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Role of ICT to Meet the Local Demands of Information Services: A Case Study of Ghorjan and Rajapur Union, Sirajganj

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ABSTRACT

The study aims to analyze the local needs/demands of information services in two Char-based Unions (i.e. Ghorjan and Rajapur) of Sirajganj district to address shortcomings of information requires for sustaining people's life and livelihood and contributing to the development of a Disaster Information Management System in Char-land areas of Bangladesh. It is a fact that a large section of Char communities are staying out of access to information at present due to their geographical isolation, lack of appropriate communication mechanisms, and initiatives - placing them in a difficult situation to survive. From this point of view, the focal theme of this study was the assessment of local needs/demands of information to develop a "sustainable information communication and services mechanisms" by which the Char-land people get available access to such information. Based on this theme, the study adopted a participatory research approach to allow a cross-section of some selected stakeholders groups (farmer, fisherman, and migrant workers) along with Union Digital Center (UDC) and Char Digital Center (CDC) entrepreneurs, Union Parishad representatives, local NGOs, technical institutions, community volunteers, Government officials and community-based civil society organizations in selected Char-land areas to share their information needs and possible ways for channelizing it in long term perspectives and prioritize it in line with the people's necessity and emergency, and finally tried to shape a framework for sustainable use of such information and communication services by using existing UDC, CDC, and community volunteers.

Keywords: Local demands, Role of ICT, CDC, Case study, UDC, Sirajganj, and Information services.

INTRODUCTION:

The ubiquitous nature of Information and Communication Technology (ICT) is not a myth at present but a reality - familiar to most of the people across the globe (Muzareba and Rahman, 2016) which includes different online and offline communication services like computer, telephone, television, internet, printer, photocopiers and so on that play a major role for the economic, societal and political development of a country (FAO, 2001; Hasan *et al*., 2009 and Hoque and Sorwar, 2015; Hossain *et al*., 2019). Both developed and developing countries are experiencing the digital revolution

at present (Overseas Development Institute, 2002; Kashem *et al*., 2013; Rahman, 2016). Developed countries made a great progress in adopting the blessings of ICT but developing countries are still far behind in that case. Everyone should have access to information for their own social, economic, political and cultural development as appropriate information empowers people towards actions that can transform lives, and allows for a greater sense of independence (Mchombu, 2000; and Goulding, 2002). However, there is a great concern that digital divide still exists between rural and urban areas of developing countries (Hoque and Sorwar, 2015).

According to de Munster (2004), "Digital divide is usually measured in terms of people's access to ICTs and those without such access or skills". Role of ICT for the development of rural areas is an emerging issue now-a-days in most of the developing countries (Hoq, 2015; Pade *et al*., 2010; Alemna and Sam, 2006; Hoque and Sorwar, 2015). Governments of developing countries have taken several initiatives to remove the barrier in case of using ICT in their daily life (Shore, 1980). Bangladesh is a low income developing country; having 165 million populations is experiencing the lack of provision of ICT (Ashraf *et al*., 2016) though internet was first introduced in our country in 1993. Rapid changes were observed in IT sector after the withdrawal of taxes on VSAT satellite ground station (Rahman, 2008; Islam and Hoq, 2011). In 2008, an ICT policy was articulated in order to build an ICT driven nation (Ashraf *et al*., 2016) as ICT is considered one of the significant tools for economic development of a country (Kashem *et al*., 2010). After the formulation of ICT policy, the ICT sector of Bangladesh has started expanding keeping a great pace in both rural and urban areas (Chowdhury and Alam, 2009). In recent years, government of Bangladesh and private sectors have undertaken various ICT interventions in order to bridge the information gap between the rural and urban community. One of the notable examples is establishing ICT centres in every union of rural areas so that rural people can easily access the necessary information without any hassle (Islam and Hoq, 2011)because ICT Plays a great role to eradicate poverty, getting education materials and information's, Early Warning System (EWS) , health sector, boost agricultural and livestock productivity, improve livelihood and shrink vulnerability of poor people who are exposed to the negative impacts of natural anomalies (Kizilaslan, 2006; Prodhan and Afrad, 2014 and Islam and Hoq, 2011). ICT centres are places where poor people of a particular community get benefitted by accessing necessary technologies as it is impossible for them to access these facilities individually (Hasan *et al*., 2009).

