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The 'fishnet approach' to livelihood improvement in depressed basins: evidence from BRAC's Integrated Development Programme

Jinnat Ara, Syeda Sitwat Shahed, Rehnuma Rahman, Sibbir Ahmad and Narayan Chandra Das

ABSTRACT

The multidimensional nature of poverty renders comprehensive development efforts encompassing livelihoods, health, and education as well as communal support, essential for achieving equality in growth. Such an integrated service approach has neither been widely practiced nor assessed: therefore, this article analyses the impact of BRAC's Integrated Development Programme implemented in remote depressed basins in north-eastern Bangladesh. Households within the intervened area are not only economically better off due to higher purchasing power, insurance against crisis as well as occupational diversity, but also have stronger social cohesion, especially women.

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Introduction

Haors are large bowl-shaped floodplain depressions located in north-eastern Bangladesh. There are 373 *haor* located in seven districts (Sunamganj, Sylhet, Habiganj, Maulvibazar, Netrakona, Kishoreganj and Brahmanbaria) covering around 43% of the total area of *haor* districts, encompassing 69 sub-districts, including about 1.99 million ha (19,998 km²) and accommodating about 19.37 million people (Master Plan for Haor Area 2012). This region has unique hydrological characteristics and is endowed with rich flora and fauna, including hill/social forests, freshwater swamp forests, reed lands, murta and cane bush, bamboo grove, and homestead vegetation.

Surrounded by the mountain ranges of India-Meghalaya to the north, Tripura and Mizoram to the south, and Manipur and Assam to the east, the *haor* area receives water from the catchment slopes of the Shillong Plateau in the north and the Tripura Hills in the south-east. In addition, about 35% of the Meghna basin ultimately drains into the Bay of Bengal through the Kalni-Kushiyara and Surma-Baulai river system. Trans-boundary flow from India into Bangladesh during the pre-monsoon season, together with excess rainfall in the upstream hilly areas and subsequent runoff, sedimentation in the rivers, deforestation and hill cuts, landslides, improper drainage, unplanned roads, and water management infrastructure lead to devastation caused by flash floods. Frequently occurring flash flooding in the *haor* area affects the primary production sector (agriculture) and threatens the lives and livelihoods of the population (Master Plan for Haor Area 2012).

These geographic adversities along with weak transportation system contribute to more than 60% of the *haor* population living below the poverty line due to a lack of access to land, education, health, water, and sanitation (Khan and Islam 2005). The unique nature of the depressed basins results in multiple aspects of deprivation. The long months of submergence renders transportation extremely challenging, and flash floods wash away the boro winter crop, the staple harvest in the *haor* (Rabby 2012). Over half the population are landless and live on earnings through physical labour (Sharma

2010). During the long monsoonal deluge, apart from fishing, there are very few alternative work opportunities available (Gardner and Ahmed 2006). Despite the wetlands having the potential for profitable fisheries, the marginalised exist by subsistence fishing as strong institutional affiliations restrict access and control over water bodies to only the local elite (Sharma 2010; Rabby 2012; Shahed et al. 2018).

Livelihood deprivation sits alongside low skill development; the majority of *haor* dwellers have few livelihood skills largely due to poor educational facilities. Retention in school gradually declines at higher grades (Nath 2013), and the teacher retention rate is generally very poor, resulting in the low standard of education. Access to primary healthcare services, particularly for maternal care, is negligible. The insecure environment reinforces early marriage, with negative effects for young women. Family planning is infrequent, as more than one-third of couples do not use contraceptives, leading to high adolescent pregnancy (Shahed et al. 2018). Seemingly, without a comprehensive development effort, very few people of this region can leave the vicious cycle of poverty.

In response to this, the Bangladesh Haor and Wetland Development Board developed the *Haor* Master Plan (2012) envisioning a 20-year development framework with specific attention to climate change, agricultural development, social safety nets, and improved standards of living, physical infrastructure and technology development. A number of international NGOs such as Care Bangladesh, Concern Bangladesh, and Oxfam, along with many local NGOs such as Grameen Bank, ASA, TMSS (Thengamara Mohila Sabuj Sangha), RDRS (Rangpur Dinajpur Rural Service), Shakti Foundation, POPI, CNRS, FIVDB (Friends in Village Development Bangladesh), and ASD (Assistance for Slum Dwellers) have also worked in the *haor* region over a long period of time. However, despite continuous multi-stakeholder support, a holistic intervention covering the environmental, economic, and social dimensions of hardship still seems to be absent in the wetlands.

Considering the multifaceted vulnerability of the *haor* region, BRAC undertook an Integrated Development Programme (IDP) in the districts of Habiganj and Sunamganj, using a holistic approach encompassing ten different programmes. This article examines the effect of the IDP on the livelihoods of *haor* dwellers. Several papers discuss the impact of various single-focus development interventions that are implemented mainly in non-*haor* poor areas, and document significant impacts. Bandiera et al. (2016) show that grants and training can sustainably lift the ultra-poor out of poverty, and Malek et al. (2015) show that credit support to tenant farmers has led to significant improvements in financial inclusion, graduation to non-farming activities, and women's participation in income-generating activities. Impact analysis of health and sanitation programmes shows that services delivered significantly improve safe delivery and sanitation conditions (Quayyum et al. 2013; Akter and Ali 2014). On the contrary, Banerjee et al. (2015) report that microfinance has produced mixed evidence of its effectiveness.

The critical question of whether a holistic development intervention is sufficient to aid the development of people facing multi-dimensional vulnerability remains unanswered. This paper contributes to bridging this knowledge gap by investigating whether a programme combining interventions can create a positive impact over underdevelopment in geographically vulnerable areas. It therefore develops existing literature on credit and grant-based support programmes, and health-related interventions (Quayyum et al. 2013; Akter and Ali 2014; Malek et al. 2015; Bandiera et al. 2016).

