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Assessment of Livelihood Capitals of Sweet Potato and Paddy Growers in Karnataka

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ABSTRACT

Sustainable livelihood analysis was attempted to elucidate the factors that affect the sources of livelihoods of sweet potato and paddy growers in Belagavi district of Karnataka. A sample of 60 sweet potato growers and 60 paddy growers were selected using snow ball sampling and data were collected using PRA tools, interview schedule and focus group discussions during July to December 2017. The sustainable livelihood index was worked out using the DFID methodology for all the capitals. Sweet potato growers realized 39 per cent higher net profit than the paddy growers. The overall human index was 46 for sweet potato growers and 52 for paddy growers. The overall physical capital index was more for sweet potato growers (72) as compared to paddy growers (70). Social capital index was similar to both the growers. The overall financial index was 40 for paddy growers and 36 for sweet potato growers. The overall natural capital index was 63 for sweet potato growers and 64 for paddy growers. The rural livelihood sustainable index was marginally more for paddy growers (58) than sweet potato growers 56. Similarities between capitals of sweet potato and paddy growers were in the decreasing order with respect to social, natural, physical, financial and human capitals. Major sources of livelihood were agriculture, employment in government/private sector and small business. The vulnerability factors were inflation, price fluctuation, crop failure and labour cost.

Key words*: Sweet potato; Paddy; Livelihood capital; Sustainable livelihood index;*

Sweet potato is considered as a versatile food crop owing to its adaptability to diverse soil and climatic conditions. Sweet potato is one of the most important staple food among disadvantaged population in India and majority of the farmers consider it as a major source of food but used to a limited extent as animal feed and industrial raw materials (*FAO, 2017* and *Prakash et al., 2016; 2017; 2018b*). Sweet potato is mainly cultivated in four states *viz.*, Odisha, West Bengal, Uttar Pradesh and Kerala which together contribute nearly three fourth (74%) of total area and production (71%) in India (*NHB, 2017; Prakash et al., 2018c*). Karnataka is one of the emerging states in sweet potato production in India with a production of over 36,000 tons annually and Belagavi district has the highest productivity of sweet potato (14.2 t ha^{-1}) compared to other districts *(NHB, 2017; Prakash et al., 2018a)*. Livelihood assessment of the sweet potato growers help to identify the different assets possessed by the growers and their contribution to their livelihood. To improve the livelihood status of the growers, the concept of sustainable livelihoods is increasingly gaining great importance in research and development initiatives for poverty alleviation, rural agriculture development and rural resources management (*Chambers, 1987; Ashley, 2000*). Broad sustainable livelihood principles underpin application of the sustainable livelihood approach, which assess how development activities fit with the livelihoods of the poor (*Carney et al., 1999; DFID, 2000*).

Livelihood can be defined as a measure of the set of actions taken by people within their capacity and capitals to make a living by maintaining highly diverse portfolio of activities, while livelihood capitals cover natural, physical, human, social and financial resources that are critical to the survival of people in response to

stresses and shocks while not compromising the natural resource base (*Ansoms and McKay, 2010; Mutenje et al., 2010; Ellis, 1998; Ellis, 2000; Scoones, 1998*). The idea of household livelihood security as defined embodies three fundamental attributes *viz.*, the possession of human capabilities (education, skills, health, and psychological orientation), access to other tangible and intangible assets (social, natural, and economic capital) and existence of economic activities (*Carney et al., 1999*). The relationship between farm household livelihood strategies and livelihood capitals has received much attention in recent years in view of sustainability (*Walelign et al., 2016; Peng et al., 2017*). Livelihood capitals viz., human, financial, social, natural and physical capitals and household structure, labour quality and ecological policies are the major drivers of farmers' choice of livelihood strategy (*Iiyama et al., 2008; Mutenje et al., 2010; Angelson et al., 2014; Peng et al., 2017*). Sweet potato and paddy are the two important food crops which provide livelihood support to the farmers of Belagavi district of Karnataka. In this context, it is important to understand the livelihood capitals of both the farmers to formulate suitable strategies to enhance the livelihood status of the farmers. With this background, the study was conducted with the objectives, to explore the key components of sustainable livelihood capitals of sweet potato and paddy growers and to formulate strategies to enhance sweet potato and paddy growers' capabilities for sustainable livelihood security.

