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Role of Social Capital in Adaptation to Climate Change: A Comprehensive Study

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ABSTRACT

The faster rate of changing pattern of climate will lead to significant challenges for society in the coming future. Intergovernmental Panel on Climate Change (IPCC) published a projection report which predicts temperature rises of up to 4.5°C or higher by 2080, and again which depends on anthropogenic changes and other factors. The Global assessment report on disaster risk reduction (GAR) 2019 had presented a layout which focused on major risk to human life from air pollution and biological hazards, in addition to other natural disasters like floods, landslides and earthquakes. There is a need to consider climate change as forthcoming disaster and to take necessary steps to reckon with the situation. Adaptation is an alteration in behaviour to become better fitted to survive the changing environment. Social capital is a valuable mechanism in adaptation to climate change. It acts as vehicle to reach the adaptation strategies to climate change. A comprehensive study was conducted at Bhagalpur and Banka district of Bihar to assess the role played by social capital to cope the weather extremities. The result revealed that the information received by the farmers from their fellow farmers was perceived as more trustworthy than any other sources of information. It was also found that proximity of institutions make them available to the needy at shortest possible time.

Keywords

Social Capital,
Adaptation,
Resilience

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Introduction

Being an agrarian state, agriculture is the key to overall development of the Bihar state economy. Nearly 81 % of the population of Bihar is involved in agriculture and allied activities which are much higher than the national average. The adverse impacts of climatic variability on agriculture production at farm level gets aggregated to the level of

the food system in terms of food shortages and rising prices, which can also endanger food and livelihood security.

Bihar is exposed to multi-hazards like floods, drought, hailstorms, cyclones and earthquakes and a number of natural and manmade disasters which affect the productivity of the agriculture sector inspite of having fertile soil, sufficient rainfall and groundwater

availability. 74 % of the total geographical covering the north Bihar region is prone to floods while south Bihar is exposed to droughts. The recent predictions revealed that changing rainfall and weather patterns lead to an increase in extreme weather events, a rise in death rates by sudden events like thunderstorms and lightning and crop losses of up to 25 per cent. The changing pattern of climate has led to various forms of drought, which ultimately reduces the quality and quantity of crops produced which were one of the very significant factors for increasing prices of food (Mustapha, 2012).

Uddin *et al.*, (2017) agreed on changing climatic conditions within past 20 years. These changes in the climate is affecting detrimentally to the natural as well as human systems. It poses a major threat which is characterized by scanty and uncertain rainfall, infertile soils, poor infrastructure, extreme poverty and rapid population growth. These conditions present serious environmental, economic and social impacts on the agricultural community which includes farm productivity, cropping pattern, degrading quality of farm products, profitability price to the supply etc.

Social

capital is an economic idea that refers to the connections between individuals and entities that can be economically valuable. The concept of "Social Capital" has gained popularity in the late 1990s. According to World Health Organisation (1998) "Social capital represents the degree of social cohesion which exists in communities.

It refers to the processes between people which establish networks, norms and social trust, and facilitate co-ordination and co-operation for mutual benefit". Pelling and High (2005) argued that social capital provides opportunities to understand the role of fundamental social attributes which

contribute towards building capacity for social collectives and individuals to respond to climate change. The social network among the people and societies strengthens their adaptive capacity to cope with climate change effect as well as to deal with several stresses coming their way. Social networks that include people who trust and assist each other can be a powerful asset.

These relationships between individuals and companies can lead to a state in which each thinks of the other when something needs to be done. Adger (2003) in his case study stated that adaptation processes based on social capital can alter the perceptions of climate change from a global to local problem. The communities find strategies to manage risks through strategic and local networks and interactions. Pretty (2003) defined that social capital captures the idea that social bonds and norms are critical for sustainability.

It facilitates cooperation by lowering the transaction costs of working together. High social capital is associated with improved economic and social well-being. Nakagawa and Shaw (2004) identified that Social capital is most effective element in recovery from disasters. Falco and Bulte (2009) observed in Ethiopia that households with greater social network are more likely to plant trees which are helpful in protecting the environment against temperature increase. Minani *et al.*, (2013) explained how social capital network positively influences farmers' income and their resilience to climate change.