BRAC's Integrated Development Programme

In the early 1970s, BRAC began by using an integrated model but later moved toward a sectoral approach, and currently operates through several mainstream programmes. These individual programmes have been found to be largely effective in reducing poverty and vulnerability. However, underdevelopment persists in the *haor* region. Believing that integrated services might be the most effective solution for such regions, BRAC developed a pilot Integrated Development Programme (IDP) in 2013, purposefully targeted at socio-economically lagging regions, including the

depressed basins/*haor* in north-eastern Bangladesh. The first phase of the IDP was initiated in Baniachong and Derai upazilas of Habiganj and Sunamganj districts (Figure 1) during 2013–2015.

In contrast to the conventional approach of single programme delivery, the IDP combines ten key services under one programme organiser through a one-stop service centre, the village development organisation (VDO), which consists of 25–40 women. To further strengthen the VDOs, development support groups were formed, comprising community members and a VDO representative. IDP targets the bottom 70% of the *haor* population, aiming to enrich their livelihood opportunities. This extensive coverage has been achieved through a balanced combination of support components of which a few are offered at the community level, and some are exclusively for specific individuals, depending on the eligibility criteria under each component.

To promote social inclusion through empowerment, the IDP combines three significant programme efforts under its integrated framework. Of these three, the Community Empowerment component has the largest share of coverage. Community empowerment has been provided to the poor, particularly women through communal institutions such as village society (*Polli Shomaj*, *Union Shomaj*) and theatre shows so that they are aware of and able to exercise their rights, can claim their entitlements and resist exploitation. National-level networking is also included to ensure greater accessibility of information regarding various government social services Vulnerable Group Feeding (VGF)/Vulnerable Group Development (VGD) programme/government allowance. The community empowerment component provides survivor support services as well as organised rehabilitation and social reintegration to address violence against women. The IDP also includes the Gender, Justice and Diversity component, which through promotional activities, aims to sensitise stakeholders regarding gender friendly environments, empowerment and thus reduce gender discrimination. In conjunction with BRAC's effort to empower women and raise awareness, the IDP also includes a Human Rights and Legal Aid Services (HRLS) component which offers support to defend the human rights of the marginalised people through legal education, legal aid, and support services.

The IDP combines another two BRAC programmes under its umbrella to improve health and sanitation condition in remote *haor* basin: WASH (Water Sanitation and Hygiene) and HNPP (Health, Nutrition, and Population). The WASH component aims to improve sanitation and hygiene practices and



Figure 1. Location of the IDP Programme.

access to safe drinking water. In addition to building shared latrines, WASH is also involved in building community groups, the capacity of community/social leaders, and advocacy with government bodies. This component serves more than 30% of the targeted population. The HNPP component, an collection of reproductive, maternal, child nutrition and general nutrition promotion, safe delivery system, post-natal care, and tuberculosis control has been brought together as part of BRAC's core health intervention model. To provide services in the remote community, HNPP developed frontline community health workers and birth attendants, and paramedic driven floating/static delivery centres to ensure safe delivery and provide newborn care. Satellite clinics provide primary healthcare for the mass population and health support is provided for the overall community on a needs-based approach.

In addition to social empowerment and development of the public health system, the IDP also aims to improve the economic condition of the *haor* through its Microfinance and TUP (Targeting the Ultra Poor), Safe Migration and Agricultural components.¹ Microfinance has the largest coverage (19%) and offers savings (general savings, monthly deposit scheme, fixed deposit scheme, double deposit scheme, and monthly profit deposit scheme) and credit products mainly to VDO members. Microloans (*Dabi*), ranging between Tk. 8000–Tk 75,000, (repaid weekly/monthly) are given exclusively to VDO members and are generally used for poultry, livestock, fruit and vegetable cultivation, handicrafts or rural trade. Micro-enterprise loans (*Progoti*) (Tk. 75,000–600,000), are given to female and male entrepreneurs to help expand existing enterprises which are too small to qualify for credit from mainstream banks. Borrowers generally use these loans to finance shops and small-scale manufacturing activities.

The TUP programme provides assets such as livestock as grants to the poorest for their economic upliftment. Both microfinance and TUP aim to increase the income, assets base, financial market participation and employment opportunities of the *haor* dwellers. Under the Safe Migration component, IDP offers opportunities to unemployed youths to migrate to other countries for more rewarding livelihoods by improving their knowledge and creating communal pressure groups on the safe migration process.

Agriculture support focusing on adaptive agriculture, fisheries, livestock and poultry (homestead vegetable cultivation, crop cultivation, livestock and poultry raising, and fish culture) is provided to men and women. Those owning at least one decimal of land receive support on homestead gardening, and those who own a maximum of 30 decimals of land were eligible for farming support where beneficiaries were trained on high-yielding variety rice cultivation and supplied with seeds. Farmers with a maximum of two acres were eligible for agricultural credit. Credit support was also extended for livestock and poultry rearing, cage cultivation, and fisheries under the BRAC's regular microcredit system. Furthermore, interested local retailer/agro-extension workers were trained and matched with local livestock, poultry, and aquaculture dealers.

The Education component targets poor school dropout children to ensure they complete primary education and supports government-provided secondary education. In *haor*, the IDP has developed pre-primary schooling, where nearly 60% of students are girls, who after completing the one-year pre-primary courses are enrolled in the nearest primary schools. To ensure the inclusion of children who have either dropped out or never enrolled, the IDP considers 8–10 years as a suitable age for primary education, and 11–14 years for higher education.

How the IDP can improve the livelihoods of *haor* dwellers

The *haors* and wetlands located in northeastern Bangladesh contribute around 6–8% of national GDP, of which 37% is from the service sector and 36% from agriculture, which in turn supplies 20% of country's total staple food (rice) (Rabby et al. 2011; Sumon and Islam 2013). Despite holding immense potential, the three major resources of *haor* (land, water and human) cannot be utilised in an integrated way due to the unique geographical and complex hydrological characteristics (CNRS 2007; Climate Change Cell 2008; CNRS-Action Aid Bangladesh 2008; Master Plan of Haor Area 2012).