METHODOLOGY

The present study adopted the DFID's livelihood framework (*DFID, 2000*) to assess the different capitals possessed by the sweet potato and paddy growers. The conceptual framework of Department for International Development provides attention to measured changes in the different factors, which contribute to livelihoods especially human, social, financial, physical and natural assets (*DFID, 2000; Sreedevi, 2005*). The sustainable livelihoods framework presents the main factors that affect the sources of people's livelihoods and also make typical relationship between them. Each capital consists of key indicators.

The study was conducted in the Belagavi district of Karnataka, which contributes more than 50 per cent of total sweet potato production in Karnataka. Two taluks namely, Belagavi and Khanapur were selected based on higher area under sweet potato. The livelihood analysis was done among sweet potato and paddy growers during July to December 2017. From each taluk, three villages were selected randomly and from each village ten sweet potato (60) and ten paddy growers (60) were selected using snowball sampling and thus the total sample was 120. Data were collected using PRA tools, structured interview schedule and focus group discussion. The farmers deriving more than 50 per cent of their income from each crop *viz.*, sweet potato and paddy were selected as respondents. Data were collected on household level to identify the various capitals namely, human, physical, social, financial and natural capital. Index was worked out for each capital using the formula

$$\text{Capital Index} = \frac{\text{Actual score}}{\text{Maxi. obtainable score}} \times 100$$

Actual Score is the score obtained by the respondent under the capitals.

$$\text{RLSI} = \frac{\text{HCI} + \text{PCI} + \text{SCI} + \text{FCI} + \text{NCI}}{5}$$

Where:

RLSI=Rural livelihood sustainability index
HCI : Human Capital Index
PCI : Physical Capital Index
SCI : Social Capital Index
FCI : Financial Capital Index
NCI : Natural Capital Index

RESULTS AND DISCUSSION

Livelihood capitals *viz.*, human, physical, social, financial and natural indices of sweet potato and paddy growers are discussed below.

Human capital index: Human capital includes education level of the growers, training undergone, labour availability, health facilities and experience of the growers. Human capital helps people to pursue livelihood strategies to achieve their goals. At the household level, human capital is the number and quality of labour available and this varies according to household size, skill levels, leadership potential, health status, etc.

From the Table 1, it is clear that, training index was more for paddy growers (49) when compared to sweet potato growers (23). It was observed that training attended by the sweet potato growers was less when compared to paddy growers and their experience. The reason could be that more number of trainings were

Table 1. Livelihood capital index of sweet potato growers (SPG) and paddy growers (PG)

Parameters	SPG (n=60)	PG (n=60)
Human capital index		
Education	40	34
Training	23	49
Labour	70	72
Health	46	49
Experience in farming	52	56
Overall	46	52
Physical capital index		
Transport facilities	68	67
Housing type	65	54
Drinking water facilities	75	70
Electricity	90	95
Type of fuel used	62	64
Overall	72	70
Social capital index		
Social relationship	63	63
Membership in organisation	53	47
Access to agricultural information	67	74
Peer group communication	64	64
Communication facilities	70	69
Overall	63	63
*Financial capital inde*x		
Household income	34	31
Credit availability	41	51
Savings	47	46
Borrowed capital	22	31
Overall	36	40
Natural capital index		
Area of land	50	44
Ownership of land	98	95
Crops grown	58	62
Type of land	46	57
Overall	63	64

organised by the departments for paddy cultivation than sweet potato cultivation. As *Lynton and Pareek (1990)* stated that training consists largely of well organized opportunities for participants to acquire necessary understanding and skill. Hence efforts need to be put to improve the capacity building of the sweet potato growers. Labour availability is higher for paddy farming as paddy requires more labours and also the involvement of family labour was more for paddy cultivation as stated by *Igboji Chidi, 2015*. Experience of the paddy growers were more as paddy is traditionally grown for years in that area. Health facilities are more for paddy growers. The overall human index was 46 for sweet potato growers and 52 for paddy growers.