This study was about a multi-users communication service to create and exchange real time intelligences regarding how fragile communities can avoid or minimize the impact of disaster. The study has been under taken to address the shortcomings of information pertaining to flood early warning and contributed to the development of a Disaster Infor-

mation Management System in two Char-based and disaster prone unions named Rajapur and Ghorjan of Sirajganj District. It is a fact that Char-based isolated communities have no timely access to disaster information due to the absence of community-friendly information, communication and transformation mechanisms. Considering that the Government of Bangladesh introduced Union Digital Centre (UDC), which is intended to become information hub but they were not used as a source of disaster related information. Besides, the UDC in proposed Char-land areas didn't include a large section of Char-based communities in the respective Union and excluded a large section of Char house-holds (HHs) to get information. Considering that Flood Early Warning System (FEWS) introduced 2 (two) additional Char Information Service Centres named Char Digital Centre (CDC)to make all types of necessary information available for all the people living in Char-land areas and the EWS that was introduced for providing easy understandable and timely flood early warming information to the unreachable people in two disasters prone Unions (i.e. Ghorjan of Chauhali Upazila and Rajapur of Bekuchi Upazila) of Sirajganj district in Bangladesh.

The overall objective of this study was to analyse demands of information services that can be delivered through the Union Digital Centres and Char Digital Centres and its long terms perspectives for the sustainable use in the Char -land areas. The specific goals were set i) to identify local needs /demands of information services and prioritize it in line with local problems and inaccessibility of such information; ii) to measure existing areas of income (i.e. stable and temporary income sources) and expenditure and define possibilities of future income for self-sustainability of the UDCs/CDCs in Char land areas, and iv) to recommend further actions to strengthen the information dissemination system.

METHODOLOGY:

A wide range of qualitative methods were used to collect field based data which includes Focus Group Discussions (FGDs), Participatory Research Appraisal (PRA), Key Informant Interview (KII), In-depth Interview and Case Studies in order to ensure interactive environment to allow a cross section of participants under the specific category of stakeholders for sharing their honest opinion. The relevant secondary information was generated from

various sources, such as analytical reports, Bangladesh Bureau of Statistics (BBS) and Union database etc. to supplement the primary information. In both cases, the study applied a strict data triangulation process to verify the information and to assure its reliability. A total of ten FGD sessions (five in Ghorjan union and five in Rajarpur union) were held to understand the community perception regarding the necessity of information services and associated problems where both men and women group of the community, community leaders includes representatives of community based organizations and local government representatives participated. Those

group meetings discussed about demands of information, priorities of local needs and demands and existing areas of income (i.e. stable and temporary income sources) and expenditure, and define possibilities of future income for self-sustainability of the UDCs and CDCs. In addition to, A total of 42 relative government agency, local governments and local elites were interviewed which includes local business entrepreneurs/traders and private sector representative to discuss regarding possible areas of income, service and expenditure and future income service options, business planning based on people's needs.
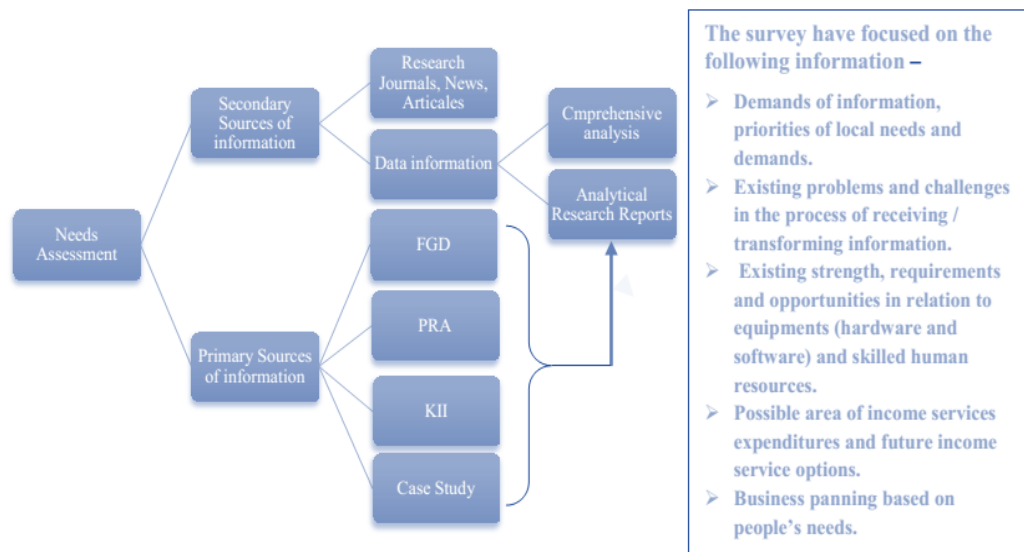

Fig 1: Flow chart of study design.