Sharma (2010) reports that among the 71% landless households in the *haor*, 55% suffer from food insecurity, mono-crop cultivation, and seasonal unemployment. Considering that seasonal wage labour is the main occupation for most people (38%) as oppose to agricultural labour (27%) and fishing (20%), Sharma suggests finding alternative income-generating activities throughout the year as potential coping strategies for *haor* habitats; the need to develop crisis coping strategies to deal with natural calamities and lean season; and suggests transferring cash or assets to poor households to help them move out of chronic poverty. Sumon and Islam (2013) suggest efficient utilisation of resources involves repair and rehabilitation of flood control infrastructures, enhancement of communication networks, multiple uses of water resources, with emphasis on fishery, agriculture, cattle farming and employment opportunities for both men and women throughout the year, and would be more efficient through a combined effort by all stakeholders, including government and NGOs.

Community-based development efforts are expected to achieve limited impact if associated structural change is not planned accordingly. Talukdar (2019) highlights that the poverty and vulnerability of *haor* dwellers living in the flood-prone areas, can be best addressed through multifaceted development combined with diverse and innovative actions. Megh and Najnin (2011) suggest structural changes involving raising the heights of embankments, construction of box culverts, and replanting trees. Most government initiatives focus on structural changes, whereas NGOs focus on non-structural actions (Kamruzzaman and Shaw 2018). Along with the government many international and local NGOs have been working in the *haor* region over a long period of time. Evidence suggests that in most cases projects focus on a single objective rather than multiple goals. The “Strengthening Household Ability to Respond to Development Opportunities-II” (Shouhardo II: 2010–2015) project implemented by CARE Bangladesh resulted in significant positive change in child stunting over time through improved care practices for mothers and children, increased consumption of vitamin supplementation (children) and food for both children and mothers, increased use of hygiene practices by mothers, and improvements in access to safe water (Smith 2015). Even though the project included livelihood and empowerment support components, the impact estimation strongly depended on the outcome indicator of stunting. Hence the broader impact of the project is not care.

International environmental NGOs such as Greenpeace, ACOPS (Advisory Committee of Protection of the Sea), The International Institute for Environment and Development, IUCN, ActionAid, and Winrock International are working with Bangladeshi-based NGOs such as BCAS, CNRS, Bangladesh Poribesh Andolon (BAPA), FEJB, Ongikar Bangladesh Foundation, and Sundar Jibon (Ahsan, DeValls, and Blasco 2009).

NGOs have also implemented several governmental projects as partners (Islam 2002). These include in Tanguar *haor* of Sunamganj District, Sylhet Division (one of the biggest wetlands of Bangladesh and a Ramsar site), the “Community Based Sustainable Management of Tanguar Haor Project” (CBSMTHP: 2006–2016) funded by Swiss Agency for Development and Cooperation and implemented through the Center for Natural Resource Studies (CNRS), Efforts for Rural Advancement (ERA), HELVETAS Swiss Inter-cooperation, Bangladesh Environmental Lawyers Association (BELA), and Gana Unnayan Sangstha (GUS). It aims to develop co-management governance, with a grassroots foundation linking to the government’s highest policymaking level to establish the conservation, stabilisation and sustainable use of the natural resources of Tanguar Haor and generate significant improvements in the livelihoods (ICUN n.d.). The project midterm review pointed out that the efforts to mobilise economic opportunity and secure access rights to resources are commendable, but sustainability itself is a critical concern and the co-management institutions are not truly inclusive as the bottom-up approach essential for the sustainability of the governance system is yet to be established (Mazumder 2014). Other examples of wetland development projects are the IFAD-funded “Community-based Fisheries Management Project” implemented jointly by the World Fish Center and the Local Government Engineering Department, and the “Climate-Resilient Ecosystems

and Livelihoods (CREL) Project” funded by USAID and implemented by Winrock International (Mazumder 2014).

Multi-layered development providing inclusive interventions in the environmental, economic, and social dimensions of poverty is lacking in the wetlands, and to address this BRAC’s IDP takes an integrated approach that combines ten essential support components under one service delivery mechanism.

IDP provides services through their frontline staff in the *haor* areas for the overall development of *haor* dwellers. During home visits or weekly/biweekly meetings, the programme staff provide awareness raising information, and monitor their progress for two years. The frontline staff transmit relevant information (such as information about how to reduce flood losses by harvesting early, and how to save livestock during floods) to the beneficiaries of different components when needed for the participants’ welfare. They provide information related to crisis coping strategies and materials on what to do during natural calamities. Table 1 shows the expected outcome of IDP. We expect that this holistic approach would have an impact on reducing the overall vulnerability of *haor* dwellers.

Table 1. Conceptual framework on how the IDP can impact livelihoods.

IDP component	Output	Outcome
Community empowerment	Increase awareness about social and legal issues	Increase women empowerment
Gender, justice and diversity	Increase social inclusion	Reduce violence against women Increase communal network
Human rights and legal services	Reduce gender discrimination	Improved gender equality
Water sanitation and hygiene	Improved sanitation and hygiene	Improved health
Health, nutrition and population	increased access to health services	Improved maternal and child nutrition
Education	Reduce school dropout	Increase completion of primary and secondary schooling
Asset transfer to the ultra poor	Increase income, asset and savings Increase self-employment	Improved income and employment opportunities Increase asset accumulation Increase food consumption
Microfinance	Improved borrowing behaviour	Increase financial market participation
Agriculture	Diversify agro-productivity	Reduce loss from flood risk
Safe migration	Increase awareness about the migration process	Increase safe migration
Education	Reduce school dropout	Increase completion of primary and secondary schooling

Methods

Evaluation design

Prior to the pilot intervention, a census was conducted in Derai (2011) and Baniachong (2012). It collected information on demographic characteristics and education of household members, morbidity and healthcare-seeking behaviour, sanitation, access to electricity, land use and occupation, access to financial and other services, and self-perception on food security and poverty from the intervention *upazilas*.

