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RURAL DEVELOPMENT IN BANGLADESH OVER FOUR DECADES: FINDINGS FROM MAHABUB HOSSAIN PANEL DATA AND THE WAY FORWARD

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Abstract

The Mahabub Hossain Panel Data (MHPD) was initiated in 1988 and maintained by and named after the late Dr. Mahabub Hossain, a well-known agricultural and development economist who led a number of reputed organizations in Bangladesh (Bangladesh Institute of Development Studies and BRAC) and in the region (International Rice Research Institute). This background report portrays the historical context, sampling evolution, survey structure and methodology, and academic and policy contributions of the MHPD with some lessons learned for the next step forward. The MHPD has tracked rural households for a period of over three decades (1988–2014) with five waves of household surveys covering over 2,800 households and has collected a wide range of information on household composition, schooling of household members, assets, cropping intensity and patterns including cost and return, employment and income, consumption, participation in different government and nongovernment programs. To produce this document, we reviewed several books and journal articles authored by Mahabub Hossain and related academic papers and documents and collated information on MHPD, including (i) mapping out information on past and ongoing panel or cross-sectional household survey data series in Bangladesh; (ii) undertaking the review of all past rounds of MHPD survey documents, such as survey implementation plans, questionnaires, codebooks, databases, and processed data; (iii) consulting relevant stakeholders, including the past implementers of the surveys and the users of the data as needed to validate documented information; (iv) taking stock of the contribution of MHPD to academic literature and policy development; and (v) drawing a number of lessons learned for future data collection and policy making. The report aims to i) serve as a comprehensive reference document for scholars and policymakers who wish to understand MHPD for possible use in their research; ii) provide a comprehensive baseline from which we can consider ways to enhance MHPD further to continue contributing to understanding the economic and social issues of today and near future. By compiling all associated research work based on MHPD, the report also offers a historical landscape of Bangladesh's social and economic development and a credible explanation for the Bangladesh development model for global comparison.

Keywords: Bangladesh, rural development, household panel data, evidence-based policy making (EBPM)

JEL Classification: C81, O18, Q12, and Z18

Contents

1. INTRODUCTION

From its independence in 1971, Bangladesh was termed a “basket case” by influential development partners and “the test case for development” by eminent scholars (Faaland and Parkinson 1976). Over the last 50 years, Bangladesh has made remarkable progress, recently become middle income country, and is now scheduled to graduate from the UN’s Least Developed Countries (LDC) list in 2026. Such development of a country of around 147,000 square km with 170 million people is often considered a “development puzzle” or “miracle” under several unfavorable conditions, including weak governance and political instability, persistent socio-economic inequalities among the people, unplanned urbanization, and exposure to natural disasters (Sawada, Mahmud, and Kitano 2018; Hossain, Kairy, and Bayes 2016; Hossain and Bayes 2015). Recent studies identified rapid structural transformation of the Bangladesh economy, which was catalyzed through several factors: farm sector development facilitated by green revolution/technology; societal development and women empowerment through microfinance revolution; nongovernment organization (NGO) initiatives; female education; infrastructure development; transformation of farm-based to nonfarm based rural economy; transformation of industries from the domestic informal sector to formal export-oriented manufacturing sectors such as garment and pharmaceutical industries; and international migration and remittances, among others (Sawada, Mahmud, and Kitano 2018; Hossain and Bayes 2018).

To depict the historical landscape of development economics’ contribution to the evaluation of social and economic development, several longitudinal household panel surveys and the accompanying research have been maintained in many developing Asian countries in the last several decades. Major data series in the region are summarized in Table 1, which includes the Palanpur Panel study in North India (Himanshu, Lanjouw and Stern 2018; Himanshu and Lanjouw 2016; Himanshuv and Stern 2011; DFID 2011; Bliss and Stern 1982; Ansari 1964); the Village Level Studies (VLS) by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) (ICRISAT 2021; Townsend 1994; Townsend 2016; Davis et al. 2015; Walker and Ryan 1990; Binswanger and Jodha 1985; Rosenzweig 2003; Ogaki and Zhang 2001; Dercon, Krishnan and Krutikova 2013; Badiani et al. 2007), which became the Village Dynamic Study (VDS) in India and Bangladesh jointly by ICRISAT and the International Rice Research Institute (IRRI) (ICRISAT 2021; Mullen 2016; Deb et al. 2014); two panel surveys in India on high-yielding seed varieties, structure of household, income, wealth, schooling, and agricultural inputs and outputs implemented by the National Council of Applied Economic Research (NCAER)–Additional Rural Incomes Survey (ARIS) and the Rural Economic Development Survey (REDS) (Foster and Rosenzweig 1995; 1996); several important Panel Studies in the Philippines, including the studies of the East Laguna Village in Laguna and other villages in Central Luzon and Panay by the IRRI (Hayami et al. 1990; Hayami and Kikuchi 1999; Estudillo, Sawada, and Otsuka 2008, 2009 a, b; Sawada et al. 2012; Sakai, et al. 2017); the Bukidnon Panel studies by the International Food Policy Research Institute (IFPRI) (Bouis and Haddad 1990; McNiven and Quisumbing 2008); Cebu Longitudinal Health and Nutrition Survey by few researchers from the United States and the Philippines (Pan 2021) and the Laguna Household Surveys initiated by Professor Robert Evenson (Ejrnæs and Pörtner 2004; Popkin 2020; Rosenzweig and Wolpin, 1986). Other Panel Studies in developing Asia include: the Indonesia Family Life Survey (IFLS) by Rand Corporation (Cao and Rammohan 2016; Strauss et al. 2004); some of the Living Standard Measurement Study (LSMS) such as the Vietnam Living Standards Survey (VLSS) and Vietnam Household Living Standards Survey (VHLSS) supported by the

World Bank with panel portions in countries such as Viet Nam (Nguyen, Nordman, and Roubaud 2013; Strauss, Witoelar, and Sikoki 2016; Sawada et al. 2017; Sawada et al. 2018)–the General Statistics Office (GSO) of Vietnam first estimated the poverty rate based on the cost of basic needs using Vietnam Living Standards Survey with the collaboration of the World Bank (Demombynes and Hoang Vu 2015); a multi-purpose panel study by IFPRI in Pakistan (Alderman and Garcia 1993; Alderman et al. 1996; McCulloch and Baulch 1999; Sawada and Lokshin 2009; Lee and Sawada 2010;IFPRI 2014); the Townsend Thai Panel studies in Thailand (Townsend 2016); three essential panel studies in the People's Republic of China (PRC), namely, Chinese Family Panel Studies, the China Health and Nutrition Survey; and HRS family panel for developing Asia, [1] namely, China Health and Retirement Longitudinal Study (CHARLS) (Gustafsson and Hiros 2014); Longitudinal Ageing Study in India (LASI) (Arokiasamy et al. 2012; Sinha et al. 2022); Malaysia Ageing and Retirement Survey (MARS) (Mansor et al. 2019; Alam et al. 2022); and Health, Aging, and Retirement in Thailand (HART) (Anantanasuwong and Seenprachawong 2012; Anantanasuwong 2017). These panel data sets are essential tools for understanding the dynamics of the economy because they provide a more robust identification of causality in the analysis compared to those based on cross-sectional surveys. In recent years, panel data sets have also been matched with information on administrative data and policy interventions to evaluate the effectiveness of interventions, offering alternative forms of impact evaluation to pure experiments and randomized control trials (RCTs), which can be expensive, challenging, or not readily scaled up (IZA 2017; Harrison and List 2004; Levitt and List 2009).[2]

In Bangladesh, there are three comparable panel study series, namely, i) the Mahabub Hossain Panel Dataset (MHPD) implemented by the Bangladesh Institute of Development Studies (BIDS), International Rice Research Institute (IRRI), and Bangladesh Rural Advancement Committee (BRAC) (1987–88, 1999–00, 2003–04, 2007–08, and 2013–14); ii) the Bangladesh Integrated Household Survey (BIHS) 2011, 2015, and 2019 conducted by IFPRI (IFPRI 2020); and iii) the Dynamics of Rural Poverty Study (2010 and 2019), respectively, by the Institute of Microfinance (InM) (Osmani and Latif 2013) and the BIDS) (Personal communication with BIDS Director General Dr. Binayak Sen, 2021). All three surveys are largely deemed nationally rural representative studies. Among these data sets, MHPD is unique in several contexts (Table 2): (i) The MHPD has been tracking the rural households of the country for a period of over three decades (1988–2014), (ii) it has already been used in more than 70 academic studies which might have enhanced the government, non-governmental, and international development policies since the late 1980s (Hossain 2002; Hossain and Bose 2004; IMF 2005; World Bank 2012; Madhur and Faruqee 2016; Hossain, Kairy, and Bayes 2016); and (iii) In terms of content, while all three studies have many common dimensions of a standard LSMS, the MHPD has been collecting more detailed time use of households' earning members and a detailed account of the costs and returns of a parcel of land that the respondent could remember the best. In addition to those nationally representative panel studies, there is a unique and rich longitudinal demographic study on births, deaths, marriages, and migrations in small *Upazila*, Matlab, in Bangladesh (Barham et al. 2021).

[1] Available at https://g2aging.org/?section=study&studyid=1.

[2] They gave a list of empirical models (namely, natural experiments, propensity score matching, instrumental variable approach, structural models, etc.) that require making identification assumptions to identify treatment effects from naturally occurring data.

Table 1: Major Panel Datasets in Developing Asian Countries: At a Glance

Identification	Study Region	Round, Sample Size, etc.	Study Implementer(s)	Donor (s)	Major References
1. The Palanpur Panel	Palanpur-North India	100% sample of the village 1957/58, 1963/64, 1974/5, 1983/4, 1993, 2008-10 and 2015	Agricultural Economics Research Centre (AERC) of the University of Delhi, and Oxford/LSE	University of Delhi, DFID	Himanshu, Lanjouw, and Stern 2018; Himanshu and Lanjouw 2016; Himanshuv and Stern 2011; DFID 2011; Bliss and Stern 1982; and Ansari 1964).
2. Village Level Studies (VLS)	Andhra Pradesh and Maharashtra states of India	1st Phase (1975–84): 240 households from 6 villages 2nd Phase (1986–Present): 600 households from the previous villages	ICRISAT	Advanced Research Institutes (ARIs) and partners from universities and other institutes in the UK, US, Japan, Canada, France, and Australia	ICRISAT 2021; Townsend 1994; Ogaki and Zhang 2001; Townshed 2016; Badiani et al. 2007; Dercon, Krishnan and Krutikova 2013; Davis et al. 2015; Rosenzweig 2003; Walker and Ryan 1990; Binswanger and Jodha 1985.
3. Village Dynamic South in Asia (VDSA)	Semi-arid tropics (SAT) of Asia	1,831 households from 42 villages in Bangladesh and India. 30 villages from India and 12 villages from Bangladesh	ICRISAT, NCAP and IRRI	Bill and Melinda Gates Foundation (BMGF) for South Asia	ICRISAT 2021; Mullen 2016; Deb et al. 2014
4. The East Laguna Village Study	East Laguna Village in Laguna Province	• Philippines Started in 1966 with 66 households which became 1,953 in 2007 • 17 rounds were conducted • Panel data creation started since the 1970s	IRRI	IRRI with others	Hayami and Kikuchi (1999); Sawada et al. (2012); Sakai, et al. 2017
5. Philippines, Bukidnon Panel Survey	Philippines	• The baseline survey contained 510 households, though 448 households were enumerated during the first four rounds between 1984–1985 • A number of 448 households in 1992 and 572 households in 2003	Research Institute for Mindanao Culture, Xavier University, Cagayan de Oro City, Philippines; and IFPRI	Research Institute for Mindanao Culture, Xavier University, Cagayan de Oro City, Philippines; and IFPRI	Bouis and Haddad 1990; McNiven and Quisumbing (2006). https://dataverse.harvard.edu/dataset.xhtml?persistentId=hdl:1902.1/17606
6. Rand's Family Life Survey (FLS)	Indonesia	• First studied in 1999 with stratified random sampling (7,730 HHs in the initial round) • Then five rounds completed where last round held in 2014–15 (1993)	RAND	• 1st round by NICHD, USAID, the Ford Foundation, and WHO • Later rounds by the National Institute on Aging (NIA) with others	Cao and Rammohan 2016, https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/hh.htmlll-being/social-and-behavioral-policy/data/FLS/IFLS/study.html
7. Living Standard Measurement Survey (LSMS) panel portion in Viet Nam	Viet Nam	• Stratified random sampling survey • First round (1992–93) covered 4,800 sample households • Seventh round was completed in 2010.	General Statistical Office, State Planning Committee, Viet Nam and The World Bank	UNDP and Swedish International Development Authority (SIDA)	Nguyen, Nordman, and Roubaud (2013); Strauss, Witoelar, and Sikoki 2016), https://microdata.worldbank.org/index.php/catalog/1910#metadata-sampling [24/07/2021]

