3	0% (0) 6% (3) 94% (47)
Total entrepreneurial behaviour	
Low (<+ 17.85) Medium (+ 17.85 to 22.87 High (>+22.87)	10% (5) 74% (37) 16% (8)

It could be observed from the Table 3 that relatively large potion of the farmers (40%) have studied up to GCE Ordinary Level (O/L) followed by 22% who have studied up to GCE Advanced Level (A/L). It shows the strength of the farmers' educational level. The correlation analysis test (Table 5) shows that the farmers education was significantly both AM ($r=0.369$, $p<0.01$) and total entrepreneurial skills ($r=0.294$, $p<0.05$) of vegetable farmers. In respect of education of the family members, about 30 % of vegetable farmers' family education was at a high level. There were 60 % of vegetable farmers in the medium level of education while only 10 % belonged to low level. It means that children of the respondents have paid grater attention for a good education. The table 5 shows that, family education is an important socio economic variable which significantly influenced the farm decision making ($r=0.475$, $p<0.01$) as well as overall entrepreneurial skills ($r=0.281$, $p<0.05$) of respondents. Family education helps to make sound and quick decisions. Actually vegetable farmers need to make quick and sound decision on cultivation, harvesting, pest and deceases control and marketing.

Therefore, the farmers with highly educated spouse or children may be able to arrive at sound decisions.

Majority of (56 %) vegetable farmers were recorded in the family size of 3 – 5 members. Around 44% vegetable farmers belonged to large families which had more than 6 members. Family size significantly influenced farm decision making ($r=0.416$, $p<0.01$) of vegetable farmers.

Table 3 further illustrates that majority of respondents were at low level to medium level wealth category. Around 40% and 52% of farmers were in the low level and medium level wealth category, respectively. The family wealth highly correlated not only with farm decision making ($r=0.443$, $p<0.05$) but also with entrepreneurial skills ($r=0.348$, $p<0.05$). It was clear that the farmers with high entrepreneur skills and effective decision making capacity had a better wealth and socio-economic conditions.

3.3 Livelihood Related Variables

Farming income was the main variable not only of farmers but also of those engaged in other professions. The average income of the respondents was recorded as Rs.7 105.32 per month. There were 98 % vegetable farmers having Rs.4000.00 - Rs.25000.00 income per month. Only 2 % of vegetable farmers had a relatively high income (Rs.25 000.00 to Rs.75 000.00 income per month). The price fluctuation of vegetables is very high. This adversely affects the farmers' income. This needs to be considered by the relevant authorities to implement an effective mechanism to control the price fluctuation. It would help both farmers and consumers. The important feature of this study was that entrepreneur skill had shown positive and significant relationships with total income ($r=0.295$, $p<0.05$) and income from other sources ($r=0.28$, $p<0.05$). It can be explained that the farmers with high entrepreneur skills earn high income from either farming or non farming activities.

In case of land, average land size of vegetable farmers was 0.27 ha. Gunasena (2008), states that the majority of Sri Lankan farmers are small land holders and they have less than 0.2 ha of land. The findings of this study also prove the above statement. Further, about 34 % and 26 % of vegetable farmers had less than 0.2 ha of land and more than 0.4 ha of land blocks. Majority of farmers (40 %) had 0.2 - 0.4 ha of blocks for cultivation. The results clearly indicate that all the farmers were small land holders. Therefore, it is not practicable to get a high profit from vegetable farming because their economic scale was low. Table 5 reveals that land size has shown significant positive relationship with the entrepreneurial

characteristics of the respondents, (r=0.453, P=0.01). It means that farmers who have relatively large land had shown entrepreneurial characteristics than others. However, land was a limited factor in those areas.

Productivity is another important variable which directly influenced the income of the farmers. Productivity highly varied from 25600 kg/ha/year to 400 kg/ha/year. However, average productivity was 4276 kg/ha/year. Important point is farmers entrepreneurial skills had positively influenced land productivity (r=0.289, P=0.05)

Table 3: Socio-economic Characteristics of Vegetable Farmers

N = 50

Socio-economic characteristics	**Percentage**
Age(year)	
Young (<35)	0 % (0)
Middle (35-55)	34% (17)
Old (>55)	66% (33)
Sex	
Female	56% (28)
Male	44% (22)
Education	
Low	20% (10)
Medium	60% (30)
High	20% (10)
Family size	
3-5	56% (23)
>6	44% (22)
Family education	
Low (Less than 8 year)	38% (19)
Medium (up to GCE O/L)	40% (20)
High (up to GCE A/L or above)	22% (11)
Family education	
Low	30% (15)
Medium	60% (30)
High	10% (05)
Family wealth	
Low	40% (20)
Medium	52% (26)
High	08% (04)

