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Led by IFPRI

IFPRI Discussion Paper 02016

April 2021

Changes in Women's Empowerment in the Household, Women's Diet Diversity, and their Relationship against the Background of COVID-19 in Southern Bangladesh

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

The COVID-19 pandemic in Bangladesh, associated public health measures, and people's responses to these measures are projected to have caused job losses among women, who tend to be in more precarious jobs, a decline in women's empowerment and reduced diet diversity among women. Using a November 2020 telephone survey to re-interview adult women respondents of a November 2019 in-person survey, we test the way and the extent to which women's employment outside their homes, women's decision-making power with regard to income use and food purchases, and women's diet diversity in rural Patuakhali and Faridpur districts changed over the year partly marked by the COVID-19 pandemic. We further examine the relationship between change in women's empowerment and change in women's outside employment, and the relationship between change in women's diet diversity and change in women's empowerment. Contrary to expectations, we find more women found, rather than lost, jobs over the past year. The chance that women gained outside employment was 12.2 percent, while the chance they lost employment was 3.5 percent. However, we observe a negative trend in women's involvement in food purchase decisions in their households. Changes in women's decision-making power over food purchases are not statistically related to change in women's outside employment. Gaining employment outside the home is associated with a decrease in women's autonomy over the use of household income. Contrary to expectations, we find the number of food groups consumed by women increased over the year with COVID-19. The chance that women gained achievement of minimum diet diversity over the year is 38 percent; the chance they lost it 11.5 percent; the chance it did not change is 50.5 percent. Change in women's diet diversity is positively related with change in women's decision-making power over food purchases but negatively with change in women's autonomy over income use.

Keywords: Women's empowerment, Women's diet diversity, COVID-19, Bangladesh

ACKNOWLEDGMENTS

We would like to thank the Feed the Future Bangladesh Nutrition Activity and Abt Associates for granting permission to use their 2019 annual survey data and to re-interview their women respondents. We would like to thank Nazmul Alam, IFPRI's Bangladesh office, for useful advice and assistance in organising the telephone survey, the team of OrgQuest for conducting the telephone survey, and Farzana Sehrin for background information. This work was undertaken as part of, and funded by, the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH). Any opinions expressed here belong to the authors, and do not necessarily reflect those of A4NH or CGIAR. We would like to thank all donors who supported this research through their contributions to the CGIAR Fund. We would also like to express our gratitude to the respondents for their participation and time.

ACRONYMS

BIHS	Bangladesh Internal Household Survey
BNA	Bangladesh Nutrition Activity
BRAC	Bangladesh Rural Advancement Committee
CATI	Computer-assisted telephone interviews
DHS	Demographic and Health Survey
FDR	False discovery rate
IFPRI	International Food Policy Research Institute
IPA	Innovation for Poverty Action
LMIC	Low- and middle-income countries
MJF	Manusher Jonno Foundation
NGO	Non-governmental Organization
SEA	Standard Enumeration Areas
WEAI	Women's Empowerment in Agriculture Index

I. INTRODUCTION

In Bangladesh, while women's empowerment has been improving, limits on empowerment continue to contribute to their lack of access to healthy diets (Bhagwalia et al 2012; UN Women 2020). Some of these limits come from within the households they reside in (Sraboni et al. 2014). In Bangladesh, as in many other low- and middle-income countries (LMICs), the COVID-19 pandemic and public health measures taken to avert its spread and impact have engendered a number of changes in people's lives and livelihoods, both in direct and indirect ways, through people's reactions to the changed policy environment. Changes in women's empowerment and in nutrition, including of women, are anticipated but robust evidence is still limited.

This study will address the evidence gap of changes in women's empowerment in their households and women's diet diversity in rural Bangladesh against the background of the COVID-19 pandemic. More specifically, it will investigate the way and the extent to which women's income earning abilities, women's decision-making power with regard to food purchases and use of income, and women's diet diversity changed over the course of a year, between November 2019 and November 2020. Part of that year, which we label the year with COVID-19, was marked by the COVID-19 pandemic, which started in early March 2020, and was followed by the subsequent implementation of public health measures.¹ Another contribution of this study is an assessment of the relationship over the year with COVID-19 between change in women's decision-making power about food purchases and income use and change in their income earning abilities, and an assessment of the relationship between change in women's diet diversity and change in women's empowerment. It is important to note that the pandemic was not the only event occurring between November 2019 and 2020; for example, the cyclone Amphan that hit part of rural Bangladesh in May 2020. Other conditions may have changed as well. Hence, the changes we detect

¹ A list and timeline of key public health measures and support schemes in Bangladesh is included in Annex A.

in women's empowerment, women's diet diversity, and their relationship therefore cannot necessarily be solely attributed to the pandemic, related public health measures, or consequences thereof.

Despite substantial recent improvements, Bangladesh faces high levels of undernutrition (USAID 2018). Women and children both suffer from undernutrition. According to the 2017 Demographic and Health Survey (DHS), 19 percent of women aged 15–49 years are underweight (i.e. with a Body Mass Index lower than 18.5). Undernutrition is exacerbated by poor dietary diversity. While the percentage of women of reproductive age with inadequately diverse diets has declined (de Brauw et al. 2019), in 2014, 54 percent of women of reproductive age still consumed inadequately diverse diets (HKI & JPGSPH 2016). Based on 24 hour-recall questions in the Bangladesh Integrated Household Survey (BIHS), the number of food groups women consume on average was estimated at 4.37 (*1.15*) out of nine in 2011 and 4.56 (*1.17*) in 2015 (Islam et al. 2018).² Limited dietary diversity implies that micronutrient inadequacy and micronutrient malnutrition is high among women in rural Bangladesh (Sinharoy et al. 2017). In 2013, an estimated 40 percent of (non-pregnant/non-lactating) women of reproductive age suffered from anaemia, 57 percent from zinc deficiency, and 22 percent from vitamin B12 deficiency (USAID 2018).

Women are more likely to suffer from nutritional deficiencies than men, for reasons including women's reproductive biology, low social status, poverty, socio-cultural traditions, disparities in household work patterns, and low levels of education (WHO 2000; HLPE 2017). In Bangladesh, limited women's empowerment and gender-related constraints, within and outside the household, hamper women's access to healthy diets (Bhagowalia et al. 2012).

² Standard deviation in parentheses. The nine food groups include: (1) starchy staples; (2) green leafy vegetables; (3) other vitamin-A rich fruits and vegetables; (4) other fruits and vegetables; (5) organ meat; (6) meat and fish; (7) eggs; (8) legumes and nuts; (9) milk and milk products.

Women in rural Bangladesh, apart from being disempowered in terms of leadership in the community, lack control over income and resources in their households (Sraboni et al. 2014). Women also bear the brunt of domestic and reproductive responsibilities in their households, at the expense of their engagement in agricultural production. Malapit et al. (2019a) confirmed women's limited control over income, agricultural assets and produce and pointed out women's limited mobility which constrains their market participation. The latter further limits their access to income, but also their ability to buy nutritious foods from the market. A study conducted by the Feed the Future Bangladesh Nutrition Activity (BNA 2019), showed that less than 20 percent of women visit a market, *hat* (open-air market) or *bazaar* (shop) at least once every two weeks.

For Bangladesh, evidence is emerging that women's empowerment in their households, in terms of enhanced agency, is positively correlated with household dietary diversity and per capita calorie availability (Sraboni et al., 2014) and with women's diet diversity (Sinharoy et al. 2017; Sraboni and Quisumbing 2018; Quisumbing et al. 2020). A lower empowerment gap between the primary female and male decision maker in the household is further associated with higher women's diet diversity (Quisumbing et al. 2020).

The empirical evidence of a link between women's empowerment and adequate nutrition among women is consistent with theory on bargaining within households which states that a household member's outside options, i.e. his/her resources if the household would be dissolved, strengthens his/her bargaining power vis-a-vis other household members (Doss and Quisumbing 2020). Contributions to household production could also strengthen one's bargaining power; however, as in Bangladesh property and land are often held by men, women's contributions to family agriculture are likely to have smaller effects on bargaining power (Quisumbing & Maluccio 2003; Sraboni et al. 2014). With strengthened bargaining power comes greater agency, for instance, in terms of greater decision-making power over the use and allocation of

household income. Enhanced agency can contribute to achievement, such as attaining an adequate and diverse diet (Kabeer 1999; Sinharoy et al. 2017).

