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Language in India www.languageinindia.com **ISSN 1930-2940 Vol. 20:9 September 2020**
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Folklore and Indigenous Knowledge for Sustainable Living: A Case Study of Disaster Preparedness and Management

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Abstract

India has been a home for diverse cultures and civilization since exceptionally long. It is rich in tradition and has been preserving its civilization over a period of around 5,000 years. The various communities and groups of people living here provide enormous resources for sustainable development through their Indigenous Traditional Knowledge. These kinds of knowledge systems are passed from one generation to other as a legacy or heredity. The ancient concepts, scriptures, and practices along with the regional idioms and proverbs is a storehouse of profound ideas, practices and teachings that has the capability to bind human and nature in one thread. So, there is a vital need to document these knowledge systems and use them by incorporating the technical and scientific knowledge with it to help the people. Disaster in India has been a very prominent issue that needs attention and the traditional knowledge has heartfelt concepts and ideas that can help the people for better preparedness. With the spread of modern practices, the indigenous practices have taken a back seat and have lost its essence. This paper tries to document some of the traditional indigenous knowledge from local communities of Bihar that can not only help in predicting disaster but will also provide a means of disaster preparedness and preventiveness

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Keywords: Indian folklore, disaster preparedness; disaster management; indigenous technical knowledge; traditional knowledge; folklore

1. Introduction

Indigenous knowledge is the core skill knowledge built up by a group of people living in close contact with the nature and interacts with the local environment (United Nations Environmental Programme, 2008). It is considered as the foundation or pillar of community practices that have helped various local communities survive from natural calamities. Indigenous knowledge is a valuable tool for identifying, recognising, assessing, monitoring and incorporating disaster risk at the local level. It is an important element that strengthens and builds up for the cultural safety and enhances disaster preparedness at various levels. It is the base for food preparation, agriculture, environment conservation, health care and many more such activities (Shaw, 2008). The local communities can predict the upcoming cyclones, sea erosions, floods, rise in sea level and earthquakes by observing natural signs and behaviours of ocean, water, wind, changes in weather conditions and behaviour of animals and accordingly the local communities prepare themselves for the hazardous situations, for example: the use local materials such as sand, thatch for constructing houses in flood prone areas in order to reduce the effects of floods.

Traditional knowledge is passed down from one generation to next through verbal or oral mode like in forms of stories, songs, proverbs, poems, and festivals. It is hardly documented in pages and this major reason as to why most of the traditional knowledge and practises are getting demolished with older people passing away. With the spread of modern practices, the indigenous practices have taken a back seat and have lost its essence. The ancient concepts, scriptures and practices along with the regional idioms and proverbs is a storehouse of profound ideas, practices and teachings that has the capability to bind human and nature in one thread. So, there is a vital need to document these knowledge systems and use them by incorporating the technical and scientific knowledge with it to help the people. The government now also is paying heed to such knowledge systems and thus it is trying to absorb much of it and mingle it with the contemporary technical tools and help the people in the time of crisis as both man- made as well as natural disasters are very common in Indian, especially the state of Bihar.

Parashar & Shaw (2012) talks about on community-based disasters in urban India. Communities have created and utilized their own ways to deal with hazardous situations and build up to recovery from the effects of disasters by adopting certain ways and means to adjust to the risk situation. Several institutions including non-government organizations (NGOs), international non-government organizations (INGOs), and national and local governments (LGs) have recognized that community-based approach is essentially a tool for building up and recovering from the disaster risk. The Government of India with the support of United Nations Development Programme (UNDP), implemented the world's largest CBDRM program (2002-2009) in 176 multi- hazard prone districts across 17 states of India (ADPC, 2010). The major role of this program was to strengthen and rebuild the capacity of the communities and institutions by integrating community- based disaster preparedness into local government development plans (ADPC, 2010). The program mainly focused on disaster risk management

(DRM) and covered broad areas like awareness program, capacity to build recovery from the disasters, institutionalization in educational level, involvement of local people, gender, mainstreaming, convergence and partnership (UNDP, 2010). Thus, these steps by taken by the government is an initiative to document more of such traditional and indigenous knowledge for better preparedness of disaster and its management as well. This study is an attempt to document some basic and important traditional and indigenous knowledge from the local communities of Bihar.

