



ROLE OF INDIGENOUS KNOWLEDGE IN SUSTAINABLE DEVELOPMENT

Rebeka Sultana, *Noor Muhammad and Zakaria A.K.M.

Rural Development Academy, Bogra, Bangladesh

ARTICLE INFO

Article History:

Received 29th November, 2017
Received in revised form
25th December, 2017
Accepted 10th January, 2018
Published online 28th February, 2018

Key Words:

Indigenous Knowledge,
Sustainable Development

ABSTRACT

This paper attempts to review the role of indigenous knowledge in sustainable development, to find out the list of most used indigenous knowledge and to find out the sectors of contribution of indigenous knowledge. The study was solely based on secondary data. The information was gathered from different related books, journals, internet, newspaper and personal collection. Data were collected according to the requirement of fulfillment of objectives. The research found that there has mass implications of indigenous knowledge in sustainable development. indigenous knowledge plays role in conserving the nature, food production, forestry development, medicine, sustainable practices, land and resource management and ecotourism, climate change and disaster risk reduction. Integration of knowledge systems and implication for the 2015 sustainable development agenda also incorporated in this research. list of some indigenous technical knowledge also found. There are several challenges for preserving and promoting indigenous knowledge systems also revealed.

Copyright © 2018, Noor Muhammad et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Rebeka Sultana, Noor Muhammad and Zakaria A.K.M., 2018. "Role of indigenous knowledge in sustainable development", *International Journal of Development Research*, 8, (02), 18902-18906.

INTRODUCTION

General Background of the Study

The indigenous knowledge of farmers are considered as important sources of information about the local farming systems, experiences, institutions, culture etc. It is also proved that this knowledge system plays significant role in designing a formal and efficient extension services (Sharland, 1991). Indigenous communities around the world are constantly struggling to maintain their rights, their traditions and their knowledge, in a system still dominated by a western worldview. They face the challenge of living in two worlds, the indigenous and the non-indigenous one, in constant tension with each other, with the latter having more power in shaping the former. For centuries, indigenous populations have suffered from invasion and oppression, and oftentimes they have seen their knowledge eclipsed by western knowledge, imposed on them through western institutions. Yet, indigenous populations have managed to survive for centuries adapting in many different ways to adverse climate conditions and managing to create sustainable livelihood systems.

Diverse forms of knowledge, deeply rooted in their relationships with the environment as well as in cultural cohesion, have allowed many of these communities to maintain a sustainable use and management of natural resources, to protect their environment and to enhance their resilience; their ability to observe, adapt and mitigate has helped many indigenous communities face new and complex circumstances that have often severely impacted their way of living and their territories. Indigenous knowledge and climate resilient agricultural practices/technologies which are cost effective lead to food security at household level as they can easily be carried out by resource poor or small farmers.

It is therefore crucial to demonstrate and promote these practices/ technologies in the project area. These demonstrations, their dissemination and their replication by the farmers will serve as evidences for informed advocacy. On the basis of these evidences, the target group will advocate that these practices should be promoted by government in its plans and programs. The collective advocacy from a large number of target populations will be needed for impacting the policy. Through an extensive literature review, this paper aims to understand how indigenous cultures and their knowledge systems can contribute to global challenges. In order to do so, the paper will attempt first to conceptualize indigenous

*Corresponding author: **Noor Muhammad**
Rural Development Academy, Bogra, Bangladesh.

peoples' notions of development; then, to explore the relationship between indigenous knowledge and sustainable practices and land and resource management. After that, there will be a discussion on the implications of indigenous knowledge in climate change adaptation strategies as well as in disaster risk reduction. This will be followed by a critical reflection of the impact of mitigation strategies on indigenous populations and territories and on the necessity of guaranteeing full access to lands and justice to allow indigenous peoples to realise their rights.

Scope of the study

According to many research works, it is clear that when local knowledge is left out of the planning and policy making process, the results are that the development is either less successful or, in some cases, disastrous (Ty and Cuc, 1998). While western techno-scientific approaches are (in themselves) insufficient response to today's complex web of social, economical, political and environmental challenges (Grenier, 1998). The role of indigenous knowledge has just been recognized in recent years by some research institutions and NGOs. But many obstacles such as environmental degradation, lack of sound policy and economical development make preserving and promoting IK become difficult.

Limitations of the study

This study was done for special foundation training of RDA from 28th November, 2017 to 26th January, 2018). Time was limited for the study. The study was based on secondary data only, field survey was not possible.