continued on next page

Table 1 *continued*

Identification	Study Region	Round, Sample Size, etc.	Study Implementer(s)	Donor (s)	Major References
8. Pakistan Panel Household Survey (PPHS)	Pakistan	1986–87 and 1990–91 (686 households) 2001 (2,721 Households), 2004 (1,907 Households), and 2010 (4,142 Households)	PIDE with IFPRI and WB	IFPRI and The World Bank	IFPRI (2014); McCulloch and Baulch (1999); http://www.pidelms.com/pphs/ date 12/07/2021
9. The Townsend Thai Panel data include both annual and monthly panels	Thailand	• [First round] contains 2,880 households, 262 groups, 161 village financial institutions, and l92 key informants, and 1,920 individual plots. • Last round was done in 2011	Primary data collection by the Thai Family Research Project (TFRP) and secondary data archived by the University of the Thai Chamber of Commerce (UTCC)	NICHD, NSF, the Ford Foundation, the John Templeton Foundation, BMGD, UTCC, the Thai Ministry of Finance, the Bank for Agriculture and Agricultural Co-operatives (BAAC), the National Opinion Research Center (NORC), and NBER.	https://mitpress.mit.edu/blog/townsend-thai-project [24/7/2021] http://townsend-thai.mit.edu/about/
10. China Health and Nutrition Survey	People's Republic of China (PRC)	• Panel (rotating panel), with revised modules of questionnaires for each wave • 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009 + • Approximately 4,400 households, 19,000 individuals	The Carolina Population Center, the University of North Carolina at Chapel Hill		Gustafsson and Hiros 2014, https://ftp.iza.org/dp8244.pdf http://www.cpc.unc.edu/projects/china
11. Chinese Family Panel Studies	PRC	• -Panel, with a new wave of interviews each year since 2010 for about 16,000 households • National probability sample (excluding ethnic minority autonomous districts in western region)	Institute of Social Science Survey, Peking University		Gustafsson and Hiros 2014, https://ftp.iza.org/dp8244.pdf http://www.cpc.unc.edu/projects/china
12. China Health and Retirement Longitudinal Study	PRC	• Panel, with a new wave of interviews every two years • 2011–2012, 2013+ (pilot survey and resurvey 2008, 2012) • National probability sample of people age 45 and over • Approximately 17,500 individuals of 10,000 households	Institute of Social Science Survey, Peking University		Gustafsson and Hiros, 2014 https://ftp.iza.org/dp8244.pdf http://www.cpc.unc.edu/projects/china

Source: Authors' compilation. The studies listed at 1, 3, and 4 are not nationally representative. However, the importance of these studies in rural dynamic studies is presented here.

Table 2: Comparable Panel Datasets in Bangladesh

Surveys	Completed Rounds and Sample Size	Strength	Weakness	Major References and Sources
Mahabub Hossain Panel Data (MHPD)	1987–88 (1,231 households), 1999–2000 (1,872), 2003–04 (1,927), 2007–08 (2,010), 2013–14 (2,846)	• Nationally (rural) representative • Overall comprehensive with more detailed data on farm cost–return, time use, etc. • Oldest panel of Bangladesh • Multistage random sampling (stratified) • Most widely used for academic research and policy making	• Missing information on urban households • Absence of detailed information on aged people	• Hossain and Bayes (2010), • Hossain and Bayes (2018) • IRRI, BIDS, BRAC, and SCL
Bangladesh Integrated Household Survey (BIHS)	2011–12 (6,500 hhs from 325 PSU[a]), 2015 (6,500 hhs from 325 PSU) and 2018–19 (5,604 from 325 PSU)	• Nationally rural representative • Relatively comprehensive • Delineate the status of food security in the Feed the Future (FTF) zone • Multistage Random sampling • Gender sensitive disaggregated information	• Relatively nascent (started in 2011) • Missing urban households • Absence of detailed information on aged people	• Ahmed et al., (2013) https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/NXKLZJ • IFPRI
InM-BIDS Panel study	2010–11 (6,300 households), 2020 (Not clearly known)	• Nationally representative at rural level • Multistage random sampling (stratified)	• Data, methodology, etc. are not publicly available for second round, information on the first round, however, can be tracked for the baseline from Osmani and Sen (2011) • Missing urban households • Absence of detail information on aged people	• Osmani and Sen (2010) • Osmani and Sen (2011) and personal communication with Dr. Binayak Sen, DG-BIDS • InM and BIDS

[a] Primary sampling unit.

Source: Authors' compilation.

The MHPD was maintained by the late Dr. Mahabub Hossain, a well-known agriculture and development economist who worked with several reputed organizations in Bangladesh and other regions. To date, five rounds of surveys have been conducted for 1987–88, 1999–00, 2003–04, 2007–08, and 2013–14, with the latest survey covering 2,846 households across rural Bangladesh. Two more rounds were conducted in 1990 and 1994 by Hossain Zillur Rahman, which Mahabub Hossain did not maintain. There are also a number of sister surveys, namely, education surveys by BRAC (Ahmad and Haque 2011), village dynamics survey (ICRISAT 2021; Ahmed et al. 2015), and recent COVID-19 telephone surveys by the Asian Development Bank Institute (ADBI) (Malek, Truong, and Sonobe 2021a, b, c). A major part of the MHPD data series is currently available on the IRRI website with some description of the survey. Still, there is no up-to-date background paper on the MHPD data sets which thoroughly documents the history, evolution of survey methodologies, and contribution to research and development policies.

This report aims to provide comprehensive background information on the Mahbub Hossein Panel Data in Bangladesh, including its historical development, survey methodology, and academic and policy contributions. To produce this document, we mainly depend on several book volumes based on the survey data that were authored by Hossain et al. (Hossain et al. 1994; Hossain, Sen, and Rahman 2000; Hossain and Bayes 2010 and 2018; Bayes and Hossain 2007; Sawada, Mahmud, and Kitano 2018). In addition, we reviewed all related academic papers and documents and collated information on MHPD, including (i) reviewing all past rounds of MHPD survey documents, such as survey implementation plans, questionnaires, codebooks, databases, and processed data; (ii) consulting relevant stakeholders, including the past implementers of the surveys and the users of the data as needed to validate documented information; and (iii) take stock of the contribution of MHPD to academic literature and policy development.[3]

From an academic point of view, the major contributions of this study are as follows: 1) It serves as a comprehensive reference document for scholars and policymakers who wish to understand and use MHPD for their research, and 2) It explores ways to enhance MHPD to contribute to understanding economic and social issues in Bangladesh today and in the future. Compiling all associated research work based on MHPD will also offer a historical landscape of development economics' contribution to evaluating Bangladesh's social and economic development and an evidence-based explanation for Bangladesh's development model, which can be used for global comparison.

The remainder of this paper is organized as follows: We present the historical context that gave birth to MHPD and summarize the sampling design for the different rounds, structure, and implementation quality of the surveys in Section 2. Section 3 briefly describes key socioeconomic indicators drawn from the MHPD series and summarizes the research/academic and policy contributions. Finally, the scope of MHPD toward evidence-based policy-making is elaborated.

2. SURVEY OVERVIEW: THE FIRST TO FIFTH ROUNDS AND THE HISTORICAL CONTEXT

While the agriculture sector employed more than 75% of the total population and 25% of Bangladesh's GDP in the 1970s, those recent shares have declined to 50% and 16%, respectively (Ministry of Finance 2019). In the past several decades, the rural economy of Bangladesh has undergone a rapid transformation, and the MHPD, starting in 1987–88, has closely monitored this process through five rounds of surveys. The MHPD was initially started as a one-off survey, but the richness of the data, including a number of sister surveys and the policy contribution, gained attention and support from many organizations over time. The MHPD is now recognized as the country's oldest reliable longitudinal household data. This section provides an overview of the historical context, the evolution of its sampling methodology, survey design, implementation, and data accessibility in three different subsections. [4]

[3] Before Mahabub Hossain passed away on 4 January 2016, he expressed his due concerns to the main author of this report (Mohammad Abdul Malek) about the continuation of this data set sometime in August 2015.

[4] A short overview on sister surveys is also given after the fourth and fifth round of the first subsection.

2.1 MHPD Survey Rounds: Historical Context and Sampling Methodologies

2.1.1 The First Round (1987–88): In Search of the Effect of the Green Revolution

The 1970s was a challenging time for a newborn country with scarce resources and land to feed more than 65 million people. The continuous increase in population, with a 2.15% annual growth in the 1970s and 2.6% on average in the 1980s, paved the way for Bangladesh to become one of the most densely populated countries in the world. Rapid population expansion and frequent natural disasters have endangered the country's food security (Hossain, Naher, and Shahabuddin 2005; Begum et al. 2013). For instance, consecutive and destructive floods in 1974 curtailed crop production, resulting in a famine that took a toll of 80,000 to 100,000 lives due to starvation and malnutrition in just a few months (Sen 1982). The country was essentially facing the predictions of the Malthusian theory of population. Experiences of famine and increased demand for food grains have forced the country to emphasize the notion of food security. Food security in Bangladesh is highly dependent on rice production (Azad 2021), but most of the land was already occupied by the cultivation of rice production during the early 1970s. The scarcity of land encouraged people and the government to adopt the "green revolution" technology (Griffin 1979; Hossain 1988). As a result, the adoption of green revolution technology, including modern variety (MV) rice seeds, was amplified after the middle of the 1970s and diffused to 25% of the total cultivated land by 1985–86 (Hossain 1988). Mahabub Hossain, while he was with BIDS, realized the necessity of nationally representative farm household data to estimate the impact of the green revolution on food security, income distribution and inequality, and poverty. This necessity of producing representative data perhaps drove Mahabub Hossain to conduct a baseline survey of 62 villages from 57 districts throughout the country in 1987–88 (Hossain 1987, 1988). As shown in Table 3, this baseline survey was conducted under the project "Differential impact of green revolution on favorable and unfavorable rice-growing environments" of the IRRI with the collaboration of BIDS (Hossain et al. 2000; Bayes and Hossain 2007; Hossain and Bayes 2010, 2018).

Multistage Stratified Random Sampling was Followed for the Baseline – 20 Households per Village

Intending to select nationally representative survey sample households, the baseline study wielded a multistage stratified random sampling method to draw sample households across the country. First, 64 unions from the list of all unions of the 64 districts were carefully chosen using a random number table at the first step of the sampling (Hossain et al. 2000; Hossain et al. 2007; Hossain and Bayes 2018).

Table 3: Basic Overview of the Study Projects Associated with MHPD Surveys

Survey Year	Principal Investigator	Researchers Who Utilized the Data Very First	Project/s	Study Implementing Organization	Major Donor Organization	Survey Company/ Organizations	Major References
1987–88	Mahabub Hossain	Mustafizur Rahman, and Abdul Bayes	Differential impact of green revolution on favorable and unfavorable rice-growing environments	BIDS	IRRI	BIDS	Hossain and Bayes (2009)
1999–00	Mahabub Hossain	Suan-Pheng, Kam, Manik Lal Bose, and Lorena S. Villano	1. 'Poverty Elimination through Rice Research Assistance (PETRRA)' 2. The Impact of International Agricultural Research on Alleviation of Poverty	IRRI	IRRI, CGAIR	Socio-Consultant	Bayes and Hossain (2007)
2003–04	Mahabub Hossain	Abdul Bayes	Poverty mapping in Bangladesh using GIS	IRRI	IRRI	Socio-Consultant	Bayes and Hossain (2007)
2007–08	Mahabub Hossain	Abdul Bayes	Challenging the Frontier of Poverty Reduction: Targeting the Ultra Poor	BRAC	DFID	Socio-Consultant	Hossain and Bayes (2009, 2018)
2013–14	Mahabub Hossain	Abdul Bayes	A Resurvey of the Households from 62 Villages	BRAC	BRAC, GRIPS	Socio-Consultant	Hossain and Bayes (2009, 2018)

Source: Authors' compilation.