DISCUSSION:

The categories of participants were diverse in the study areas that showcased their variety of needs/demands with varying professions. Some of the needs/demands being extremely pointed out followed by all categories of participants while on the contrary some needs/demands were figured out only by specific stakeholders.

Needs/Demands of Information of Farmer Group

The information needs/demands of farmers' group were defined through interactive process in the study areas.

Farmers' groups in both study areas have some similarities and dissimilarities in information needs because Ghorjan union is still aback from Rajapur union because flood severely affects Ghorjan Union each year and cause unbearable sufferings to the local people When we asked the target people to define what kinds of information and services are required for continuing live and livelihood in better ways, they defined a numbers of information needs which are mentioned below:

Ghorjan Union	Rajapur Union
1. Flood forecasting news	1. Crop seasonality
2. Market information	2. Flood early warning
3. Education related information	3. Early preparation for flood
4. Health information (specially women and child)	4. Preserving food during flood
5. Information of good quality seeds, fertilizer, insecticide our local business information	5. Homestead plinth
	6. Government Relief
6. Relief information	7. Pisciculture

7. Proper price information	8. Diarrhea disease
8. Veterinary doctor information	9. Road repairmen and construction
9. Weather information	10. Tree plantation
10. Agriculture Product Market process	11. Soil quality
11. Agriculture harvesting system process	12. Work information
12. Modern agriculture instrument	13. Training for women
13. Agriculture loan without interest	14. Quality water
14. Agriculture hybrid training information	15. Char development
15. Harmful insecticides how to remove	16. Electricity in Char areas
16. Pesticides information	17. Care of Pregnant woman
17. Harmful grass remove in the agricultural field	18. Old aged grants
18. Good quality seed and bumper production	19. Nutrition of food for health
19. Easy way to get flood forecasting news	20. Cropping system in sandy soil
20. Irrigation facility information and when it will easy way to apply	21. Animal husbandry
21. Agriculture crop production in the drought condition	22. Governments rules for old aged grants
	23. Health treatment
22. After flood how we nurture our agriculture fields	24. Union Parishad rules and regulations
23. Droughts tolerance crop and rice information	25. Government rules of tuition fees in school
24. Flood tolerance rice cultivation information	26. Gender discrimination
25. Flood forecasting and flood related diseases	27. Deep Tubewell
	28. Crop insecticides
	29. Application of pesticides
	30. Treatment of pregnant woman

Needs/Demands of Information of Fisheman Group

A Fisherman demand advisory services as they are motivated to develop their fish production. Their motivation is closely linked with the existence of market opportunities and prospects for improved and safety working conditions. When a fisherman has the potential information to develop his production, he requires adequate information to negotiate with potential service providers.

It is argued between two unions that in a free and open market, the information and demand for services should arise spontaneously. Market information will bring service providers and fisher-man together. Indeed this happens when fishermen are well informed and when the delivery of services is clearly economically attractive for both providers and their clients. The demands of information services vary from Ghorjan Union to Rajapur which are mentioned below:

Ghorjan	Rajapur
1. Hospital or community clinic information	1. Food nutrition
2. Gonno Shikkah Kenrda information	2. Old aged grants
3. Where available of good quality doctor	3. Health treatment
4. 4 hours for go and come back to school	4. Treatment of pregnant woman
5. Village information center	5. Fish catch and fish selling
6. Sanitation facility information	6. Weather forecasting news
7. Availability flood forecasting news information	7. Fisheries law
8. Cyclone warning news information	8. Education for all
9. Irrigation facility information	9. Agriculture and fish practices in same land
10. Shallow machine instruments	10. Plant disease
11. Agriculture information centre	11. Animal husbandry
12. Old age education center	12. Flood
13. Actual price of fish	13. Flood shelters
14. Veterinary doctor	14. Crops cultivation
15. Community clinic information	15. Technical and vocational education training
16. Police station and secured system information	16. Poultry firm
	17. Land digging works