Cropping intensity is the plant density per unit of land per year. In other word, plant density is the number of plants in a certain area. It was observed that 68 % of vegetables were in the medium level of cropping intensity. Few numbers (14 %) of farmers were in the low level. The correlation analysis results showed ($r = 0.279$, $p<0.05$) that cropping intensity was positively significant with the risk taking ability of vegetable farmers. It is clear that the farmers who try to increase the cropping intensity must take risks because increasing the cropping intensity is highly vulnerable to the pest and disease attacks and hazards from the climatic factors.

The average experience of vegetable farmers was 18.13 years. The experience of farmers was classified based on the mean and SD of experience. About 74 % of vegetable farmers were in the medium level of experience. There were 14 % and 12 % of them in low level and high experience category (Table 4). The experience is an important factor in achieving high productivity. If they had previous experience regarding the prevention of pest attacks and diseases of crops, they could protect their field. Hence their efficiency may be high. Experience negatively influences the achievement motivation of the farmers, ($r= -0.376$, $p<0.05$) (see Table 5).

Table 4 shows that majority (94%) of vegetable farmers had received subsidies like equipment and seeds from non government organizations (NGO). Other important point is that they do not receive fertilizer subsidy from the government. Therefore, they are frustrated to a certain extent. This must be seriously considered by policy makers.

Table 4: Livelihood Related Variables

N = 50

Livelihood related variables	**Percentage**
Land size(ha)	
<0.2	34%(17)
0.2-0.4	26%(13)
>0.4	40%(20)
Cropping intensity	
Low	14% (7)
Medium	68% (34)
High	18% (9)
Experience(Year)	
Low	14% (7) 1
Medium	74% (37)
High	12% (6)
Subsides facilities	
Yes	94% (47)
No	6% (3)
ISB	
Low	16% (8)
Medium	66% (33)
High	18% (9)
Adoption	
Low	24% (12)
Medium	66% (33)
High	10% (5)

Table 4 further illustrates that ISB of vegetable farmers were in the medium level. It was 66 % while, 16 % and 18 % were in the low level and high level respectively. ISB was highly correlated with ($r=0.323$, $p<0.05$) achievement motivation and total entrepreneurial behaviour ($r=0.372$, $p<0.05$) of vegetable farmers, (See Table 5). The results clearly illustrates that an individual farmer with a high motivation regarding personal and family development tries to find more and more new information regarding their environment. Further, it may help to develop the entrepreneurship of the farmers.

Almost all farmers had obtained credit from various sources. The farmers with achievement motivation had shown a greater interest to obtain more loans ($r=0.318$, $p<0.05$) to develop their farms.

Technically sound practices are very important for the success of vegetable cultivation. Therefore, farmers should have not only sound knowledge on agriculture but also must be capable of adoption to the recommended practices. Table 4 clearly illustrates that majority of respondents were in moderate (66%) adoption level. Most of the farmers had participated in various training programmes. Around 84 % of vegetable farmers had participated in various training programmes. Although the vegetable farmers have farmers' societies, they do not function well towards organizing the required training for it's members. Therefore, mobilizing of vegetable farmer is very important to develop their entrepreneurial characteristics. Correlation analysis shows (Table 5) that the experiences in training had significantly influenced farm decision making ($r=0.31$, $p<0.05$), achievement motivation ($r=0.363$, $p<0.05$) and total entrepreneurship of the farmers ($r=0.334$, $p<0.05$). Therefore, training is a pre-requisite to develop the entrepreneurship of vegetable farmers. It is time to organize entrepreneur development training programmes for concerned farmers. Entrepreneur development can accelerate broad based rural development by developing agrarian society by increasing awareness of new agricultural technology. Further, entrepreneurship development helps to make a central pillar of overall development strategy of the farming communities to increase their living conditions by transferring unexploited resources to exploited resources for agriculture. In this background, significant initiatives are required to increase the farmers' entrepreneur skills. Strengthening of farmer and farm organizations is the most important requirement to develop the farmers' entrepreneur skills. Sound training programmes should be organized to impart awareness on entrepreneurship. Government with private and NGOs should take the initiative jointly for this purpose.