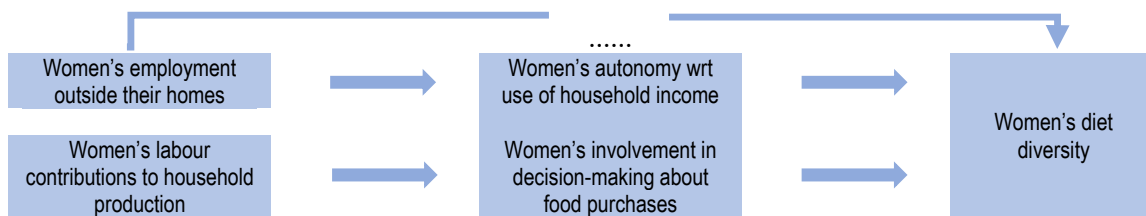


Figure 1: Conceptual framework linking women's outside options, women's agency, and women's diet diversity

While, to our knowledge, robust evidence is still missing, the implications of the COVID-19 pandemic, associated public health measures and responses are projected to have had negative effects for women's empowerment in Bangladesh (UN Women 2020; Jaim 2020; BRAC 2020). First, women, have had limited representation and voice in decision making about policy and measures to avert the COVID-19 crisis because of limited political participation, particularly at sub-national levels, and limited consultation of civil society representing women. Most COVID-19-related policy has been largely gender blind (UN Women 2020). Second, while women's labor force participation is low, the majority of women who are employed are working in the informal sector, which was halted due to lockdowns or seriously hindered by other restrictions (UN Women 2020; Sarker 2020; Bahn et al. 2020). Even though percentages of women with a job outside the home are relatively low in rural areas (less than 10 percent [BNA 2019]), there are reports of reduced abilities for income generation and job loss among women, especially those who worked as domestic helpers or home-based workers, due to the pandemic (Termeer et al. 2020). Digital alternatives for conducting one's business or work may also have been less accessible for women than men (Koning et al. 2020). Third, in many cases, savings groups or microfinance initiatives had to modify or stop their operations, possibly impairing women's access to financial assets (Koning et al. 2020). In a rapid assessment conducted partly through phone interviews by the Bangladesh Rural Advancement Committee (BRAC), more women than men reported not receiving any COVID-19-related government

support (BRAC 2020). Women's reduced access to resources therefore may have had negative implications for intrahousehold decision-making power. This is confirmed in qualitative accounts of female business owners (Jaim 2020). Fourth, school closures and restrictions that hindered people's ability to work outside the home implied heavier domestic and care work burdens for many women, who also could not rely on household help during the pandemic (UN Women 2020; Jaim 2020; BRAC 2020). Fifth, crises are found to be typically linked with an increase in gender-based violence (Mittal and Singh 2020). Reasons include increased economic dependence of women, distorted intrahousehold power dynamics, limited ability to escape the perpetrator, reduced scrutiny from the wider community or police, and increased anxiety, frustration, and, in some cases, alcoholism, on the part of men when they lose their income earning abilities. In the June 2020 review of a series of large-scale phone surveys conducted by the Manusher Jonno Foundation (MJF), more than 25 percent of women reported being victims of violence in the month prior to the interview; in most cases, the violence was domestic. Twenty percent of those subjected to violence reported never having been subjected to violence before the pandemic (MJF 2020; Sifat 2020).

The COVID-19 pandemic and associated public health measures are also thought to have had negative consequences for food security and nutrition in Bangladesh. Reasons include supply constraints, price volatility, and reduced household purchasing power (FAO 2020a; FAO 2020b; Termeer et al. 2020; Egger et al. 2021). To our knowledge, there is no published evidence of diet diversity of women in rural Bangladesh during the COVID-19 pandemic. Kundu et al. (2020) conducted a survey in September 2020, combining face-to-face interviews with randomly sampled rural and urban heads of households in moderate and low COVID-19 risk areas and a snowball-sampled online survey. In their study population, they found the number of food groups (out of 12) consumed in the previous 24 hours by any household member was on average 6.22 (2.52). The number of food groups consumed was significantly lower in rural households; among those with heads in precarious employment, such as day laborers, farmers or (family) business owners, and among those where the main earner lost or changed his/her job. The

number of food groups consumed was significantly negatively correlated with respondents reporting pandemic-related decreased monthly income, increased prices, challenges with accessing the same food quantities as prior to the pandemic, and challenges with accessing the same type of food.

In our study, we address the following four research questions. As a first research question (research question I or RQ I), we examine the way and the extent to which women's empowerment in the household, in terms of women's autonomy over the use of household income and involvement in decision making about food purchases, changed over the year with COVID-19. Given the projected changes discussed above, our hypothesis is that women's empowerment in the household declined over the year with COVID-19. As a second research question (RQ II), we examine the way and the extent to which change in women's empowerment over the year with COVID-19 is related to change in women's employment outside their homes. The loss of (informal) jobs or income-generating activities by women may have reduced their outside options and bargaining power, with negative consequences for their control over the use of income in their households and their decision-making power about food purchases. Alternatively, the loss of jobs or income-generating activities by men in the year with COVID-19 could have changed the balance between husbands' and wives' outside options and strengthened women's control over the use of income and their decision making power about food purchases in their households. The third research question (RQ III) addressed by our study is the way and the extent to which women's diet diversity changed over the year with COVID-19. Our hypothesis is that women's diet diversity declined following reduced household purchasing power and/or more constrained access to food, as well as from reduced women's empowerment. As a fourth research question (RQ IV), we examine the way and the extent to which change in women's diet diversity over the year with COVID-19 is related to change in women's empowerment. We hypothesize that anticipated negative changes in women's diet diversity are related to a reduction in women's empowerment in their households, potentially following reduced outside options of women.

II. CONTEXT

Our study population resides in Patuakhali and Faridpur districts of southern Bangladesh (Figure 2). From the start of the COVID-19 pandemic (8 March 2020) until 23 November 2020, right before the start of the follow-up data collection, Bangladesh counted 449760 confirmed COVID-19 cases and 6416 deaths, Dhaka division, of which Faridpur district is part, counted 305060 cases and 3394 deaths and Barishal division, of which Patuakhali district is part, counted 9643 cases and 218 deaths (World Health Organization, 2020a). The attack rate (number of cases over persons in the population at risk) between 8 March and 23 November 2020 was 3406 in Faridpur and 865 in Patuakhali district. Patchy statistics show fluctuating number of cases by population over the period from 8 March until 23 November 2020 in both districts (World Health Organization, 2020b). Early September until half October 2020, test positivity was higher in Faridpur (18 - 23 percent) than in Patuakhali district (5 - 12 percent), in November 2020 test positivity was slightly higher in Patuakhali (approx. 22 percent) than in Faridpur district (approx. 18 percent).

Agriculture, livestock keeping and fishery are still important ways to ensure a livelihood in rural Bangladesh, but their importance and their contribution to rural households' income is declining. Livelihoods are increasingly diversifying away from agriculture, toward relying on business and petty trade, remittances, non-farm wage labor, agro-industry, construction and transportation, and service delivery (Ahmed et al. 2015).

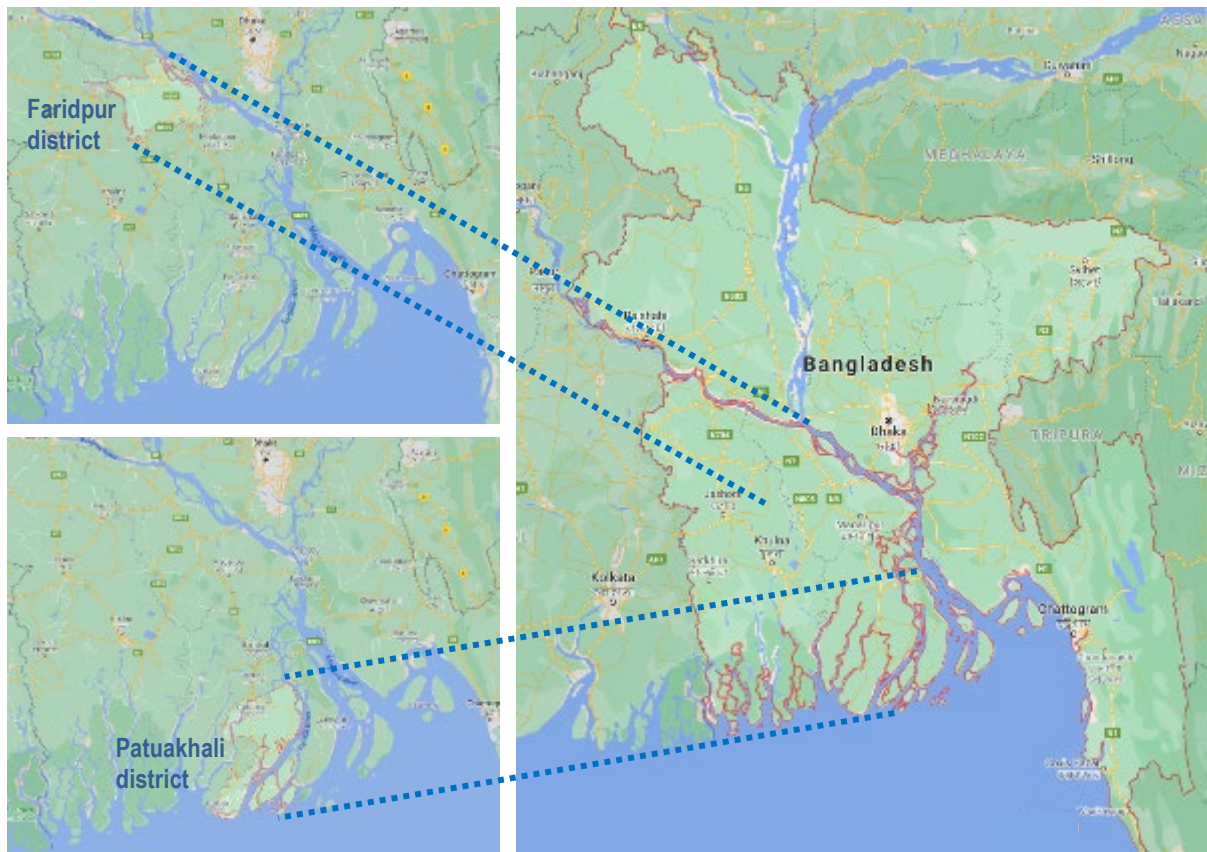


Figure 2: Map of Bangladesh locating Patuakhali and Faridpur districts (By authors using Google Maps)