When high social network exists in society, it enhances their probability of information sharing, mutual help, and social learning which further helps them in taking adaptation decisions qualitatively. Ngigi *et al.*, (2012) and Osei (2016) proved that the more social people possessing greater contacts with officials as well as other people of the society

will get the sources earlier than the others having less social capital in the society. In adaptation to climate change, social capital is considered as a very much valuable mechanism. Local institutions, governance, social capital and collective actions are directly related to development, resilience and increased adaptive capacity and high level of social capital (Padigala, 2015). These institutions need to be developed for developing the social capital in society as increase in social capital ultimately lead to increasing resilience and adaptation capacity to cope climate change effect.

Research Methodology

The study had been conducted in the Zone-III A of Bihar. The following study utilized descriptive research design. Bhagalpur and Banka districts were chosen purposively as representative of Zone-III A of Bihar. Among 16 blocks of Bhagalpur district 2 blocks namely Sabour and Jagdishpur and out of 11 blocks of Banka District 2 blocks namely Belhar and Shambhuganj were selected randomly for this particular study.

From each block, two villages were selected randomly. Thus total of eight villages were identified for the study. Thirty respondents from each village were selected randomly who were majorly dependent on agriculture and allied sectors for their livelihoods. A total of 240 farmers from eight villages of four blocks of Bhagalpur and Banka were selected randomly for this particular study. Personal interviews were conducted by the researcher to all the respondents by using well-structured questionnaire. Proper statistical techniques were applied to analyse the data.

Results and Discussion

Proximity of local institutions to farmers decides the frequency of interaction between

them. This further helps to develop trustworthiness, safety and sense of confidence among farmers regarding institutions.

The continuous interaction between farmers and local institutions develop a pool of information and intensifies network, thus developing social capital. The people having higher social capital had easy access to resources and amenities as compared to people having lower social capital.

Out of all the local institutions available at chosen villages for the research work, only District Agricultural Office was located at more distance. Although the access to this institution also was found to be frequent. These local institutions had enabling factors as well as limiting factors which were responsible for its access to the people. Respondents agreed on having more faith on their fellow farmers than any other sources of information. The result obtained from present study as well as relevant discussions have been presented under following heads:

Proximity of institutions

Table 1 depicts the distance of different local institutions from the respondents' village. Village panchayat, Block office, SHGs, PDS and Primary school were very near in all the eight villages at approximately at 0.5-1 km from the villagers' residence. It was easy for the local people to get access with these institutions.

District Agricultural Office were also located in both the districts but at more distance. It was near to Rajindipur village at 6 km distance. Middle school was not available at Rajindipur and Mukheria but was available at distance of 0.5 km in Kainichak. Inter colleges were available in three villages at proximal distance.

Table.1 Distribution of different institutions according to their proximity

Sl. No.	Institutions	Kaihnichak	Khajuri	English	Rajindipur	Maksadpur	Mukheria	Dumaria	Tiwaritola-amgadhwa
Distance (km)									
1	Village panchayat	0.5	2	2	2	4	1	0.01	2
2	Block	1	1	3	2	7	5	1.5	6
3	DAO	45	55	10	6	25	40	40	40
4	Primary school	0.5	0.5	1	0.7	0.5	0.1	0.5	5
5	Middle school	0.5	3	1	-	3	-	2	3
6	Inter college	0.5	-	-	-	-	-	5	3
7	Higher education institution	0.5	-	-	-	-	-	-	-
8	Nationalized bank	0.5	-	-	-	2	2	1.5	6
9	Cooperative bank	0.7	6	-	1	-	-	1.5	6
10	PHC	4	4	0.2	-	-	-	2	4
11	Veterinary clinic	1	-	-	-	-	4	1.5	6
12	Village hatt	1	-	-	-	4	1	1	3
13	SHGs	0.1	0.05	0.05	2	0.1	1	0.01	1
14	PDS	6	0.02	1	2	2	3	0.15	1
15	Youth club	-	-	0.2	-	-	-	-	-

However, higher educational institutions like graduate college and youth club were available only at Kaihnichak and English village respectively at less distance. Nationalized bank, Cooperative bank, PHC and village-hatt were found in five villages out of eight surveyed villages at less distance.