Ghorjan	Rajapur
1. Flood information	1. Homestead vegetable cultivation
2. Health treatment information	2. Animal husbandry
3. Plinth and raised homestead related information	3. Treatment for Pregnant women
4. Sanitation facility information	4. Infant treatment
5. Maternal health information	5. Birth Registration
6. Relief information	6. seeds for Farmers
7. Good quality doctor information	7. Where and how to get Works
8. Good Madrasa and school	8. Sewing work for women
9. Family planning information	9. Exam Result information
10. Result information	10. Short hand training

Unfortunately, many small scale fishermen are unable to take advantage of market opportunities partly because they are constrained by lack of information, and also because they do not have the knowledge and the resources to formulate and articulate their demands for information.

Needs/Demands of Information of Woman Group

Women strongly emphasized on free health care programme participation; and group learning on both economic activities and wider social and wellbeing issues (including awareness of basic rights and laws and enhancing knowledge of health, hygiene and disaster preparedness). Participating women are strongly interested to know how to reduce environmental and economic risk (for instance, raising households on plinths above the highest known flood levels, establishing social safety nets to assist vulnerable households, providing access to clean water and sanitary latrines to reduce disease, and creating employment during disaster); assistance to households to establish small businesses and creating income that work for the family; access to a village savings and loans groups.
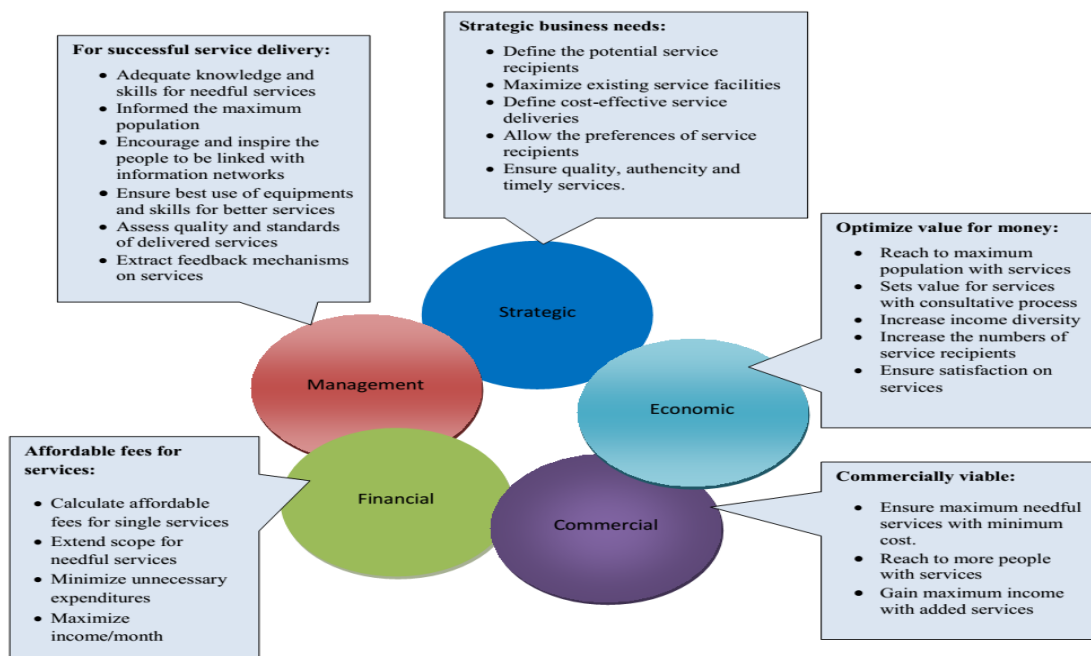

Fig 2: Business model for Rajapur and Ghorjan unions.

Sustainability of Digital Centers and Skilled Volunteers (Considering Business Plan)

According to Liam *et al*. (2013) "Sustainability implies responsible and proactive decision-making and innovation that minimizes negative impact and maintains balance between ecological resilience, economic prosperity, political justice and cultural vibrancy to ensure a desirable planet for all now and in the future". Sustainable digital centers and skilled volunteers are the key components for the local

communities for information reception but their sustainability follows through diversity of income sources of the entrepreneurs of UDC & CDC, less expenditure of them and a handsome future earning expectation which is rather a means of social and cultural stability of the overall community people.

