

Exploring the Correlates of Indigenous Knowledge Utilization Index in Hill Ecosystem of West Bengal

K. Pradhan¹, Soma Pradhan² and Zigme Yolmo³

1. Asstt. Prof., 2 & 3. M.Sc (Ag), Department of Agril. Ext., UBKV, Coochbehar, West Bengal

Corresponding author e-mail: kausikextnubkv@gmail.com

ABSTRACT

In the present modern era, the technology is moving forward at a greater pace. As an aftermath of that the local indigenous knowledge are dwindling down and slowly getting extinct. Therefore there is an urgent need for protection and integration of the indigenous knowledge for the sustainable development of the local people and local ecological resource management. Keeping this in mind the present study was conducted in order to explore the indigenous knowledge utilization index along with the socio-economic, socio-personal and psychological attributes of the knowledge users and their relationship with each other. The present study was conducted in the village of Aloobari Jungle Busty, and Aloobari Rai Gaon, under the block Jorebunglow-Sukhiapokhari of Darjeeling district in West Bengal due to the dominance of aborigines and their ample utilization of indigenous knowledge base in this area. Purposive as well as multi-stage random sampling procedure was followed in the present study. The Indigenous knowledge utilization index and the socio-personal, socio-economic and socio-psychological attributes of the indigenous technological knowledge users were systematically operationalised and measured with the help of the slightly modified pre-constructed measurement scales. The data were collected with the help of structured interview schedule constructed for the study. The seventeen predictors variables put together have explained 53.20 per cent variations embedded with the predicted variable, IKUI. In the present study the identified factors are renamed as Social exposure and competency, Socio-personal capability, Social esteem and cognition, Social economy and possessiveness, Agro-economic predisposition, Social rationality.

Key words: Sustainable development; Indigenous knowledge utilization index (IKUI);

With the advent of modern technology dissemination with their declared hegemony, some of the local indigenous technological knowledge (ITK) bases have gone extinct or dwindled down and also the shrinkage of the bio resources rich areas under indigenous communities and vanishing of indigenous technological knowledge there is an urgent need for application and integration of indigenous technological knowledge with the scientific knowledge for the sustainable development of the local people and local ecological resource management. Indigenous technological knowledge on the flora of India is as old as the ancient scriptures, bio-geographical niche, cultural history and natural resources on which the indigenous communities are dependent upon in this sub continent. The topography coupled with gigantic water shed river system, diverse mountainous and desert oceanic ecosystems and varied climatic influences and other

factors have contributed immensely towards the rich flora of the region with variety of life forms subsistent on them. ITK is a community based functional knowledge system, developed, preserved and refined by generations of people through continuous interaction, observation and experimentation with their surrounding environment. It is a dynamic system, ever charming, adopting and adjusting to the local situations and has close links with the culture, civilization and religious practices of the communities (Pushpangadan *et al*, 2002).

The Indian region is endowed with rich diversity representing 18000 flowering plant species occurring in various distinct floristic zones, about 75000 species of animals, 340 species of mammals, 1200 kinds of birds, 420 reptiles, 140 amphibians, 2000 fishes, 50,000 insects, 4000 molasses and other invertebrates are distributed in a landmass of 325 million hectares and a coastline of 7516 kilometers. Indigenous communities are