Several formal and informal institutions, social norms, and customs influence women’s empowerment in their households in Bangladesh. Patrilocality is a common practice, as is marrying someone from another village, which generally separates women from their natal families (Schuler and Rottach 2010). Despite increasing importance given to girls’ education and better awareness of risks related to early marriage and childbearing, a substantial number of parents still marry their daughters at a young age, particularly if there is no dowry demand, because of poverty and fear that gossip or ill fortune would hamper their abilities to do so (Schuler and Rottach 2010).

Family and kinship relations in Bangladesh are organized along patriarchal lines (Kabeer 2011). The senior male household head holds the most authority. The status of women in the household depends in part on their ability to have a son who will carry on the family name. Property is also inherited along male lines. Women typically bring fewer assets into marriage compared to men (Quisumbing and Maluccio 2003). Women's access to material assets, as well as to social capital, are restricted by family and kinship relations (Kabeer 2011). Throughout her life, a woman remains dependent on a male relative, first her father, then her husband, and then her son. Traditionally, in Bangladesh, mothers-in-law have great influence over daughters-in-law (Schuler and Rottach 2010). Yet, even if they support greater empowerment of their daughters-in-law, these mothers-in-law have little power to influence decisions by their own sons regarding, for instance, early childbearing, or mobility of their wives.

Norms dictate that men will provide women with food, clothing, and shelter (Kabeer 2011). Unpaid domestic and care work is largely the women's responsibility. Total daily time spent working by men and women is roughly the same in Bangladesh, but women spend 86 percent of their working time engaged in unpaid domestic activities, compared to only 25 percent for men (Seymour and Floro 2016).

Norms related to *purdah* (female seclusion), but also the lower social status associated with women doing psychical work outside the home, form restrictions on women's mobility and their ability to engage in own income-earning activities (Schuler and Rottach 2010; Jayachandran 2020).³ According to the BNA survey, only 37.8 percent of women reported having adequate physical mobility in Patuakhali district, and 36.6 percent in Faridpur district (BNA 2019).⁴ Women's labor force participation is generally low. In 2017, 36.3 percent of women were employed, of which 91.8 percent were in the informal sector, an estimated third of those as daily wage workers. More than half of women working in the informal sector

³ *Purdah* is the practice of female seclusion which in some cases limits women's interaction with men who are not family members, and a key reason for women's limited mobility (Ahmed and Sen 2018).

⁴ Adequate physical mobility is defined as the ability of women to visit at least two locations such as the city, market, family/relative at least once per week, or to visit a health facility/public meeting at least once per month.

are employed in agriculture (UN Women 2020; Mottaleb et al. 2020). Female employment in agriculture as a share of total employment in agriculture was 45.1 percent in 2017 (Quisumbing et al. 2020).

The BIHS 2015, nationally representative of rural areas, revealed that, on average, women's empowerment score was 0.78 (a score of one indicates empowered in all aspects of each of the five domains) (Feed the Future 2015; Quisumbing et al. 2020).⁵ In total, 41.2 percent of women are empowered. Women have inadequate achievements, particularly in group membership, speaking in public, access to and decisions on credit and purchase, sale and transfer of assets. A total of 50.7 percent of women have equally high empowerment scores compared to the primary male decision maker in their household. Women's empowerment improved by 2015 compared to 2011, with all Women's Empowerment in Agriculture Index (WEIA)-related indicators showing an increase (Feed the Future 2015). Kabeer (2011) attributes a positive trend in women's empowerment in Bangladesh to a combination of increased opportunities for women to participate in the economy and the public sphere more broadly, enhanced women's access to local government and social service delivery facilitated by state policy, and collective action against gender injustice in the space created by socially-oriented development non-governmental organizations (NGOs).

In terms of food and nutrition security in Bangladesh during COVID-19, two rapid assessments of the pandemic's implications, conducted in April and May-June 2020 point to high price volatility of staple foods such as rice and lentils, fruits and vegetables, and meat, fish, chicken, eggs and milk (FAO 2020a; FAO 2020b). Reasons for price volatility differ by food product. Price surges related to increasing demand because of, for instance, stockpiling of staple foods by consumers, processors and retailers, and to higher production prices due to labor shortages. Price decreases related to lower demand, due to

⁵ The women's empowerment score is a weighted average of achievements in ten indicators in five domains included in the Women's Empowerment in Agriculture Index (WEAI). The five domains include production, resources, income, leadership, and time (Quisumbing et al. 2020).

reduced consumer purchasing power, restaurant closures, transportation challenges, access to markets and shops, and, in the case of poultry products, in response to a false belief that these transmitted the coronavirus causing COVID-19. Two months into the pandemic, the government took measures to stabilize rice prices, but prices of other products remained volatile. Vegetables, fruits, and protein-rich foods became relatively more expensive. People in poorer segments of the population and people who were unable to work are said to have increased the proportion of low-cost carbohydrates in their diets while reducing intakes of relatively more expensive protein-rich foods. Nutritional deficiencies among people in low-income groups therefore are projected to have deepened. A rapid country assessment of COVID-19-related changes in the food system in Bangladesh conducted in July 2020 through consultation of in-country experts and available secondary data by Termeer et al. (2020) largely confirmed these trends.

A study based on follow-up phone surveys during the pandemic (April-May 2020) in samples of rural households in Bangladesh who were involved in pre-COVID-19 studies shows that 70 to 80 percent of respondents self-reported a decline in household income relative to pre-COVID-19 times (Egger et al. 2021).⁶ In between 25 and 29 percent of households, an adult household member was employed before the pandemic but not at the time of the follow-up survey. Only four to 10 percent of households self-reported reduced (food) market access linked to mobility restrictions, closed markets, or food shortages. About 10 percent of households self-reported having skipped meals or reduced portion size or quality because a lack of resources prevented them from buying essential food items. In contrast, among landless rural Bangladeshi laborers, about 70 self-reported having skipped or reduced meals, and percentages of households that skipped or reduced meals were significantly higher in April 2020, during the pandemic, than in April 2019. A follow-up phone survey with mothers of infants in a rural area close to the capital

⁶ A first sample, relevant for our study population, includes 2229 rural households in villages participating in a project that aimed to increase access to the justice system (BGD1). A second sample, relevant for our study population, includes 2936 respondents from Chittagong and Dhaka Divisions who participated in a lottery for agricultural work permits in Malaysia (BGD4). We contrast with findings from a sample of 294 landless rural agricultural labourers (BGD5) (Egger et al. 2021).

Dhaka shows that median monthly family income declined from US\$ 212 in 2018 to US\$ 59 early into the pandemic (May-June 2020) and that the proportion of household reporting moderate, resp. severe, food insecurity increased from 6 to 37 percent, resp. from 3 to 15 percent (Hamadani et al. 2020).

Trends in food and nutrition security over the COVID-19 period in other LMICs differ by context. In Nepal, for instance, about 10 percent of agricultural households involved in pre-COVID studies self-reported having skipped or reduced meals during a follow-up survey; in Kenya, about 50 percent did so, while nearly 90 percent did in Sierra Leone (Egger et al. 2021). Among urban residents in Addis Ababa, Ethiopia, overall food consumption in August 2020 was similar to pre-pandemic levels, even among respondents who reported reduced income or job loss. The pre- to post-pandemic comparison among urban Ethiopian residents, however, did indicate a shift toward consuming a greater proportion and more calories through staples and a lower proportion and less calories through fruits and vegetables (de Brauw et al. 2020; Hirvonen et al. 2021).

III. METHODS

3.1. Ethics information

The study was granted ethical clearance by the Bangladesh Medical Research Council (registration number 348 11 10 2020), the International Food Policy Research Institute (IFPRI) Institutional Review Board (application approval number MTID-20-1140), and the Social Sciences Ethics Committee of Wageningen University & Research (12-11-2020). A pre-analysis plan was also registered (Lecoutere et al. 2020).