In the second stage, all villages of the 64 unions selected in the first step were investigated based on information on land, population, and educational status. After a careful inspection, two villages from each union totaling 124 villages in the study were purposively designated, and the aforementioned criteria (land, population, and educational status) were compared to obtain the most identical and representative village of the union. This progression of the study made 64 sample villages the first choice for the final inspection. A village census and focused group discussion (FGD) were then conducted among these 64 villages to collect information on household ownership and land distribution, adoption of MV rice technology, and income sources. Due to some practical difficulties and problems in the field—for instance, lack of cooperation among the villagers and logistical inconsistencies in the census—a second choice for some villages was undertaken (Hossain et al. 2000; Hossain and Bayes 2018, Azad 2021). In addition, due to administrative issues regarding the survey operation, a number of smaller districts were excluded from the study. For example, two-sample unions in the Chittagong Hill Tracts region were dropped from the study. On the other hand, the benchmark study also undertook more than one village from larger districts, such as Mymensingh and Comilla, to finalize the villages (Hossain and Bayes 2018). These adjustments in the sampling left 62 villages from the 57 (out of 64 districts) districts of the country for the final investigation held in 1987–88.

In the final stage, the first village census conducted in 1987–88 calculated a total of 9,874 households from the 62 villages, yielding an average of 159 households per village. Among the households in each village documented in the census, 20 households, on average, were selected as the final sample using the random sampling method (Hossain et al. 2000). To justify the representativeness of different categories of households within the village, households were categorized by household land ownership and tenancy status. While four subgroups were defined based on the land ownership status, namely (1) functionally landless (less than 0.2 hectares), (2) small landholder (between 0.2 and 1.0 hectares), (3) medium landholders (between

1.0 and 2.0 hectare), and (4) large landholders (above 2.0 hectare), tenancy status (either participation in tenancy cultivation or not) was included in the sampling technique. The proportionate random sampling technique was applied to draw 20 samples from different strata of households, and thus, a total of 1,245 households from 62 villages were finally selected for the final investigation in the 1987–88 survey.

2.1.2 The Second Round (1999–2000): Poverty Analysis through Rice Research

The results obtained from the 1988 baseline survey published by Hossain et al. (1994) inspired the BIDS to conduct a longitudinal study focusing on poverty by tracking the same households in the same villages over time. The financial support of a group of donors (Hossain and Bayes 2010) helped BIDS conduct another two rounds of surveys in 1990 and 1994 under the project "Analysis of Poverty Trends" by the leadership of Hossain Zillur Rahman (Hossain and Bayes 2009). Although the results and findings of the 1990 round were made available in the book *Rethinking Rural Poverty* (Rahman and Hossain 1995) and those of the 1990 and 1994 rounds in the IMF–Bangladesh PRSP documents (IMF 2005), these two rounds' (1990 and 1994) data are lost and inaccessible.[5] In the changing context, when Mahbub Hossain obtained a position at the IRRI Social Science Division, he restarted the initiative to conduct a new round of survey in 1999–00 under the IRRI project "Poverty Elimination through Rice Research Assistance (PETRRA)" (Hossain and Bayes 2009). The main objective of the second round (1999–2000) was to identify the contribution of rice research to poverty alleviation in Bangladesh. In addition to the IRRI project, the Consultative Group for International Agricultural Research (CGIAR) also utilized the survey data for their project "The Impact of International Agricultural Research on Alleviation of Poverty", and the outcome was published as books and research report (Hossain and Bayes 2009; Bayes and Hossain 2007 and Hossain et al. 2007).

Sample Households Increased to 30 per Village in the Second Round

The 1999–00 study tracked the same households and villages covered in the benchmark (first round) study and their offshoots to satisfy the longitudinal property of the study. Although the study was designed to investigate the same households in the same villages over time, some attritions were observed due to natural reasons, namely, the death of household members and migration to another village, district, or country. Unlike the baseline survey, the importance of wealth was prioritized because of the increased contribution of farm and non-farm economies and the influence of assets and wealth in society. Realizing the dynamics of the rural economy, such as the reduction in the importance of land among the people, the increased importance of the nonfarm economy, the commercialization of agricultural products, and the wealth ranking technique of the participatory rural appraisal (PRA) were followed (Nabi et al. 1999). Thus, the selected households were classified into four categories using the wealth ranking method instead of land ownership status. These four categories were (1) very poor, (2) poor, (3) rich, and (4) wealthy (Hossain and Bayes, 2018; Hossain et al. 2007). In addition to the households covered in the first survey round, new households, including all of the offshoots of original households, were also enumerated in this 1999–00 survey. When including new samples, proportional weight was placed in

[5] A request for data was made to the current BIDS Director General, Binayak Sen, who was also involved with Mahabub Hossain for this 62-village study in the 1987–88 round, but the data were not found due to documentation issue at BIDS.

households with different income groups.[6] New households were selected based on the proportionate weight criteria. However, if the offshoots from the 1987–88 survey had already surpassed the targeted average of 30 sample households for any village, no additional households were enumerated for that village (Table 4). Although 1,888 sample households were investigated during the second-round survey implementation, data and information on 1,872 households were processed for the analysis due to incomplete information collected from 16 households (Personal Communication with Socio-Consultant Ltd. 2021). Among the 1,872 households, 1091 unique households in the baseline survey were examined, resulting in a 9.20% attrition rate (Table 5). Among the 1,091 unique households in the baseline survey, 218 were split into 581 households. The split households are considered surviving samples from the past wave. For example, if the i^{th} household identified in 1987–88 had been broken and split into i_1^{th} and i_2^{th} in 1999–00, these households were each considered as a household in the later year. Hence, the split households were considered with equal weights. This is obvious because it is difficult to identify one main surviving household out of two brothers, for example, who each formed separate households after the death of their father. Therefore, tracking the old identity of a split household seemed quite difficult in the MHPD data.. A sample of 418 new households was added to the survey of 1999–00 following the proportionate weight-giving method as explained.

Table 4: Distribution of Households per Village of All Rounds (1987–88 to 2013–14)

Survey Year	Observations	Mean	Stand. Dev.	Minimum	Maximum
1987–88	62	19.85	0.36	19	20
1999–00	62	30.19	1.41	25	36
2003–04	62	31.08	1.62	28	37
2007–08	62	32.42	2.64	26	40
2013–14	62	45.90	3.82	40	56

Source: Authors' own calculation from the raw data.

2.1.3 The Third Round (2003–04): Poverty Mapping in the Country

The research publication and the findings from the previous two (1987–88 and 1999–2000) survey rounds and the data series drew the attention of researchers and policymakers, as a panel longitudinal data series were scant nationally and internationally (Bayes and Hossain 2007). With the aim of estimating and mapping poverty in Bangladesh, Mahabub Hossain conducted a third-round survey. The survey was conducted under a project of the IRRI called "Poverty Mapping in Bangladesh Using GIS" or "Spatial Poverty Mapping" in 2003–04. The results and findings of this study were published by Kam et al. (2005), Hossain (2007), and Nargis and Hossain (2006).

[6] For instance, if there were 100 households in a village that included 10 very rich households, 20 rich households, 50 poor households and 20 very poor households, fresh sample households after including old households and their offshoots would be selected in the proportion of 0.10, 0.20, 0.50, and 0.20, respectively.

No Additional Samples but Offshoot Households Were Added in the 2003–04 Round

Using a similar multistage stratified random sampling technique, the survey enumerated 1,927 sample households in 2003–04 by tracking the previous 30 households on average per village. All households covered in 1999–00 and their offshoots were included in this round; thus, the number of households was 32 per village on average (Table 5). The households that migrated to other villages, districts, or countries were no longer tracked in the survey. Among the sample households, 1,803 unique households in 2003–04 were enumerated in the study, yielding an attrition rate of 3.69% in 2003–04. However, a total of 33 offshoot households were added in this round following the method wielded in 1999–00.

Table 5: Attrition and Addition Status of All Rounds (1987–88 to 2013–14)

Survey Year	Sample Size (Actual Found in Data)	Total Unique HH (from Last Round)	HH of Last Round Split in Current Year	Total Split in Current Year	HH in Attrition from the Last Round	Addition of HH from the Last Round
1987–88	1,231	–	–	–	–	–
1999–00	1,872	1,091	218 (17.71)	581	140 (11.37)	418 (33.96)
2003–04	1,927	1,803	75 (4.01)	166	69 (3.69)	33 (1.76)
2007–08	2,010	1,858	97 (5.03)	217	69 (3.58)	32 (1.66)
2013–14	2,846	1,825	294 (14.63)	686	185 (9.20)	629 (31.29)

Notes: HH is the abbreviation for household; Percent are in parentheses.

Source: Authors' own calculation from the raw data.

2.1.4 Fourth Round (2007–08): Impact of Food Price Hike on Poverty

After getting a position at BRAC, Dr. Hossain espoused the further initiative to conduct the fourth round in order to estimate the impact of food price escalation in 2007 on poverty and to produce longitudinal data on extreme poverty. This survey was undertaken under the project "Challenging the Frontier of Poverty Reduction: Targeting the Ultra Poor" of BRAC. The main objective of this project was to identify the ultra-poor due to the price hike shocks that occurred in 2006–07. A number of donors headed by DFID supported the project's funding (Hossain and Bayes 2010, 2018).

Sampling Strategies and Size Were Similar to 2003–04

The fourth-round survey enumerated a total of 2010 sample households in 2007–08 by taking 32 households on average per village. With a 3.58% attrition rate, 32 offshoot households were added in 2007–08.

After the 2007–08 survey results were published, Mahabub Hossain took the initiative to conduct two sister surveys: one on an education survey with BRAC and another on village dynamics studies with ICRISAT and IRRI, as elaborated below:

Sister survey (1). Education Survey by BRAC

BRAC initiated a survey of the same households of MHPD sample villages during 2009–10 to portray the school participation pattern and determinants of dropout among rural children with its core fund and different donor organizations (Ahmad and Haque 2011). Ahmad and Haque (2011) also delineated that in addition to the 20 households of 62 villages, data were collected from 653 poor children from five types of schools: BRAC non-formal primary schools; government primary schools; private primary schools; *ebtedayee* madrasas (religious school); and BRAC pre-primary schools.

Sister Survey (2). VDS Bangladesh by ICRISAT and IRRI

As stated earlier, the ICRISAT-VLS study in India is the oldest longitudinal study in South Asia.[7] As part of the ICRISAT-VLS, the study turned into a village dynamics study (VDS) and was widened to 42 villages in India[8] and Bangladesh with the financial support of the Bill and Melinda Gates Foundation. ICRISAT conducted the study with the partnership of IRRI in a period of five years, from 2009 to 2014 (ICRISAT 2021), where Socio-Consultant Limited (SCL)[9] implemented all surveys by employing village-level dedicated enumerators in Bangladesh. Among the 42 villages, 12 villages were taken from 11 districts in Bangladesh, and the rest of the villages were from different parts of India. To design the study as nationally representative, a total of 11 districts from MHPD districts were chosen purposively so that they could represent all geographical variations of the country. The samples were selected exercising a multistage random sampling technique similar to the MHPD (Ahmed et al. 2015). The VDS has produced longitudinal data on various yearly, monthly, and even daily data during the study period of the selected villages. The yearly longitudinal data include general household information, such as household roster information, household assets, land, loans, education, and migration of household members. On the other hand, monthly data cover the prices of cereal goods, such as rice, wheat, and maize, and the prices of noncereal goods, such as the prices of different kinds of pulses, oils, vegetables, milk, and sugar. Employment data were also collected monthly. However, rainfall data have been stockpiled daily in the study of village dynamics. These high-frequency data were collected to better understand the dynamics of rural poverty, livelihood, and household behavior. The results of such studies were published in many papers (Ahmed et al. 2015; Deb, Bantilan, and Kumar 2014), and detailed data are available at http://vdsa.icrisat.ac.in/vdsa-database.aspx.

