

## Interpreting the Farmers' Perception and Predisposition for Exploring the Contribution of Large Cardamom Enterprise on Livelihood Pattern in East Sikkim Himalayas

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### ABSTRACT

*In the recent changed climate scenario, the impact of climate change on growing large cardamom in hill ecosystem is very much predominant. Sometimes it is observable that the large cardamom growers are very much ignorant about the ill effects of climate change discourses. The perception and predisposition are the two psychological attributes of human being which ultimately give birth to the behavioural component like attitude. The impact of climate change on large cardamom practices is influencing the attitude of the large cardamom growers in case of changing the practices like anything without knowing the pros and cons of their approach. Hence, the present study was conducted to analyze the attitude of the large cardamom growers of Sikkim under changing climate as large cardamom farming provides a sustainable livelihood option for the farmers of that region. The study was conducted at six gram panchayat wards under Regu block of East Sikkim district in Sikkim. Purposive, multi-stage and simple random sampling procedures were followed in the present study and the number of respondents was hundred. In the present study, attitude of the large cardamom growers towards large cardamom farming has been considered as the dependent variable and eighteen other attributes of the respondents were considered as the independent variables. Personal interview method with the help of structured interview schedule was followed for data collection. Major statistical tools used were descriptive statistics, Pearson correlation and multiple regressions. Majority of the respondents showed high level of favourable attitude towards large cardamom cultivation. Correlation coefficient revealed three variables namely management orientation, risk orientation and innovativeness to be positively and significantly associated with the dependent variable, attitude of the large cardamom growers. Multiple regression analysis showed that two variables namely family annual income and management orientation have contributed significantly and positively but, the variable annual expenditure has contributed significantly but negatively in case of characterizing the predicted variable, attitude of the large cardamom growers and the entire explicability is 31.10%.*

**Key words:** Attitude; Climate change; Large cardamom; Sustainable livelihood; Explicability;

In recent times, climate change has gained greater significance in light of its impacts on agro-based enterprises and the resulting risk and uncertainty associated with various aspects like production, storage, marketing etc. Under Indian context, the situation is more vulnerable as India is one among those geographical zones prone to worst affected by climate change in the world and consequently, it is experiencing serious threats of climate change on its agricultural production and

productivity. Therefore, appropriate efforts should be initiated and concerted for properly understanding and taking timely measures for mitigating those climate change impacts to make the crop enterprises profitable and sustainable under the changing climate.

Now, spice crops cover a major portion of the total cash crops in our country which helps India gain a considerable amount of foreign earnings through export. Again, among several cash crops, large cardamom

(*Amomum subulatum*) occupies an important position. India is the highest producer of large cardamom in the world with 54% share in world production (A. Pathak, 2008) and it fetched around USD 47.54 million during 2010/11 from a total production of 3,316 metric tonnes of large cardamom (HCCDD, 2011). Mostly, large cardamom is grown in the hilly areas. Sikkim is the highest producing state of large cardamom in India which contributes 88 per cent of the total large cardamom production of the country (A. Pathak, 2008). With annual production of 3863 MT from 26,459 ha (Gudade et al., 2013), large cardamom is the main cash crop of Sikkim. Therefore, large cardamom cultivation is one of the sustainable livelihood options for many of the farmers in Sikkim due to its high value, less labour-intensive and non-perishable nature. For instance, a study conducted by the ICIMOD in 2014 revealed that out of the total 111,830 households studied 16,037 (14.34%) have large cardamom plantations on their farms.

But, now a days, climate change, like other crop enterprises, has been a major challenge in case of harnessing fullest potential of large cardamom farming in Sikkim. Large cardamom has experienced a declining trend in recent years both in terms of plantation area and volume produced which is often attributed to the climate change aberrations. For example, the actual area of large cardamom cultivation has decreased from 22,714 ha in 2003 to 12,500 ha by 2007/08 with a decline of 45 per cent and the quantity of cardamom produced has also followed a similar declining trend since 1999 (ICIMOD, 2014). Major climate change consequences affecting large cardamom cultivation are rapid spread of diseases at higher altitudes, irregularity of seasonal rainfall and the drying up of high altitude springs and also decreased number of pollinator species, including honeybees and bumblebees (Benjamin C. Hunsdorfer, 2013).