2. Literature Review

2.1 Importance of Indigenous Knowledge

Sithole, Naser & Guadagno (2015) studies indigenous and traditional knowledge in Papua New Guinea that plays a valuable role in disaster prevention and mitigation which has been passed from one generation to other. It includes the behaviour of certain animals, plants, celestial bodies and other environmental features that help them to interpret and predict the upcoming natural hazards. These observations helped the communities to interpret and predict storms, heavy rainfall, floods, droughts, volcanic eruptions and landslides and allow them to become alert and prepare for such hazardous situation, for example, in Popondetta community, a thunder roars and coming breeze from the mountains are signal for a cyclone and heavy flood. It is also observed that when seagulls move away from the coast, it is an indication of tsunamis. When bats, snakes and other animals run away from the volcanos it indicates volcanic eruption. In Bulolo community the appearance of a rainbow is a signal for cyclone and are linked with tsunamis. The appearance of bats is related with incoming storms. When birds are migrated, heavy rains and droughts are predicted. When the sea snakes and hermit crabs run away from the coast, then their movement are taken as warnings against typhoons and storms. When the branches of trees and the leaves of banana falls on the ground without heavy winds, people prepare themselves for storms and typhoons.

In Coastal communities of Oro, the houses were built up of slit to suffer lesser impact of flood and sea tide. The houses were also made of quail tree in the corner, while palm barks were used for walls and palm leaves for the roof. This is done to make the house light-weighed so that it can resist wind and cause limited damage in case of collapse. These communities believe on the customary rules, traditional faith, belief, rituals, and practices that are preventing, conserving the environment, and managing the natural resources in their surrounding in day- to-day lives. These are the key to support resilience in the face of hazardous situation.

2.2 The Importance of the Native Science and Traditional Ecological Knowledge

Gregory Cajete (2018) defines Native Science as “a metaphor for a wide range of tribal processes of perceiving, thinking, acting and coming to know that have evolved over millennia of human experience with the natural world.” According to him, Native Science is a wide term that includes not only the traditional ecological practices but at the same time categories like

metaphysics and philosophy; art and architecture; practical sustainable technologies and agriculture; and ritual and ceremony which is practiced by the indigenous peoples in both past and well as in present. Areas such as astronomy, farming, plant domestication, plant medicine, animal husbandry, hunting, etc. were also included in the Native Science. In a way the native science supports the essential aspects of human life and existence.

2.3 The Vitality of Indigenous Knowledge

Sillitoe & Bicke (2004) discuss indigenous knowledge and have come across several problems related to development and growth of communities. There are different terms of Indigenous and traditional knowledge like indigenous knowledge, traditional knowledge, local knowledge, community- based knowledge, indigenous knowledge systems and practices, indigenous technical knowledge, and traditional and local knowledge system. Shaw et al. (2009) describes traditional knowledge as increasing part of knowledge, maintained and developed by people through their interaction with the natural environment which has been passed from one generation to other.

Indigenous knowledge is formulated on cultural and ethical perspective, like folk song for raising awareness (Bangladesh) and water-puppet show and tell a story of flood (Vietnam). Shaw et al (2009) also points that the indigenous knowledge is considered as subsistence food which leads and provides detailed information on traditional knowledge which has been passed over the years. In contrast, technical indigenous knowledge can be considered as the guidebook for traditional knowledge and wisdom. Indigenous knowledge has also become a part of the survival and rescues life of the people and communities (Shaw & Takeuchi, 2007). Thus, indigenous knowledge is considered as the nature of interdisciplinary and is built as the life security of human, animal, and other various activities of the community.

Parashar & Shaw (2012) studies Jagaghars community which is considered as an important institution of Puri, a coastal city situated in the state of Orissa. They use their local indigenous knowledge to preserve and conserve the natural resources such as flora and fauna, maintenance of ponds and keeps the water table high.