As the census did not cover any non-intervention areas, the impact is analysed using cross-section data from a follow-up survey in 2016 when the counterfactual group was identified. Since the IDP covered all the villages of Derai and Baniachong where at least half the households received CEP support (46%) followed by 34% households receiving WASH support, counterfactuals could not be identified from the same *upazilas* due to the possibility of spillover effects. However, assuming that the neighbouring non-intervened *upazilas* may have had similar socio-economic characteristics before the intervention, control households were identified through

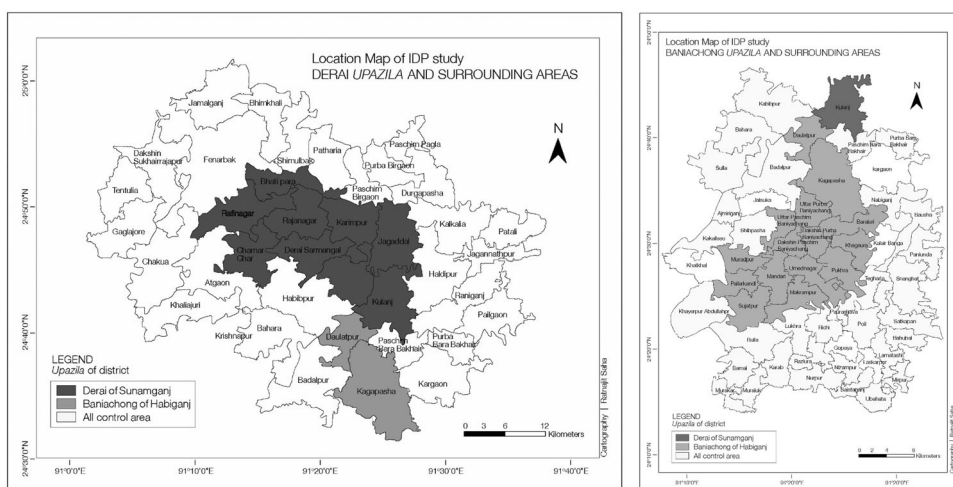


Figure 2. Location of IDP upazilla and surrounding unions.

surveying households from adjacent non-intervened *upazilas* situated at the boundary of the two intervened upazillas. We identified 8–9, and 10 neighbouring upazilas located at the borders of Baniachong and Derai respectively, which hold 130 villages that share boundaries with villages of the two intervened *upazilas*. Further survey mapping indicates that, within the two treated upazilas, 50 and 79 villages from Derai and Baniachong respectively are located at the periphery of the *upazilas*. In the follow-up survey, we thus covered 129 treated *upazilas* (located at the periphery of Derai and Baniachong) and 130 *upazilas* from nearby non-intervention areas (Figure 2). From each village, we randomly selected 20 households. After cleaning the data, the final sample generated consists of 4674 households, of which 2074 are treatment households and 2600 are comparison households.

The follow-up survey collected detailed information at both household and individual level. At the household level, it collected data on demographic characteristics, sanitation and hygiene practices, health-seeking behaviour, asset holding (including financial, natural (lands), and physical assets), food security, food expenditure and calorie consumption (over the last three days), issues related to women's empowerment, legal and political awareness, and vulnerability. At the individual level, it collected data on anthropometric measurements of under-five children and women of reproductive age. It also collected the information on child immunisation, current school enrolment status, and level of education.

BRAC implements its individual intervention across the country, so it is possible that the non-intervention areas are also covered by regular BRAC programmes. However, the intensity of BRAC coverage in IDP intervention areas is likely to be higher than in non-intervention areas. Table 2 highlights that although households from non-IDP areas had access to BRAC services, the intensity of coverage is low compared to IDP covered areas.

Table 2. Coverage under various BRAC programmes in the intervention and non-intervention areas.

	IDP area (%)	Non-IDP area (%)
Community empowerment	46.5	1.2
WASH	34.6	1.1
Microfinance	18.9	10
Agriculture	18.8	0.2
Health, nutrition and population	15.2	1.2
TUP	8	0.2
Education	5.5	3.8
HRLS	0.8	0

Notes: Figures in percentage (total coverage*100/total number of HHs in the sample).

Descriptive statistics

This section reports changes in key outcome variables between baseline and follow-up for the intervention areas. To document the changes, data for households covered by both follow-up survey and census were analysed, using panel data for households located in the intervention areas. Table 3 describes the changes in key outcomes during baseline and follow-up. Derai and Baniachong trends are depicted separately since the census in these upazilas was conducted separately in 2012 and 2013. Rows 1–6 of Table 3 show outcomes for households receiving TUP support only. The food security situation of households covered by the TUP programme improved remarkably in both upazilas, especially for Derai. Access to credit increased dramatically between baseline and follow up, perhaps due to greater access to microfinance loans. Rows 7–14 of Table 3 shows the changes in outcome for health and education-related indicators for all the eligible population. In Derai only 0.9% of pregnant women had child birth under skilled midwives at baseline, compared to 23% at follow up. In Baniachong, 22% initially took birth protection compared to 33% at follow up, whereas in Derai, 41% couples used it at follow up, up from 34% at baseline.

Sanitation facilities have substantially improved in both upazilas. In Derai, the proportion of the households using sanitary latrine increased from 42% to 84%, with a similar improvement in Baniachong. The proportion of respondents in Derai using soap while using the toilet also increased, from 18% to 72%. We observe that the number of children enrolled in primary school increased by 2 percentage points between 2012 and 2016 in both Baniachong and Derai. Regarding indicators related to CEP, GJD and HRLS, we were only able to calculate the percentage of men who recognise the importance of gender equality and therefore allow their women counterparts to be involved in development activities. Here, gender equality has improved by 3.7 percentage points in Derai and 13 percentage points in Baniachong.