3.4 Bottlenecks Hampering the Development of the Entrepreneurial Behaviour of Farmers

Goyal *at el.,* (2009) has applied factor analysis to identify major constraints faced by women entrepreneurs in India. The same procedure has been adopted to analyze constraints faced by the tea farmers.

1. Relatively low income

The vegetable farmers did not receive a reasonable price for their harvest because there was a monopoly market in the locality. Therefore, an efficient

marketing system for the farmers needs to be developed. Both government and private sector must play leading roles to implement a programme in determining prices for the farm products. It will determine the sustainability of the farmers' livelihood.

2. Poor entrepreneur developments

Eventhough farmers had shown medium level entrepreneurial skills, they may not be considered as entrepreneurs. The recognized major constraint was poor entrepreneur development of the respondents due to poor skills and knowledge regarding entrepreneurial development. It is time to organize the entrepreneur development training programmes for the vegetable farmers.

3. Lack of credit facilities

Poor credit facilities were considered to be the major problem for the vegetable farmers. Formal institutions like banks, demand collaterals in giving loans to farmers. Vegetable farmers face difficulties finding collaterals to obtain loans. Therefore, kind of micro finance system needs to be introduced among the vegetable farmers to fulfil their credit requirements. The relevant authorities should take this matter in to care seriously.

4. Lack of information, training programmes and poor extension service

Poor information sources, non availability of training programmers and poor extension services were identified as constraints in those regions. The extension can not be given by the government agencies only. Therefore, private organizations and NGOs need involvement in the training and extension as a partnership venture.

5. High pest and disease attacks

Some diseases and pests badly affect the vegetable fields and farmers had no suitable solution to prevent them. So, sound awareness progarmmes need to be organized by the relevant agencies. The traditional extension system carried out by the Department of Agriculture is not sufficient to solve farmers' problem. Private and NGOs related to agricultural sector also need to take the responsibility in transferring technology related to new agricultural innovations. Government with private organizations and NGOs should take the initiative as a partnership for agricultural extension.

Table 5: Correlations Coefficient

Independent variables	Tota l EB	I	AM	FDM ability	RT ability
Age	-.178	-.007	-.344	-.055	-.211
P Value	.217	.959	.014	.706	.141
Education	.294	.148	.369	.135	.205
P Value	.038	.306	.008	.350	.153
Faming Income	.280	.115	.171	.194	.297
P Value	.049	.427	.236	.177	.036
Other Income	.270	.061	.150	.221	.331
P Value	.058	.673	.297	.124	.019
Total Income	.295	.089	.171	.226	.342
P Value	.037	.540	.236	.114	.015
Family Size	.225	-.115	.236	.416	.071
P Value	.117	.425	.098	.003	.627
Family Education index	.281	-.063	.275	.475	.036
P Value	.048	.665	.053	.000	.802
Wealth index	.348	.022	.136	.443	.306
P Value	.013	.879	.346	.001	.031
Crop intensity	.094	-.086	.096	.099	.234
P Value	.517	.554	.508	.494	.103
Land Size	.125	.007	.101	.111	.149
P Value	.386	.962	.484	.444	.301
Experience	-.095	-.015	-.376	.107	-.154
P Value	.513	.917	.007	.458	.286
ISB	.309	.173	.229	.201	.227
P Value	.029	.230	.109	.162	.113
Training	.401	.163	.404	.330	.188
P Value	.004	.258	.004	.019	.192
Productivity	.289	.129	.191	.155	.352
P Value	.042	.370	.184	.283	.012
Adoption recommend	-.114	-.138	-.220	-.002	.053
P Value	.431	.340	.125	.989	.717
Credit	.157	.008	.318	.118	.049
P Value	.275	.957	.024	.413	.737

4. Conclusion and Policy Implications

Majority of farmers were in medium innovativeness and FDM ability category. Nevertheless, majority were also in high RT ability and AM ability. The results of the study prove that majority of growers have shown medium entrepreneurial skills on the total entrepreneurial characteristics of the respondents. Therefore, sound training programmes should be organized to develop entrepreneurial skills of the farmers. It may help to increase the social capital of the rural community. Multi-stage and multi stakeholder programmes are needed for this purpose. Community based organizations and officers of farm organizations, extension officers and grass root level institutes *viz.* NGOs, and *Vidhatha* centers should take this responsibility. Further, education, family education level, farming income and total income, wealth of the farmers, training and productivity of the farmers were positively correlated with the entrepreneurial skills of the respondents.