2.1.5 The Fifth Round (2013–14): Analysis of Rural Transformation, Migration, and Multi-Faceted Development Outcomes

Meanwhile, Bangladesh has made remarkable achievements in terms of economic growth through the development of the garment industry, the institutionalization of microfinance, and the receipt of remittances from overseas. Such development and transformation urged the need for the continuation of the study by updating MHPD, and thus, the fifth round of the MHPD survey was undertaken by the BRAC Project “A Resurvey of the Households from 62 Villages” during 2013–14 to understand the dynamics of rural transformation and assess the impact of migration on rural livelihoods. The National Graduate Institute for Policy Studies (GRIPS), Japan, also partially supported the survey. The results and findings of this survey, along with the comparisons of previous rounds, have been published by Hossain and Bayes (2018) and Sawada, Mahmud, and Kitano (2018), as well as in a number of academic papers (Hossain et al. 2021; Kikkawa and Otsuka 2020; Kikkawa, Matsumoto, and Otsuka 2019; and Mahmud and Sawada 2018).

[7] More descriptive information on these villages can be found in Walker and Ryan (1990) and Lanjouw and Stern (1998).

[8] The evolution from VLS to VDS can be found here: http://vdsa.icrisat.ac.in/vdsa-evolution.aspx. Stefan Dercon of Oxford played a key role in tracking and resurveying ICRISAT-VLS (Badiani et al. 2007).

[9] Socio-Consultant, a reputed survey company in Bangladesh, has been conducting the field works and cleaning the data to produce a final version of MHPD for all rounds since 2000 (Hossain, Sen, and Rahman 2000; Hossain et al. 2007; Hossain and Bayes 2018).

Sample Size Increased to 46 Households per Village in 2013–14

Like the 1999–2000 survey, a household census and FGDs in all 62 sample villages were carried out to reevaluate the representativeness of the sample households in each village. The census enumerated 22,000 households from all villages. Following the multistage stratified random sampling method employed in the baseline survey, the fifth round initially took an average of 40 households per village. After all necessary adjustments, a total of 2,846 households from 62 villages (46 households per village) with 609 fresh samples were finally selected (Hossain and Bayes 2018). In this round, 1,825 unique households in the previous round were resurveyed. Among the 1,825 households, 294 households were split into 686 households in the 2013–14 survey. However, the final round also observed a 9.20% attrition rate due to natural causes, such as death or migration.

Sister Survey (3) COVID-19 Telephone Surveys by ADBI (2020–21)

In order to document the impact of the COVID-19 pandemic on the rural economy and livelihoods, three rounds of surveys were conducted by the author of this report together with Tetsushi Sonobe and Peter J. Morgan with funding from ADBI, respectively, in June 2020, September 2021, and January 2021 (Malek, Throung, and Sonobe 2021). Using a telephone survey with a separate short questionnaire, they were able to revisit about 2,200 households of the 2013–14 MHPD samples. The survey results were published in a book chapter, working paper, and in popular media (Malek, Hoa, and Sonobe 2021a, b, c).

3. EVOLUTION OF SURVEY QUESTIONNAIRE, IMPLEMENTATION, AND DATA ACCESSIBILITY

Although the standard LSMS survey normally enumerates rural and urban households, and the MHPD has targeted rural households only because of its goals and policy objectives. Such surveys generally comprise three different categories of questionnaires: a household questionnaire, a price questionnaire, and a community questionnaire (Deaton 1997; Grosh and Glewwe 2000). The household questionnaire generally includes household-level questions such as details of household composition, education, health, assets, land, and agricultural activities, while the community questionnaire encompasses communal information such as local infrastructure, demography, schooling, and health facilities. In contrast, the price questionnaire considers food prices (Deaton 1997). Similar to standard LSMS and other similar panel survey data sets, as mentioned earlier, the MHPD can be regarded as a full-length and comprehensive household-level survey and full-length LSMS.

The major sections, modules, and questions included in the five-round surveys are briefly presented in Table 6. The foundational components of the structured questionnaire were constructed in 1987–88; for instance, information on household components, schooling of household members, assets, cropping intensity and pattern, employment and income, consumption, participation in different government and NGO programs, etc.

Table 6: Overview of Information Collected from the Surveys of 62 Villages

Year	Major Information Collected from 62 Villages: Information on HH Head and Members	Association with NGO or Any Organization	Information on Migrant Members	Detail of Migration and Disbursement of Remittance	Land Ownership	Own Land Cultivation	Cultivation of Rented (in) Land	Cropping Pattern and Crop Production	Cost and Returns of a Parcel that Respondent can Remember Most	Non-crop Income and Cost	Fisheries Production and Income	Purchase and Sale of Lands	Cost of Cultivation and Use of Inputs for Cultivation	Labor Market in Agriculture	Nonfarm: Employment and Income	Details on Business, Industry, and Cottage Industry	Time Use of HH Members' (10+) Information	Information on Loan Taking	Agricultural Credit: Source, Availability and Utilization	HH Fixed Asset (Without Land)	Agricultural Extension Services	Crop Marketing	Use of Digital Media	Women's Empowerment	Meeting Basic Needs of HH/HH Expenditure	Coping Crisis	Self-assessment	Involvement with BRAC
1987–88	C	N	L	N	L	C	C	C	N	L	L	L	L	C	L	N	C	N	C	L	C	L	N	N	N	N	N	N
1999–00	C	L	C	N	C	C	C	C	C	L	L	C	C	C	C	L	C	C	L	C	C	C	L	N	L	C	L	N
2003–04	C	L	C	N	C	C	C	C	C	C	L	N	C	C	C	C	C	C	L	C	C	C	L	C	L	C	L	N
2007–08	C	L	C	N	C	C	C	C	C	C	L	L	C	C	C	C	C	C	L	C	N	C	L	N	L	C	C	N
2013–14	C	L	C	C	C	C	C	C	C	C	C	L	C	C	C	C	C	C	L	C	C	C	C	C	C	C	L	C

Notes: C – fairly complete information; L – limited information (not all questions are asked compared to the last round); N – no information available. Except for 2013–14, all previous rounds follow a single module.

Source: Authors' compilation.

Some additions or subtractions of sections and modules are found in a few rounds of MHPD surveys. In the second round (1999–00), there was only one module with some additional sections, and supplementary information within the section was added to this survey. For instance, information on women's empowerment and household behavior to cope with natural shocks and disasters were added to two separate sections. Also, information on health status, association with any organization, and details of owned and cultivated land were added under different sections. One special section of cost and return from cultivation was added to give a detailed account of the costs and returns of a parcel of land that the respondent could remember the best.

In 2003–04, although no significant addition was made in the questionnaire, some sections and subsections were excluded in this round; for example, information on agricultural extension and women empowerment is especially worth mentioning here. Considering the limited time gap with the previous round, village profile data were not collected in this round. No major changes except minor variations—for instance, the details of household members who stayed outside of households—of some subsections were added in the 2007–08 round.

Some major changes were observed in terms of the modules or sections in 2013–14. Some changes can be mentioned in particular: The questionnaire of the previous round was dissected into two separate modules with the addition of a fresh module on migration and remittance. With such additions, the MHPD data set continues to offer ample opportunity to estimate household income, household consumption, health, education, and employment status of its members and analyze the social and economic behavior of the households. Furthermore, the MHPD had also been maintaining its time interval between 3–5 years since its inception, except for the round conducted in 1999–2000. On the other hand, the survey team revisited the same household multiple times during the operation to maintain the survey and data quality.

3.1 Survey Implementation and Data Accessibility

In order to maintain the high quality of the data, Mahabub Hossain, the sole responsible person for all rounds of the MHPD surveys, supervised data collection. However, a number of researchers were involved in publishing first-hand results of the collected data (Table 3). Though different organizations (BIDS, IRRI and BRAC) collaborated under the funding of a number of donor organizations (IRRI, CGAIR, GRIPS, BRAC) for different rounds, all waves of the field survey was conducted, and data were cleaned and stored, by the survey team of Socio-Consultant Limited (SCL), except in the first round.[10] Despite facing many ground-level constraints in the field, the SCL, a survey-conducting organization, established the network in all 62 villages and implemented the surveys so far. A two-week extensive training for the enumerators and supervisors was normally organized before the survey rollout/interviews in the field. A pilot survey was conducted to test the questionnaire before the actual survey was conducted. In addition, the supervisor of the survey team constantly checked the questionnaire for the consistency of the responses.

One of the major changes occurred in the second round when the average sample size increased from 20 to 30 households. In order to increase the target households from 20 households in the baseline survey to 30 households, some fresh households were added in addition to the previous households and their offshoots following household wealth ranking willingness to response criteria (Bayes and Hossain 2007; Hossain and Bayes 2018).

[10] BIDS was responsible for conducting the first round of the survey (Hossain et al. 2000).

It is noted that there is no unique household identification number throughout the survey, and creating a panel data set requires a different key code that lists the IDs of the same household over time. All offshoot households were identified as the identity of predecessor households. Thus, the impossibility of tracking original households makes MHPDs an unbalanced panel (Kikkawa 2020).

As mentioned earlier, parts of the MHPD data sets are currently available for researchers on the IRRI website (http://ricestat.irri.org/fhsd/); however, detailed information on the data sets, including how data had been processed and shared, is not well documented on the website.

4. DESCRIPTIVE STATISTICS, ACADEMIC RESEARCH, AND POLICY CONTRIBUTIONS

This section of the report provides a short description of key socio-economic variables generated from raw MHPD, reflecting the rural economy's structural transformation that occurred in the last three decades in Bangladesh. In addition, this section summarizes the academic and policy contributions generated from the research projects led by Mahabub Hossain, his associates, and independent researchers who utilized the MHPD exclusively. [11]

4.1 Key Descriptive Statistics

Selected key descriptive statistics covering household land tenancy, socio-economic characteristics, and income sources of sample households for each of the MHPD survey rounds are presented in tables 7–10 and figures 1–3.

Regarding land tenancy, Table 7 labels farm households into four types of farmers—owner farmers, owner tenants, tenant owners, and pure tenants—based on their tenancy status and how they evolved over the decades. Table 7 and Figure 1 show that 37% of total households cultivated their own lands in the baseline survey of 1987–88, while only 9% had no cultivatable lands and were, therefore, pure tenants. Over time, however, the landscape of tenancy has changed, with the share of owner farmers dropping in the final round (2014) to 22%, whereas the share of pure tenant farmers increased from 9% to 17% during the period. The results also show that nonfarm households constituted about 34% of total households in the baseline survey, and their share increased to 43% in the aforementioned period.

Table 8 and Figure 2 present some basic socio-economic features of households, while Table 9 and Figure 3 depict the income structure of households. The average household size in 1988 was 5.87 persons, gradually declining to 4.33 persons in 2014. Due to the rural nature of households, the education of household heads was substantially lower in 1987–88 (3.1 years), which increased slightly to 4.5 years in 2013–14. Household and cultivated land size declined by about 50% of the original value, perhaps due to the increased population and urbanization. In the meantime, household total assets and loans from different sources have more than doubled during the period.

[11] One point to note is that identifying the original households in the case of split households made the analysis of some variables difficult, for instance, total income, total consumption, etc., at times of adversity, although per capita income and consumption were not affected (Deaton 1997).