In spite of these climate change impacts, large cardamom farming in Sikkim, still, has lots of opportunities to make Sikkim as the large cardamom hub of the country and thereby, ensuring sustainable livelihood security for the large cardamom growers of the state. In this direction, the first and foremost thing would be a change in the mindset of the large cardamom growers from conventional method to scientific large cardamom cultivation practices including several climate resilient and environment-friendly technologies to mitigate climate change impacts. Again, this change in

mindset is strongly associated with the change in attitude of an individual which involves change in the feeling or reaction towards certain things (G. L. Ray, 2008). Liaghati et al. (2008) also mentioned that attitude is an important determinant of the behaviors of human and thus, provides guidance and target to behavior and performance. Therefore, development of favourable and positive attitude among the large cardamom growers towards scientific large cardamom production and management is a prerequisite for harnessing fullest potential of this enterprise in the improvement of the livelihood security of the large cardamom growers in Sikkim under the changing climate.

With this backdrop, the present study has been carried out to explore the attitude of large cardamom growers towards their large cardamom enterprise under the climate change scenario and thereby identify different attributes of the large cardamom growers of Sikkim having significant influence on their attitude towards large cardamom cultivation under the changing climate.

## METHODOLOGY

The study was conducted in Regu block of East Sikkim District in Sikkim. Regu block was purposively selected and both the Gram Panchayat Units and Gram Panchayats were randomly selected. Multistage and random sampling procedures were followed for the selection of final respondents. From an exhaustive list of the heads of the large cardamom growing families, a total hundred number of large cardamom growers were selected randomly as respondents in the study area. In the present study, attitude of the large cardamom growers towards large cardamom farming has been considered as the dependent variable and eighteen socio-economic, socio-psychological, socio-personal and communication related attributes of the respondents were considered as the independent, antecedent and predictor variables. The data were collected with the help of the structured schedule constructed for the study through personal interview method. The important statistical measures used to analyze the survey or research data were frequency, percentage, range, mean, standard deviation, coefficient of variation, coefficient of correlation, multiple regression.

## RESULTS AND DISCUSSION

Table 1 presents the distribution of the large

cardamom growers in Sikkim according to their attitude towards large cardamom cultivation. The results show that majority of the respondents are under the high group (81%) followed by medium group (18%) and low group (1%) respectively. The mean score of total distribution is 40.93 and standard deviation of the distribution is 3.49. The coefficient of variation value within the distribution 8.52 per cent signifies the very high consistency level of the distribution for the variable 'attitude towards large cardamom cultivation'.

**Table 1. Distribution of the respondents according to their attitude towards large cardamom cultivation (Y):**

Category	Score	No.	%	Statistics
Low	20-29	1	1	Range = 20-47
Medium	30-39	18	18	Mean = 40.93
High	40-49	81	81	SD= 3.49, CV= 8.52%

**Table 2. Correlation Coefficient (r) of Farmers' attitude towards large cardamom cultivation (Y) with 18 causal variables**

Variables	(r)
Age (X <sub>1</sub> )	-0.154
Caste (X <sub>2</sub> )	-0.011
Family size(X <sub>3</sub> )	-0.012
Education (X <sub>4</sub> )	0.087
Family Education Status (X <sub>5</sub> )	0.006
Family Annual Income (X <sub>6</sub> )	0.011
Annual expenditure(X <sub>7</sub> )	-0.105
Land Holding (X <sub>8</sub> )	-0.047
Farm power (X <sub>9</sub> )	-0.012
Asset Possession (X <sub>10</sub> )	-0.058
Livestock possession (X <sub>11</sub> )	-0.106
House type (X <sub>12</sub> )	0.048
Social participation(X <sub>13</sub> )	-0.019
Extension contact(X <sub>14</sub> )	0.056
Mass media exposure(X <sub>15</sub> )	-0.058
Management orientation(X <sub>16</sub> )	0.401**
Risk orientation (X <sub>17</sub> )	0.218*
Innovativeness(X <sub>18</sub> )	0.199*

\* 5% level of significance; \*\* 1% level of significance

Table 2 reflects coefficient of correlation among the dependent variable, attitude towards large cardamom cultivation of large cardamom growers with the eighteen casual variables. The result shows that the variable management orientation (X<sub>16</sub>), risk orientation (X<sub>17</sub>) and innovative (X<sub>18</sub>) are positively and significantly associated with the dependent variable farmers' attitude towards

large cardamom cultivation (Y) of the large cardamom growers in case of livelihood contributions in changing climate.

*Management orientation and attitude of the farmers towards large cardamom cultivation in the changed climate* : The management of any agricultural enterprise needs careful consideration planning, organizing, production and marketing of products. Management orientation may be treated as one of the psychological variables which develops a motive within the psyche to develop the positive thinking on a particular issue. In the present study, the large cardamom growers are very much sincere, diligent and careful in making their vocation more competitive and profit making as large cardamom is the only exportable cash crop in the area. For development of a positive attitude towards large cardamom production, marketing and profit making from the enterprise needs a careful planning regarding the scientific production practices and marketing of the produce in a profitable way with the help of local market intelligence which can be developed with the help of the psychic orientation in proper management of the enterprise. That is why the variable 'management orientation' is positively and significantly associated with the attitude of the farmers towards cultivation large cardamom in the changed climate.