represented by nearly 430 distinct ethnic groups under 227 linguistic groups inhabiting different phyto-geographical locations. An appreciable proportion of the biological components are used by indigenous communities for variety of value added products such as food, fodder, dyes, fibre, gum resins, bamboos, medicinal herbs etc. through their traditional mode of survey, collection and uses. Various ethnic groups have gathered considerable knowledge about the use of plants due to their constant and intimate association with the nature. Indigenous technological knowledge on Indian flora still remains scrupulously guarded by the communities from publicity. The communities have developed the indigenous technological knowledge system to conserve and utilize the biological diversity of their surroundings. The recognition of the creativity of the traditional communities is essential for the conservation of biodiversity as well as conservation of intellectual diversity (Jena, 2007). Ranganathan (2004) argued on the need for a bottom-up process in which indigenous knowledge systems are placed at the heart of the process of education for sustainable development. From "Great Khana" to the local "Mushuri Vaidya" it has cut across the immense diversity of history, culture and technology. The journey was started along the meander of people's knowledge, indigenous techniques and wisdom as well as local practices to explore their efficacy and endurance over the threats of time of urbanizations. The popular beliefs and folk lore have now scientific principles for interpretative approach. Under such a resilient research climate the present study was conceptualized and carried out in order to explore the indigenous knowledge utilization index along with the socio-economic, socio-personal and psychological attributes of the knowledge users and their relationship with each other.

METHODOLOGY

The present study was conducted in the village of Aloobari Jungle Busty, and Aloobari Rai Gaon, under the block Jorebunglow-Sukhiapokhari of Darjeeling district in West Bengal due to the dominance of aborigines and their ample utilization of indigenous knowledge base in this area. Purposive as well as multi-stage random sampling procedure was followed in the present study. An exhaustive list of respondents from the selected villages was prepared with the help of block

officials. From the prepared list 100 respondents were selected randomly for final data collection. The Indigenous knowledge utilization index (IKUI) and the seventeen socio-personal, socio-economic and socio-psychological attributes of the indigenous technological knowledge users were systematically operationalised and measured with the help of the slightly modified pre-constructed measurement scales. The use of indigenous technological knowledge means a particular indigenous technological knowledge which is used or practised by the knowledge user throughout his/her life period. The Indigenous knowledge Utilization Index was measured with the help of a slightly modified scale devised by Kolawole and Laogun (2005) on indigenous knowledge utilization. In the present study the degree of Indigenous knowledge Utilization was categorized into three categories namely regular, occasional, and never, with the assigned scores of 3, 2 and 1 respectively. The Indigenous knowledge Utilization Index (IKUI) of a particular respondent was derived by calculating the average score of all the responses for each ITK. The data were collected with the help of structured interview schedule constructed for the study. The collected data were processed into the statistical tools like coefficient of correlation, multiple regression and factor analyses.

RESULTS AND DISCUSSION

Table 1 reflects the Pearson's coefficient of correlation among the IKUI and seventeen causal variables. The result shows that the variable age, experience, annual income, farm size, livestock possession, material possession, social participation, Information seeking behaviour, risk preference, self confidence and economic motivation are positively and significantly associated with the IKUI at 5 per cent and 1 per cent level of significance.

Age and IKUI: Age is the personal indicator of getting endowed with the environmental phenomena. It increases the possibility of gaining knowledge and utilizing that knowledge in own situation. The different obstacles in their home situation, farming situation and social situation compel them to use their own wisdom for resolving the problem. The indigenous technological knowledge is the knowledge which transmits from one generation to another as a result the old aged person are torch bearers of indigenous knowledge, accordingly the old aged persons are much more familiar with

Table 1. Coefficient of correlation (r) among the Indigenous Knowledge Utilization Index and seventeen causal variables

Variables	(r)
Age	0.287**
Education	-0.190
Experience	0.484**
Family educational status	-0.182
Annual income	0.203*
House type	0.051
Farm size	0.235*
Livestock possession	0.510**
Material possession	0.312**
Social participation	0.243*
Information seeking behavior	0.348**
Scientific orientation	-0.017
Risk preference	0.273**
Adoption leadership	0.143
Self confidence	0.382**
Attitude towards Indigenous knowledge	-0.051
Economic motivation	0.292**

** Significant at 1% level of significance,

* Significant at 5% level of significance

different uses and utilization pattern of indigenous technological knowledge rather than the young aged people. That is why the variable age is positively and significantly correlated with the Indigenous Knowledge Utilization Index.