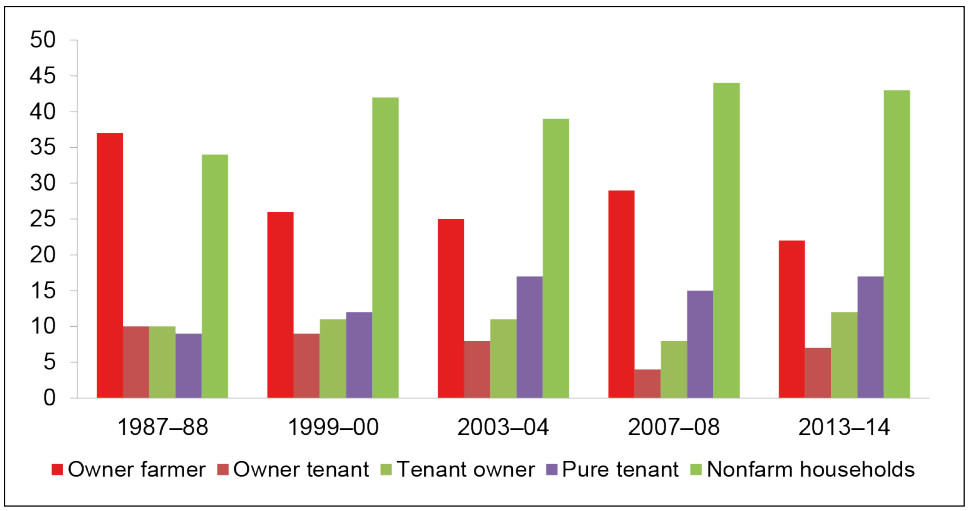
Table 7: Household Categorization Based on Tenancy

Year	Sample Size	Farm Households				Nonfarm Households[v]
		Owner Farmer[i]	Owner–tenant[ii]	Tenant–Owner[iii]	Pure Tenant[iv]	
1987–88	1,231	461 (37)	128 (10)	118 (10)	111 (9)	413 (34)
1999–00	1,872	495 (26)	160 (9)	206 (11)	222 (12)	789 (42)
2003–04	1,927	494 (25)	151 (8)	213 (11)	327 (17)	742 (39)
2007–08	2,010	585 (29)	88 (4)	166 (8)	292 (15)	879 (44)
2013–14	2,846	624 (22)	192 (7)	333 (12)	470 (17)	1,227 (43)

Notes: i. – Owner farmer households cultivate only their own land and do not cultivate in rented land; ii. – Owner tenant farmers cultivate more than half of their own land; iii. – Tenant-owner farmers cultivate more than half of the land owned by others; iv. – A household is thought pure-tenant if it does not have its own cultivated land, but depends on rented land; v. – A household is defined as a nonfarm household if it does not involve any kind of cultivation. Percentages are shown in parentheses.

Source: Authors' own calculation from the raw data.

Figure 1: Household Categorization Based on Tenancy



Source: Authors' own calculation based on raw data.

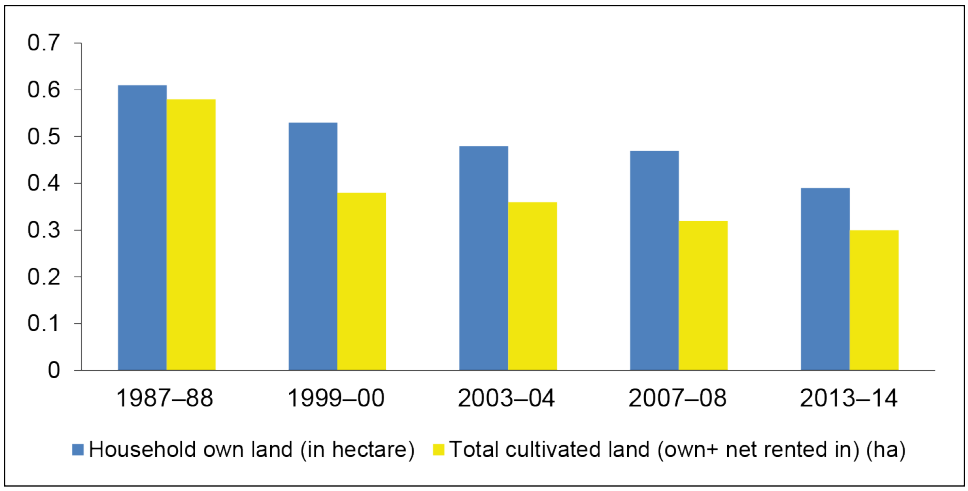
Table 8: Descriptive Statistics of Households Socio-economic Characteristics

Year	Sample Size	Household Size	Household Head Schooling Years	Age of Household Head (in years)	Household Own Land (in hectare)	Total Cultivated Land (Own + Net Rented in) (ha)	Household Total Capital (BDT)	Household Total Amount of Loan (BDT)
1987–88	1,231	5.87 (2.83)	3.10 (3.91)	41.74 (14.14)	0.61 (0.95)	0.58 (0.86)	10,116 (24,340)	1,799 (6,061)
1999–00	1,872	5.25 (2.37)	3.90 (4.30)	44.34 (13.30)	0.53 (1.00)	0.38 (0.67)	25,292 (85,272)	4,725 (32,513)
2003–04	1,927	5.08 (2.26)	3.85 (4.38)	46.12 (13.71)	0.48 (0.89)	0.36 (0.62)	24,498 (74,084)	5,308 (18,968)
2007–08	2,010	4.94 (2.31)	3.90 (4.27)	48.10 (14.45)	0.47 (0.90)	0.32 (0.55)	43,547 (143,827)	11,494 (58,890)
2013–14	2,846	4.33 (1.91)	4.52 (4.40)	47.31 (14.27)	0.39 (0.71)	0.30 (0.51)	20,659 (132,136)	29,139 (246,014)

Notes: i. Std. Dev. Is in parentheses.

Source: Authors' own calculation from the raw data.

Figure 2: Household Own Land and Cultivated Land in Hectares



Source: Authors' own calculation from raw data.

Table 9 and Figure 3 present household income categorized by different agricultural and nonagricultural income sources.[12] All income amounts are adjusted according to the national Consumer Price Index (CPI), assuming 2005–06 as the base year—an average household derived 56% of its total income from agricultural sources, while the remaining 44% from non-agricultural sources in 1987–88. As time passes, the share of the nonagricultural sector grows and becomes the dominant income source, contributing approximately two-thirds of total household income.

Table 9: Distribution of Household Income Across Economic Activities at Base Year 2005–06 ('000 BDT)

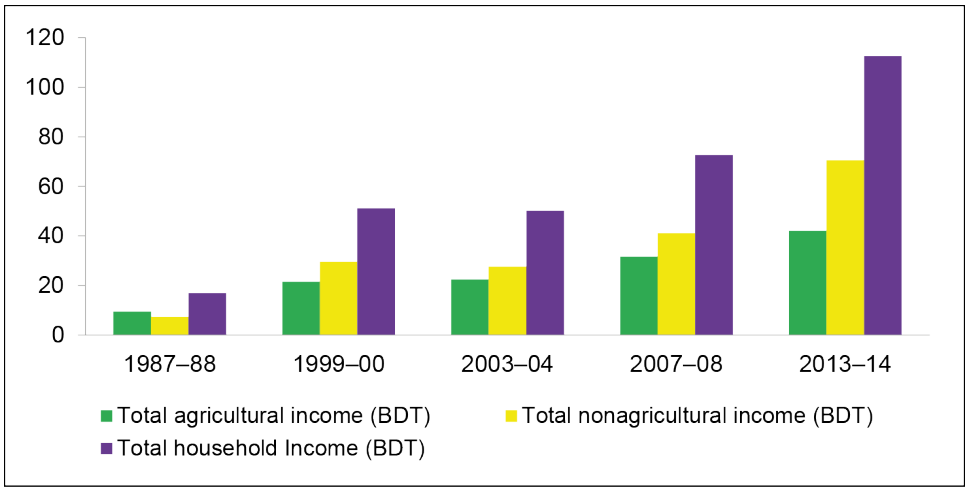
		Agriculture				Non-Agriculture					Total
Year	Sample Size	Crop[i]	Non-crop[ii]	Agricultural Wage Income	Total Agricultural Income	Non-agricultural Wage[iii]	Nonfarm Trade/ Business/Service[iv]	Remittance	Other Transfers	Total Nonagricultural Income	Total Household Income
1987–88	1,231	5.6 (33)	1.8 (10)	2.2 (13)	9.5 (56)	1.5 (9)	4.4 (26)	1.5 (9)	–	7.4 (44)	16.9 (100)
1999–00	1,872	12.2 (24)	6.6 (13)	2.7 (5)	21.5 (42)	2.7 (5)	19.7 (38)	7.2 (14)	–	29.6 (57)	51.1 (100)
2003–04	1,927	13.3 (27)	6.2 (13)	2.9 (6)	22.5 (45)	3.3 (7)	17.1 (34)	7.2 (14)	–	27.6 (55)	50.2 (100)
2007–08	2,010	19.0 (26)	7.9 (11)	4.7 (7)	31.6 (43)	6.7 (9)	17.8 (25)	16.5 (23)	–	41.1 (57)	72.7 (100)
2013–14	2,846	21.9 (19)	14.2 (13)	5.8 (5)	42.0 (37)	11.0 (10)	30.6 (27)	27.2 (24)	1.8 (2)	70.6 (63)	112.6 (100)

Notes: (i) – Income from any kind of cultivated crop is included in crop income; (ii) – Income from poultry, fishing, forestry, livestock, and any kind of agricultural activities are included in noncrop income; (iii) – Income from transport, construction, etc., is included here; (iv) – Income from any kind of nonagricultural trade, business, and service income is included; and (v) – Percent. Is in parentheses.

Source: All figures are authors' own calculation from raw data.

[12] We did not calculate income from the raw data, rather we have used household analysis data file that Mahabub Hossain used for his analyses and is available in the data files preserved at Socio-consultant—the consistency of those income data has been checked with available published books and papers.

Figure 3: Household Income Distribution in '000 BDT Considering 2005–06 as Base Year



4.2 Academic Research Contribution

A number of academic research papers, including peer-reviewed journal articles, have been published using MHPD data. To the best of our knowledge, the publications tracked based on MHPD are listed in detail and summarized briefly in Tables 10 and 11, respectively.[13] According to our detailed search, approximately 70 research works have been published over the three decades (Table 11). More than two-thirds (46) of the total publications are listed as working paper series (such as working papers, conference papers, workshop papers, occasional papers, reports, etc.) and peer-reviewed journal articles. Among the remaining publications, ten books and seven book chapters are summarized in Table 8. Apart from those, one book review, one policy brief, three newspaper articles, and two doctoral dissertations were also published. Most publications (55 publications) were published using longitudinal data with a combination of two or more rounds of MHPD data. The baseline survey held in 1988 was used in 10 publications, the highest among the individual rounds, followed by three publications in the second round held in 2000 and two publications in the 2014 rounds. The other two rounds did not show any publication independently, as most of the publications were attracted by the longitudinal data after the availability of the second-round survey data.

[13] Some other publications or even ongoing research works may not be tracked as many independent or groups of researchers who might have worked using the MHPD data are not currently available online. We listed only two doctoral dissertations from our online search, though the author often heard the late Mahabub Hossain mention more than 12 doctoral dissertations used MHPD.