*Risk orientation and attitude of the farmers towards large cardamom cultivation in the changed climate*: Risk orientation is the perception of risk or uncertainty by an individual during conducting any activity. Perception of risk can emerge as a tool for developing and planning a prior strategy to avert the risk in an enterprise. The psychological orientation towards, risk strengthen the predisposition of behavior in going along with any new practices. In the present study, the large cardamom growers are facing several challenges due to the change in micro climate and occurrence of natural calamities in the study area. According to their need they are changing the cultivation practices of large cardamom to avert the risk of micro climate change. So, the higher degree of risk orientation facilitates them to manage the large cardamom in a profitable manner by averting the loss from climate change events. Ultimately, the proper risk orientation of large cardamom growers develops the attitude for accepting new farming practices to overcome the climate change discourse. That is why the variable 'risk orientation' is positively

and significantly associated with the attitude of the farmers towards cultivation large cardamom in the changed climate.

*Innovativeness and attitude towards large cardamom cultivation of large cardamom growers in the changed climate:* The innovativeness is the primary criteria for developing and managing an enterprise efficiently through creativity and applying those creativity in case of using the scientific practice to get profit from the enterprise. In the changing climate perspective, the large cardamom growers are facing several challenges to make the vocation more profitable with the help of scientific practices to be applied in case of mitigating the climate change aberration. Innovativeness always transforms the mindset of an individual to apply the knowledge in a better way and making the decision in favour of any innovative change through development of positive attitude towards adopting new technology for overcoming with the risk embedded with the enterprise in changed climate situation. That is why the variable ‘innovativeness’ is positively and significantly associated with the attitude of the farmers towards cultivation large cardamom in the changed climate.

Table 3 reflects the multiple regression analysis of

the predicted variable i.e. attitude towards large cardamom cultivation of the farmers with eighteen predictor variables. From the table it is observable that two variables family annual income ( $X_6$ ) and management orientation ( $X_{16}$ ) are positively and significantly and the variable annual expenditure ( $X_7$ ) is negatively and significantly contributing towards characterizing the attitude of the farmers towards large cardamom cultivation (Y) in the changed climate.

*Family annual income and attitude towards large cardamom cultivation in the changed climate:* Family annual income is the expression of economic dimension in rural settings. The variable family annual income reflects the resource richness of a family. The resources endowment always makes an individual or a family more perfect in case of risk taking ability for appropriate management of an enterprise through positive attitude development. Here, in the present study, higher annual income coming from large cardamom enterprise develops a favourable attitude of the family members towards large cardamom cultivation taking into consideration various technological interventions to mitigate climate change aberrations. That is why the variable family annual income is positively and significantly contributing

**Table 3. Multiple regression analysis of farmers’ attitude towards large cardamom cultivation (Y) with eighteen predictor variables**

Variables	Standardized regression coefficient ( $\beta$ )	Unstandardised regression coefficient (B)	S.E of ‘B’	t-value
Age ( $X_1$ )	-0.115	-0.039	0.039	-0.994
Caste ( $X_2$ )	-0.060	-0.324	0.535	-0.613
Family size( $X_3$ )	0.105	0.329	0.351	0.936
Education ( $X_4$ )	0.065	0.136	0.357	0.382
Family Education Status ( $X_5$ )	-0.155	-0.616	0.537	-1.148
Family Annual Income ( $X_6$ )	0.479	0.060	0.031	1.913*
Annual expenditure( $X_7$ )	-0.607	-0.124	0.051	-2.445**
Land Holding ( $X_8$ )	0.059	0.072	0.181	0.398
Farm power ( $X_9$ )	0.026	0.115	0.530	0.217
Asset Possession ( $X_{10}$ )	0.018	0.042	0.304	0.139
Livestock possession ( $X_{11}$ )	-0.140	-0.703	0.553	-1.272
House type ( $X_{12}$ )	0.096	0.669	0.808	0.829
Social participation( $X_{13}$ )	-0.091	-0.572	0.838	-0.682
Extension contact( $X_{14}$ )	-0.013	-0.022	0.248	-0.088
Mass media exposure( $X_{15}$ )	-0.185	-0.312	0.262	-1.188
Management orientation( $X_{16}$ )	0.425	0.301	0.092	3.258**
Risk orientation ( $X_{17}$ )	0.071	0.083	0.164	0.507
Innovativeness( $X_{18}$ )	0.034	0.040	0.171	0.232

R<sup>2</sup>= 0.311, \* 5% level of significance, \*\* 1% level of significance

in case of characterizing the attitude towards large cardamom cultivation in the changed climate.