Iloka (2016) studies the reduction of disaster risk and climate change in Africa. Though the indigenous knowledge has not been well recognised and documented in reduction of disaster risk of the native people in Africa. The local people have understood and managed to survive and adapt, as the policy- makers still rely on mitigation based on scientific knowledge. Whyte (2018) discusses the concept of transferring indigenous knowledge in Greek lakes region among local people. The changes in lake levels and the shifts or changes in the direction of tree species in forest indicates the climate changes and health risks that are likely to be faced by tribal peoples. Weatherhead et al. (2010) describe the traditional knowledge of Inuit hunters in Clyde River, Nunavut, in the Arctic as to how the hunters predict the wind speed by

observing the changes in animal behaviour, the emergence of seasonal ice crusts, conditions of the sea ice and sea forms.

2.4 Indigenous Knowledge for Better Disaster Preparedness in India

Jha & Jha (2011) focusses on documenting the folktales, myth, and traditional knowledge towards disaster management of Lepcha community of Sikkim. Since the tribal people have lived with the environment and possess rich knowledge of the nature by identifying and observing, for example, the birds' sings loudly and flock together to indicates good weather but if the birds are silent it is a signal for rains and storms. If a particular kind of bamboo blooms, it indicates the occurring of famine.

Lepcha people also believe that the certain changes in the behaviour of various pheasants and certain animals like shrews, martens and weasels makes people aware of the upcoming disaster like earthquake. The sudden movement of birds indicates the forest fire. Lepcha people use their traditional knowledge to overcome the effects of disaster and take preventive measures by making houses of bamboo and timber which reduces the loss of people lives during massive earthquakes.

2.5 Indigenous knowledge in Bihar

According to Mishra, Singh & Kumar (2011), indigenous knowledge or traditional knowledge is the speciality of a given society and culture which has been passed down from one generation to the next. The various communities of Bihar have their own traditional knowledge on agriculture, health care, food preparation and other activities that helps them to take preventive measures during the disasters and predict disasters by observing the change in the weather conditions. Hence, the local communities can read and understand the weather and so they prepare themselves accordingly for the crisis situations. The farmers also can predict rains through wind directions coming from south west, the colour of the dark clouds. When ants taking eggs in their mouth and move to the safe places, it indicates heavy rainfall. When sparrow takes bath with dust it too indicates rain.

3. Methodology

The study was conducted to document the indigenous or traditional knowledge from the local people of various communities of Bihar. This research was carried out in five major districts of Bihar (Patna, Nalanda, Muzaffarpur, Vaishali and Darbhanga) that are very prone to disaster risks and are majorly affected by it. Data were collected from the people mostly above the age of 55 years as this age group has the maximum knowledge of their traditional practices and ideas that were followed during the phase of their forefathers. There were approximately 50 respondents and most of them were males. The number of female respondents were comparatively low as compared to the males. The interview method was used to extract data from the respondents. The data has also been received with the help of focus group discussion and interpersonal interaction.

The basic step of data collection can be briefly explained in the following steps:

- Identifying the disaster prone and affected areas
- Identifying the people of the suitable age group
- General interaction with the people and communities to get the idea about their knowledge system and indigenous knowledge, hence identifying the informants
- Interview schedule, focus group discussions and interpersonal interactions
- Documentations

4. Results and Discussions

In the state of Bihar, the major population is of the farmers and they are mostly uneducated and marginalised. Bihar is mainly an agriculture-based state where the allied sectors gives opportunity for maximum application of the resources available in the system. However, the ironical part is that the skills, knowledge, and survival strategies of the local communities are ignored to promote the modern means. But, the traditional or indigenous knowledge of the people here has the scientific approach and are relevant up to a great deal for disaster risk reduction and management.

Most the respondents of this study were the farmers and the housewives who had some ancestral history of agriculture or are presently connected with agricultural practices. They have shared their traditional knowledge in form of some small poems, local idioms and preverbs. They have also related their knowledge with *Ghagh Kavi* who was an ancient 16th century agriculture poet. His poems and idioms are relevant till date and this has been working as a great source of indigenous knowledge.