Experience and IKUI: Experience is an outcome of knowledge gathering and wisdom developing. With the help of the explanation of environment phenomena, an individual systematically develops experience. For pursuing any particular job an individual requires manoeuvring of knowledge and experience. Experience helps the people to do a particular job in an efficient manner. The indigenous technological knowledge usage and utilization demands skilful nurturing of the methods which cannot be done without gaining the experience through practising the indigenous technological knowledge in their own situation. That is why experience is positively and significantly correlated with Indigenous Knowledge Utilization Index.

Annual income and IKUI: The source of income is very important for survival in today's world. Annual income reflects the financial condition of an individual in a social system. It helps in making an individual risk taker and venturesome. The indigenous technological

knowledge users have also engaged in doing number of activities such as agriculture/ horticulture, carpentry, poultry farming, dairy farming, and several other occupations. This keeps them busy inside their own cultures and beliefs. In the study area the high income groups were those people who were high indigenous technological knowledge users as well as they had also engaged themselves in doing number of economic activities. Due to their high income they have adopted the information related to indigenous technological knowledge which are embedded with risk and seems to be new technologies to them but at the same time have given more priorities to their culture and ethnocentrism. That is why annual income is positively and significantly correlated with Indigenous Knowledge Utilization Index.

Farm size and IKUI: In the rural areas farm size is the indicator of social prestige and esteem. In the tribal community mostly the people are giving much more importance to the person who have better farm size and are associated with different enterprises for maintaining their livelihoods. The astounding fact is that in the study area the individual with greater farm size are the traditional people and nurturing the traditional ideas in case of any activity associated with home making, livelihood enterprise management and health maintenance. The people associated with smaller farm size, their livelihood options are very much limited. Consequently, they have limited scope to utilize the indigenous technological knowledge in different sectors of their homemaking and livelihood vocations. That may be the possible reason in case of the positive and significant correlation among farm size and Indigenous Knowledge Utilization Index.

Livestock possession and IKUI: Livestock possession is reflecting the amount of livestock possessed by an individual in a rural system. The people with higher livestock possession are associated with the nurturing of livestock in an efficient manner as it is the alternative livelihood option to them. Consequently, these people are traditional, tribal people and they are using the indigenous technological knowledge for curing the livestock from any elements. The people with little livestock possession are not much more concerned about their livestock and they are fully dependent on the people who are managing their livestock in a systematic manner with the help of indigenous knowledge. That is why the variable livestock possession is positively and significantly

correlated with Indigenous Knowledge Utilization Index. *Material possession and IKUI:* In any tribal rural social system material possession is always treated as the indicator of the social status. The person possessed a good number of sophisticated materials are enjoying the better social status than any other person. The members of the community are giving due importance to those persons in case of any decision making procedure in home and outside. The better management of livelihood enterprises contributes to the possession of materials. So, the person with high level of material possession can manage their livelihood enterprises in an efficient manner. As the study area is a tribal area, the people who possessed the high value material, are managing the enterprise efficiently with the help of indigenous technological knowledge which they have acquired from their forefathers. That is why the variable material possession is positively and significantly associated with the Indigenous Knowledge Utilization Index.

Social participation and IKUI: The society in a tribal area is mostly cohesive in nature that is the members of the society are strongly associated with each other and group cohesiveness is very high as well as they have a strong belongingness and dependence on their own cultural attributes. In the present study the social participation is measured through the participation of the members in the existing rural social organizations. In the study area the people are very much concerned about their own cultures. Within the organization they are also nurturing their cultural aspects. The indigenous technological knowledge practice is one of the inherited cultures in their society. The indigenous technological knowledge practice methodology is also communicated through the existing organizations. The members of the social organizations are also responsible to disseminate the indigenous technological knowledge to other members through discussion and experience sharing. As a result the people who have high social participation score or attached with different rural social organizations in their society are utilizing the indigenous technological knowledge in a better way. That may be the plausible reason for the positive and significant association of social participation and Indigenous Knowledge Utilization Index.