3.2. Data

The study population consists of 832 adult women between 19 and 50 years of age (at the time of the COVID-19 follow-up survey) in Patuakhali and Faridpur districts in southern Bangladesh who participated in the individual in-person survey conducted by the Feed the Future Bangladesh Nutrition Activity (BNA) between 30 October and 15 November 2019, which we use as baseline, and a follow-up survey using computer-assisted telephone interviews (CATI) conducted between 25 November and 8 December 2020.

For the 2019 individual in-person survey, BNA employed a two-stage cluster sampling design. In each of the three *upazilas* (sub-counties) in each district, nine standard enumeration areas (SEA) (villages) were randomly sampled probability proportional to size. Per SEA, 21 households were randomly selected based on a census of households with a woman of reproductive age (18-49 years) (BNA 2019).

To construct the COVID-19 follow-up sample, we started from the BNA baseline sample of 1127 adult women from households where the phone number of the head of the household (or other adult household member) was available in the BNA baseline data. To reduce the risk of response bias (Hirvonen et al. 2020), we used proportionate sample stratification by quintile of household wealth (measured at baseline using Equity Tool [2016]) per age group of the adult woman per district combined with a replacement

strategy per stratum. We first split the original sample of 1127 adult women by district, then into those younger than 26 years of age and those 26 years or older at the time of the BNA baseline, then into wealth quintile. Second, per stratum, we randomly selected a number of adult women proportionate to population size per stratum at baseline such that our main sample included 900 adult women. Third, if the enumerators were unable to reach an adult woman selected for the main sample within five attempts or the phone number was not connected, that respondent was replaced with another adult woman in the same stratum randomly selected from the remaining 227 women in the original sample.

During the Covid-19 follow-up survey, we tried to contact a total of 1088 adult women and managed to interview 832 adult women, amounting to 74.6 percent (Table 1). This is higher than the average 63 percent of connected per attempted number from in-person baseline surveys reported in Innovations for Poverty Action (IPA)’s review (IPA 2020a). Out of the 832 adult women who were interviewed both at baseline and follow-up, 422 reside in Patuakhali district, 410 in Faridpur district; 624 are between 27 and 50 years of age at follow-up, 208 younger than 27.

Table 1: Sample and attrition

	Sampled	Called	Attrition	Interviewed
Main sample for COVID-19 follow-up survey	900	898	198	700
Reserve list	227	190	58	132
Total	1127	1088	256	832

The main reasons for attrition from the sampled respondents that were called to those finally interviewed in the COVID-19 follow-up survey include an unconnected phone number, a working phone number that was not picked up on any of the five call attempts, and no consent. Proportions of respondents per stratum in the interviewed sample are not significantly different from proportions per stratum in the main and reserve sample. We formally tested for attrition bias and found no evidence of significant imbalance in

key baseline characteristics and baseline measures of the dependent variables after adjusting p-values for multiple hypotheses testing (See Annex B).

The research tools comprised of a baseline survey with individual face-to-face interviews by female enumerators conducted by BNA and an individual phone (CATI) follow-up survey. The phone survey was conducted in Bangla by a team of female enumerators based in Dhaka, Bangladesh. The follow-up phone survey was conducted in approximately the same period of the year as the BNA baseline survey to avoid interference linked to seasonality.

The participants in the follow-up phone survey were recruited by contacting the household heads (or other adult household member) of the household in which the adult women reside whose phone was recorded during the 2019 BNA baseline survey. In this phone call, the organization, enumerator, and aim of the study were introduced. The enumerator explained how phone numbers were obtained and that we would like to ask the adult woman (whom the enumerator named) in the household who was interviewed during the 2019 BNA survey questions related to diet and food purchases. Then, the enumerator asked if the contacted head of household (other household member) could a) pass the phone to the named adult woman for a private phone conversation with the enumerator; or b) give the phone number of the named adult woman to the enumerator to contact for a private phone conversation. If the named adult woman was unavailable or unable to have a private phone conversation, the enumerator set a later appointment. The enumerators were instructed how to avoid – in a polite and culturally sensitive manner –the household head (or other adult household member) who was called to reach the adult woman listening in during the phone interview or putting the phone on speaker.

The informed consent process was verbal. After being informed, the female respondent was asked for her consent to participate in the phone survey and instructed to answer by “Yes, I agree” or “No, I do not agree” (Kopper and Sautmann 2020). The answer was recorded, with the respondent’s awareness. After

the interview, female respondents received an incentive equivalent to about US\$1.30, sent to their preferred mobile money number.

The structured electronic questionnaire for the follow-up phone survey included 36 questions, 26 of which were the same as in the 2019 BNA survey. The repeated questions enabled us to measure the key dependent and explanatory variables, including women's autonomy with regard to the use of household income, women's involvement in decision making about food purchases⁷, women's employment outside the home, and women's diet diversity, in a consistent way at baseline and follow-up. The other questions were about changes in husbands' employment and income, changes in husbands' and women's labor contributions to household production, changes in total monthly household income, and households' challenges with food access as compared to the same period the year before.

Raw data, meta-data and replication code are publicly available in a data repository with DOI:

<http://dx.doi.org/10.17632/hxf7nb964d.1>.

3.3. Indicators

Dependent variables include the change over the year with COVID-19 in women's *income use autonomy*, an indicator for the level of women's autonomy on deciding how to use income generated from agricultural and non-agricultural activities.⁸ Most negative values of the indicator point to external motivation for the way to use the income; slightly negative values point to introjected motivation; 0 signifies having no alternative; and most positive values point to autonomous motivation. Change over

⁷ The indicators of women's empowerment used in this study are based on survey questions used for measuring a project-level women's empowerment in agriculture index (Pro-WEAI) nutrition and health module (piloted by BNA). Because we conducted the follow-up survey through telephone, the number of survey questions was limited, and we were not able to measure all aspects included in the Pro-WEAI nutrition and health.

⁸ The indicator *income use autonomy* is based on the vignettes used to measure women's autonomy in the use of income from agricultural and non-agricultural activities included in the pro-WEAI survey questions (as part of the Relative Autonomy Index (RAI)). We used the weighting scheme applied for calculating the RAI with 0 for vignette 1 (no alternative), -2 for vignette 2 (external motivation), -1 for vignette 3 (introjected motivation), and +3 for vignette 4 (autonomous motivation) (Malapit et al. 2019b:681). We applied an additional weighting and multiplied the weight assigned to each vignette by 1 if the respondent answered to she is completely the same as the person portrayed in the vignette, by 0.66 if she answered to be somewhat the same, by 0 if she answered to be completely different, and by 0.33 if she answered to be somewhat different.

the year with COVID-19 in women's income use autonomy is measured by subtracting the value at baseline from that at follow-up. A second dependent variable is change over the year with COVID-19 in women's involvement in *food purchase decisions*, which is measured by the proportion (out of five) of food purchase decisions in which the female respondent declared herself to be one of the household members normally making the decision (or the only one).⁹ A third dependent variable is change in the number of *food groups* (out of ten) of which the female respondent declared she consumed a food item the day prior to the interview (24-hour recall, from morning until going to sleep).¹⁰ Change over the year with COVID-19 in *diet diversity* is a fourth dependent variable which takes a value of 1 if the female respondent achieved minimum diet diversity (i.e. consumed food items from five or more food groups the day prior to the interview) at follow-up but not at baseline, takes the value -1 if she did so at baseline but not at follow-up, and takes the value 0 if (not) achieving minimum diet diversity remained unchanged between baseline and follow-up.

A key explanatory variable when addressing RQ II is change over the year with COVID-19 in the female respondent (declaring) she *works outside the home*. It takes the value of 1 if she works outside the home at follow-up but not at baseline, takes the value -1 if she did so at baseline but not at follow-up, and takes the value 0 if her status of employment outside the home remained unchanged between baseline and follow-up. Change over the year with COVID-19 in women's *income use autonomy*, change in involvement in *food purchase decisions*, as well as change in *work outside the home* are used as explanatory variables when addressing RQ IV.

We also control for other changes over the year with COVID-19 when testing hypotheses related to the research questions. The change in the *husband's income*, relative to the change in *household income*, is

⁹ Decisions include whether or not to purchase 1) small amounts of food, for example smaller than 5 kg; 2) larger amounts of food, for example larger than 5 kg; 3) eggs; 4) Milk or milk products; and 5) meat, poultry or fish (including organ meats).