Areas of Income (Digital Centers and Skilled Volunteers)

UDC, CDC and Volunteering are prominent elements of sophisticated corporate approaches to community investment but the process of attaining an employment is not easy at all rather it is full of obstacles and very confusing. Applicant or interested individuals go through the agony of cumbersome government policies and arduous bureaucracies. Digital sustainability has been implemented through appropriate use of ICT in Bangladesh as it is targeting audience both at individual level and institutional level. At the individual level the audience is both educated urban/rural people who are searching for employment and migrant workers who are already working. At the institutional level, it is the organ-izations working with workers and associated with the migration process.

- Create income generation opportunity for people through promoting professional skills in development of multimedia materials.
- Improving the competency of people for better performance in the local employment market.
- Information and instruction based audio-visual life-skill digital content that provides infor-mation to unemployed, semi-skilled and low income young women both in rural and urban areas. It takes them through the process of preparation, helping them at each step, pro-viding sufficient information for them to make informed choices.

Income generation for UDC Entrepreneurs, CDC Entrepreneurs & Volunteers counts on the facilities or instrumentations they have to provide wellbeing of local people in a very lower cost. Rajapur and Ghorjan Union's UDC & CDC entrepreneurs have a few income sources with their existing strength which rather pushing them up for further expansions.

Table 1: Existing Sources of Income of UDC, CDC & Volunteers

	UDC	CDC	Volunteers
Areas of Income (Based on Field Study in Rajapur and Ghorjan Union)	• Birth Registration • Death Certificate • Photocopy • Paper and Photo Print • MS Office works • Electricity bill • Varsity admission and result • Job related information	• Training Allowance • Government Information delivery using Internet Service	• Training Allowance

UDC/CDC have opportunity to create their com-petitive market based on orientated demand of information, environment and weather, develop competitive and business advantages, and under-stand threats to sustaining advantage in the face of challenging competitive threats. Different appro-aches including institutional organization, the resource-based view, dynamic capabilities, have helped academicians and practitioners understand the dynamics of competition and develop recom-mendations on how UDC/CDC should define their competitive business strategies. Advances in infor-mation transformation and communication techno-logies have driven the recent interest on business model innovation. However, the business model innovations are transforming information, communi-cation and IT- driven in the education sector; other forces, such as globalization and deregulation, have also resulted in new business models and fed the interest on this area. The business model is organ-ized as follows.

In Rajapur and Ghorjan Union UDC/CDC provide services with small scale areas because of their unavailability of facility, less demands, uneducated and some constraints. Everyday UDC provides service with their capabilities and almost twenty people have taken service. But CDC provides more service than UDC based on the information in the Ghorjan area with a free of cost.

Table 2: UDC/CDC monthly, yearly and future income in Chowhali union

Income Sectors	Present Amount of Income (USD)		Business plan for the next years	Future income for Next 3 Years (USD)
	Monthly	Yearly		
Photocopy, Print	41.42	497.08	If the photocopy machine and printer have more income will high.	497.08 * 3 =1491.25
ID cards, Electricity bill	20.12	241.44	If UDC/CDC provide a large scale they will get more profit	241.44 *3= 724.32
Education based information (Exam result, CV, form fill up	21.3	255.64	If the availability of internet network and low cost business will soar, UDC/CDC will get more profit.	255.64 *3= 766.93
Stationery	35.51	426.07	All kind of stationery will be available in the UDC /CDC center, then they will fulfill the demand	426.07 *3= 1278.21
Total = 118.35 USD		Total = 1420.24 USD		Total = 4260.71 USD

In Rajapur UDC the current and future income of the Entrepreneurs usually depends on how the equipments are working whether it is working smoothly or out of work. Unfortunately most of the equipments were found out of work. However the actual income of the entrepreneurs is counted without the expense that occurs monthly. The actual income in general is not sufficient for an entrepreneur to maintain his family expense each month.