Objectives of Study

- To review the role of indigenous knowledge in sustainable development
- To find out the list of most used indigenous knowledge
- To find out the sectors of contribution of indigenous knowledge

MATERIALS AND METHODS

Methodology deserves a very careful consideration. Methodology and procedures are the important factors in conducting a research. Appropriate methodology used in research helps to collect valid and reliable data and analyze the information purposively to arrive at correct decision. The study was solely based on secondary data. The information was gathered from different related books, journals, internet, newspaper and personal collection. Data were collected according to the requirement of fulfillment of objectives. There has a lot of related data in websites. But the most important data were only incorporated here. Gathered experience and knowledge also incorporated in this paper.

RESULTS AND DISCUSSION

Indigenous Knowledge Systems in Conserving the Nature

An interesting example regarding the role of IK in conserving nature resources comes from a village. Lai Chau Province's Department of Forest Protection (DFP) has adopted the Ban Banh model to change their approaches to forest protection

and management. Guidelines called the "Participatory Constructing of Community Regulations of Forest Management and Development" have been designed by the DFP, based on the foundation of the Ban Banh initiative, for application in the whole province. In the last three years (2000-2003), 1,785 communities in the province have completed formulating their community rules of forest management under the DFP guidelines. In this case, there are many reasons for a successful community forest management.

It is clear that community forestry is successful due to its appropriateness to local customs of Thai characteristic of common property, their self-regulation, based on their indigenous knowledge in flora and biodiversity, and the role of local leadership. Because of the rules and common benefits, all villagers have followed the local regulations during the forest management process. In conclusion, the relationship between culture and natural resources in general and biodiversity in particular, reflects the cultural characteristics of each ethnic group through their behaviour and adaptation to the nature.

Indigenous Knowledge Systems in Food Production

The second example is a special farming system of an ethnic group in the Northern Mountain Region. Efforts by the aid groups to introduce new crop varieties (seeds) into this area, in order to increase production, have not worked because the new varieties do not fit into the farming system nor the traditional customs of the local people. Moreover, the inputs required realizing increased production cost too much. For instance, the traditional maize variety has lower productivity than the introduced varieties. Its advantages include the following: it does not require fertilizers, it is not attacked by many insects, it can dry in the field, the flour made from it is dry, nutty and fragrant, it can be steamed into a coarse flour, it is glutinous and more delicious than the introduced varieties, it stores better and is less susceptible to worm infestation. The lesson learned from this case is that the local maize variety has been developed and used for many years and is very good in terms of being adapted to the local physical conditions and culture. Therefore, any external interventions can be failure if they do not take into account "local" characteristics. It should be noted that the weakness and strengths of indigenous knowledge systems, is that they are local (Billie, 1994; Ty and Cuc, 1998).

Indigenous Knowledge Systems in Forestry Development

For more than 30 years, national and international support to re-green denuded hillsides has focused on the planting of exotic trees. Eucalyptus, acacia, tropical pines have all been planted, chosen in part because of their drought-resistance but also because experts knew so little about indigenous trees. The eucalyptus, which was used very widely, has been destroyed by fungi. Furthermore, it failed to counter soil erosion on hill slopes. Aware of the importance of forests in the local ecology, they eventually agree that with the present situation of their village, there was no choice but to grow native Mac Rac, only few of which still grew in the local forest, to re-green the barren hills and limestone mountains. Within only three years after launching the afforestation programme, the local people have solved problems of firewood and water shortages. Local people also planted other higher value timber trees such as Thitka, Chukrasia, and Margose as inter-crops. At present, the entire 1,010 hectares of stone mountains in the village are covered with forest, and local agricultural yields have

improved significantly since then. In general, re-greening results have improved because the local people know which indigenous trees to use under what conditions. On the contrast, the government has tried to use exotic trees which do not suit the local conditions. There is a tendency that the government always wants to find a “magic” solution for all communities and all areas in the upland instead of concerning the diversity of the upland region in terms of natural and social conditions.

Indigenous Knowledge Systems in Medicine

According to the statistics of the Institute of Material Medicine, the number of medicinal plants in Vietnam is 3,830 species. It is predicted that the number can reach 6,000 species. Regarding the distribution of medicinal plants, based on statistics from 1961 to 1985, there are about 700 species in upland Vietnam, 400 species are found in the midland out of 1,863 medicinal plants. They are distributed in the area where the ethnic groups live. Each of the communities in the upland knows how to use about 300 to 700 medicinal plants for several purposes (On, 2003). Most of the upland households can use tens to hundreds of medicinal plants which are available in the communities to heal normal diseases such as headache, diarrhoea, fever, etc.