¹⁰ Food groups include 1) meat, poultry, fish; 2) eggs; 3) Dairy; 4) pulses; 5) nuts and seeds; 6) dark green leafy vegetables; 7) vitamin A-rich fruits and vegetables; 8) other vegetables; 9) other fruits; and 10) grains and tubers low-nutrient density food groups.

based on questions asked at follow-up. The questions asked the female respondent to compare her husband's income from the week prior to the interview to his income in a typical week in the same period one year before, and for the respondent herself to do the same. The change in *husband's income* takes the value 1 if the female respondent reported her husband's income to have increased since a year before, takes the value -1 if she reported it decreased or was 0 at follow-up, and takes the value 0 if she reported it unchanged. Change in *household income* takes the value 1 (resp. 2) if the female respondent reported it to have increased (resp. increased a lot); it takes the value -1 (resp. -2) if it decreased (resp. decreased a lot); and takes the value 0 if it did not change over time. Change in having *no husband* takes the value 1 if the female respondent had a husband at baseline but not at follow-up, else it takes the value 0.¹¹ *Market challenges* indicate having experienced challenges with market access in the week prior to the follow-up interview, in which case it takes the value 1; else the value 0.¹²

In some regression specifications, we include additional baseline control variables. These include the female respondent's *age* (as reported at baseline plus one); a dummy variable indicating the female respondent is the (*wife of*) *household head*¹³; the number of *children* up to 17 years of age (at baseline) residing with the *household*; the number of living *children of the female respondent* (at baseline); a dummy variable with value 1 if the female respondent was in the *lowest wealth quintile* in her age group by district; and a dummy variable with value 1 if she resided in *Faridpur* district at baseline (as opposed to Patuakhali district).¹⁴

¹¹ A woman respondent was recorded as having no husband at baseline if she reported to be single, never married, married but with her spouse lives elsewhere, widowed, divorced or separated, or other (as opposed to married living with her spouse). Change over time in having no husband is based on reports of the husband having died, left, or divorced by follow-up. Note that we did not record whether women who did not have a husband at baseline, had one at follow-up.

¹² We consider challenges with market access occurred if the woman respondent reported she or any of her household members experienced: 1) Difficulties in going to food markets due to mobility restrictions imposed by government; 2) Difficulties in buying food due to most food markets being closed; 3) Being unable to buy the amount of food she and her household usually consume because of shortages in the markets they buy from; 4) Being unable to buy the amount of food she and her household usually consume because the price of food was too high.

¹³ As opposed to being the brother/sister, brother/sister-in-law, parent, parent-in-law, son/daughter, son/daughter-in-law, other relation of the head of household (or other adult household member) who answered the baseline BNA survey.

¹⁴ We decided not to use women having an education level beyond primary education as a control variable because it significantly and strongly correlates with women's age, lowest wealth quintile, being (wife of) the head of household, and living without the presence of a husband.

Table 2: Descriptive statistics

Indicators	Baseline					COVID-19 follow-up					Change over the year with COVID-19				
	N	Avg	S.D.	Min	Max	N	Avg	S.D.	Min	Max	N	Avg	S.D.	Min	Max
<i>Income use autonomy</i>	832	-.023	.279	-.67	.67	832	-.019	.25	-.67	.67	832	.004	.371	-1.34	1.34
<i>Food purchase decisions (excluding women without children at baseline)</i>	759	.667	.38	0	1	759	.618	.355	0	1	759	-.049	.473	-1	1
<i>Food groups (excluding fasting women)</i>	829	4.329	1.372	0	9	805	5.426	1.753	1	10	802	1.12	1.968	-5	7
<i>No husband (dummy)</i>	832	.085	.28	0	1	832	.1	.3	0	1	832	.014	.119	0	1
<i>Market challenges (dummy)</i>											832	.564	.496	0	1
											N	Value	Freq.	Percent	
<i>Diet diversity (excluding fasting women)</i>	829	.405	.491	0	1	805	.665	.472	0	1	802	-1	92	11.47	
												0	405	50.50	
												1	305	38.03	
<i>Work outside the home</i>	832	.075	.263	0	1	829	.162	.368	0	1	829	-1	29	3.50	
												0	699	84.32	
												1	101	12.18	
<i>Husband's income</i>	756	.643	.479	0	1	756	.114	.318	0	1	756	-1	490	64.81	
												0	180	23.81	
												1	86	11.38	
<i>Household income</i>	808	.988	.782	0	2	808	.132	.396	0	2	808	-2	242	29.95	
												-1	314	38.86	
												0	162	20.05	
												1	73	9.04	
												2	17	2.10	
<i>Age</i>						832	34.448	8.827	19	50					
<i>Number of children in the household</i>	832	1.656	1.23	0	12										
<i>Number of children of woman respondent</i>	821	1.868	1.069	0	8										
<i>Faridpur (dummy)</i>	832	.493	.5	0	1										
<i>Lowest wealth quintile (dummy)</i>	832	.321	.467	0	1										
<i>(Wife of) household head (dummy)</i>	832	.865	.342	0	1										
<i>Education beyond primary school (dummy)</i>	832	.459	.499	0	1										

3.4. Analysis

To address RQ I and RQ III, we tested if changes over the year with COVID-19 (i.e. change from baseline to follow-up) are significantly different from zero for a set of relevant indicators (ΔY), albeit controlling for selected changes over time (ΔC) and baseline characteristics (Z_0) (*Equation 1*). Our main test is $\alpha_0 = 0$.

$$\Delta Y_i = \alpha_0 + \alpha_1 \Delta C_i + \alpha_2 Z_{i0} + \varepsilon_i \quad (1)$$

The dependent variables are change in women's empowerment (RQ I: *work outside the home, income use autonomy, food purchase decisions*) and change in women's diet diversity (RQ III: the number of *food groups* consumed, achieving minimum *diet diversity*). In case of RQ I, we included regression specifications where we control for changes in having a *husband* and *husband's income* to filter out the influence of a potentially altered balance between husbands' and wives' outside options. For RQ III, we included specifications in which we control for changes in *household income*, having a *husband* and *market access challenges* to filter out the influence of change in a household's purchasing power or market access. In case of women's involvement in food purchases decisions, we excluded women who did not have any children at baseline.¹⁵ In case of the diet indicators, we excluded women whose reported consumption concerned a fasting day at baseline and/or follow-up.

To address RQs II and IV, we used a first difference approach to test the relationship between change in women's empowerment (ΔY) and change in women's employment outside the home (ΔX) (RQ II) and the relationship between change in women's diet diversity (ΔY) and change in women's empowerment,

¹⁵ While the BNA baseline questionnaire indicated a restriction to ask questions about decisions over food purchases for the woman herself and her child only if the woman respondent had a child less than 2 years of age, the questions were asked to all women respondents, regardless of having children and regardless of having a young child (< 2 years). But because the questions pertain to food purchase decisions for the woman respondent herself and her child, we excluded women who reported not to have any children at baseline in the analyses where women's involvement in decision-making about food purchases is a dependent or explanatory variable.

including women's outside employment (ΔX) (RQ IV); albeit controlling for selected other changes (ΔC) and baseline characteristics (Z_0) (Equation 2).^{16, 17} Our main test in this case is whether the coefficient of the relevant key explanatory variable (ΔX) is zero ($\beta_1 = 0$).

$$\Delta Y_i = \beta_0 + \beta_1 \Delta X_i + \beta_2 \Delta C_i + \beta_3 Z_{i0} + \varepsilon_i \quad (2)$$

We used separate regressions for each of the women's empowerment indicators, *income use autonomy* and *food purchase decisions*, in function of women's *work outside the home* (RQ II). Similarly, we used separate regressions for both women's diet diversity indicators, *food groups* and *diet diversity*, in function of, respectively, *women's income use autonomy*, *food purchase decisions*, and *work outside the home*. For similar reasons as above, in case of RQ II, we included specifications where we control for changes in having a *husband* and *husband's income*. In case of RQ IV, we included specifications where we control for changes in *household income*, having a *husband*, and *market access challenges*.

We estimated equations (1) and (2) using Ordinary Least Squares with robust standard errors for continuous dependent variables, and Ordered Probit regression with robust standard errors for the case of (ordered) categorical dependent variables such as change over time in women's *work outside the home* and change in achieving minimum *diet diversity*. In cases of categorical dependent variables, to facilitate interpretation of results, we additionally estimated probabilities when addressing RQ I and RQ III, and average marginal effects of the explanatory variable of interest on the probability of each of the categories of the dependent variable when addressing RQ II and RQ IV.

¹⁶ To put results of testing RQ II and RQ IV in perspective, we estimated the relationship between women's empowerment and women's work outside the home at baseline and at follow-up, as well as the relationship between women's diet diversity and women's empowerment (Annex D).

¹⁷ As discussed in the pre-analysis plan (Lecoutere et al. 2020), we initially intended to also examine the extent to which change in women's empowerment (RQ II), resp. change in women's diet diversity (RQ IV), are related to changes in women's labour contributions to household production. However, women's labour contributions to household production are expected to have weaker implications for women's empowerment and for its measurement at baseline we needed to rely on recall questions asked at follow-up which increased risks of recall bias. Therefore, we decided to report these results as robustness checks in Annex E.