Income Sectors	Present Amount of Income (USD)		Business plan for the next years	Yearly Future income for 3 Years (USD)
	Monthly	Yearly		
Photocopy, Print, Scanner, Projector	47.34	568.09	Photocopy machine & Printer is out of work. Need to fix. Increase the use of projector.	568.09*3= 1704.28
ID cards, electricity bill, Birth Certificate, Death Certificate etc.	29.59	355.06	If UDC/CDC provide a large scale they will get more profit	355.06* 3=1065.18
Education based information (Exam result, CV, form fill up, Computer compose, Email, Job application, Visa check etc.	41.42	497.08	Availability of internet network and low cost business will soar and UDC/CDC will get more profit.	497.08*3=1491.25
Stationery (Paper, Photo paper etc)	47.34	568.09	All kind of stationery need to be available in the UDC /CDC center than they will fulfill the demand	568.09*3=1704.28
Total = 165.69 USD		Total = 1988.23 USD		Total = 5965 USD

Areas of Expenditures (Digital Centers and Skilled Volunteers)

Our research indicates (expenditure of UDC/CDC employee, volunteer programme's and their community investment aspirations) that until recently, dissemination of information through UDC/CDC, the shift to skill-based volunteering is based less on deliberate strategy, and more on responding to requests from volunteer hosts for more strategic, skill-based volunteer time. Primary approaches to skill-related volunteering programs have emerged. They are:

- Provision of a little amount of cost or charge services; and
- Skill-transfer and capacity building

The range of expenditures of UDC, CDC and Volunteers depend on peoples need to access information as well as their usual and emergency needs to hardware and software. Rajapur Union and Ghorjan Union both have UDC Entrepreneurs, CDC Entrepreneurs & Volunteers, who are working as people's organization to deliver various informations thus the expenditures, arise.

Table 3: Existing Sources of Expenditures of UDC, CDC & Volunteers

	UDC	**CDC**	**Volunteers**
Areas of Expenditures (Based on Field Study in Rajapur and Ghorjan Union)	• Paper purchasing • Pen purchasing • Electricity bill • Home rent • Furniture • Computer instruments • Internet package	• Communication expense (Travel & Mobile) • Computer instrument (in need) • Internet Package	• Communication expense (Travel & Mobile)

Recommendations for Improving the Information Dissemination System

The following recommendations have been made in light of the activities being observed during detail field survey in two unions. These are recommendations made to strengthen and improve the information dissemination system already being undertaken in the respective unions. The specific activity through which the recommendations could be incorporated is included in parenthesis.

Reommendation-1: Ensure that available data/ information on flood in the target areas effectively disseminated

- Ensure that information dissemination on flood early warning is addressed from top level people to root level people as early as possible through easiest ways.
- Ensure that data/information during flood about what to do for saving maximum lives and properties with instant measures.
- Consequences after flood to cope up with deprivation needs to be informed in a sustainable way.

Recommendation-2: Ensure that available data/ information on fundamental needs of people in the study areas effectively disseminated

- Minor health problems and its first aid measures for the people of study areas should necessarily are circulated by the easiest possible way.
- Ensure development of information on communication and transportation to connect remote areas time to time with mainland, schools, bazaar, hat, other institutions etc.

- Publicize basic information of educational system (primary education, secondary education, school fees, admission process etc.) is significant for uneducated people of rural areas to encourage their children's schooling.
- Emphasizing on dissemination of women's personal health issues and its careful measures to take through increasing the number of female health-expert or female doctors for the rural women.
- Increase the informative knowledge of the farmers about static agricultural parameters (seasonal cropping, soil quality, pests and pesticides, cropping during flood, fruiting tress etc.) to reduce their vulnerability.
- Raise the informative knowledge of people about food nutrition of easily and cheaply procurable foods (rice, wheat, vegetables, fish etc.) for their normal wellness.

Recommendation-3: Strengthen Union Digital Centre's information dissemination system by increasing more capacity building

- UDC as an information hub is a best way to disseminate information but information availability and redundancy need to reassert.
- Immediate fixing the instruments which are out of work as well as increase the potential expertise of the UDC entrepreneurs.
- Ensure to cover more people under information system by setting up UDC in places mostly available to large number of people.

Recommendation-4: Increase the potential income sources of the UDC entrepreneurs to encourage their efficiency

- Enrichment of instrumental facility besides the existing equipments to accelerate income sources for sustainable management of UDC.
- Government initiatives to determine the entrepreneur's monthly fixed salary to ensure reliability to their respective jobs.