Majority of farmers were of old age. However, it has had no effect on entrepreneurial characteristics of vegetable farmers. Higher number of farmers was female and sex was not an influencing factor to develop entrepreneurial characteristics. In respect of education of the respondents, the majority of the farmers had studied up to GCE Ordinary Level (O/L). Family education of the majority farmers were medium level. The mean land size was 0.27 ha. Majority of tea farmers belonged to the family size category 3 – 5 members.

Average income was recorded at Rs 7 105.32 per month. Majority were in medium level family income. The mean experience of respondents was 18.13 year. High numbers of farmers were in the medium level of experience. ISB is more important for farming groups because they need to know about price, methods of pest and disease control. Most farmers were in the medium level of ISB. Most farmers also have participated in various training programmes.

Poor entrepreneur development, high labour cost and low labour supply, lack of credit facilities, lack of information, training programmes and poor extension services, and low availability and high price of high quality planting materials were recorded as bottlenecks hampering the development of entrepreneur characteristics of the vegetable farmers in *Matara* district.

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Book Review

Small Village Tank Systems of Sri Lanka : Their Evolution, Setting, Distribution and Essential Functions by Dr. C.R. Panabokke, HARTI, 2009.

Reviewer : M.U.A. Tennakoon

The small tank system of irrigation in Sri Lanka which evolved well before the dawn of the Christian Era, was the cradle and nursery of the nation and the nucleus of the dry zone village. As clearly demonstrated in this study, the village tank storage of rain water received in the dry zone is a unique creation in an undulating peneplain on a weathered hard rock basement terrain that distinctly differs from those irrigation systems developed in the alluvial plains of Egypt, Mesopotamia or the Indus River Basin in India.

In this study, the author has shown that the small tank is the gradual outcome of the local geo-engineering genius of the ancient tank builders who successfully wrought out a remarkable technology of land and water management in the undulating dry zone landscape. That technology was constantly improved over time, facilitating the construction of more sophisticated larger tanks by the time of King Vasabha during the first century A.D, and thereafter.

In the process of endeavouring to give the reader an understanding of the varying facets of the evolution, setting , distribution and essential functions of the village tank, the author who had a long and arduous scientific study-trek embolden with his constant field studies spanning over half a century, has shown his dedication to explain those facets. This has been done in six chapters, four annexes, one appendix, several maps and diagrams with clear and succinct demonstration and description of the physical environmental components associated with form and content of geology, soil, physiographic characteristics with drainage patterns and water supply which have both hindered and supported the human power of endurance and ingenuity not only in mere survival but also in nurturing a remarkable hydraulic civilization over the centuries in such an exacting dry zone environment.

This is not a study in isolation. The author has referred to some centuries old successful irrigation functions both within and outside Sri Lanka to show system similarities and dissimilarities to draw useful lessons from them. The cases in point are : (a) the author's comparative study of the irrigation code of Hammurabi, King of Babylon, 1,900 B.C. and exhortation of King Parakramabahu of Sri Lanka (1153 A.D. – 1186 A.D); (b) the evolutionary

change from small tank construction to large reservoir construction from the early Anuradhapura Period (up to the first century A.D) and through the latter part of that period to the Polonnaruwa Period and (c) the manner in which the centrally governed irrigation management of large reservoirs collapsed at times of political instability while the highly decentralized, people-based and micromanaged small village tank irrigation systems survived the test of time.

The author in marshalling requisite information and data for this study, in addition to drawing them from his own past studies spanning over several decades, has meticulously surveyed already available subject specific and allied literature and has amply honoured those worthwhile and sensible ideas in them, not simply by citing them in the text, but by appreciating them with valid in-depth interpretations where appropriate. The way he has dealt with the subject matter of J.S. Kennedy's 1936 study of the 'Evolution of Scientific Development of Village Irrigation Works' published in the Proceedings of Engineering Association of Ceylon, Colombo, (pp. 229-320) and the manner in which he has sequenced his arguments in the speech delivered on 'Aspects of the Small Tank Heritage of the Rajarata' at the Third Convocation of the Rajarata University in 2002, merits reader's appreciation in particular.

One loose end of the publication is the not-so-high quality of two or three maps embedded in the text. Nevertheless, it is a 'must read' scientific study of small village tanks.