POLICY BRIEF 01

Livelihood Security through Organic Farming in North East Hill Region of India

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Livelihood security means secured ownership of, or access to, resources and income earning activities, including reserves and assets to offset risks, ease shocks and meet contingencies. The outcomes of livelihood security include economic security, food security, educational security, health security, habitat security and social network security. Organic agriculture can substantially contribute to farmers' food security by improving nutrition intake and improve farmers' livelihood enhancing biodiversity, and also in reducing vulnerability to climate change (Scialabba and Hattam, 2002 and IFAD, 2005). In North East Hill Region (NEHR) despite of being an organic hub by virtue of its soil being organic by default, no systematic attempt has been made to evaluate the livelihood security of the organic farmers so the study made an attempt to assessed the livelihood security of the organic farm households in the NEHR.

Data source

The NEHR comprises of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. From the NEHR, Meghalaya, Nagaland and Tripura were selected purposively for the study as they have the highest area under the crop from the crop groups *i.e.*, cereals, pulses, vegetables and spices. Rice, rice bean, cabbage and ginger were selected under each crop group. Sikkim was selected as the control state to compared with the other states.

To find out the economic benefits of the organic farming cost and returns of the selected crops were worked out by applying the standard defined techniques.

Livelihood security framework

Identification of the livelihood indicators

The index developed by Centre for Agriculture and Extension (CARE) is based on six different domains: food security, health security, education security, economic security, habitat security and social security. Each indicator comprised of several sub-indicators. Total of 23 sub-indicators were identified after intensive review of literature.

Normalization of the indicators

As the selected indicators have different units of scale, the indicators need to transform so as to bring under common scale. Thus, Normalization was carried out to bring the indicators within the comparable range. The values were normalized using min-max method (Feroze and Chauhan, 2010).

Construction of composite livelihood security index

After normalisation appropriate weights were assigned to each indicator. The weights of individual indicators have been assigned on the basis of Principal Component Analysis (PCA). Kaiser normalisation and scree plot were used to identify the initial eigen values greater than one. According to the number of eigen values the same numbers of rotated components were extracted for each variable. For the organic adopters nine components and for the non-adopters eight components were retained through Kaiser's criteria and cattell's scree plot. The values obtained were added for each sub-indicator to get the weight for that particular indicator. Similarly, weights were obtained for all other indicators.

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Livelihood Security index ranges

Depending on the scores of different aspects of livelihood security, the overall livelihood security outcomes were categorised into three level, *i.e.,* low, moderate and high on the basis of the livelihood security scores by using square root cumulative frequency method.

Results

Cost and returns of the selected crops

For most of the crops under consideration, crops under organic cultivation were found to be economically more beneficial which was mainly due to the cost saving and increase in gross income. Kumar *et al.* (2006) and Laxmi *et al.* (2017) also reported the similar findings of cost saving and higher gross return. In case of rice, the yield was lower under organic cultivation which was 1963.12 kg/ha (Table 1). Lower yield of rice under organic cultivation was reported by Kondaguri *et al.* (2014). The gross income under organic cultivation was also found to be significantly lower.

Table 1: Cost and returns of various crops

Crops	Particulars	Organic adopter	Non-adopter
Cabbage	Total cost (₹/ha)	35198.42	36182.91
	Yield (Kg/ha)	5268.06	6267.26
	Gross income(₹/ha)	56633.33	53125.00
	Net income(₹/ha)	21434.91	16942.09
Ginger	Total cost (₹/ha)	69797.31	71974.50
	Yield (Kg/ha)	7209.96	5822.06
	Gross income (₹/ha)	80366.67	77475.00
	Net income(₹/ha)	10569.35	5500.50
Rice bean	Total cost (₹/ha)	30479.04	31009.38
	Yield (Kg/ha)	2276.03	1959.32
	Gross income (₹/ha)	36335.00	35306.33
	Net income (₹/ha)	4869.44	4149.18
Rice	Total cost (₹/ha)	34257.39	32367.83
	Yield (Kg/ha)	1963.12	2576.33
	Gross income (₹/ha)	78648.15	103821.69
	Net income (₹/ha)	44390.76	71453.86

Food security index

The 24 hours recall method was used to measure the Household Dietary Diversity Score (HDDS). The index of the HDDS and the annual consumption expenditure were more for the non-adopter revealing that the food security index for organic adopter (0.27) were lower compared to the non-adopter (0.36) (Table 2).

Table 2: Food Security Indices

Livelihood indicator	Organic adopter	Non adopter
Household dietary diversity score (HDDS)	0.36	1.64
Household dietary diversity score	1.06	1.42
Food security index	**0.27**	**0.36**

Health security index

Health is one of the vital components in the household livelihood. Four sub-indicators were considered out of which the score for health expenditure per year was higher for the organic adopter (0.57) than non-adopter (0.37). Accessibility to PHC was also higher for the adopter (1.67). Regarding the accessibility to health services during pre and post-natal both the organic adopter and non-adopter secured the same score of 1.39. The health security was marginally higher for the non-adopter (0.40) compared to the adopter (0.37) Table 3.