Institutions and their pattern of interaction

Table 2 shows the role of different institutions and their pattern of interactions with the localities. These institutions were providing various kinds of help. Apart from their authorized roles, they were also providing

number of support to the needy and victims during the disasters like floods, drought etc. But it does have lacunas.

Most of the time those who had contacts with officials and recommendations were likely to get benefits at very ease as reported whereas, the needier remained helpless due to lack of resources and contacts.

SHGs were playing very prominent roles by serving as micro- finance source as well as by providing trainings of new techniques of cultivation.

Table.2 Institutions and their pattern of interaction

Sl. No.	Institutions	Role	Pattern of interaction	
			Enabling factor	Limiting factor
1	Village panchayat	<ul style="list-style-type: none"> Centre of information Centre of collective decisions Dissemination of schemes among the villagers 	<ul style="list-style-type: none"> Contacts with sarpanch & mukhiya Less Proximity from villagers' home 	<ul style="list-style-type: none"> Less occurrence of panchayat meetings Unavailability of mukhiya at panchayat Biasness in addressing the problem
2	Block office /DAO	<ul style="list-style-type: none"> Provide inputs of agriculture Centre of information about new seeds, equipment and schemes 	<ul style="list-style-type: none"> Contacts with officers Regular visit to the office Public meeting 	<ul style="list-style-type: none"> Unavailability of inputs when required Low response from officials
3	Schools /colleges	<ul style="list-style-type: none"> Provide shelter, foods, old clothes during floods Source of information Distribution of old clothes to the victims 	<ul style="list-style-type: none"> Early warning of situation 	<ul style="list-style-type: none"> Lesser space Unavailability of sufficient resources
4	Agri.-input dealers	<ul style="list-style-type: none"> Distribution of seeds Sources of information 	<ul style="list-style-type: none"> Regular visit Knowledgeable input dealer Active farmers 	<ul style="list-style-type: none"> No knowledge of input dealer Lack of cooperation from input dealer
5	Banks	<ul style="list-style-type: none"> Provide loans Provide Insurance facilities to humans, crops as well as animals 	<ul style="list-style-type: none"> Regular visit 	<ul style="list-style-type: none"> Entry of 3rd party Unable to provide mortgage security

		<ul style="list-style-type: none"> • Provide subsidies. 		
6	PHCs	<ul style="list-style-type: none"> • Provide medicines and hygienic products to victims 	<ul style="list-style-type: none"> • Less distance from home 	<ul style="list-style-type: none"> • Unavailability of medicines, equipment as well as doctors at time • Passive attitude of staffs
7	Veterinary clinics	<ul style="list-style-type: none"> • Provide medicines for animals • Availability of veterinary doctors for the proper treatment of pets. 	<ul style="list-style-type: none"> • Regular conatcts 	<ul style="list-style-type: none"> • Unavailability of medicines as well as doctors at required time
8	SHGs	<ul style="list-style-type: none"> • Provides loan at low interest • Lend machines or equipment to the villagers • Initiate organic farming at rajindipur village • Provide training on mushroom cultivation to village women 	<ul style="list-style-type: none"> • Active participation • Regular visit 	<ul style="list-style-type: none"> • Lack of active participation by villagers
9	PDS	<ul style="list-style-type: none"> • Distribution of kerosene oils, grains etc. at subsidised rate 	<ul style="list-style-type: none"> • Contacts with staffs 	<ul style="list-style-type: none"> • No contacts with the staffs

Table.3 Distribution of respondents according to their climate change sources of information and perceived trustworthiness towards the sources (n=240)