Table 10: List of All Publications from MHPD

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
1992	JA	1988	Rural Poverty in Bangladesh: Trends and Determinants	Mahabub Hossain and Binayak Sen	*Asian Development Review*, 10(1)	
1993	WP	1988	Public Rural Works for Relief and Development: A Review of the Bangladesh Experience	Mahabub Hossain and M. M. Akash	IFPRI Working Papers on Food Subsidies. No. 7	Centro Internacional de Mejoramiento de Maíz y Trigo, (CIMMYT), México
1994	WP	1988	Rural Nonfarm Economy in Bangladesh: A Dynamic Sector or a Sponge of Adsorbing Surplus Labor?	Mahabub Hossain, Mustafizur Rahman, and Abdul Bayes	SAAT Working Paper, ILO, New Delhi, India	ILO
1994	BC	1988	Production Environments, Modern Variety, Adoption, and Income Distribution in Bangladesh	Mahabub Hossain, M. A. Quasem, M. A. Jabbar and M. M. Akash	In David C.C. and Otsuka, k. (eds), Modern Rice Technology and Income Distribution in Asia	IFPRI
1995	B	1988	*Rethinking Rural Poverty: Bangladesh as a Case Study*	Hossain Zillur Rahman and Mahabub Hossain	The University Press Limited	The University Press Limited
1995	BC	1988	Socio-Economic Characteristics of the Poor	Mahabub Hossian	In Rahman and Hossain (eds) Rethinking Rural Poverty. UPL, Dhaka	UPL, Dhaka
1996	JA	1988 (Along with others – 1990, 1995)	Rural Nonfarm Sector in Bangladesh: Stagnating and Residual, or Dynamic and Potential?	Binayak Sen	The Bangladesh Development Studies, pp. 143–180	BIDS
1997	WP	1988 (Along with 1990, 1994)	Methodology for Identifying the Poorest at Local Level. No. WHO/ICO/MESD. 27. World Health Organization, 1997	Binayak Sen and Sharifa Begum	World Health Organization (No. WHO/ICO/MESD. 27)	World Health Organization
1997	JA	1988 (Along with others – 1995)	Recent Developments in Bangladesh Rural Economy: Implications for Strategies and Policies for Alleviation of Poverty	Mahabub Hossain and Hossain Zillur Rahman Rahman	*The Pakistan Development Review*, Winter 1997, Vol. 36, No. 4	Pakistan Institute of Development Economics, Islamabad
2000	JA	1988 (Along with others – 1990, 1995)	Growth and Distribution of Rural Income in Bangladesh: Analysis Based on Panel Survey Data	Mahabub Hossain, Binayak Sen and Hossain Zillur Rahman	*Economic and Political Weekly*, pp. 4630–4637	
2002	BC/CP	1988, 2000	Changes in Agrarian Relations and Livelihoods in Rural Bangladesh: Insights from Repeat Village Studies	Mahabub Hossain, Manik Lal Bose, Alamgir Chowdhury and R. Meinzen-Dick	In Ramachandran, V. K.; Swaminathan, M. (eds), Agrarian Studies: Essays *on Agrarian Relations in Less-Developed Countries* pdf	Tulika Print Communication Ltd, India
2002	CP	2000	Impact of the Adoption of Modern Varieties of Rice on Productivity Gains and Income Distribution for the Irrigated and the Rain-Fed Ecosystem. *International Conference on Impacts of Agricultural Research and Development: Why Has Impact Assessment Research Not Made More of a Difference?*	Mahabub Hossain, Manik Lal Bose, T. T. Ut, A. G. Agarwal, J Thakur, and E.B. Marciano	International Conference on Impacts of Agricultural Research and Development, CP-80	International Conference on Impacts of Agricultural Research and Development

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Table 10 *continued*

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
2002	BC	1988, 2002	Assessment of Comparative Advantage in Rice Cultivation in Bangladesh	Quazi Shahabuddin, Mahabub Hossain, A. Mustafi and C. Narciso	In M. Sombilla, M. Hossain, and B. Hardy (eds) *Developments in the Asian Rice Economy* (2002): 369–384. 2002. Assessment of Comparative Advantage in Rice Cultivation in Bangladesh. Develo pments in the Asian Rice Economy, pp. 369–384	IRRI
2002	PB	1988, 2002	Promoting Rural Nonfarm Economy of Bangladesh	Mahabub Hossain	CPD-IRRI Policy Brief 3	CPD-IRRI
2003	OP	2000	Trade Liberalisation and the Crop Sector in Bangladesh	Mahabub Hossain and Uttam Kumar Deb	Centre for Policy Dialogue (CPD) Occasional Paper-23	Centre for Policy Dialogue.
2003	R	1988 and 2000	Rice Research, Technological Progress, and Impacts on the Poor: The Bangladesh Case (Summary Report)	Mahabub Hossain, David Lewis, Manik Lal Bose, and Alamgir Chowdhury	EPTD Discussion Paper No. 110	Environment and Production Technology Division; IRRI
2003	WP	1988 and 2000	Nature and Impact of Women's Participation in Economic Activities in Rural Bangladesh: Insights from Household Surveys	Mahabub Hossain, Manik Lal Bose, and A. Ahmad	Centre for Policy Dialogue -WP	Centre for Policy Dialogue
2004	CP	2000	Mapping Rural Poverty in Bangladesh: How Census Data Collection Systems Can Help	S. P. Kam, Mahabub Hossain, Manik Lal Bose, and L. Villano	In International Conference on Official Poverty Statistics: Methodology and Comparability	In International Conference on Official Poverty Statistics: Methodology and Comparability, 4-6 October 2004
2004	CP	1988 and 2000	Changes in Agriculture and the Economy in the Flood-Prone Environment 13 in Bangladesh, 1988 to 2000: Insights from a Repeat Survey of 16 Villages	Mahabub Hossain, Manik Lal Bose, and Alamgir Chowdhury	In Bhuiyan SI, Abedin MZ, Singh VP, Hardy B, (eds), Rice Research and Development in the Flood-Prone Ecosystem. Proceedings of the International Workshop on Flood-prone Rice Systems Held in Gazipur, Bangladesh, 9–11 January 2001	IRRI
2004	WP	1988 and 2004	Geographical Concentration of Rural Poverty in Bangladesh	Suan Pheng Kam, Manik Lal Bose, Tahmina Latif, M A H Chowdhury, S Ghulam Hussain, Mahbub Ahmed, Anwar Iqbal, L Villano, Mahabub Hossain	Centre for Policy Dialogue Working Paper-38	Centre for Policy Dialogue

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Table 10 *continued*

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
2004	WP	1988 and 2004	Poverty Alleviation Through Agriculture and Rural Development in Bangladesh	Mahabub Hossain	Centre for Policy Dialogue Working Paper-39	Centre for Policy Dialogue (CPD)
2004	JA	1988 and 2000	Rural Nonfarm Economy: Evidence from Household Surveys	Mahabub Hossain	*Economic and Political Weekly*, pp. 4053–4058	
2004	WP	1988 and 2000	Rural Nonfarm Economy in Bangladesh: A View from Household Surveys	Mahabub Hossain	Centre for Policy Dialogue (CPD)-WP-40	Centre for Policy Dialogue (CPD)
2005	WS	1988 and 2000	Inequality in the Access to Secondary Education and Rural Poverty in Bangladesh: An Analysis of Household and School Level Data	Alia Ahmad, Mahabub Hossain and Manik Lal Bose	In Workshop on Equity and Development in South Asia, India, vol. 2005	World Bank in December 7–8, 2004, New Delhi, India
2005	CP	1988, 2000	Growth of the Rural Nonfarm Economy in Bangladesh: Determinants and Impact on Poverty Reduction	Mahabub Hossain	In Proceedings of International Conference titled 'Rice Is Life: Scientific Perspectives for the 21st Century, pp. 436–439	IFPRI
2005	JA	1988 and 2000	Spatial Patterns of Rural Poverty and their Relationship with Welfare-influencing Factors in Bangladesh	Suan-Pheng Kam, Mahabub Hossain, Manik Lal Bose, and Lorena S. Villano	*Food Policy*, 30(5–6): 551–567	
2006	JA	1988, 2000	Adoption and Productivity Impact of Modern Rice Varieties in Bangladesh	Mahabub Hossain, Manik Lal Bose and B. A. Mustafi	The Developing Economies, 44(2): 149–166	
2006	JA	1988, 2000 and 2004	Income Dynamics and Pathways Out of Rural Poverty in Bangladesh, 1988–2004	Nigar Nargis and Mahabub Hossain	*Agricultural Economics*, 35: 425–435	
2007	BC	1988 and 2000	Rice Research, Technological Progress, and Poverty: The Bangladesh Case	Mahabub Hossain, David Lewis, Manik L. Bose and Alamgir Chowdhury	In Michelle Adato and Ruth Meinzen-Dick (eds): *Agricultural Research, Livelihoods, and Poverty: Studies of Economic and Social Impacts in Six Countries*, 56–102	The Johns Hopkins University Press, Baltimore; IFPRI
2007	B	1988, 2000, and 2004	Gramer Manush, Grameen Arthoniti: Jibon Jibikar Poriborton Porjalocona	Mahabub Hossain and Abdul Bayes		Writers' Foundation Bangladesh and Shoraj Prokashoni
2009	JA	1988 and 2000	The Role of Gender in Economic Activities with Special Reference to Women's Participation and Empowerment in Rural Bangladesh	Manin Lal Bose, Alia Ahmad and Mahabub Hossain	*Gender, Technology and Development*, 13(1): 69–102	
2009	BC	1988, 2000 and 2004	Income Dynamics, Schooling Investments, and Poverty Reduction in Bangladesh, 1988–2004	Mahabub Hossain, A. N.M. Rahman and J. Estudillo	J. Estudillo, Y. Sawada (Eds.). *Rural Poverty and Income Dynamics in Asia and Africa*. Routledge, NY, pp. 70–94	Routledge
2009	DP	1988, 2000, 2008	The Impact of Shallow Tubewells and Boro Rice on Food Security in Bangladesh	Mahabub Hossain	IFPRI Discussion Paper 00917	IFPRI

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Table 10 *continued*

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
2009, 2010	B	1988, 2000, 2004 and 2008	Rural Economy and Livelihoods-Insights from Bangladesh	Mahabub Hossain and Abdul Bayes		A H Development Publishing House
2010	BC	1988, 2000, 2004 and 2008	Dynamics of Poverty in Rural Bangladesh, 1988–2007: An Analysis of Household Level Panel Data	Mahabub Hossain and Nigar Nargis	In: Banerjee L, Dasgupta A., and Islam R (eds), *Development, Equity and Poverty: Essays in Honor of Azizur Rahman Khan*	Delhi, Macmillan Publishers India Ltd. 2010: 213–32
2010	WP	1988, 2000, 2004 and 2008	Dynamics of Poverty in Rural Bangladesh: A Research Framework	Osmani, S.R. and Benayak Sen	Working Paper No. 9	Institute of Microfinance
2011	CP	1988, 2000, 2004 and 2008	Changes in Tenancy and Labor Markets and Impact on Livelihoods in Rural Bangladesh: Findings from a Longitudinal Survey 1988–2007	Mahabub Hossain and Abdul Bayes	Paper presented in the Conference of the Asian Society of Agricultural Economists (ASAE) held in Hanoi, No. 2232-2019-2313. 2011	ASAE
2011	CP	1988, 2000, 2004, 2008	Exclusion and Drop Out in School Participation in Bangladesh: Insights from Repeat Household Surveys	Mahabub Hossain and Mohammad Abdul Malek	7th Asian Society for Agricultural Economists (ASAE) International Conference Hanoi, Viet Nam, 12-15 October 2011	ASAE
2011	CP	1988, 2000 and 2008	Total Factor Productivity and the Efficiency of Rice Farms in Bangladesh: A Farm Level Panel Data Comparison of the Pre-and Post-Market Reform Period	Mohammad Jahangir Alam, Ismat Ara Begum, Sanzidur Rahman, Jeroen Buysse, and Guido Van Huylenbroeck	Contributed Paper Prepared for Presentation at the 85th Annual Conference of the Agricultural Economics Society, Warwick University, UKNo. 353-2016-18085. 2011	Agricultural Economics Society
2011	CP	2000 and 2008	Women's Participation in Agriculture in Bangladesh: Trends, Determinants and Impact on Livelihoods	W.M.H Jaim and Mahabub Hossain	Paper presented at 7th Asian Society of Agricultural Economists (ASAE) International Conference Hanoi, Viet Nam, October 13-15, 2011. (ASAE-No. 2232-2019-2315)	Asian Society of Agricultural Economics (ASAE)
2012	D	2000 and 2004	Agricultural Land Tenancy in Rural Bangladesh: Productivity Impact and Process of Contract Choice	S. Ahmed		University of Adelaide
2012	BC	1988, 2000 and 2008	Four Decades of Agricultural Development in Bangladesh	Mahabub Hossain	In Bangladesh at 40-Changes and Challenges	A H Development Publishing House
2012	CP	1988, 2000, 2004, and 2008	Impact of a Commodity Price Spike on Poverty Dynamics: Evidence from a Panel of Rural Households in Bangladesh	Joseph Valdes Balagtas, Humnath Bhandari, Samarendu Mohanty, Ellanie Cabrera and Mahabub Hossain	Contributed Paper Prepared for Presentation at the 56th AARES annual conference, No. 423-2016-26992. 2012	AARES