The data received from the local people during the research have been categorised in various sub sections in this paper for better understanding.

4.1 Disasters Prediction

(a)

सावन मास बहे पुरवइया।
बछवा बेच लेहु धेनु गइया।।
Savan maas bahe purvaiya.
Bachwa bech lehu dhenu gaiya

It means that in the month of July (Savan) if the wind blows from the easterly direction then there are chances that drought can occur, or some famine can occur as this is not the time for the easterly wind. So, the farmers should prepare themselves and should sell their bulls and buy cows instead as the bulls would not be helpful because there would be no rain therefore no farming and thus if they would have cows, they would be able to have milk.

4.2 Weather Condition Readings

(b) आसाढ़ी पूनो दिना, गाज, बीज बरसन्त।
नासै लक्षण काल का, आनन्द माने सन्त।।
Assadhi puno dina, gaaj, beej, barasna.
Naase lakshan kaal ka, aanand mane saant.

This proverb states that if it rains in the month of June and July (Assadh) then it's sign of good rainfall which will make the weather good and people will get relief form the scorching heatwaves that blows in these months.

(c) लाल पियार जाब होइहें आकाश।
बरसा के नाहीं कौनो आशा॥
Laal piyar jab hoihen akaasa
Barsaa ki naahi kauno asaa

This proverb attempts to forecast rainfall condition based on the colour of the sky. When the sky turns crimson or pale then one should not expect any rainfall.

4.3. Rainfall Prediction

(d) शुक्रवार की बादरी, रही सनीचर छाय।
तो यों भाखै भड्डुरी, बिन बरसे ना जाए।।
Shukrvaar ki baadri, rahi sanichar chaaye.
Toh yo bhaakhe bhaddri, bin barse na jaaye

It states that if the sky is cloudy on Friday and it remains the same on Saturday then it would definitely rain heavily so the people should be prepared during the rainy season for these weather shifts and should store some food for the adverse conditions.

(e) असुनी नलिया अन्त विनासै।
गली रेवती जल को नासै।। भरनी नासै तृनौ सहूतो।
कृतिका बरसै अन्त बहूतो।।
Asuni naliya aant vinaashe.
Gaali revati jal ko naase, bharni naase tunay sahuto
Kritika barse aant bahuto

If it rains in the month of March and April (Chait) during *Ashwini Nashatra* then it will rain till the end of the month that is, heavy rainfall is predicted. If it rains in *Revati Nashatra* then less rainfall is predicted and if it rains in *Bharani Nashatra* then even the grass on the

ground may dry. It means that there could be drought like conditions. If it rains during *Kritika Nashatra* then a good rainfall is predicted.

(f) सावन करे प्रथम दिन, उवत न दीखे भाव।
चार माहिना बरसे पानि, याको है परमान॥
Saawan kere pratham din, uwat na dikhe bhaan
Chaar mahinaa barse paani, yako hai parmaan

This proverb illustrates yet another rainfall predictor proverb. If the sky is overcast on during the first day of lunar eclipse during the Hindi month of Shraawan and one fails to see the rising sun, then one should be assured that four months of incessant rainfall is imminent.

The farmers of Bihar predict rain by some other indigenous wisdoms as well for example:

- If the wind blows from the south west direction, then it is a signal for heavy rainfall which may lead to flood.
- A good amount of rainfall for a long period is expected to come when the clouds shows dark colour for 2-3 consecutive days.
- The farmers also predict rainfall when the sparrows take dust bath.
- The movement of ants to safer place with their eggs too indicates heavy rainfall.