The variable family annual income is directly contributing 47.90% in case of characterizing the attitude of the large cardamom growers towards large cardamom cultivation. One unit change of the variable annual income is delineating the 0.06 unit change in the predicted variable, attitude towards large cardamom cultivation.

*Management orientation and attitude towards large cardamom cultivation in the changed climate:* Management orientation is the psychological activity of individual to become conversant for managing his/her enterprise in effective manner. The entrepreneur with positive attitude, proper planning and management contributes his enterprise reach to the peak profit level. In the present study, it has been found that the large cardamom growers with higher degree of management orientation have developed more confidence and competence in operating their large cardamom enterprise profitably with coping their enterprise with changed climate through adopting appropriate technology from time to time. That may be possible reason why the variable management orientation is positively and significantly contributing in case of characterizing the predicted variable, attitude towards large cardamom cultivation in the changed climate.

In the present study it is found that variable management orientation is directly contributing 42.50 per cent in case of characterizing the attitude towards large cardamom cultivation. One unit change of the variable management orientation is delineating the 0.301 unit change in the predicted variable.

*Annual expenditure and attitude towards large cardamom cultivation :* Annual expenditure indicates the costs incurred annually in maintaining the farm and home for an individual family. Annual expenditure, in contrast to the annual income, stimulates an individual to identify the areas where the cost can be reduced through taking certain cost saving strategies. In the present changing climate, there is always a chance of increased cost for modifying the enterprises according to the need of the situation. But, increased cost always poses a barrier in the development of favourable attitude towards an enterprise. This is also similar in case of large cardamom growers. There is a hike in the annual

expenditure in maintaining their family due to increasing cost of living and it is also evident that the large cardamom cultivation has also become expensive due to increasing cost of cultivation that may be attributed, to some extent, to the cost of adopting alternative and appropriate technologies to mitigate the climate change impacts on the large cardamom farming. Consequently, rise in the expenditure ultimately reduces farmers' interest in large cardamom farming leading to an unfavourable attitude in them towards large cardamom cultivation. That is why the variable annual expenditure is negatively and significantly contributing in case of characterizing the predicted variable, attitude towards large cardamom cultivation.

In the present study it is found that variable annual expenditure is directly contributing 60.70 per cent in case of characterizing the attitude towards large cardamom cultivation. One unit change of the variable management orientation is delineating the 0.124 unit change in the predicted variable, attitude towards large cardamom cultivation in the changed climate.

The  $R^2$  value being 0.311, it is to infer that the eighteen predictor variables put together have explained 31.11 per cent variation embedded with the predicted variable attitude towards large cardamom cultivation. Still 68.89 per cent variable embedded with predicted one is unexplained. Thus it would be suggested that inclusion of some more contextual variables possessing direct bearing on the attitude towards large cardamom cultivation of the farmers could have increased the level of explicability.

## CONCLUSION

In view of the findings of the present study, it can be concluded that large cardamom growers of Sikkim are really facing difficulties in maintaining the profitability and sustainability of their large cardamom enterprise under the changed climate scenario. Variations in several climate parameters induced by climate change often create changes in several aspects like emergence of new pest and disease, decrease in number of pollinator species etc. which in turn affect the quality production and productivity of large cardamom in Sikkim. To combat this situation requires the farmers to shift their conventional method of large cardamom cultivation to scientific practices with the help of different modern and climate resilient technologies to withstand the

climate change impacts on large cardamom. Again this shifting will be most effective only when the farmers develop in themselves a strong and positive attitude towards adopting and applying the scientific large cardamom farming practices in their farm. Present study has also envisaged that the attributes like educational background, management orientation, risk orientation and innovativeness of the large cardamom growers would stimulate the development of favourable attitude of the farmers towards scientific large cardamom cultivation. On the other hand, the cost incurred due to changes in farming practices is to negatively affect their attitude towards the large cardamom enterprise.

However, adequate facilities and strong motivation will surely usher in an enabling environment in which the large cardamom growers of Sikkim will have the desirable attitude towards scientific large cardamom cultivation under the changing climate in Sikkim which would ultimately ensure a sustainable livelihood from their large cardamom enterprise. Therefore, any strategic framework for developing favourable attitude of the farmers in Sikkim towards scientific large cardamom cultivation under the changing climate should consider the ground reality and give emphasis on the aforementioned influential factors for its effective and efficient implication.

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