Sl. No.	source	Highly trustworthiness	Sometimes trustworthiness	undecided	Not at all trustworthiness
		<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
1	Newspaper	53 (22.1)	108 (45)	76 (31.7)	3 (1.3)
2	TV	46 (19.1)	163 (67.9)	28 (11.7)	3 (1.3)
3	Social media	7 (2.9)	81 (33.8)	149 (62.1)	3 (1.3)
4	Internet	13 (5.4)	138 (57.5)	86 (35.8)	3 (1.3)
5	Line departments	16 (6.7)	179 (74.6)	42 (17.5)	3 (1.3)
6	SAU advisory	8 (3.3)	129 (53.8)	98 (40.8)	5 (2.1)
7	Agro-input dealers	18 (7.5)	129 (53.8)	88 (36.7)	5 (2.1)
8	Fellow farmers	224 (93.3)	16 (6.7)	0	0
9	Family members	211 (87.9)	28 (11.7)	1 (0.4)	0
10	Village leaders	29 (12.1)	205 (85.4)	6 (2.5)	0

*figures in parenthesis is in per cent

Perceived credibility towards sources of information

Table 3 reveals the trust level of the respondents on different sources of information they use to stay updated with current situations. Majority of the respondents (93.3%) had perceived that fellow farmers and family members (87.9%) were highly trusted as source of information for all the agricultural information and suggestions. TV, newspapers, Line department, village leaders and internet were found to be trustworthy but

they did not perceive it to be more efficient. Only a handful of farmers had access to social media, SAUs advisory and Agro-input dealer but people questioned trustworthiness of these sources of information. The present study was conducted to assess the role of social capital in adaptation to climate change. Descriptive analysis of farmers’ personal interview taken basing on structured questionnaire revealed that the proximity of institutions were less and these institutions play a very significant role apart from their regular roles by helping and providing number of support to the needy.

The social network enables the societies to learn different experiences and adaptation techniques possessed by heterogeneous nature of societies and it opens the door to several options for them. Pretty J. (2003) stated that social capital can help to ensure compliance with rules and keep down monitoring costs, provided networks are dense, with frequent communication and reciprocal arrangements, small group size, and lack of easy exit options for members.

It is important to focus on creating strong social network among societies in order to get better adaptation options towards climate change. There is a need to clarify the role of social capital for adaptation to changing climate at broader level and for that further research is required to be done.

References

- Adger WN (2001) Social capital and climate change. Tyndall centre working paper (8), Norwich.
- Adger WN (2003) Social capital, collective action and adaptation to climate change. Reviewed works. Retrieved from <http://www.clarku.edu/econgeography>
- Alam GMM, Alam K, Mushtaq S (2016) Influence of institutional access and social capital on adaptation decision: empirical evidence from hazard-prone rural households in Bangladesh. *Ecological Economics* 130: pp 243-251.
- Ali L, Mangheni NM, Sanginga PC, Delve RJ, Mastiko F, Mirro, R (2007). Social capital and adoption of soil fertility management technologies in Tororo district, Uganda. In *Advances in Integrated Soil Fertility Management in Sub-Saharan Africa: Challenges and opportunities*. Dordrecht: Springer, pp 947-954.
- Arrow K (2000) Observations on social capital. In *social capital: A multi-faceted perspective*, ed. P. Dasgupta and I. Serageldin, 3-5. Washington, D.C.: World Bank.
- Bayat A (2015) Social capital and developmental outcomes: A case study of the black communities in the Cederberg and Matzikama municipalities in the mid- 2000s. PhD. University of the Western Cape.
- Bebbington A (1997) Social capital and rural intensification: local organizations and islands of sustainability in the rural Andes. *Geographical journal*, 163 (2): pp 189-197.
- Byg A, Hersland L (2016) Socio-economic changes, social capital and implications for climate change in rural Nepal. *GeoJournal*, 81(2): pp 169-184.
- Coleman JS (1988) Social capital in the creation of human capital. *Am J Sociol* 94: S95-S120. Department of forest (1996-2006). Forest working plan. Lahaul/spiti
- Dany V, Regan M, Taplin R, Bajracharya B (2013) The role of social capital and local institutions in coping with climate stresses: the case of krapum chhouk commune in rural Cambodia. *Asian Journal of Agriculture and Development*, 10(1): pp 61-78.
- Dasgupta P (2002) *Social Capital and Economic Performance: Analytics**. University of Cambridge and Beijer International Institute of Ecological Economics, Stockholm.
- Evans P (1996) Government action, social capital and development: Reviewing the evidence on synergy. *World development* 24: pp 1119-32.
- Falco S D, Bulte E (2009) Social capital and weather shocks in Ethiopia: climate change and culturally-induced poverty traps. Working paper, London:

- London school of economics.
- Jones N, Clark JRA (2014) Social capital and the public acceptability of climate change adaptation policies: a case study in Romney Marsh, UK. *Climatic Change*; 123(2): pp 133-145.
- Minani B, Rurema DG, Lebailly P (2013) Rural resilience and the role of social capital among farmers in Kirundo province, northern Burundi. *APSTRACT: Applied Studies in Agribusiness and Commerce* (2/3): pp 121-125.
- Munasib ABA, Jordan LJ (2011) The effect of social capital on the choice to use sustainable agricultural practices. *Journal of agricultural and applied economics*, 43(2): pp 213-227.
- Nam P (2011) Social capital and private adaptation to climate change: Evidence from the Mekong river delta in Vietnam. In: Institute for International Economics Policy (IIEP) conference on the "Economics of adaptation to climate change, at George Washington university, Washington, dc. pp 1-24
- Nakagawa Y, Shaw R (2004) Social Capital: A missing link to Disaster Recovery. *International Journal of Mass Emergencies and Disasters*, 22(1): pp 5-34.
- Osei S (2016) Social capital and climate change adaptation strategies: The case of small holder farmers in the central region of Ghana. Master Thesis. University of the Western Cape.
- Padigala B (2015) Social capital and local institutions: A perspective to assess communities' adaptation potential to climate change. In Leal (2013). *Hand book of Climate Change Adaptation*, Springer-Verlag GmbH Berlin Heidelberg is part of Springer Science+Business Media.
- Paldam M (2000) Social capital: One or many? Definition and measurement. *Journal of Economic Surveys* 14: pp 629-53.
- Paul C, Weinthal E, Bellemare M, Jeuland, M. (2016) Social Capital, Trust, and Adaptation to Climate Change: Evidence from Rural Ethiopia.
- Pelling M (1998) Participation, social capital and vulnerability to urban flooding in Guyana, *Journal of International Development*, 10:469-486.
- Pelling M, High C (2005) Understanding adaptation: what can social capital offer assessments of adaptive capacity? *Global Environmental Change* (15): pp 308-319.
- Petzold J (2017) Social capital resilience and adaptation on small islands. *Climate change on the Isles of Scilly: climate change management*.
- Prasad V, Helfrich M, Crate SA (2009) Social capital as a source of adaptive capacity to climate change in developing countries. *International Journal of Climate Change: Impacts and Responses*, 1(3): pp 149-162.
- Pretty J (2003) Social capital and the collective management of the resources. *Science* 302(5652): pp 1912-1914
- Pretty J, Smith D (2004) Social capital in biodiversity conservation and management. *Conserve Biol* 18(3): pp 631-638
- Pretty J, Ward H (2001) Social capital and the environment. *World development* 29: pp 209-27.
- Putnam RD (1993) The prosperous community: Social capital and public life. *The American prospect*, 4(13): pp 35-42.
- Rahill GJ, Ganapati NE, Cle'risme' JC, Mukherji A (2014) Shelter recovery in urban Haiti after the earthquake: The dual role of social capital. *Disasters Journal*. 38(s1),S73-S93.

- Siddique S (2015) Adapting to Climate Change in Dhaka: The Role of Social Capital. Bachelor of Arts Thesis. Faculty of Wesleyan University
- Sanchez-Cortes, M., Lazos, E. (2011). Indigenous perception of changes in climate variability and its relationship with agriculture in a Zoque community of Chiapas, Mexico. *Climate change* 107(3-4): pp 363-389.
- Smith J.W, Anderson DH, Moore RL (2012) Social capital, place meanings, and perceived resilience to climate change. *Rural Sociology*, 77(3): pp 380-407.
- Yameogo TB, Fonta WM, Wunsher T (2008) Can Social Capital influence Smallholder Farmers' Climate-Change Adaptation Decisions? Evidence from Three Semi-Arid Communities in Burkina Faso, West Africa. *Social Science*, 7:33.

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