4.4. Harvest Prediction

(g) रोहिणी तबे, मृगशिरा तबे, कुछ दिन आदरा जाय।
कहे घाघ सुन घाघिनी, स्वान भात नहि खाय॥
Rohini tabe, mrigsira tabe, kuchh din adraa jaye
Kahe Ghaagh sun Ghaaghini, swan bhaat nahi khaye

This proverb elaborately discusses the "nakshatra" or star positions. Under the influence of the ascendant stars Rohini and Mrogshira if there is heat wave followed by rainfall in Aardraa then the harvest will be so abundant that even dogs would be so full that they will not eat rice.

4.5 Food Security and Storage Habit during Crisis

In old times, the farmers in Bihar took lots of preventive measures while storing the food grains as there were less development of the modern technologies that could store the food grains for longer period of time. Those ideas of the food storage are still relevant in the time of crisis and are very helpful in protecting the food items. Some of those ideas are listed below:

- Azadirachta Indica (Neem) leaves were used are used very commonly by the farmers to store rice and wheat grains to protect them from various insects during the rainy seasons. With the help of the Neem leaves the gains could be stored for longer duration without much destruction.
- In the time of floods, the moisture content was increased to a large extent and to protect the grains form it the farmers used to put some chemical fertilizers like urea in plastic bags with the food bags so that it stays safe for longer period.
- The farmers used to store the gains in a large sized container known as *Kothi* which was made up to mud. Kothi is replaced with large steel or aluminium container in today's time.

4.5. Heath Care Habits

There are various medical aids often known as '*Gharelu Nuskhe*' (home remedies) used by the local people in the state of Bihar for health management during the time of hazards. These health care practises are not only relevant during the time of disasters rather they are relevant for all time and has scientific values as well. Some of such indigenous knowledge related to the human health is mentioned below:

- If a person is affected by cold waves and suffering from the cough and cold then it is advised to drink a local drink called *Kadha* made of up Tulsi, turmeric (haldi), colves (laung), black pepper (kaali mirch) and fenugreek (saunf). This Kadha is helpful in increasing the immunity as well and it this has a lot of medicinal values.
- For severe cold two cloves of garlic are used by the local communities as a cure.
- After massive disasters, the spread of diseases like pneumonia and typhoid is very common. The local people use Nutmeg (Jayfal) mixed with mustard oil as syrup to cure Pneumonia.
- To cure a person suffering from the effects of heatwaves green mango drink (aam panna) is given.

4.6. Food Habit Management

The indigenous or traditional knowledge related to the food habit management are mentioned below:

- Lemonade (neembu paani), buttermilk (Chhanch), roasted gram (Sattu) drink and Aegle marmelos (bael) drink should be consumed in hot weather conditions or during summer season to keep the body hydrated. These drinks are helpful in protecting the person form heatwaves.

5. Conclusion

Bihar is mostly affected by the disasters of flood, drought, heatwaves, cold waves and sometimes earthquakes. Floods, heatwaves, cold waves, and drought are extremely common

disasters in Bihar which affects the people very massively almost every year. The problem with Bihar state is that it has a large population which is uneducated and hence unemployed so, at the time of crisis these people are adversely affected and even the Government schemes could not help them enough because the real help doesn't reach the people who need it. Therefore, it is mandatory to bring in the use of local indigenous and traditional knowledge in front and make people understand its role in predicting and preparing for the disasters. This would not only promote the usage of local traditions but will prepare people to face the hardships during the disasters, for example the basic information about the food intake during the heatwaves given by the local people are very relevant and scientific as well like the use of lemonade and buttermilk to prevent dehydration. These types of basic concepts should be identified and spread in larger context to be prepare for the adverse weather conditions.

As it can be observed from the results that the role of indigenous knowledge is not only restricted to food habits, it also helps in predicting the rainfall and its intensity which makes people aware of the upcoming hazards so that they can prepare themselves for it. These knowledge systems also give the account for storing the food grains so that the food security is ensured. To brief in, the indigenous or local traditional knowledge of the people especially the framers of Bihar would prove to be greatly beneficial in disaster preparedness and management if used properly in collaboration with the modern technical tools and assets.

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Acknowledgement

The research and argument presented in the present paper are parts of an ongoing project which is being sponsored by ICSSR under the scheme IMPRESS.

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