Information seeking behaviour and IKUI: Information is playing a pivotal role in our knowledge

vibrant modern society. In the study area which is full of tribal population is also giving due importance to the information which is at par with their cultural norms. The information which is a cultured and assimilated to the tribal society is well accepted by the traditional people. The person of the study area is also seeking the information which is embedded with their culture from any source to improve their livelihood status. Actually, the indigenous technological knowledge is the only avenue as it is previously a cultured and socialized for enriching their livelihood status holistically. That is why the variable information seeking behaviour is significantly and positively associated with the Indigenous Knowledge Utilization Index of the tribal people.

Risk preference and IKUI: Uncertainty or risk is the inevitable phenomenon in our society in case of any activity conducted by an individual. Without risk there is no shortest way to achieve the success. The person endowed with good earning, luxury material and large farm size is mostly preferred to take risk in case taking any venture associated with the livelihood avenues. In the study area the person enjoying the high social prestige and esteem are very much embedded with their cultural norms and they are preferring to take risk in case of applying any new information in their own situation to enrich their livelihood status. The indigenous technological knowledge is playing the vital role in this tribal area to augment the socio-economic status of the people as it is assimilated with the culture. In each and every sphere of the life process the people in this area are utilizing the indigenous technological knowledge like anything. So the knowledge, material, resource endowed indigenous people is taking risk to utilize the indigenous technological knowledge in better way to improve their livelihood status. That may be plausible reason for the significant and positive association of risk preference with the Indigenous Knowledge Utilization Index.

Self confidence and IKUI: Self confidence is the inherent character of an individual to show faith on his own efficiency for pursuing any job in any situation without relying upon any other support. It is inevitable in the tribal society the each and every people undergoes his or her life process with the help of strong self confidence. It may be uttered that ethnocentric self confidence is the basic attribute of any individual who lives in a tribal society. Not only that but also indigenous technological knowledge is one of the traditions of the

tribal culture to pursue any job also in case of using the indigenous technological knowledge practices in any situation requires self confidence of the indigenous technological knowledge users as it is the practice which is inherited from the previous generation. Lack of self confidence increases the change of mistake in case of practising indigenous knowledge. That is why the variable self confidence is positively and significantly correlated with Indigenous Knowledge Utilization Index.

Economic motivation and IKUI: Economic motivation can be enumerated as the drive or force to achieve the economic upliftment within a social system. It is an internal desire of an individual to enrich his or her livelihood status. In any society each and every individual motivates himself to seek knowledge regarding the application of information in his own situation related to the livelihood avenues which ultimately helps in achieving economic affluence. In the present study area the indigenous technological knowledge practices are perceived as the only way to enrich and augment the economic status of the people. So the motivation to improve the economic status is *sine qua non* with the motivation of tribal people to utilize the indigenous knowledge. That may be the possible reason for significant and positive correlation of Economic motivation and Indigenous Knowledge Utilization Index.

Table 2 reflects the multiple regression analysis of the predicted variable Indigenous Knowledge Utilization Index with seventeen predictor variables. From the table it is observable that the variables experience, livestock possession and information seeking behaviour are positively and significantly contributing towards characterizing the Indigenous Knowledge Utilization Index. The variable scientific orientation is contributing significantly and negatively in case of characterizing the predicted one, Indigenous Knowledge Utilization Index.