Many studies have shown that there are some herbalists in every community in the upland. They are the persons who hold knowledge and experiences in finding and using medicinal plants for healing in the communities. In addition, the knowledge in using medicinal plants have mostly been kept and maintained by women in the households in the uplands. The medicinal plants not only protect public health but also contribute to hunger eradication and poverty reduction in the uplands. Medicinal plants have been regarded as special goods in the uplands of Bangladesh. Several communities in the uplands are involved in collecting, processing and selling medicinal plants. With the enormous benefits and large demand, in recent years a large amount of wild medicinal plants have been harvested to supply to domestic pharmaceutical companies and export to China. It is estimated that 400 - 500 species of medicinal plants have been harvested in a unsustainable way. Many species have been over-exploited and are therefore exhausted (On, 2003). Clearly, the consequent biodiversity loss means an erosion of indigenous knowledge, which is a serious problem.

Indigenous Knowledge in sustainable Practices, Land and Resource Management and Ecotourism

As it was previously mentioned, indigenous groups have their own visions of development, which differ from the idea of development attached to modern societies. Respect for nature and its conservation as well as community-based management of lands and natural resources are central to the indigenous ideas of well-being. Natural resources are not marketable and the community is the pillar around which indigenous peoples organise their lives (Cunningham, 2010a). Territories are vital for indigenous populations, as it is in these spaces that indigenous communities can carry out social, economic, cultural and environmental activities, which include sustainable production and consumption practices, as well as resource conservation and management techniques, the majority of which are based on traditional knowledge and customary systems of governance (Hiwasaki *et al.*, 2014; Cunningham, 2010a).

Indigenous Knowledge and Climate Change

Indigenous peoples live in the most vulnerable ecosystems. Ranging from circumpolar Arctic, high -mountains zones, floodplains, tropical rainforests, desert margins, small islands and low-coastal areas, indigenous territories are directly affected by the current ecological crisis responsible for issues such as climate change and loss of biodiversity. Among the climate change threats, indigenous peoples from Asia identify the intensification of typhoons, monsoons and flooding, sea-level rise and salinization of freshwater (Tebtebba Foundation, 2009). Indigenous populations have suffered from the consequences of desertification, extensive drought and rainfall declines (Conway, 2009; Nyong *et al.* 2007), while the life of indigenous peoples' in the Arctic is threatened by the melting of the stable ice, necessary to carry out hunting and fishing activities (Salick and Byg, 2007). Similarly, Kronik and Verner (2010) identified in the case of indigenous groups from Latin America and the Caribbean, phenomena such as the melting of glaciers, the intensification of hurricanes, the rise of the sea-level and changes in the rainfall patters.

Indigenous Knowledge and Disaster Risk Reduction

The integration of indigenous knowledge in disaster risk reduction has been slow compared to other disciplines (McAdoo *et al.*, 2009). Indeed, only recently, research on disaster risk reduction has not only demonstrated the high value of indigenous traditional knowledge in preventing and mitigating the effects of natural disasters, but also in relation to early warning, preparedness, response and post-disaster recovery (Rautela and Karki, 2015). Indigenous groups around the world adopt different strategies depending on the natural hazards to which they are more subject. For this reason, sometimes indigenous groups from different countries, but who live in areas with similar weather conditions, use similar strategies. Among the strategies that have been observed by researchers, there are prevention strategies based on weather forecasting and the modification of agricultural practices to limit damages to crops and other interventions to prevent the population and the livestock from all sorts of harm. Mercer *et al.* (2007) in their analysis of indigenous groups living in Small Island Developing States in the Pacific, point out that some of the territories that, in recent years, have been the most affected by natural hazards, grouped these strategies into general categories that include 1) land use planning; 2) building methods; 3) food resilience; 4) social resilience; 5) and environmental resilience.

Integration of Knowledge Systems and Implication for the 2015 Sustainable Development Agenda

For decades, traditional knowledge has been compared and contrasted with scientific knowledge, putting the latter always in a position of privilege compared to the former. However, since the development of knowledge systems rarely occur in isolation, seeing indigenous knowledge and scientific knowledge as two separate and isolated entities does not describe the real situation (Agrawal, 1995, Anderson, 1990; Bravo, 2000, Ellen and Harris, 2000, in Bates, 2009). Additionally, literature on the topic has widely highlighted the fact that there is not a clear divide between the two, but on the contrary, the integration of indigenous and scientific knowledge is a very important issue to consider, as one knowledge systems may be used to fill in the gaps of the other,

creating in this way what Thompson (2011) defines as “new pluralist paradigms” leading to a more sustainable way of living (Agrawal, 1995).