Table 3. Changes in key outcomes during baseline and follow up.

Programme key outcome indicators	Derai		Baniachong	
	Baseline 2012	Endline 2016	Baseline 2013	Endline 2016
% of TUP household facing food deficit	68.18	13.33	27.27	17.86
% of TUP households with access to credit	31.82	48.89	27.27	57.14
% of TUP households having savings	0	75.56	0	85.71
% of TUP households with Kacha House	68.18	42.22	36.36	17.86
% of TUP households with MF loans		52.08		52.08
% of TUP households taking loan from moneylender	na	40.19	34.20	35.95
% of pregnant women received at least one ANC	5.7	52.1	na	na
Deliveries through skilled birth attendant (%)	0.9	22.6	15.9	21.6
% of eligible couples using contraceptives	34.1	40.9	22.0	33.0
% of households with slab latrines (with water seal)	41.6	83.8	44.0	87.0
% of households with access to safe drinking water	94.9	99.1	97.0	99.0
% of the target people who practice washing hands with soap after defecation	18.1	72.1	67.0	92.0
Primary school-aged children enrolled in school (%)	81.0	83.0	80.2	82.9
% of children complete their primary education and enrolled in secondary school	24.0	31.0	27.0	30.69
% of men recognise importance of gender equality as well as allowing women counterparts in development activities	0.542	0.579	0.51	0.64
Number of observations	2563		2620	

Estimation model

We estimate the impact of the IDP on our outcome variables of interest by comparing households located inside but at bordering areas of Derai and Baniachong to those located outside but close

to the bordering areas, using the following simple regression model:

$$Y_{ivj} = a + b\text{Treat}_j + T_v + e_{ivj} \quad (1)$$

where Y_{ivj} is the outcome variable for household i in village v and sub-district j . Treat_j takes the value of 1 if sub district j is covered by the IDP and 0 if otherwise, T_v is village level fixed effects, and e_{ivj} is an error term. b in equation (1) measures the causal effect of the intervention if there are no omitted variables that are correlated with the intervention and outcome. Given that the two groups of households, the intervention and non-intervention groups, are located near the border of treatment *upazilas*, it is likely that they would have similar socio-economic characteristics in absence of the intervention. Hence it is perhaps safe to assume that there are no omitted variables in equation (1) that are correlated with Y and T .

Results and discussion

Impact on asset holding

Panels A and B of Table 4 report the impacts of the IDP on productive and durable assets holding, respectively. Natural assets (land ownership status) has been excluded from the analyses as land is

Table 4. Impact on productive and durable assets.

	Impacts (1)	Mean of outcome for non-intervention areas (2)
<i>Panel A: Productive assets (number)</i>		
Cow/buffalo	0.722 (0.518)	2.663
Goat/sheep	1.200** (0.515)	2.711
Chicken/duck	−1.093 (1.54)	3.377
Power pump	0.728* (0.413)	2.510
Plough	0.384 (0.971)	3.0
Threshing machine	1.061* (0.613)	2.747
Cow shed	1.192* (0.620)	2.634
Shop	3.17 (1.928)	2.530
Boat	1.181 (1.707)	3.389
Rickshaw/van	1.046 (0.811)	3.174
Value of business asset	6808*** (1863)	18,843
<i>Panel B: Durable assets (number)</i>		
Television	0.314*** (0.075)	1.675
Electric fan	0.327*** (0.074)	1.671
Freeze	0.227*** (0.072)	1.674
Mobile phone	0.334*** (0.074)	1.682
Bicycle	0.254*** (0.074)	1.704
Chair/table	1.120***	6.720
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

very expensive, therefore it is unlikely that the programme would have an effect on land ownership after two or three years of intervention. Column 1 shows the estimated impacts and column 2 the mean of the outcomes for non-intervention areas. The intervention significantly increases assets holding: 20% of the treatment and 135 of the comparison households received TUP support, hence higher livestock and poultry ownership among IDP households can be expected. In tandem, the value of productive assets is also considerably higher (by BDT 6808) for the intervention areas compared to non-intervention areas ($P < 0.01$) (column 1).

Impact on income and employment

Since the IDP support includes asset transfer and access to microfinance for the poor, it is likely to affect the employability of participant household members. Results show that the IDP has succeeded in improving occupational diversity among the *haor* community (Table 5). Male working members (aged 15–65 years) have significantly increased involvement in non-agricultural self-employment, while their participation in casual wage employment and as servants has declined significantly (column 1 of Table 5), which is a positive sign of departure from tradition-bound status of poverty (Ahmed 2004). Moreover, our results show that the programme increases international migration (Table 6). This is expected because the IDP provides information and community support to potential migrants. Since the intervention increases productive asset holding and self-employment, likely that the income of participant households will also be higher. Results in Table 7 confirm this hypothesis as per capita annual income for beneficiaries is 9% higher.

Table 5. Impact on main occupation of working-age males and females.

Working-age members involved in (as main occupation):	Male		Female	
	Impacts (1)	Mean of outcome for non-intervention areas (2)	Impacts (3)	Mean of outcome for non-intervention areas (4)
Farm-based self-employment (Yes = 1, No = 0)	0.021 (0.014)	0.505	0.036*** (0.012)	0.880
Non-farm-based self-employment (Yes = 1, No = 0)	0.043*** (0.010)	0.143	−0.016** (0.008)	0.052
Farm-based wage employment (Yes = 1, No = 0)	−0.043*** (0.010)	0.169	0.002 (0.004)	0.008
Non-farm-based wage employment (Yes = 1, No = 0)	−0.021** (0.010)	0.146	−0.014*** (0.005)	0.019
Salaried employment (Yes = 1, No = 0)	0.009** (0.004)	0.018	−0.007 (0.005)	0.018
Servant (Yes = 1, No = 0)	−0.008** (0.004)	0.018	−0.003 (0.006)	0.022
Begging (Yes = 1, No = 0)	0.000 (0.001)	0.001	0.002* (0.001)	0.001
Number of observations	4674			

Notes: ***, **, * significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Table 6. Impact on international migration.