Experience and IKUI: Experience can be explained as knowledge gathering and wisdom developing character of an individual. An individual systematically develops experience through many years of practise that helps them to do a particular job in an efficient manner. The indigenous people have gained experience through practicing the indigenous technological knowledge in their own situation. In the study area, it was seen that the people with high experience have been utilizing the indigenous technological knowledge more than those with less experience. That is why

Table 2. Multiple regression analysis between the Indigenous Knowledge Utilization Index and seventeen predictor variables

Variables	(β)	(b)	S.E	t-value
Age	-0.048	-0.0012	0.003	-0.383
Education	-0.008	0.0008	0.012	0.068
Experience	0.433	0.0114	0.004	3.204**
Family edu.status	-0.157	-0.0191	0.014	-1.365
Annual income	-0.008	-0.0002	0.002	0.075
House type	0.089	0.0393	0.045	0.867
Farm size	(0.030	0.0065	0.020	0.332
Livestock possession	0.297	0.0233	0.008	2.924**
Material possession	0.041	0.0163	0.037	0.443
Social participation	0.080	0.0415	0.055	0.752
Information behavior	0.250	0.0139	0.007	2.026*
Scientific orientation	-0.171	-0.0224	0.011	-1.976*
Risk preference	0.001	0.00006	0.014	0.005
Adoption leadership	0.031	0.0062	0.017	0.355
Self confidence	0.048	0.0041	0.012	0.333
Attitude towards IK	-0.054	-0.0063	0.010	-0.628
Economic motivation	-0.009	-0.0012	0.017	-0.072

R²= 0.532;

**Significant at 1% level of significance,

* Significant at 5% level of significance

experience is positively and significantly contributing in case of characterizing the Indigenous Knowledge Utilization Index. The variable experience is directly contributing 43.30 per cent in case of characterizing the Indigenous Knowledge Utilization Index. One unit change of the variable experience is delineating the 0.0114 unit change in the predicted variable, Indigenous Knowledge Utilization Index.

Livestock possession and IKUI: In a rural system, the social prestige of an individual is reflected by the amount of livestock possessed by him or her. Livestock is an alternative livelihood option to the rural people, and for this reason they have been nurturing the livestock in an efficient manner with the help of indigenous knowledge. The people with higher livestock possession are very much concerned about their livestock and those who possess less livestock are fully dependent on them. That is why the variable livestock possession is positively and significantly contributing in case of characterizing the Indigenous Knowledge Utilization Index. The variable livestock possession is directly contributing 29.7 per cent in case of characterizing the Indigenous Knowledge Utilization Index. One unit change of the variable livestock possession is delineating the 0.1233

unit change in the predicted variable, Indigenous Knowledge Utilization Index.

Information seeking behaviour and IKUI: Information plays an important role in our knowledge intensive modern society. The study area mostly consisted of the tribal people and it was seen that the information which is a cultured and assimilated to the tribal society is well accepted by them. The people in the study area are seeking all source of information that can help them to improve their livelihood status as well as to renovate new ideas of farming that could be useful in future. That is why the variable information seeking behaviour is significantly and positively contributing in case of characterizing the Indigenous Knowledge Utilization Index. The variable information seeking behaviour is directly contributing 25 per cent in case of characterizing the Indigenous Knowledge Utilization Index. One unit change of the variable information seeking behaviour is delineating the 0.0139 unit change in the predicted variable, Indigenous Knowledge Utilization Index.

Scientific orientation and IKUI: Scientific Orientation means the orientation of an individual in case of searching the truth or rationale behind any information. So an individual with his or her analytical approach can find the rationale and truth behind any knowledge. Scientific orientation compels to observe a phenomenon with his or her analytical power without giving extreme importance to his or her culture and belief. Sometimes from different research works it is observed that the indigenous technological knowledge is mostly practiced by an individual after gathering the information from his or her previous generation without knowing the scientific rationale behind the knowledge. Indigenous technological knowledge is mostly traditional and timely tested with or without any scientific base. So the individual with a good scientific orientation is not getting motivation to utilize the indigenous technological knowledge in its fullest extent. That is why the variable scientific orientation is significantly and negatively contributing in case of characterizing the Indigenous Knowledge Utilization Index. The variable scientific orientation is directly contributing 17.1 per cent in case of characterizing the Indigenous Knowledge Utilization Index. One unit change of the variable scientific orientation is delineating the 0.0224 unit change in the predicted variable, Indigenous Knowledge Utilization

Index towards reverse direction.