List of Some Indigenous Technical Knowledge (Hossain, 2016)

- Laddering/pulling the spinny branch of over the standing wheat crop (local variety) about a month after the seeding is done for profuse tillering.
- Applying the excreta of poultry birds at the base bean and cucurbit plant for better yield
- Applying rice kura (rice husk) in the pond
- Soaking Boro rice seeds in water for 1-3 days before sowing in the bed for rapid germination
- Applying cow dung in the pond to feed the fish
- Setting up bamboo sticks, branches of trees etc., in rice fields to let the birds sit and eat away insects
- Feeding the katanate grass to livestock for improving lactation
- Feeding JatBichi Kala (*Musa sp.*)/burnt jute sack with tender leaf of banana to livestock for curing loose motion
- Applying the excreta of poultry birds in the pond to feed the fish
- Spreading ash in vegetable field to control aphid
- Applying urea fertilizer in the pond to feed the fish
- For preserving the tender shoots of jute plants for future use as vegetable
- Using vermin compost for increasing fertility of soil
- Keeping rice seedlings under shed/pond water for 1-2 days before transplanting for the purpose of increasing tolerance
- Applying lime in the pond to clear the unclean water
- Drying mature bottle gourds (*Lagenaria vulgaris*) in the sun and storing the seeds inside without rupturing the fruits
- Longitudinal incision at the base of gourd plants by sharp blade for early flowering
- Using earthen containers and drum to store grains
- Feeding the flesh of mollusks and snails to ducks for growth
- Applying oil cakes in the pond to feed the fish
- Using banana leaves in the pond to feed grass carps
- Using neem (*Azadirachta indica*)/Nishinda/Bishkatali leaves to store grains
- Feeding garlic mixed with mustard oil and rice to chicken to control ‘Ranikhet’ disease (Newcastle disease)
- Using bamboo for increasing oxygen in the pond
- Practicing IPM in crop field
- Cutting of cabbage into small pieces dried in the sun and then kept in polythene bags for future consumption
- Using country plough for ploughing land

Challenges for Preserving and Promoting Indigenous Knowledge Systems

The cultural diversity of the different ethnic people in the uplands reflects the diversity of IK. which is one difficulty with regard to planning of development projects. On the other hand, many scholars have pointed out that mountain people in mountainous regions in Mountainous Mainland in South East



Asia are often excluded from the decision making and planning process (Jamieson *et al.*, 1998; Jianchu and Mikesell, 2003). In fact, many policies and programmes tended to impose the same national development policy on the uplands without considering the diversification of ethnic culture and natural conditions. Both planners and technicians tend to pay attention to modern technologies that have often introduced from other places rather than relying on indigenous knowledge, which is considered primitive. The result is an erosion of traditional knowledge and the loss of an invaluable resource for humane and sustainable development (Jamieson *et al.*, 1998).

Conclusion

The new sustainable development agenda encompasses many issues that are directly affecting indigenous peoples' lives. Education, poverty, access to justice and climate change are only a few of the challenges that indigenous people have been and are currently facing. Their knowledge and know-how, deeply rooted in the relationship of indigenous peoples with nature and community, has proven to be efficient to respond to some of these challenges; however, it is not enough. Caught between environmental hazards on one side and development initiatives on the other, if some solutions are not taken rapidly there will be negative consequences for the survival of these populations as well as for their knowledge systems. Knowledge loss has been already responsible for increasing the vulnerability and risk for indigenous populations. It is, therefore, important that the national and international community starts recognizing indigenous peoples and their knowledge as valuable allies in the fight against climate change and sustainable development challenges and in maintaining global biodiversity. In light of the new post- 2015 sustainability agenda, joint efforts are urgently required to develop and implement suitable initiatives to empower indigenous peoples to uphold and realise their rights and be involved in the decision making process, becoming in this way active agents of change.

From the case studies, it is clear that IK plays an important role in development of several sectors, including forestry, agriculture, and medicine. IK is environ-mentally sustainable in many cases. Also, it is an important source of local subsistence and food security. It has been produced based on local resources, technologies and local culture. In addition, it is equitable in terms of access to resources, decision- making and management.