	Impact (1)	Mean of outcome for non-intervention areas (2)
International migration		
Households have at least one migrant member (Yes = 1, No = 0)	0.023*** (0.008)	0.031
Number of observations	146	

Notes: ***, **, * significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Table 7. Impact on per capita income.

	Impacts (1)	Mean of outcome for non-intervention areas (2)
Per capita annual income (BDT)	1507.2** (667.08)	17,315
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Impact on savings and credit

The IDP provides credit and assets to the ultra-poor. These two interventions also encourage beneficiaries to save on weekly or monthly basis. It is thus expected that the IDP may impact saving behaviour and access to loans for participant households. Panel A of [Table 8](#) shows that the average amount of savings is higher for households from intervention areas relative to non-intervention areas. Moreover, households from intervention areas are significantly more likely to save in formal institutions such as banks and post offices.

Panel B of [Table 8](#) shows that the amount of outstanding loans is higher for intervention areas, but this difference is not statistically significant. Further results show that the dependency on moneylender loans has declined significantly due to the intervention. Compared to the non-intervention areas, households from the intervention areas are 9 percentage points less likely to report taking loans from moneylenders (Column 3, [Table 8](#)). Loans from a moneylender are less useful as the interest rate is often very high; according to Mallick (2009), the average interest rate is 103%. Results also show that programme participants are 14 percentage points less likely to borrow money from other NGOs ($p < .01$) and four percentage points more likely to borrow from BRAC ($p < .01$).

Table 8. Impact on savings and borrowing behaviour.

Indicators	Mean of outcome for non-intervention areas			Mean of outcome for non-intervention areas	
	Impact Panel A: Savings behaviour			Impact Panel B: Credit-seeking behaviour	
	(1)	(2)		(3)	(4)
Amount of savings (BDT)	5650*** (1149)	3044	Amount of outstanding loan (BDT)	6584 (4031)	34811
Place saved amount (BDT)			Had outstanding loans from (%)		
Home	454.3** (209)	466.0	Bank (Yes = 1, No = 0)	0.001 (0.007)	0.037
Bank/post office	5107.0*** (1058)	1516.0	Moneylender (Yes = 1, No = 0)	−0.094*** (0.017)	0.363
BRAC	14.340 (84)	361.0	Shopkeeper (Yes = 1, No = 0)	0.016** (0.007)	0.018
BRAC TUP	232.1*** (30)	8.0	Friends/relatives/ neighbour (Yes = 1, No = 0)	0.086*** (0.015)	0.180
Other NGO	−235.2 (154)	538.0	BRAC (Yes = 1, No = 0)	0.037*** (0.011)	0.074
Others	78.35 (248)	153.0	Other NGOs (Yes = 1, No = 0)	−0.146*** (0.014)	0.133
Number of observations				4674	

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Impact on health-seeking behaviour

To diversify access to healthcare among marginalised people from the *haor*, the IDP established several healthcare centres. Analysing the data on health-seeking behaviour for individuals who were sick in the last 15 days, we find that the intervention reduces the likelihood of not seeking any medical treatment as well as seeking of healthcare from unqualified village doctors and drug sellers (Table 9). On the other hand, healthcare seeking from formal institutions has increased significantly ($p < .01$). These results suggest that the IDP has implications for human capital development through improved health status.

Panel A of Table 10 shows that the IDP has increased antenatal care among mothers, indicating that the programme may have decreased pregnancy related complications, thereby improving child health. BDHS 2014 data show that on average about 79% of Bangladeshi women report having antenatal care from any provider, but this is only 57% in *haor* (column 2 of Table 10). Our results imply that although the IDP helped to increase the use of antenatal care to some extent, the gap between *haor* and general rural areas persists.

Though the programme has increased child delivery at formal medical centres, the effect is not statistically significant (Panel B, Table 10). Importantly, our results show that the intervention has not only increased mothers' awareness about the importance of breastfeeding but also successfully transformed this knowledge into practice as the proportion of exclusively breastfed children has increased significantly (Panel C, Table 10).

Results in Panel D show that the IDP has increased the amount of postnatal care, but this effect is not statistically significant. Results in panel E show that the programme has decreased the prevalence of breathing-related complications of children, and more children from intervention areas sought treatment for complications related to breathing issues ($p < 0.01$). Regarding the use of contraceptives, there is no significant difference between treatment and comparison areas (panel F).

Overall, we find that due to the intervention there have been noticeable changes toward accessing health services during illness by bringing primary health care to isolated *haor* dwellers. Understanding local knowledge and practices relating to maternal health and childbirth is fundamental to addressing the cultural practices that prevail in the abysmal conditions of *haor* (Winch et al. 2005), which to some extent has been addressed as the practice of visiting formal institutions has increased.

Table 9. Impact on health-seeking behaviour.

Seeking health care from:	Impact (1)	Mean of outcome for non-intervention areas (2)
Did not seek medical help (Yes = 1, No = 0)	−0.02* (0.01)	0.06
Formal institution (Yes = 1, No = 0)	0.07*** (0.02)	0.14
Drug seller (Yes = 1, No = 0)	−0.03** (0.01)	0.11
Village doctor (Yes = 1, No = 0)	−0.12*** (0.02)	0.25
Traditional healers (Yes = 1, No = 0)	0.01 (0.00)	0.01
Homeopath (Yes = 1, No = 0)	−0.01* (0.01)	0.02
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Table 10. Impact on practice of seeking health services before, during and after child birth.