Table 3: Health security index

Livelihood indicator	Organic adopter	Non adopter
Health expenditure per year	0.57	0.37
Accessibility to primary health centre (PHC)	1.62	1.56
Accessibility to big hospital	1.13	2.09
Accessibility to health services during pre and post-natal	1.39	1.39
Health Security index	**0.37**	**0.40**

Economic security index

The economic indicators like the annual income (0.94), possession of livestock (2.61) and total farm assets (1.34) were higher for the organic adopter. The economic security index score was found to be higher for the organic adopter (0.38) as compared to non-adopter (0.33) signifying higher economic stability of the organic households (Table 4). As the organic adopter were more secured educationally this may be one of the reasons for higher economic stability. This

finding coincides with the finding of Lanjouw and Lanjouw (2001) that small gains in education attainment can bring significant improvements in rural incomes.

Table 4: Economic security index

Livelihood indicator	Organic adopter	Non adopter
Annual income	0.94	0.74
Possession of livestock	2.61	1.11
Total farm assets	1.34	1.03
Household savings	0.69	0.72
Economic security index	**0.38**	**0.33**

Education security index

Education plays a significant role in the day-to-day livelihood activities. Out of the six sub indicators, the score for the accessibility to primary school was found to be higher for the organic adopter (1.67). Other sub indicators were more for the non-adopter. The education security index was found to be more secured for the organic adopter with the score of 0.40 (Table 5). As the organic adopter were more secured economically this may be one of the reasons for the better performance of education compared to the non-adopter.

Table 5: Education security index

Livelihood indicator	Organic adopter	Non adopter
Accessibility to primary school	1.67	1.51
Accessibility to high school	1.19	1.33
Accessibility to secondary	1.20	1.78
Accessibility to college/university	1.33	2.37
Household head schooling	0.99	1.03
Expenditure on education	0.43	0.66
Education security index	0.40	0.35

Habitat security index

Table 6 denoted that habitat security was found to be more secured for the non-adopter (0.36) compared to organic adopter (0.25). As the state i.e., Sikkim is undulated with irregular topography the inhabitant's settlements are mostly in higher altitudes comprises of mountainous range, snow infected areas and at par vulnerable to climate change (Rymbai, 2016). *Prima facie*, resulted to hardships among the households in proper settling.

Table 6: Habitat security index

Livelihood indicator	Organic adopter	Non adopter
Quality of housing	0.90	1.40
Accessibility of drinking water (km)	0.82	1.20
Toilet facility (km)	0.09	0.39
Habitat security index	**0.25**	**0.36**

Social security index

It was found that out of the four indicators, three indicators i.e., member of any institution like youth organisation, village governance, SHGs (2.23), any assistance for management of pest and disease (0.65) and any assistance for new crop varieties (0.61) were more for the organic adopter except one *i.e.*, assistance for pest and disease. The social security was found to be higher for the organic adopter with the index of 0.44 (Table 7). As the

Table 7: Social security index

Livelihood indicator	Organic adopter	Non adopter
Member of any institution like youth organisation, village governance, SHGs	2.23	1.35
Obtain any assistance for management of pest and disease	1.39	1.43
Obtain any assistance for management of pest and disease	0.65	0.59
Obtain any assistance for new crop varieties	0.61	0.32
Social security index	**0.44**	**0.43**

Composite Livelihood security

The Composite livelihood security for the organic adopter were 2.12 which was marginally lower than the non-adopter whose score was 2.22 (Table 8).

Table 8: Social security index

Composite Livelihood Security Index	Organic adopter	Non adopter
	2.12	2.22

Livelihood Security index ranges

For the organic adopter, 36 per cent of the household were in low level, 40.67 per cent in moderate level and 23.33 per cent were in high level of livelihood security (Figure 1). Most of the organic adopter were in moderate level of livelihood security (40.67 %).

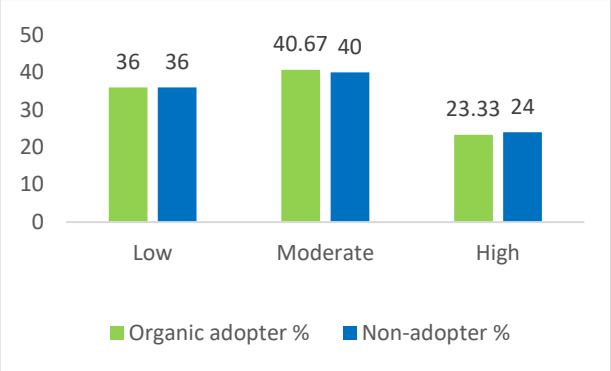

Figure 1. Distribution composite livelihood security index

Policy implications

This brief presents the livelihood security framework through organic farming in the region. As per the findings organic farming is economically more beneficial as it has cost saving benefits and its ability to enhance the gross income due to its premium prices. Except rice, crops considered under study were found to be economically beneficial, therefore, protocol to cultivate through the organic method should be developed in non-adopting regions. Since rice is a major cereal crop in the region, it is necessary to make the crop economically more beneficial through organic method. In this regard, organic farming must be popularised through the extension functionaries of the respective states among the farmers and other stakeholders involved in agriculture. As the organic produce have the novelties of fetching higher price in the market the organic adopter were economically more secured reflecting the impact of adopting organic method of cultivation. Education security index (0.40) and social security index (0.44) were also found to be more secured for the organic adopter. So far, the composite livelihood security is concerned there have been marginal difference between organic adopter (2.12) and non-adopter (2.22). Nevertheless, policy can be targeted in order to increase the other livelihood indicators so that the livelihood of the organic farmers can be more secured.

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