Recommendation-5: Strengthen Char Digital Centre's information dissemination system by increasing capacity building

- Ensure instrumental availability and accessibility to CDC entrepreneurs required to disseminate information to all char-land people.
- Increase the number of CDC in major char-land areas to address maximum number of people in any point of time.
- Establishment of collaborative approach between UDC and CDC to share the lacking of each other for majority's betterment.

Recommendation-6: Increase the potential income sources of the CDC entrepreneurs to encourage their efficiency

- Ensure uninterrupted connection of internet for CDC entrepreneurs to collect any information anytime from websites for dissemination. From some services (providing services to local people like-emailing, job search, birth registration etc.) they can generate income very easily.
- Ensure monetary support or grants to disseminate information to all stakeholders; even in emergency need disseminate information to respective communities as early as possible.

Recommendation-7: Increase work-space and efficiency of Volunteer/CBO/CSAG to target areas for door to door dissemination of information

- Increasing volunteer number based on villages or wards to disseminate information from people to people for saving lives and properties as much as possible.
- Developing modern and time consuming training facilities for the volunteers/CBOs in regular basis along with mock-drill.
- Strengthen knowledge, capacity and leadership of CBOs/CSAGs as if they can carry out necessary activities during the time of urgency.

Recommendation-8: Ensure large scale dissemination systems for all communities to take instant actions and time savings

- Dissemination of information using mike in bazaar, hat, mosque, play ground, temple or any other places usually where people mostly gather.
- Leaflet, booklet, pamphlet, poster or other informative printed papers can be circulated and publicized in mostly gathered public places.
- Billboard or digital display board containing different information which people generally seek for can be constructed in populous places.

CONCLUSION:

With special focus on the local needs and demands of the information on various aspects of the char land area information emphasis on the dissemination, the follow up the feasibility study assessed a wide range of information surrounding the operational and conceptual aspects of the local community. Most of the community people perceived extreme poverty as the root cause of unemployment, lack of awareness and illiteracy. Indeed this happens when communities are well informed and when the delivery of services is clearly economically attractive for both providers and their clients. The demands of community mostly based on information standards and other quality standards. The survey finding was carried out in the status of access to information within the char land areas. The feasibility study of the focus areas has been carried on through informative perspective of capacity building and including skill development within the community at the grass root people and various government agencies and the feasibilities reports also documented an improvements and perception in identifying consequences of information on flood early warning and contribute to the development of a Disaster Information Management System in Char-land areas of Bangladesh. Char-based isolated communities have no timely access to disaster information and it continues due to absence of community-friendly information communication and transformation mechanisms. The confidences level of the local community in being able to articulate cultural, economic, social and political rights of human being has also significantly improved, which has reflection on community involvements in the different awareness

information campaigns, particularly country yard meetings, school programme, information rights focused ICT, dramas and the dissemination of campaign materials , brochures, etc. There has also been definite improvement in the consequences among community people as to where they can access to the holistic information and seeking information from the UDC/CDC official and volunteers. The UDC/CDC has not only reduced the gap of information among the community people but also increased the awareness building. Thus, it is concluded that a holistic approach rights to information and obstacle prevention must teach both information rights holders and institutional barriers simultaneously, so that the benefit of the community are experienced in the dynamic relationships and previously silenced sections of the society are emancipated to claim what they want.

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CONFLICTS OF INTEREST:

The authors declare there's no conflict of interest to publish the present work.

REFERENCES:

1) Alemna, A. A., and Sam, J. (2006). Critical issues in information and communication technologies for rural development in Ghana. *Inform. Develop.*, **22**(4), 236-241. https://doi.org/10.1177/0266666906074181

2) Ashraf, M., Grunfeld, H., Harris, R., Alam, N., Ferdousi, S., & Malik, B. T. (2011). An explorative study of ICT for Developmental Impact in rural areas of Bangladesh. *Media Asia*, 38(1), 22-31.

3) Community Report Sirajgonj Zila, (2012). Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning.