Nevertheless, IKS have been eroded due to many social, economic and environmental driving forces. Therefore, it is

really necessary to put the IKS back to work by undertaking the actions below:

Recommendations

- Collecting, documenting and disseminating IKS;
- Preserving and reviving IKS by empowering local communities and rediscovering the values of IKS;
- Building and strengthening national institutions relating to indigenous knowledge;
- Mainstreaming IKS in national development planning such as incorporating IKS tional curricula and sectoral development policies and programmes, especially poverty reduction and environmental protection programmes;
- Promoting and enhancing IKS through the development of partnerships and stakeholder networks; Recognizing the market value of IKS.
- Different motivational steps should be undertaken in the study area for popularizing and expanding eco-friendly indigenous farm practices for sustainable development.
- Demonstration and replication of different techniques on indigenous farm practices should be conducted in the study area and also other similar parts of the country.
- Research related to best technology for their more improvement can be conducted in the research institutional level.
- Lobbying with relevant departments of the government and policy makers at local and national levels to integrate learning from communities in the execution of large scale.

REFERENCES

- Agrawal, A. 1995. Dismantling the divide between indigenous and scientific knowledge. *Development and change*, 26(3), 413-439.
- AIS (Agriculture Information Service). 2007. *Agricultural Dairy*. Department of Agricultural Extension, Ministry of Agriculture, Government of the People's Republic of Bangladesh, Dhaka.
- Billie, R. D. 1994. "Using Indigenous Knowledge to Improve Agriculture and Natural Resource Management", (pp. 123-129) in *Indigenous Knowledge: Readings and Resources for Community- Based Natural Resources Management Researchers*. Volume 4. *International Development*.
- Cunningham, M. 2010a. Acerca de la visión del "buen vivir" de los pueblos indígenas en
- FAO. 2003. Aspects of FAO's Policies, Programmes, Budget and Activities Aimed at Contributing to Sustainable Development. Document to the Ninety-fourth Session of the FAO Council, Rome, 15-25 November 1988. Rome, FAO. CL 94/6.
- Kronik J., Verner D. 2010. *Indigenous Peoples and Climate Change in Latin America and the Caribbean*. Washington D.C.: The World Bank. latinoamérica. ASUNTOS INDIGENAS, 1-2 (10), 52-55.
- McAdoo, B. G., Moore, A., and Baumwoll, J. 2009. Indigenous knowledge and the near field population response during the 2007 Solomon Islands tsunami. *Natural Hazards*, 48 (1), 73-82.
- Mercer, J., Dominey-Howes, D., Kelman, I., and Lloyd, K. 2007. The potential for combining indigenous and western knowledge in reducing vulnerability to environmental hazards in small island developing states. *Environmental Hazards*, 7(4), 245-256.
- Nyong, A., Adesina, F., and Elasha, B. O. 2007. The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change*, 12(5), 787-797.
- On, T.V. 2003. "Medicinal Plants and Hunger Eradication and Poverty Reduction in the Uplands of Vietnam", (pp. 206-208) in L.T. Cuc, N.T. Canh and T.V. On (eds.) *Biodiversity and Hunger Eradication and Poverty Reduction in the Uplands of Vietnam*. Hanoi:Center for Natural Resources and Environment Studies (CRES) (In vietnamese).
- Rautela, P. and Karki, B. 2015. *Weather Forecasting: Traditional Knowledge of the People of Uttarakhand Himalaya*. *Journal of Geography, Environment and Earth Science International* 3(3): 1-14.
- Salick, J., and Byg, A. 2007. *Indigenous peoples and climate change*. Oxford: Tyndall Center for Climate Change Research.
- Sharland, 1991. *Awareness of Farm Women on Environmental Degradation due to Use of Some Selected Modern Agricultural Technologies*. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Sharland, 1991. *Awareness of Farm Women on Environmental Degradation due to Use of Some Selected Modern Agricultural Technologies*. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Stads, G.J., M.H. Roozitalab, N.M. Beintema and M. Aghajani . 2008. *Agricultural Research in Iran Policy, Investments and Institutional profile: International Food Policy Research Institute Agricultural Extension, Education and Research Organization, ASTI Country Report*.
- Tebtebba Foundation. 2009. *Asia Summit on Climate Change and Indigenous Peoples*. 24-27 February 2009. Bali: Indonesia. 5-27.
- Thomson, B. 2011. Pachakuti: indigenous perspectives, buen vivir, sumaq kawsay and degrowth. *Development*, 54(4), 448-454.