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Table 10 *continued*

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
2013	B	1988, 2000, 2004, and 2008	Tin Bigha Jomi-Krishi o Khaddo Biborton Brittanto	Abdul Bayes and Mahabub Hossian		Center Int. Res. Jpn. Econ
2014	WP	1988, 2000, 2008	Tenant Farmers' Access to Credit and Extension Services: BRAC Tenant Farmer Development Project in Bangladesh	Mahabub Hossain, Mohammad Abdul Malek and Narayan Chandra Das	*Center Int. Res. Jpn. Econ.*, 7(40): 7–9	
2014	JA	1988, 2000, 2004, and 2008	Did the Commodity Price Spike Increase Rural Poverty? Evidence from a Long-run Panel in Bangladesh	Joseph Valdes Balagtas, Humnath Bhandari, Samarendu Mohanty, Ellanie Cabrera and Mahabub Hossain	*Agricultural Economics*, 45(3): 303–312	
2015	R	2000 and 2008	Microfinance and Moneylenders: Long-run Effects of MFIs on Informal Credit Market in Bangladesh	C. N. Berg, M. Shahe Emran and F. Shilpi		Available at SSRN 2677316
2015	JA	1988, 2000, 2004 and 2008	Does Microfinance Change Informal Lending in Village Economies? Evidence from Bangladesh	Asadul Islam, Chau Nguyen and Russell Smyth	*Journal of Banking and Finance*, 50: 141–156	
2015	N	1988, 2000, 2008 and 2014	Remittances and Poverty Alleviation	Abdul Bayes, Mahabub Hossian and A NM Mahfuzur Rahman	*The Financial Express*, 17 November 2015	The Financial Express
2015	B	1988, 2000, 2008 and 2014	Long-run Effects of MFIs on Informal Credit Market in Bangladesh	Mahabub Hossain and Abdul Bayes		A H Development Publishing House
2015	N	1988, 2000, 2004, 2008 and 2014	Drivers of the Rural Economy	Mahabub Hossian	The Daily Star 24th Anniversary of *The Daily Star* (Part-3)	The Daily Star
2015	B	1988, 2000, 2004, 2008 and 2014	Bish Geramer Golpo	Mahabub Hossain and Abdul Bayes		The University Press Limited
2016	N	1988, 2000, 2014	The Middle Class is Growing	Abdul Bayes, Mahabub Hossian and A NM Mahfuzur Rahman	*The Financial Express*, Dhaka, Monday, 2016-01-16	The Financial Express
2016	WP	2000, 2004 and 2008	Migration and Household Decision on Occupational Choice and Investment: Evidence from Bangladesh	Marup Hossain, Gulcan Onel, and Conner Mullally	Selected Paper Prepared for Presentation at the 2016 Agricultural and Applied Economics Annual Meeting, Boston, Massachusetts, Jul 31–Aug 2. Association	
2016	R	1988, 2000, 2004 and 2008	Dynamics of Rural Growth in Bangladesh: Sustaining Poverty Reduction	World Bank Group		World Bank Group
2017	B	2000, 2004, 2008 and 2014	Economic and Social Development of Bangladesh: Miracle and Challenges. Springer	Sawada, Y., Mahmud, M. and Kitano, N. eds	Springer	

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Table 10 *continued*

Years	Study Types	Usage of Rounds	Name of Article/ Book Chapter/ Book/Working Paper/ Conference Proceeding	Author/ Authors	Title of Journal Article/Book/ Working Paper Series/Publishers	Publishers/ Organizers
2017	WP	1988, 2000 and2008	Women Empowerment in Bangladesh: Household Decisions Under Development of Nonfarm Sectors and Microfinance Institutions	M. U. Mahmud, Y. Awada, M. Tanaka and T. Tanaka	WP -(No. 154)	JICA Research Institute
2018	JA	2000, 2004 and 2008	Too Small to be Beautiful? The Farm Size and Productivity Relationship in Bangladesh	Madhur Gautam and Mansur Ahmed	*Food Policy*, 84: 165–175	
2018	CP	1988, 2000, 2004, and 2008	Waves of Change: Understanding Ascent, Descent and Persistence of Poverty in Rural Bangladesh	M. Ahmed, M. Gautam and Binayak Sen	30th International Conference of Agricultural Economist	AE Conference
2018	B	1988, 2000, 2008 and 2014	Rural Transformation: Insights from Bangladesh	Mahabub Hossain and Abdul Bayes		The University Press Limited
2018	JA	1988, 2000 and 2014	Fragile Environment, Seasonality and Maternal and Childhood Undernutrition in Bangladesh	M. Mohsena, M. Hossain, B. Chakraborty, Abdul Bayes and A. M. Rahman	*Journal of Biosocial Science*, 50(5): 579–603	
2019	JA	2008, 2014	An Inquiry into the Heterogeneous Outcomes of International Migration: Evidence from Rural Households in Bangladesh	A. Kikkawa, T. Matsumoto and K. Otsuka	*The Journal of Development Studies*, 55(10): 2106–2128	
2019	BR	1988, 2000, 2008 and 2014	A Review of Rural Transformation: Insights from Bangladesh	Farhana Sehreen	Rural Transformation: Insights from Bangladesh	Institutions and Economics, Vol. 11, No. 2, April 2019, pp. 135–137
2020	D	2000, 2008 and 2014	International Migration and Development: Evidence from Rural Households in Bangladesh	A. Kikkawa	GRIPS	GRIPS
2020	JA	2000, 2008 and 2014	The Changing Landscape of International Migration: Evidence from Rural Households in Bangladesh, 2000–2014	A. Kikkawa and K. Otsuka	*Oxford Development Studies*, 48(3): 222–239	
2020	JA	1988, 2000 and 2008	Rural Livelihood Diversification in Bangladesh: Effect on Household Poverty and Inequality	S. Salam	*Agricultural Science*, 2(1): 133–133	
2021	WP	1988, 2000, 2004, 2008 and 2014	Impact of Rural Credit on Household Welfare: Evidence from a Long-Term Panel in Bangladesh	M.D. Hossain, A.M. Mohammad and Z. Yu	University of Tsukuba Working Paper-No. 2021-001	Economics, Graduate School of Humanities and Social Sciences, University of Tsukuba
2021	JA	2014	Gains from Female Education in Rural Bangladesh: A Multidimensional Approach	T. Tanaka, K. Takahashi, and K. Otsuka	*International Journal of Educational Development*, 81:10 2344	
2021	WP	2000, 2014	Bangladesh Microfinance Competition and Multiple Borrowing: Evidence using Panel Data from Bangladesh	Minhaj Mahmud, Yasuyuki Sawada, and Mari Tanaka.	JICA Ogata Research Institute Working Paper	JICA Ogata Sadako Research Institute for Peace and Development
2021	JA	2014	Determinants of Crop Diversification in Bangladesh: An Econometric Analysis	Abul Kalam Azad	*Asia-Pacific Journal of Rural Development*	
2022	JA	2000, 2014	Microfinance competition and multiple borrowing: Evidence using panel data from Bangladesh	Minhaj Mahmud, Yasuyuki Sawada, and Mari Tanaka.	*Review of Development Economics*, 26(2): 1164–1188	

Note: JA = Journal Article; WP = Working Paper; DP = Discussion Paper; OP = Occasional Paper, R = Report; D = Doctoral Dissertation; PB = Policy Brief; BC = Book Chapter; B = Book; BR = Book Review; and CP = Conference Paper.

Source: Authors' compilation.

Table 11: Number of Publications Based on MHPD Rounds

Year/ Rounds	Journal Article	Working Paper/ Conference Paper/Workshop Paper/Occasional Paper/Report	Book	Book Chapter	Book Review	Policy Brief	Newspaper	Doctoral Dissertation	Total
1987–88	4	3	1	2	–	–	–	–	10
1999–00	–	3	–	–	–	–	–	–	3
2003–04	–	–	–	–	–	–	–	–	0
2007–08	–	–	–	–	–	–	–	–	0
2013–14	3	–	–	–	–	–	–	–	3
Panel	12	22	8	6	1	1	3	2	55
Total	**19**	**28**	**9**	**8**	**1**	**1**	**3**	**2**	**71**

Source: Authors' compilation.

The published research works listed in Table 10 encompassed various dimensions of rural living and livelihoods across the country over a period of nearly three decades. The publications that focused only on the baseline survey concentrated on the impact of green revolutions/technology on rice production, poverty reduction in the country, and nonfarm activities (Hossain 1988; Hossain and Sen 1992; Hossain et al. 1994; Rahman and Hossain 1995), with publications from successive rounds, focused on the dynamic behavior of rural households by addressing a variety of dimensions (Hossain et al. 2002; Kam et al. 2005; Hossain, Bose, and Mustafi 2006; Bayes and Hossain 2007; Hossain and Malek 2011; Bose et al. 2009; Balagtas et al. 2014; Hossain and Bayes 2009, 2010, 2018; Gautam and Ahmed 2019; Mohsena et al. 2018; Kikkawa, Matsumoto, and Otsuka 2019; Kikkawa and Otsuka 2020; Hossain, Malek, and Yu 2021; Tanaka, Takahashi, and Otsuka 2021; Mahmud et al. 2021; Azad 2021) and the rural transformation of the country (Bayes and Hossain 2007; Hossain and Bayes 2009, 2018; Sawada, Mahmud, and Kitano 2018). The main areas of published research from MHPD surveys can broadly be summarized in five dimensions: i) green revolution technology; ii) nonfarm sector development; iii) education and women empowerment; iv) migration and international remittances, and v) poverty and inequality.

4.2.1 Adoption and Impact of Green Revolution Technology

Although green revolution technology was introduced in the early 1970s, there were many public apprehensions regarding the viability of MV rice technology in the country (Griffin 1979; Hossain 1988). Therefore, a large body of research during this time focused on the favorable and unfavorable impact of modern rice variety technologies on rice production in the 1990s (Hossain et al. 1994). Hossain et al. (1994) showed that despite the unchanged cultivated land area during the 1980s, rice production increased by around 2.8% due to the adoption of MV rice technology. Due to the green revolution, the rise in rice production started to ameliorate food shortages, especially rice shortages, which were very severe during the 1970s and the 1980s (Karim 1999). Hossain et al. (1994) found that adopting green revolution technology and its differential impacts varied across geographical variations. They found rapid adoption in the districts of Dhaka, Chittagong, Bogura, Jessore, and Comilla, whereas less progress was found in the districts of Barisal, Khulna, and Potuakhali in their study.

4.2.2 Rural Nonfarm Sector Development and Credit Market

Paired with research on the impact of the green revolution on rice production in the country, investigation into rural nonfarm development was also thoroughly investigated, especially during the 1990s and the 2000s, using MHPD survey data. Sen (1996) found that the rural economy shifted from a farm economy to a nonfarm economy during the 1990s. Furthermore, the occupational pattern of the rural economy also largely shifted in favor of nonfarm occupations in the period mentioned above (Hossain, Rahman, and Bayes 1994, Hossain, Sen, and Rahman 2000). During this time, the consumption demand for fish, meat, and vegetables increased significantly (Hossain and Rahman 1997). Moreover, Azad (2021) investigated the factors of crop diversification that influence households to cultivate high-value crops. Hossain and Rahman (1997) showed that purchasing these crops and noncrops also had high-income elasticity in their estimation. Additionally, these nonfarm activities contributed to poverty reduction during the aforementioned period. Sen (1996) found the pro-poor nature of nonfarm occupations in the rural economy of Bangladesh. Since the 1980s, Bangladesh has observed a vibrant rural credit market, including the microfinance sector, mostly targeting poor women, which has facilitated the rural nonfarm sector (Mahmud, Sawada, and Tanaka 2022; Hossain, Malek, and Yu 2021, Hossain et al. 2021; Mahmud et al. 2021; Islam, Nguyen, and Smyth 2015; Berg, Emran, and Shilpi 2013).