Physical capital index: The physical capital included transport facilities, housing type, drinking water facilities, electricity and cooking fuel available to the growers. Physical capital refers to manmade assets and other forms of physical facilities making up the built environment. Infrastructure is commonly a public good that is used without direct payment, consisting of changes to the physical environment that help people to meet their basic needs and to be more productive (*Jonathan, 2000*). Physical capital includes productive assets that can be used as tools, and communal assets, such as access to roads or local infrastructure (*De Sherbinin et al., 2008*).

It is clear from the Table 1 that, the index for electricity was more than 90 per cent for both the growers. Regarding the type of house, the index for sweet potato growers was 65 whereas it was 54 for paddy growers. Transport facilities were almost same for sweet potato and paddy growers. Similar findings were reported by *Sheela Immanuel et al., (2017)*. The overall physical capital index was more for sweet potato growers (72) as compared to paddy growers (70).

Social capital index: The components under social capital were relationship within the communities, membership in organisations, access to society, access to agricultural information and communication facilities available in the village. Social capital is the most important resource available in the rural communities as they have a strong societal tie up. The societal relationship keeps the rural society bind together.

Social capital index was similar to both the growers. Membership in organization was more for sweet potato growers (53) whereas it was 47 for paddy growers. Access to agricultural information was low for sweet potato growers (67) whereas it was 74 for paddy growers. As paddy is an important crop in the study area, farmers had more access to information on paddy than sweet potato. With adequate access to farmer support services, smallholder agriculture can significantly contribute to an increase in agricultural growth. The main aim of the farmer support programme was the promotion of structural change towards commercialisation of agriculture through the provision of support services to emerging growers in South Africa (*DBSA, 1988*).

Financial capital index : Financial capital index included

were annual income of the growers, access to credit by the growers, savings available with the growers and the borrowed capital. It was found that the index for annual income was more for sweet potato growers (34) whereas it was 31 for the paddy growers. *Prakash et al., (2018a)* reported that net income of Rs.34,585 was obtained from one hectare of sweet potato cultivation which was much more beneficial than cereal crops in Belagavi district. Savings is slightly more for sweet potato growers (47) and for paddy growers it was 46. Credit availability (51) was higher for paddy growers than sweet potato growers (41). The overall financial index was 40 for paddy growers and 36 for sweet potato growers.

Without adequate access to loans or insurance, growers who face negative shocks, such as droughts, illness can lose some of the assets which are essential for livelihood (*Diagne and Zeller, 2001*). Poor farmers as well as the medium farmers usually avail loan of 40 per cent towards meeting any calamities faced in their agricultural and livestock sectors. (*Swathi Lekshmi, 2008*). Access to agricultural credit is an important element in the empowerment process (*Kirsten et al., 1998; Hedden-Dunkhorst et al., 2001*). Access to credit has long been regarded as one of the key elements in improving agricultural productivity (*Machete, 2004*).

Natural capital index: Natural capital included the land area owned by the growers, ownership status of cultivable land, type of land and also the number of crops grown by the farmer. The index for the land area available with the sweet potato growers was more (50) when compared to paddy growers (44). The index for ownership status of land was more for sweet potato growers than paddy growers.

The overall natural capital index was 63 for sweet potato growers and 64 for paddy growers. Access to natural capital may facilitate improvements to other livelihood assets such as financial capital for income generation through productive means (*Pereira and Shackleton, 2006*).

Relationship between the livelihood capitals of sweet potato and paddy growers : The relationship between the livelihood capitals of sweet potato and paddy growers is given in Table 2. It could be observed that the human capital index was more for paddy growers (52) when compared to sweet potato growers (46). Physical capital was high for sweet potato growers (72). Similar findings were reported by *Sheela Immanuel et al. (2017)*. Social capital is same for both the growers (63). Financial capital was more for paddy growers (40) but in the case of sweet potato growers it was 36. Natural capital is marginally high for paddy growers (64) and for sweet potato growers it was 63. The Rural Sustainable livelihood index for paddy growers was more (58) than sweet potato growers (56).