Indicators	Impact (1)	Mean of outcome for non-intervention areas (2)
<i>Panel A: Antenatal care (ANC)</i>		
Received antenatal care during last pregnancy (Yes = 1, No = 0)	0.09** (0.04)	0.57
Number of antenatal check-up during last pregnancy (Yes = 1, No = 0)	0.86*** (0.17)	2.63
Received at least three antenatal care during last pregnancy (Yes = 1, No = 0)	0.22*** (0.05)	0.43
Have antenatal check-up card (Yes = 1, No = 0)	0.16*** (0.03)	0.13
Received medicine from BRAC staff (Yes = 1, No = 0)	0.35*** (0.04)	0.04
<i>Panel B: Child birth</i>		
Anyone in HH conceive in last three years (Yes = 1, No = 0)	−0.01 (0.02)	0.4
Got ANC (Yes = 1, No = 0)	0.22*** (0.04)	0.34
<i>Panel C: Child delivery</i>		
Formal/medical centre (Yes = 1, No = 0)	0.03 (0.03)	0.3
Skilled delivery (Yes = 1, No = 0)	0.03 (0.02)	0.15
<i>Panel D: Breastfeeding knowledge and practice</i>		
Have knowledge about exclusive breastfeeding (Yes = 1, No = 0)	0.06*** (0.02)	0.24
Infant received colostrum milk after birth (Yes = 1, No = 0)	0.02 (0.02)	0.31
Infant is exclusively breastfed (Yes = 1, No = 0)	0.06*** (0.02)	0.21
<i>Panel E: Postnatal care (PNC)</i>		
Number of postnatal care received after last delivery	0.08 (0.14)	1.29
<i>Panel F: Health services for infants</i>		
Received vaccination (Yes = 1, No = 0)	−0.01 (0.03)	0.87
Child experienced any breathing issues in last two weeks (Yes = 1, No = 0)	−0.14*** (0.03)	0.21
Sought help for child's breathing issue (Yes = 1, No = 0)	0.2*** (3.94)	0.76
<i>Panel G: Family planning</i>		
Use of birth control method (Yes = 1, No = 0)	−0.02 (0.026)	0.44
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas. As IDP health services primarily target child birth-related conveniences we focused on antenatal care and postnatal care.

Impact on welfare

One key objective of the IDP is to decrease consumption poverty. For this purpose, poor households were provided with microfinance, and ultra-poor households received productive assets and consumption allowances. Results in Table 11 show that the programme significantly increases per capita food consumption and calorie intake from non-cereal items like vegetables (rich in potassium, dietary fibre, folate, vitamin A and C), fish, meat and eggs.² Consequently, higher affordability for consumption entails improved welfare for intervened households.

Empirical literature suggests that household's move towards non-farm activities cannot only raise but also stabilise food consumption over a prolonged time period. Impact analysis of the IDP reinforces this, as after only three years of intervention, higher incomes induced by livelihood changes has successfully influenced consumption behaviour.

Table 11. Impact on food consumption, calorie intake, and food expenditure.

Food items	Per capita food intake (g/day)		Per capita calorie intake (Kcal/day)		Per capita food expenditure (BDT/day)	
	Impact (1)	Mean of outcome for non-intervention areas (2)	Impact (3)	Mean of outcome in non-treated areas (4)	Impact (5)	Mean of outcome for non-intervention areas (6)
Cereals	−3.167 (7.622)	547.5	1.2*** (0.24)	15.5	−12.08 (27.09)	1947.9
Pulse and legumes	0.07 (0.62)	9.30	−0.02 (0.08)	1.00	0.22 (2.11)	31.7
Green vegetables	6.19*** (2.08)	29.9	0.22*** (0.04)	0.6	0.06 (1.15)	15.1
Roots and tubers	14.55*** (2.86)	113.6	0.35*** (0.09)	3.2	10.66*** (2.67)	102.7
Other vegetables	43.13*** (4.41)	119.4	0.94*** (0.1)	2.5	17.50*** (2.32)	50.2
Fruits	−0.15 (1.20)	5.07	0.38*** (0.14)	0.5	0.99 (0.88)	3.4
Fish	11.56*** (1.67)	35.9	2.99*** (0.37)	8.4	13.71*** (1.79)	35.1
Meat	4.33*** (1.08)	4.8	1.21*** (0.32)	1.2	4.69*** (1.20)	5.4
Egg	1.14*** (0.32)	2.6	0.38*** (0.09)	0.7	2.05*** (0.58)	4.7
Milk and milk products	2.51 (2.72)	24.0	−0.01 (0.14)	1.3	1.86 (1.83)	16.1
Fats and edible oil	2.88*** (0.41)	18.1	0.53*** (0.05)	2.1	25.93*** (3.68)	162.8
Total	82.64*** (12.07)	931.4	8.45*** (0.86)	39.0	64.23** (30.16)	2438.7
Number of observations			4674			

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Impact on sanitation and hygiene practice

Poor sanitation practices are responsible for poor health. Diarrhoea and respiratory diseases are the combined leading causes of childhood mortality among rural children in Bangladesh (Rahman et al. 2005). Our findings indicate that the IDP has improved sanitation practices (column 1 of Table 12). The *haor* region lags far behind on sanitation coverage relative to rural Bangladesh: in 2014, about two-thirds of households from rural areas had access to improved sanitation facilities (BDHS 2014) whereas in 2016, among our non-intervention households, only 45% had such access (column 2 of Table 12). This vast difference shows the magnitude of under-development in the *haor* area, which was reduced by the IDP intervention, but not eradicated.

Table 12. Impact on sanitation.

Indicators	Impacts (1)	Mean of outcome for non-intervention areas (2)
Use sanitary latrine (Yes = 1, No = 0)	0.34*** (0.02)	0.45
Use tube well water for drinking (Yes = 1, No = 0)	−0.01 (0.01)	0.1
Use tube well water for cooking (Yes = 1, No = 0)	0.25*** (0.02)	0.69
Wear sandals while go to toilet (Yes = 1, No = 0)	0.03** (0.02)	0.81
Number of observations	4674	

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Water-related morbidities can be expected to reduce further across the depressed basins due to the impact of improved sanitation and safe water access.