4) Cultural survey report of Belkuchi Upazila, (2007). Available online on - http://www.banglapedia.org/HT/B_0449.htm

5) Cultural survey report of Chauhali Upazila, (2007). Available online on – http://en.banglapedia.org/index.php?title=Chauhali_Upazila

6) Chowdhury, M. S., & Alam, Z. (2009). ICT-Driven Knowledge Economy in Bangladesh: Issues and Constraints. *Journal of Knowledge Management Practice*, **10**(1).

7) de Munster. I.L. (2004). The digital divide in Latin America: A case study. *70th IFLA General Conference and Council*, 1-10.

8) FAO. (2001).*Discovering the "magic box": Local appropriation of information and communication technologies*. Retrieved 12 December, 2017, from: http://agris.fao.org/agris-search/search.do?recordID=XF2008437183

9) Goulding. A. & Spacey. R. (2002). Women and the information society: Barriers and participation. *68th IFLA Council and General Conference*, 1-10.

10) Hasan, R., Islam, S., Rahman, M. S. & Jewel, K. N. A. (2009). Farmers access to information for agricultural development in Bangladesh. *Bangladesh Research Publication Journal*, **2**(1), 319-333.

11) Hoq, K. M. G. (2015). Rural library and information services, their success, failure and sustainability: a literature review. *Information Development*, **31**(3), 294-310. https://doi.org/10.1177/0266666913515693

12) Hoque, M. R. & Sorwar, G. (2015). ICT based e-government services for rural development: a study of union information and service center (UISC) in Bangladesh. *The Electronic Journal of Information Systems in Developing Countries*, **71**(8), 1-19.

13) Hossain MR, Khatun S, and Rashid MA. (2019). Present status of information and internet services in union council of Madhukhali upazila: a case study, *Br. J. Arts Humanit.*, **1**(6), 35-44. https://doi.org/10.34104/bjah.019.35044

14) Islam, M. A. & Hoq, K. M. G. (2011). Community Internet access in rural areas: A study on community information centres in Bangladesh. *Malaysian Journal of Library & Information Science*, **15**(2), 109-124. https://mjlis.um.edu.my/article/view/6936

15) Kashem, M. A., Faroque, M. A. A., Ahmed, G. M. F. & Bilkas, S. E. (2013). The complementary roles of information and Communication technology in Bangladesh agriculture. *Journal of Science Foundation*, **8**(1-

2), 161-169.
https://doi.org/10.3329/jsf.v8i1-2.14639

16) Kizilaslan, N. (2006). Agricultural information systems: a national case study. *Library review*, **55**(8), 497-507.

17) Mchombu, C. M. (2000). Information needs of women in small businesses in Botswana. *The International Information & Library Review*, **32**(1), 39-67.
https://doi.org/10.1080/10572317.2000.10762503

18) Muzareba, A. M., & Rahman, M. (2016) Exploring Relationships among ICT, Climate Change, and Poverty in Changing Development Platform: Bangladesh Perspectives. *DU Journal of Marketing*. **16**(2), 11-25.

19) Overseas Development Institute. (2002). *ICTs and Rural Development: Review of the Literature, Current Interventions and Opportunities for Action.* Retrieved November 15, 2017 from -
https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2670.pdf

20) Pade-Khene, C., Palmer, R. & Kavhai, M. (2010). A baseline study of a Dwesa rural community for the Siyakhula Information and Communication Technology for Development project: understanding the reality on the ground. *Information Development*, **26**(4), 265-288.
https://doi.org/10.1177/0266666910385374

21) Prodhan, F. A. & Afrad, M. S. I. (2014). Knowledge and perception of extension workers towards ICT utilization in agricultural extension service delivery in Gazipur district of Bangladesh. *International Journal of Agricultural Research, Innovation and Technology*, **4**(2), 46-52.
https://doi.org/10.3329/ijarit.v4i2.22647

22) Rahman. A. (2008). Access to global information: A case of digital divide in Bangladesh. *Proceedings of the IATUL Conferences,* **25**, 1-7.
http://www.btrc.gov.bd/sites/default/files/journal_file/access_to_global_information.pdf

23) Rahman, S. M. A. (2016). Prospects of PPP in expanding ICT services in rural Bangladesh: A case of union digital center. *International Journal of Economics and Finance*, **8**(2), 163-170.

24) Shore, L. (1980). Mass media for development: a re-examination of access, exposure and impact. *Mass media for development: a re-examination of access, exposure and impact*, 19-45.