Table 2. Comparison of the different capitals between sweet potato growers (SPG) and paddy growers (PG)

Parameters	SPG (n=60)	PG (n=60)	Ranking
Human capital	46	52	IV
Physical capital	72	70	I
Social capital	63	63	III
Financial capital	36	40	V
Natural capital	63	64	II
Rural livelihood sustainability index	56	58	

The association or similarities of different capitals between sweet potato and paddy growers is given in Fig.1. Similarities between capitals of sweet potato and paddy growers are in the decreasing order with respect to physical > natural > social > human >financial capitals. *Wenqiang et al., 2018* reported that human and social capitals were higher while those for natural, physical and financial capitals were lower among Herdsmen in Mongolia, China.

Socio-economic charateristics: The sweet potato and paddy growers do not differ significantly for most of their socio- economic attributes. The average age of sweet potato and paddy growers is almost same (47 years). There is not much difference in the educational level of both the category of growers. However, the average size of land holding for sweet potato and paddy growers differ significantly at 5 per cent level (Table 3). The average yield of sweet potato is higher than the paddy. There is no much difference in the cost of cultivation between sweet potato and paddy. However, the higher yield realization makes sweet potato cultivation more remunerative. On an average, the sweet potato growers realized 39 per cent higher net profits than the paddy growers (Table 8). Similar findings were reported by *Prakash et al. (2018 a)*.

Major sources of livelihood as reported by both the growers were agriculture, employment in government/private sector and small business. The vulnerability factors were rampant inflation, price

Table 3. Socio-economic characteristics of sweet potato growers (SPG) and paddy growers (PG)

Characteristics	SPG (n=60)	PG (n=60)	Difference
Age of respondent (years)	46.65	47.05	-0.4
Level of education	6.46	5.76	0.21
Household size (number)	6.56	6.3	0.26
Total land size (ha)	2.01	1.77	1.46
Land size for cultivation (ha)	0.91	0.63	1.69**
Farming experience (years)	25.81	25.15	-2.05

** Significant at 5 per cent level

Table 4. Cost and returns in sweet potato and paddy cultivation

Particulars	SPG	PG	Diff.	Diff. (%)
Yield (t ha^{-1})	11.04	4.05	6.99***	172.59
Price (Rs. q^{-1})	573.33	1300	-726.66***	-55.89
Cost of cultivation (Rs. ha^{-1})	21230.44	22363	-1132.56	-5.06
Cost of production (Rs. q^{-1})	213.51	595.83	-382.31***	-64.16
Net profit (Rs. ha^{-1})	42178.76	30319.78	11858.98***	39.11

*** Significant at 1 per cent level

fluctuation, crop failure and labour cost. The trends observed were, price rise (input cost), drought and climate change. Major common constraints reported by the sweet potato growers were price fluctuation followed by incidence of pests and diseases, lack of storage facilities, scarcity of water and wild animals menace.

CONCLUSION

Livelihood analysis revealed that, sweet potato being a short duration crop with high yielding potential contributes significantly towards livelihood security of the growers. Tuber crops based cropping/farming system may be adopted in large scale keeping in view of the demand for the produce in domestic and international market. Sequential cropping of sweet potato followed by cereals and pulses may be adopted to maintain the soil fertility which in turn will help in food and nutritional security. The rural livelihood sustainability indicated the relative importance and the role of each capital for the development of farming. Reduction in human and financial capital would inhibit the development of sweet potato and paddy growers. So, more opportunities need to be given to the farmers to improve their skill and knowledge through training programmes. To improve their credit, more support to be given to them through strengthening the effect of cooperative organizations and associations. This would enable improvement of other capitals, thereby contributing to the devolopment of the livelihood of sweet potato and paddy growers. Tuber crop based cropping/farming system need to be emphasised in areas where it is feasible so as to double the growers' income coupled with livelihood and food security of the farming community.

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