The R^2 value being 0.532, it is to infer that the seventeen predictors variables put together have explained 53.20 per cent variations embedded with the predicted variable, Indigenous Knowledge Utilization Index. Still 46.80 per cent variations embedded with the predicted one are unexplained. Thus it would be suggested that inclusion of some more contextual variables possessing direct bearing on the Indigenous Knowledge Utilization Index could have increased the level of explicability.

Table 3. Factor analysis: Principle Component Method through Varimax rotation (Factor loadings > 0.500)

Variables	Factor			
	loadings >0.487	Eigen Value	% of var.	Cumulative % *
Information behavior	0.798	3.485	20.498	20.498
Risk preference	0.795			
Adoption leadership	0.487			
Self confidence	0.832			
Economic motivation	0.827			
Age	0.884	2.235	13.144	33.642
Experience	0.880			
Education	0.621	2.208	12.987	47.629
Family edu. status	0.683			
House type	0.818			
Social participation	0.567			
Material possession	0.845	1.664	9.789	56.417
Livestock possession	0.544			
Annual income	0.584			
Farm size	0.676	1.393	8.197	64.614
Attitude towards IK	0.771			
Scientific orientation	0.854	1.183	6.958	71.573

Table 3 presents the factor analysis for an intrinsic conglomeration of different predictor variables to form a homophilous group of predictor variables or factors. The minimum level of factor loadings (>0.487) is considered to have such conglomeration.

It is found that the association of variables of factor 1 has been comprised of Information seeking behaviour, Risk preference, Adoption leadership, scientific orientation and Economic motivation and the factors can be renamed as Social exposure and competency. The per cent of variance explained by this factor has been 20.498 and eigen value is found 3.485.

The second factor has encompassed two variable, age and experience and can be renamed as Socio-

personal capability and this has explained 13.144 per cent of variance with Eigen value 2.235. The third factor comprises of the variables, Education, Family education status, house type and Social participation and can be renamed as Social esteem and cognition. This factor has explained 12.987 per cent of variance and eigen value is found 2.208. The fourth factor has reticulated with three variables namely Material possession, Livestock possession and Annual income and can be renamed as Social economy and possessiveness. It has explained 9.789 per cent variance with eigen value 1.664. The fifth factor has conglomerated two variables namely, Farm size and Attitude towards Indigenous knowledge which can be renamed as Agro-economic predisposition. It has accounted to 8.197 variance and eigen value is found 1.393. The sixth factor has preferred to go solitary with single variable, scientific orientation which may be renamed as *Social rationality*. It has explained 6.958 per cent of variance alone with an eigen value of 1.183. All these six factors ultimately have contributed to 71.573 per cent of the explicability level of these predictor variables.

CONCLUSION

Since time immemorial, the indigenous people have been using their knowledge in case of agriculture and animal husbandry, hunting, fishing, struggles against

disease and injury, explaining natural phenomena and strategies for coping with changing environments. The local communities are very much dependent upon the indigenous technological knowledge and indigenous bio-resources. Due to the urbanization and globalization the indigenous technological knowledge praxis, techniques, wisdom and bio-resources are dwindling down day by day. It is evinced from the study that during documentation and analysis of indigenous knowledge utilization in any ecosystem the planners and policy makers should give due importance to the knowledge users' experience, livestock possession, information seeking behaviour, and scientific orientation of the indigenous technological knowledge users. These four socio-personal and psychological attributes of the users can play the pivotal role in case of exploring the indigenous technological knowledge base in the area. Not only that but also the isolated factors after clubbing the predictors namely social exposure and competency, socio- personal capability, social esteem and cognition, social economy and possessiveness, agro-economic predisposition and social rationality are equally responsible for determining, characterising and predicting the indigenous knowledge utilization index in hill ecosystem.

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