Impact on social inclusion

The multidimensional nature of poverty means that people are deprived of not only economic opportunities but also lack knowledge of their legal and human rights. Hence without the enhancement of social capital, inclusive growth is challenging to achieve. IDP has made measurable progress in its aim to improve communal cohesion.

Table 13 shows that, compared to non-intervention areas, households from the intervention areas are more likely to receive invitations to social occasions from non-relative neighbours and more likely to be helped by non-relative neighbours during crises ($p < .01$). The development support group initiative is widespread across all treatment regions, and more importantly people are aware of the services provided and have sought assistance from VDO at some point in last three years.

Table 13. Impact on communal networking.

Indicators	Impact (1)	Mean of outcome for non-intervention areas (2)
Received invitation from non-relative neighbour in last one year (Yes = 1, No = 0)	0.158*** (0.022)	0.627
Helped by non-relative neighbour (Yes = 1, No = 0)	0.174*** (0.020)	0.177
DSG in your village (Yes = 1, 0 otherwise)	0.60*** (0.02)	0.39
Know a DSG member (Yes = 1, 0 otherwise)	0.08*** (0.05)	0.89
Got any support (Yes = 1, 0 otherwise)	0.35*** (0.09)	0.27
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Impact on women's empowerment

As empowerment indicators, the survey collected information on respondent women's influence over household decision-making regarding the purchase of household assets, investment, child education, etc. Table 12 reports the impacts of the intervention on each of these dichotomous indicators. Additionally, we have also constructed an index taking all these indicators.³ Results show that compared to the non-intervention areas, women from the intervention areas have more influence over critical household decision-making such as purchasing of land and clothing, determining children's educational, and other members' health and food-related expenditures ($p < .01$) (Table 14).

Overall, programme participants' empowerment increased significantly by 11 percentage points ($p < .01$). Among the *haor* community, women's influence over their family's decisions seems in line with the rest of the country. BDHS 2014 reported that in about 87% of cases, women jointly decided on income spending and in 54% the decision was taken by females alone. In the *haor* context this figure ranges from 84% to 96% (column 2 of Table 12) depending on the type of indicators.

Table 14. Impact on women's empowerment.

Women have influence/control over taking decisions (singularly or jointly with husband) on: (Yes = 1, No = 0)	Impacts (1)	Mean of outcome for non- intervention areas (2)
Purchasing land	0.10*** (0.02)	0.72
Purchasing clothing for household members	0.13*** (0.02)	0.77
Children education	0.14*** (0.02)	0.85
Household members' treatment (if sick)	0.13*** (0.02)	0.85
Household's food expenditure	0.12*** (0.02)	0.84
Household investment	0.12*** (0.02)	0.71
Empowerment index (mean)	0.11*** (0.01)	0.81 (0.03)
Number of observations		4674

Notes: ***, **, *, significant at 1%, 5%, 10%, respectively. Standard errors in parentheses. Column (1) reports the impacts estimated using equation (1). Column 2 reports the mean of outcome variable for non-intervention areas.

Conclusion

In recent decades, rural development fuelled by non-farm activity has been remarkable in Bangladesh (Hossain and Bayes 2009). But rural growth has not been uniform, and the wetlands in north-eastern Bangladesh still lag far behind regarding improvements in health and education. Recognising the all-engulfing nature of poverty in *haor*, BRAC introduced its first integrated initiative in 2013, combining ten major support components.

This article assessed to what extent the IDP has succeeded in addressing the underdevelopment in the region. Results indicate that the combined support system has managed to improve both consumption and non-consumption poverty. A noticeable shift has been made from low-paying farm-wage work toward self-employment activities, which has not only improved income but also led to higher per capita consumption. Moreover, financial inclusion through microcredit has led to a rapid decline of moneylender loans and thus reduced credit vulnerability. The improved economic situation has been translated into sturdier social cohesion as the IDP was able to raise people's awareness.

Empirical evidence has long drawn attention to the fact that to ensure maternal and child nutrition improvements, it is imperative to complement community engaged delivery strategies with nutrition-sensitive approaches focusing on women's empowerment, agriculture, food systems, education, employment, and social inclusion (Bhutta et al. 2013). IDP has followed this roadmap with remarkable success as it has included the majority of these requirements in its goal to improve maternal and child health. Breastfeeding knowledge and awareness related to prenatal/antenatal care have increased, alongside improvements across postnatal care, which further improve the health of the *haor* population.

Overall, the IDP as an approach to address poverty in perilous parts of depressed basins seems to have produced positive outcomes. Whether such an approach can be applied to other pockets of poverty in Bangladesh should be explored in further research.

Notes

1. Under the TUP component, Special Investment Programme (SIP) for the Specially Targeted Ultra Poor (STUP) and grant plus credit support (GPCS) for the Other Targeted Ultra Poor (OTUP) were chosen from the broader TUP programme. For the selected STUP members, the support package includes enterprise development training, asset transfers as grant (average worth Tk. 12,000), subsistence allowance of Tk. 30 per day, customised

healthcare with a provisional health subsidy of Tk. 500 per beneficiary, and community mobilisation works. The OTUP package is additionally supplemented with enterprise development and life skill training, and soft loans.

2. The number of persons eating per day was calculated based on the number of persons who ate at least one meal in a particular day. To standardise the consumption at the household level, all children below 10 years old were weighted 0.5 to convert them into adult equivalent, following Gibson (2005) and BBS (2006).
3. The index for women empowerment is based on seven indicators of women's influence/control over decisions on: (i) household's land purchasing; (ii) purchasing cloth for household member; (iii) children's education; (iv) from where a household member seeks treatment if sick; (v) how much to spend on food; (vi) how to use household's savings; (vii) where to invest. For each indicator, we assign a value "1" for positive answers and "0" for negative. Total scores for each respondent are then summed, and divided by the total number of indicators.

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No potential conflict of interest was reported by the author(s).

Notes on contributor

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