We applied the method by Anderson (2008) to calculate False Discovery Rate (FDR) q-values to correct p-values for multiple hypothesis testing (McKenzie 2020). We adjusted for testing 50 hypotheses. We further ran both models separately for two age categories of women: women younger than 27 years and women 27 years or older at the time of the follow-up survey. Finally, we ran the models separately for Faridpur and Patuakhali district.

IV. RESULTS

4.1. Change in women's work outside the home and women's empowerment over the year with COVID-19 (RQ I)

Results in Table 3 Column 1 show that the change over the year with COVID-19 in women working outside the home is positive and statistically significant. The chance that women gained employment outside the home over the year with COVID-19 is 12.2 percent; the chance they lost employment outside the home is 3.5 percent. However, the chance of an unchanged status of (not) working outside the home is highest (84.3 percent). Overall, the likelihood of women working outside the home was 7.5 percent at baseline and 16.2 percent at follow-up (Table 2).

Women's income use autonomy did not significantly change over the year with COVID-19 (Table 3 Column 3). On average, both at baseline and follow-up, the measure is close to zero, which means women's beliefs about their autonomy remained between having no alternatives and introjected motivations for such decisions (Table 2).

Women's involvement in decisions over food purchases significantly declined, by 4.9 percentage points over the year with COVID-19 (Table 3 Column 6). However, when controlling for other changes over time and baseline individual and household characteristics, change in women's involvement in decisions over food purchases is statistically insignificant (Column 8). On average, female respondents were involved in 66.7 (38.0) percent of five food purchasing decisions at baseline, and in 61.8 (35.5) percent of such decisions at follow-up (Table 2).

Table 3: Change over the year with COVID-19 in women's work outside the home and women's empowerment

	Δ Work outside the home		Δ Income use autonomy			Δ Food purchase decisions		
	(1) Ord Prob	(2) Ord Prob	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Constant (α_0)	1.812***	1.467***	0.004	0.002	-0.092	-0.049**	-0.046*	0.156
S.E.	0.083	0.217	0.013	0.018	0.070	0.017	0.023	0.107
p-value	0.000	0.000	0.762	0.922	0.186	0.005	0.046	0.145
FDR q-value	0.001	0.001	0.780	0.818	0.239	0.019	0.091	0.206
2nd cut point	1.166	1.534						
S.E.	0.056	0.215						
Prob pr($\Delta Y = -1$)	0.035	0.035						
S.E.	0.006	0.006						
p-value	0.000	0.000						
Prob pr($\Delta Y = 0$)	0.843	0.843						
S.E.	0.013	0.013						
p-value	0.000	0.000						
Prob pr($\Delta Y = 1$)	0.122	0.122						
S.E.	0.011	0.011						
p-value	0.000	0.000						
Control variables	No	Z	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	829	829	832	756	756	759	689	689
R ²			0.000	0.001	0.011	0.000	0.007	0.017
Pseudo R ²	0.000	0.008						
Log pseudo lkh	-429.078	-425.463						

Note: Models (1-2) with dependent variable Δ Work outside the home estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; Models with dependent variables Δ Income use autonomy (3-5), resp. Δ Food purchase decisions (6-8), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Husband's income $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (6-8) exclude women without children at baseline; ***, **, * significance of coefficient of interest α_0 at 1, 5, and 10 percent based on FDR q-value.

4.2. Relationship between change in women's empowerment and change in women's employment outside the home (RQ II)

Results in Table 4 show that change in women's involvement in food purchasing decisions (column 4) is not significantly related to change in women's employment outside the home. Women's income use autonomy is significantly lower when, as compared to a status-quo in employment, women gained employment outside the home over the year with COVID-19 (Column 1). This relationship, however, turns insignificant after controlling for changes over time in husband's income and the presence of a husband (Columns 2-3).

Table 4: Relationship between change over the year with Covid-19 in women's empowerment and change in women's work outside the home

	Δ Income use autonomy			Δ Food purchase decisions		
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
$\beta_1 \Delta$ Work outside the home = -1	-0.037	-0.052	-0.056	-0.053	-0.003	-0.004
S.E.	0.067	0.070	0.070	0.099	0.102	0.102
p-value	0.578	0.464	0.426	0.594	0.978	0.971
FDR q-value	0.641	0.526	0.517	0.641	0.818	0.818
$\beta_1 \Delta$ Work outside the home = 1	-0.077*	-0.076	-0.077	-0.024	-0.012	-0.006
S.E.	0.039	0.043	0.042	0.049	0.053	0.053
p-value	0.049	0.075	0.068	0.616	0.824	0.910
FDR q-value	0.091	0.132	0.124	0.649	0.789	0.818
Constant	0.014	0.012	-0.089	-0.044	-0.044	0.156
S.E.	0.014	0.020	0.070	0.019	0.025	0.107
p-value	0.326	0.549	0.202	0.022	0.073	0.145
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	829	753	753	756	686	686
R ²	0.005	0.006	0.016	0.001	0.007	0.017

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{$ Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur $\}$; Models (4-6) exclude women without children at baseline; ***, **, * significance of coefficient of interest β_1 at 1, 5, and 10 percent based on FDR q-value.

4.3. Change in women's diet diversity over the year with COVID-19 (RQ III)

Contrary to expectations, women's diet diversity significantly increased over the year with COVID-19.

The number of food groups consumed by non-fasting women increased by 1.12 food groups (Table 5 Column 1). Descriptive statistics show that, on average, women consumed 4.33 (1.37) food groups at baseline, and 5.43 (1.75) at follow-up (Table 2). A more detailed analysis shows that in particular, other fruits, eggs, and dairy were more likely to be consumed at follow-up than at baseline (Annex C).

The change in women's achievement of minimum diet diversity is also positive and statistically significant (Table 5 Column 4). More specifically, the chance that women moved from not achieving minimum diet diversity at baseline to achieving it at follow-up is 38.0 percent. The chance that the status of (not) achieving minimum diet diversity remained unchanged is 50.5 percent; the chance that women moved from achieving minimum diet diversity at baseline to not achieving it at follow-up is 11.5 percent.

Overall, the likelihood of achieving minimum diet diversity was 40.5 percent at baseline and 66.5 percent at follow-up (Table 2).

The change in women’s diet diversity remains statistically significant after controlling for changes in household income, market access challenges, and the presence of a husband, as well as after additionally controlling for baseline individual and household characteristics (Table 5 Columns 2-3 and 5-6).

Table 5: Change over the year with Covid-19 in women’s diet diversity

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
Constant (α_0)	1.120***	0.993***	1.142**	1.202***	1.105***	1.012***
S.E.	0.069	0.168	0.380	0.058	0.109	0.220
p-value	0.000	0.000	0.003	0.000	0.000	0.000
FDR q-value	0.001	0.001	0.013	0.001	0.001	0.001
2nd cut point				0.305	0.410	0.507
S.E.				0.045	0.104	0.219
Prob pr($\Delta Y = -1$)				0.115	0.113	0.113
S.E.				0.011	0.011	0.011
p-value				0.000	0.000	0.000
Prob pr($\Delta Y = 0$)				0.505	0.503	0.503
S.E.				0.018	0.018	0.018
p-value				0.000	0.000	0.000
Prob pr($\Delta Y = 1$)				0.380	0.384	0.384
S.E.				0.017	0.017	0.017
p-value				0.000	0.000	0.000
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	802	780	780	802	780	780
R ²	0.000	0.010	0.014			
Pseudo R ²				0.000	0.005	0.007
Log pseudo lkh				-770.787	-744.512	-743.291

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up; ***, **, * significance of coefficient of interest α_0 at 1, 5, and 10 percent based on FDR q-value.

4.4. Relationship between change in women's diet diversity and change in women's empowerment and outside employment (RQ IV)

4.4.1. Relationship between change in women's diet diversity and change in women's empowerment

Results in Table 6 Column 1 show there is a significant negative relationship between change over the year with COVID-19 in the number of food groups consumed by women and change in women's income use autonomy. There is no evidence of a significant relationship between the change in achieving minimum diet diversity and change in women's income use autonomy (Columns 4-6).

In contrast, there is a significant positive relationship between the change in the number of food groups consumed by women and the change in women's involvement in food purchase decisions (column 7).

Likewise, the change in achieving minimum diet diversity is positively related to the change in women's involvement in food purchase decisions (column 10). More particularly, achieving minimum diet diversity at follow-up after not achieving it at baseline becomes more likely with increasing involvement in food purchase decisions, while moving from achieving minimum diet diversity at baseline to not achieving it at follow-up and unchanged (non) achievement of minimum diet diversity become less likely.

All significant relationships are robust to controlling for changes in household income, market access challenges, and the presence of a husband, as well as additionally controlling for baseline individual and household characteristics (Columns 2-3, resp.; Columns 8-9 and 11-12).