4.2.3 Educational Development and Women Empowerment

Bangladesh has made remarkable achievements in women's education, employment, and household decision-making roles since the 1990s (Tanaka, Takahashi, and Otsuka 2021). The secondary school stipend program, gradual improvement of food security, nonfarm sector development, and extensive application of microcredit programs in the country were some of the key drivers of women's empowerment in Bangladesh (Bayes and Hossain 2007; Hossain and Bayes 2010 and 2018; Hashemi et al. 1996; Ahluwalia and Mahmud 2004; Mahmud et al. 2021; Tanaka, Takahashi, and Otsuka 2021). Hossain and Bose (2004) investigated the impact of women's participation in farm and nonfarm activities using the first two rounds of MHPD surveys. The study unmasked that while men were increasingly involved in nonfarm activities where income seemed higher compared to the agriculture sector, women started to fill the gap and participate in agricultural activities over time. Although women's participation in nonfarm activities remained very low, their involvement in agricultural activities was notable (Hossain and Bose 2004). Participation in agricultural activities significantly improved their empowerment index. Additionally, women's empowerment was closely associated with the socio-cultural and economic factors found in another study based on MHPD data (Bose, Ahmad, and Hossain 2009). The increased participation of women in nonfarm economic activities have gradually made their role important in household decision-making activities and therefore accelerated their empowerment (Bayes and Hossain 2007; Hossain and Bayes 2010 and 2018).

4.2.4 Migration and International Remittance

Moreover, persistent rural-urban migration has also been observed in Bangladesh since the 1980s. This change started penetrating the market-based economy in rural economies and the people's livelihoods (Afsar 2005). In addition to rural-urban migration, international migration of Bangladeshi labor was also notable from the aforementioned time and played a vital role in the domestic economy (Hossain and Bayes 2018; Wadood et al. 2021); for instance, remittances from these migrant workers was equivalent to 5.2% of the country's total national GDP of the country in 1982–83 (Siddiqui 2003) and around 12% in 2012 (Hassan and Shakur 2017). Hence,

domestic and international migration are expected to substantially influence people's livelihoods. To investigate the livelihood and occupation pattern of the rural economy, the nexus between rural development and urbanization, and migration was persistently explored by wielding the MHPD data. Using data from 62 villages, Kam et al. (2005); Bayes and Hossain (2007); and Hossain and Bayes (2009, 2015, 2018) found that remittances from migration (both rural and urban) played a vital role in rural household income, expenditure, and overall livelihoods. Kikkawa and Otsuka (2020) found that international migration is becoming an available option for a less wealthy population, possibly due to the increased access to finance to pay for initial migration costs. By classifying migrant households based on migration history and status, Kikkawa, Matsumoto, and Otsuka (2019) found that remittances are likely invested in productive capital once migrants return home.

4.2.5 Poverty and Inequality Analysis to Portray the Rural Transformation

Stable agricultural production, development of the nonfarm economy, women empowerment, infrastructure, urbanization, and migration have substantially changed livelihood strategies in the rural economy of Bangladesh since the 1980s, especially in the 1990s. These developments brought a tremendous contribution to poverty reduction, steady food production (especially rice), improvement in health conditions (especially for the poor), substantial educational attainment, and overall standard of living (Rahman and Hossain 1995; Hossain and Bayes 2009, 2015 and 2018; Hossain, Rahman, and Estudillo 2009; Osmani and Sen 2011). These achievements have paved the way for rural transformation in Bangladesh. School attendance increased from 43% in 1987–88 to approximately 70% in 2013–14 (Hossain and Bayes 2018; Hossain and Malek 2011). They also showed that household per capita income increased annually by over 5% during 1988–2014. In addition, the head-count poverty index declined from 60% in 1987–88 to 38% in 2013–14, whereas extreme poverty fell to 5% in 2013–14 from 33% in 1987–88, according to an estimation based on MHPD data (Hossain and Bayes 2018).

4.3 Contribution to the Policy Making

The MHPD data have offered a wealth of knowledge and evidence that contributed to informing NGOs, the government of Bangladesh, and international development agencies. For instance, the evidence of a transition from the farm to the nonfarm sector of the rural economy was used to develop a national rural development policy. For example, a leading think tank in the country Center for Policy Dialog (CPD), in association with the IRRI, formulated a policy document, "Promoting Non-farm Economy of Bangladesh," to facilitate the country's agricultural policy (Hossain 2002). The government of Bangladesh and the World Bank extensively used MHPD data to formulate national policy documents in 2005 and 2016, respectively (IMF 2005; Madhur and Faruqee 2016). The MHPD data were also used for policy documents on rural poverty and inequality (Osmani and Sen 2010). The largest NGO, BRAC, extensively used MHPD to formulate strategies for several development programs, including the graduation approach for the ultra-poor, the agriculture credit program for the tenant farmers, and the education program (Hossain, Kairy, and Bayes 2016). A Bangladesh case study was used to formulate the World Development Report 2013 (Jobs), where the MHPD was also used to assess the diversity of jobs (World Bank 2012).

5. ENRICHING THE SCOPE OF MHPD TOWARD EVIDENCE-BASED POLICY MAKING PROCESS IN BANGLADESH: NEXT STEPS FORWARD

5.1 Effective Use of Panel Data to Promote Evidence-Based Policy Making—Areas of Future Research

The MHPD could be continuously useful for future decades to understand the dynamics of the economy within the country and across countries in regions with similar data sets. In addition, the MHPD, after being matched with information on administrative data and policy interventions, could be helpful in evaluating the effectiveness of interventions, offering alternative forms of impact evaluation to pure experiments and RCTs, which can be expensive, challenging, or not readily scaled up (IZA 2017; Harrison and List 2004; Levitt and List 2009). Such studies[14] could employ quasi-experimental and nonexperimental impact assessment econometric tools to establish the causality of some policy interventions and are considered indispensable for evidence-based policy-making solutions.

Considering the diverse range of publications from the MHPD data, it is easy to understand the importance and feasibility of this database to investigate many ongoing and emerging issues from intergenerational perspectives and global comparisons. There are a few areas for future research and policy-making:

5.1.1 Updating Survey Modules to Further Align MHPD as a Tool for Evidence-Based Policy Making on the Emerging Issues

To support evidence-based policy making, the continuation of major components of the existing questionnaire needs to be continued. However, considering the current needs of the time, several modules could be added, namely a module for measuring older persons' well-beings and time use and a special module understanding the lasting impact of COVID-19 pandemic. Some information may also be collected in several other areas: usage of machinery and digital technologies in agriculture, coping with climate change, and unplanned urbanization in household questionnaires, and some village-level information about institutions and governance. Such panel data collection could be combined with administrative information, available RCT data sets on policy interventions (for example, Bandiera et al. 2017 on BRAC graduation program, Hossain et al. 2019 on agricultural microcredit and Barrett et al. 2021 on technology adoption), satellite imagery, and other innovative data from Bangladesh and could be the baseline for future randomized experiments. The inclusion of new questions must observe the need to maintain the distinct nature of the MHPD contents, and the major components of the questionnaire need to be kept intact.

[14] There are a number of studies that have already used MHPD for such purpose. For example, applying a fuzzy regression discontinuity design where plausibly exogenous variation in school enrollment is created by the nationwide stipend program for women, Tanaka, Takahashi, and Otsuka (2021) estimated gains from female education; using a canonical difference-in-difference regression methodology, Mahmud and Sawada (2018) estimated the impact of the infrastructure on employment and job transition patterns; using different econometrics specifications Hossain, Malek, and Yu (2021) estimated the long-term impact of different credit sources and Berg, Emran, and Shilpi (2013) estimated long-run effects of informal credit.

5.1.2 Expanding the Geographical Coverage to Make It Nationally Representative

Since MHPD samples were taken from 57 (out of 64) country's districts following stratified random sampling, the first two rounds (1988 and 2000) MHPD samples were considered nationally representative. However, due to the absence of sample households in metropolitan cities, urban and peri-urban areas have increased in the last few decades. Thus, the previous three rounds of surveys (2004, 2008, and 2014) may have failed to represent urban households in Bangladesh. Therefore, to measure the overall living standards and understand the country's socio-economic development dynamics, the household survey should include sample households that have all geographical variations, including metropolitan cities and *purasovas*. The inclusion of such urban samples would be beneficial in understanding the dynamics of urban economics, the rural-urban divide, and the impact of large-scale infrastructure projects (say, the Dhaka Metro Rail Project), etc. The representative new villages from the remaining seven districts also need to be considered for any further round. An appropriate sampling methodology must be developed to select urban and new villages.

5.1.3 Use of MHPD to Address Emerging Social and Economic Development Agenda

As elaborated earlier, recent studies using MHPD identified several factors for rapid transformation in Bangladesh; however, to develop a more credible explanation of the Bangladesh development model, the continuation of such multipurpose MHPDs could help researchers to produce robust comparisons of Bangladesh's development with neighboring countries in South Asia and Southeast Asia (for example, India, Pakistan, Viet Nam, Malaysia, and Indonesia), which would have similar panel data sets. When Bangladesh celebrates 50 years of its independence in 2021, after the sixth round of MHPD collection is complete, explaining its development in collaboration with well-known researchers as a case through a book project could be extremely useful for many low-income countries, especially in Africa.

5.2 Administration and Implementation of Longitudinal Panel-Quality Data

5.2.1 Strengthening Institutional Arrangement

Considering that MHPD is a public good that should be readily available for researchers in the decades to come, the natural candidates to mobilize funding, execute the survey, and preserve the data for researchers in the future are any public sector organizations in Bangladesh (e.g., Bangladesh Bureau of Statistics, BIDS, NIPORT, University of Dhaka, etc.). In recent years, especially after the COVID-19 pandemic, like many national governments and international organizations, the government of Bangladesh has given due importance to data-driven evidence-making policy; however, having those public sector organizations ready for the continuation of such a data set requires significant amounts of time, effort, and resources. Until any of those local organizations are decided, like-minded researchers with expertise in the MHPD could be the key to creating a new round and continuing the data set with a long-term vision.

The next important issue is empowering appropriate survey-implementing partners, which eventually depends on the type of questions and how they are presented to the respondents (Glewee 2005; United Nations 1984). In the changing context, technology (CAPI, GPS, etc.) needs to be incorporated in the next round of data collection. As depicted earlier, SCL, which has already gained expertise in maintaining the quality of the survey and cleaning the data, as well as data collection using smartphone applications, could be empowered to conduct the survey for the next round of surveys. Without engaging such a survey company, it would be challenging to maintain a systematic approach and collaboration across research organizations to maintain local enumerators and village collaborators to ensure consistency and data quality from a long-term perspective. Then, to harness the research community around the MHPD, a dedicated website[15] could be initiated where all data sets could be accessible, which could be a dynamic source of relevant researchers, conferences, and a collection of papers.

5.2.2 Data Management and Access Policy: A Checklist

At present, there is neither systematic collation of MHPD nor the presence of a physical or virtual data depository, except for the partial release of its data through the IRRI website. To raise awareness and promote the use of MHPD, a concerted effort is needed in data management and sharing, particularly in the following areas. First, a team of economists/researchers collaborating with relevant universities/think tanks, government agencies, and survey firms who have prior exposure to the data set can lead to data collation and management. Second, the team monitors the survey quality by ensuring proper clarification of the statistical unit, accurate data editing and entry using CAPI, checking quality control criteria, proper organization, and dissemination of data needs to be ensured. It is also necessary to document the survey methodologies that need to follow, such as the criteria for adding split and new samples for planning any new round or ensuring the consistency of questionnaires across the survey rounds. In addition, a user manual, especially for income calculation with systematic coding following a similar methodology as that followed by earlier rounds, needs to be prepared under the supervision of a responsible researcher and statistical expert. Third, to communicate first-hand results of any new round, a summary report of the survey outcome (descriptive statistics) can be generated immediately after the completion of the survey, followed by more analytical work, including working papers and books within a period of 18–24 months after the survey completion. After this period, the open access of the produced data is in accordance with the data-sharing policy. Fourth, a central online data depository with a backup system and data-sharing policy must be prepared to promote the wide usage of MHPDs by research communities. Different researchers use primary data by following different statistical software packages. To ensure maximum utilization, data should be made available on the dedicated website as mentioned above in such a way that requires no discomfort for users, and hence users of the data can easily convert from one form of statistical software to another.

[15] The similar websites are available for the comparable data sets, namely, ICRISAT Village Dynamics Study at http://vdsa.icrisat.ac.in, Townshend Thai panel at http://townsend-thai.mit.edu/data), Pakistan household Panel at http://www.pidelms.com/pphs/ and BIHS panel at https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/NXKLZJ.

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