Table 6: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment

	Δ Food groups			Δ Diet diversity			Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob	(7) OLS	(8) OLS	(9) OLS	(10) Ord Prob	(11) Ord Prob	(12) Ord Prob
β_1 Δ Income use												
autonomy	-0.418*	-0.380*	-0.384*	-0.026	-0.003	-0.013						
S.E.	0.188	0.192	0.194	0.105	0.108	0.109						
p-value	0.026	0.049	0.048	0.802	0.977	0.902						
FDR q-value	0.061	0.091	0.091	0.784	0.818	0.818						
β_1 Δ Food purchase												
decisions							0.381**	0.408**	0.398**	0.237**	0.261**	0.270**
S.E.							0.148	0.150	0.152	0.086	0.088	0.088
p-value							0.010	0.007	0.009	0.006	0.003	0.002
FDR q-value							0.026	0.023	0.026	0.021	0.013	0.011
Constant	1.120	0.972	1.080	1.202	1.105	1.009	1.111	0.938	1.161	1.185	1.069	0.878
S.E.	0.069	0.168	0.381	0.058	0.109	0.222	0.074	0.179	0.412	0.060	0.114	0.243
p-value	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
2nd cut point				0.305	0.410	0.509				0.303	0.435	0.629
S.E.				0.045	0.104	0.221				0.047	0.109	0.243
AME pr($\Delta Y=-1$)				0.005	0.001	0.003				-0.048	-0.051	-0.053
S.E.				0.020	0.020	0.021				0.018	0.018	0.018
p-value				0.802	0.977	0.902				0.007	0.004	0.003
AME pr($\Delta Y=0$)				0.005	0.001	0.003				-0.042	-0.047	-0.048
S.E.				0.020	0.020	0.021				0.015	0.016	0.016
p-value				0.802	0.977	0.902				0.006	0.003	0.002
AME pr($\Delta Y=1$)				-0.010	-0.001	-0.005				0.089	0.098	0.101
S.E.				0.040	0.041	0.041				0.032	0.032	0.033
p-value				0.802	0.977	0.902				0.005	0.003	0.002
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	802	780	780	802	780	780	731	711	711	731	711	711
R ²	0.006	0.015	0.020				0.008	0.020	0.025			
Pseudo R ²				0.000	0.005	0.007				0.005	0.012	0.014
Log pseudo lkh				-770.757	-744.512	-743.283				-705.893	-680.179	-678.946

Note: Models (1-3, resp. 7-9) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6, resp. 10-12) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-12) exclude women whose reported consumption concerned a fasting day at baseline- and/or follow-up, models (7-12) additionally exclude women without children at baseline; ***, **, * significance of coefficient of interest β_1 at 1, 5, and 10 percent based on FDR q-value.

4.4.2. Relationship between change in women's diet diversity and change in women's outside employment

Neither change over the year with COVID-19 in the number of food groups consumed, nor change in achieving minimum diet diversity, are significantly related with change in women's employment outside the home (Table 7 Columns 1-6).

Table 7: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's work outside the home

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
$\beta_1 \Delta$ Work outside the home = -1	0.121	0.060	0.092	0.118	0.076	0.072
S.E.	0.346	0.355	0.354	0.185	0.190	0.191
p-value	0.727	0.866	0.794	0.523	0.688	0.707
FDR q-value	0.751	0.818	0.784	0.574	0.748	0.749
$\beta_1 \Delta$ Work outside the home = 1	0.182	0.152	0.174	0.186	0.167	0.164
S.E.	0.212	0.215	0.216	0.120	0.120	0.121
p-value	0.391	0.480	0.420	0.120	0.163	0.173
FDR q-value	0.505	0.527	0.517	0.186	0.224	0.229
Constant	1.093	0.974	1.136	1.176	1.082	1.002
S.E.	0.076	0.169	0.381	0.061	0.110	0.220
p-value	0.000	0.000	0.003	0.000	0.000	0.000
2nd cut point				0.330	0.432	0.515
S.E.				0.049	0.105	0.219
Δ Work outside the home = -1						
AME pr($\Delta Y = -1$)				-0.023	-0.015	-0.014
S.E.				0.036	0.036	0.036
p-value				0.525	0.689	0.708
AME pr($\Delta Y = 0$)				-0.022	-0.014	-0.014
S.E.				0.034	0.036	0.036
p-value				0.521	0.688	0.706
AME pr($\Delta Y = 1$)				0.045	0.029	0.027
S.E.				0.070	0.072	0.072
p-value				0.522	0.688	0.707
Δ Work outside the home = 1						
AME pr($\Delta Y = -1$)				-0.036	-0.032	-0.031
S.E.				0.023	0.023	0.023
p-value				0.124	0.167	0.176
AME pr($\Delta Y = 0$)				-0.035	-0.032	-0.031
S.E.				0.022	0.023	0.023
p-value				0.119	0.162	0.171
AME pr($\Delta Y = 1$)				0.071	0.064	0.062
S.E.				0.045	0.045	0.045
p-value				0.119	0.162	0.172
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	800	778	778	800	778	778
R ²	0.001	0.011	0.015			
Pseudo R ²				0.002	0.006	0.008
Log pseudo lkh				-768.187	-742.187	-740.973

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up; ***, **, * significance of coefficient of interest β_1 at 1, 5, and 10 percent based on FDR q-value.

4.5. Heterogeneity by age group and by district

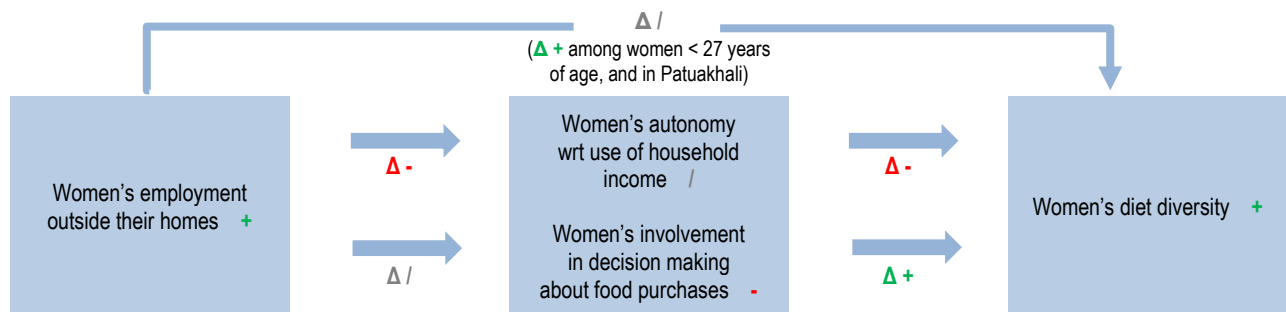
Women's outside employment, decision-making power over income use and food purchases, diet diversity, and the relationships between these could have evolved differently among women at different life cycle stages (Arestoff and Djemai 2016; Pradhan et al. 2019). The district where a woman resides, Faridpur or Patuakhali, could be another source of heterogeneity in changes over the year with COVID-19.

Results of the models testing the four research questions by age group, among those younger than 27 years and 27 years or older at the time of the follow-up survey, and by district can be found in Annexes F and G. Trends and relationships are largely similar to those observed in the entire sample. Noteworthy differences include a significantly higher chance of achieving minimum diet diversity when, compared to a status quo, women gained employment outside the home, and a lower chance of losing or an unchanged minimum diet diversity achievement, in Patuakhali district and in the relatively small sub-group of women younger than 27 years (RQ IV). Furthermore, in Patuakhali district, the number of food groups consumed increased both when women gained and lost employment outside the home, as compared to an unchanged employment status. In Faridpur district, the number of food groups consumed declined when women lost employment outside the home as compared to an unchanged employment status (RQ IV). Other differences, which could be due to insufficient statistical power given relatively small sample sizes, include an insignificant change in women's involvement in food purchase decisions among women younger than 27 years and in Patuakhali district (RQ I). Also, the relationship between change in income use autonomy and employment outside the home in Faridpur district (RQ II) is insignificant, as is the relationship between change in women's diet diversity and change in women's empowerment among women younger than 27 years and in Faridpur district (RQ IV).

V. DISCUSSION

In Bangladesh, as in other low- and middle-income countries, the COVID-19 pandemic and public health measures to contain it have had substantial effects on people’s lives and livelihoods. It should not be surprising that intrahousehold relationships may have also been affected. In this study, which focuses on rural southern Bangladesh, we investigate changes over the course of one year, part of which includes the pandemic; we examine changes to women’s employment outside their homes, women’s empowerment with regard to income use and food purchase decisions, and women’s diet diversity. We do so by assessing change in indicators of each of these measured in November 2019 using data collected through an in-person survey conducted among adult women, and data collected in a follow-up phone survey conducted among the same women in November 2020. As such, our study helps provide evidence about how measures related to the evolution of women’s empowerment changed in the context of the pandemic. Figure 3 summarises our main findings.

Figure 3: Changes over the year with COVID-19 in women’s outside options, women’s decision-making power over income use and food purchases, and women’s diet diversity and the relationships between these



Notes: Δ Relationship between changes over time; Green plus, red minus, grey slash: resp. positive and statistically significant, negative and statistically significant, insignificant change over time/relationship between changes over time

To answer RQ I, we tested changes over the year in the way and the extent to which women’s employment outside their homes and women’s empowerment, in terms of women’s decision-making power over the use of household income and food purchases. Several rapid assessments projected that the COVID-19 pandemic and public health measures reduced employment opportunities for women (UN Women 2020; Sarker 2020; Bahn et al. 2020). In our study population, however, employment status

outside the home appeared to improve, as 12.2 percent of women found employment during the past year, and only 3.5 percent exited the labor force. However, we found women's involvement in food purchase decisions decreased over the year, in line with projections of a decline in women's empowerment (e.g. UN Women 2020; Koning et al. 2020; BRAC 2020; Jaim 2020). Women's autonomy in the use of income from agricultural and non-agricultural activities did not change.

RQ II investigated the way and the extent to which change in women's empowerment is related to change in women's outside options. We did not find a significant relationship between the change in women's involvement in food purchasing decisions and the change in women's employment outside the home. The negative trend in women's involvement in food purchasing decisions therefore is likely to be unrelated to the change in women's outside employment. However, women's autonomy over income use appeared to decline when women gained employment outside the home over the year with COVID-19, which was unexpected. This finding could be driven by households in which their husbands also experienced increased income; potentially, some husbands whose wives gained employment outside the home constrained the woman's autonomous spending power in an attempt to slow down her empowerment, but husbands whose income decreased probably had less power to do so.

With RQ III, we tested how and to what extent women's diet diversity changed over the year with COVID-19. We expected dietary diversity to have declined due to decreased household purchasing power or more constrained market access to food (e.g. FAO, 2020a; FAO, 2020b; Termeer et al., 2020). We found women's diet diversity increased over time even when we control for (mostly negative) changes in household income and having experienced market access challenges.

More specifically, we find on average that the number of food groups consumed by non-fasting women increased by 1.12 food groups during the past year, instead of decreasing as expected. Our average in the follow up of 5.43 is in line with Kundu et al. (2020), who found an average of 6.22 food groups (out of

12) consumed by any household member of sample respondents (with 60 percent rural households). Although studies early on in the pandemic reported increased moderate and severe household food insecurity, strategies of skipping meals or reducing portion sizes or quality of food in rural Bangladesh (Hamadani et al. 2020; Egger et al. 2021) and reduced consumption of fruit, fish and meat in India (Harris et al., 2020), other studies focused on India (Ceballos et al., 2021), Ethiopia (Hirvonen et al., 2021), and Kenya (Janssens et al., 2021) showed limited changes in diets later in the pandemic. Reasons for limited effects on food consumption and diets put forward by Hirvonen et al. (2021) include shifts in expenditures in favor of food expenditures by reducing on non-food consumption, entertainment or services that are no longer available, or relying on savings or credit. Such coping strategies were observed in small cities in southwestern Bangladesh as well (Ruszczuk et al. 2021). In rural Bangladesh, another reason may relate to reduced marketing opportunities of own production. Markets for eggs, for instance, suffered from false beliefs that poultry products spread the coronavirus and markets for perishable products, such as milk and fruit, suffered from transport challenges (FAO 2020a; FAO 2020b; Termeer et al. 2020; Ruszczuk et al. 2021). Households may have consumed rather than sold own production of these food items.

To address RQ IV, we tested the way and the extent to which changes in women's diet diversity is related to changes in women's empowerment. The change in the number of food groups consumed by women is positively related to changes in women's involvement in food purchase decisions. Likewise, with increasing involvement in food purchase decisions, gaining achievement of minimum diet diversity over the year becomes more likely, while unchanged (non) achievement of minimum diet diversity and losing its achievement become less likely. These positive relationships emerged even though women's involvement in food purchase decisions declined while women's diet diversity increased in our study population. In contrast, we found a significant negative relationship between the change in the number of food groups consumed by women and the change in women's income use autonomy.

Our study has several implications. First, during a crisis, it is important not to assume that specific changes are taking place in women's opportunities; rather, data collection is necessary. We found unexpected gains in women's employment outside the home, and perhaps similarly one might not have expected women's decision-making power over food purchases to decline. Further, when there is a general decline in women decision-making power, one should not automatically project generally worse outcomes for women. For example, we observed improvements in women's dietary diversity even though decision-making power over food purchases declined. Nonetheless, the reduction in women's agency may have other negative consequences we could not capture in our phone surveys.

Second, it is important to realize that the COVID-19 pandemic was a shock that may have affected the trajectory of changes taking place in women's agency over time in Bangladesh. We observe reductions in women's autonomy of income use as well as the reduction in women's decision-making power over food purchases; both of these variables seemed to have been improving, albeit slowly, in general prior to the pandemic. That said, the increase in women's outside options could be due to changes in women's agency in the longer term; further study will be necessary in the future to observe how the pandemic has affected the trajectory that women's agency had been on in the past.

Third, we should remain conscious of the study's limitations. The changes over the year are not necessarily only attributable to the COVID-19 pandemic, the measures to avert its spread, and people's reactions to these measures. For example, the cyclone Amphan hit the area in May 2020. There have also likely been changes in households, communities, and livelihoods that we did not capture, some of which might have occurred prior to the pandemic. Further, despite running the baseline and follow-up surveys at approximately the same time of year to avoid issues of seasonality, we cannot exclude small local atypical seasonal timing of harvests, availability or prices of different grains, pulses, fruits or vegetables, not necessarily related to the pandemic. Our results are not necessarily representative of the adult female population in the rural districts of Faridpur and Patuakhali, Bangladesh. Particularly, adult women without

access to mobile phones were excluded from our study population. Although that percentage was small in the original BNA baseline sample (2.6 percent in Patuakhali and none in Faridpur), our study may still overestimate (changes in) women's outside employment, empowerment, or diet diversity, if these tend to be positively associated with access to a mobile phone. Finally, as the follow-up survey was collected through phone interviews and the baseline data through in-person interviews, there may be some inconsistency in measurement, different feelings of trust and privacy by respondents vis-a-vis interviewers, and higher risks of unnoticed reduced attention (Van der Zouwen and Van Tilburg 2001; IPA 2020b).

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ANNEX A: PUBLIC HEALTH AND SUPPORT MEASURES IN RESPONSE TO THE COVID-19 PANDEMIC IN BANGLADESH

Restrictive measures related to the COVID-19 pandemic	
General measures	
26 March 2020	Government first announced lockdown until 4 April 2020 (Mottaleb et al. 2020). Hundreds of city dwellers boarded buses and trains to return home.
1 April 2020	Government extended the lockdown until 11 April 2020 (Mottaleb et al. 2020)
1 April 2020	Government cancelled all public programs to avoid mass gatherings.
5 April 2020	Government extended the lockdown until 30 April 2020 (Mottaleb et al. 2020)
11 April 2020	All public transport services were suspended until 25 April 2020
13 May 2020	Government extended the general holiday and airport and road lockdown until 30 May 2020 (Mottaleb et al. 2020). Government extended shutdown of most public and private places until 30 May 2020
6 June 2020	Government identified and divided the country in red, yellow, and green zones based on number of affected people.
Measures taken for factory production	
10 April 2020	The Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) announced in a joint statement that readymade garment (RMG) factories would remain closed until 25 April (FairWear 2020).
26 April 2020	In a first phase, factories operations were to start with 30% of the workforce, advising to ask only the workers living near their respective factories to join (FairWear 2020)
2 May 2020	Based on the success of health and safety guidelines, factories were allowed to invite back an additional 20% of the workforce (FairWear 2020).

Support measures related to the Covid-19 pandemic	
Government policies to support local business	
25 March 2020	Prime Minister Sheikh announced a with a value equivalent of US\$ 625 million) for export-oriented industries to mitigate the impact of the coronavirus on the country's economy (FairWear 2020).
5 April 2020	The Prime Minister announced four fresh financial stimulus packages, increasing public expenditure, formulating a stimulus package, widening social safety net coverage and increasing monetary supply, in total amounting to US\$ 8 billion (FairWear 2020).
3 May 2020	Garment workers' salary disbursement from the stimulus package started with government disbursing salaries directly to accounts of affected workers of factories that applied and qualify for support (FairWear 2020).
Government policies and regulations to protect employees	
25 March 2020	The bailout/stimulus package of US\$ 625 million for export-oriented industries is to be disbursed in the form of salaries and wages for employees and workers of the industries (FairWear 2020).
10 May 2020	Ministry of Labour prohibits garment and other factories from laying off workers ahead of the Eid-ul-Fitr festivities. Furthermore, such factories were mandated to pay a full month's salary to workers who worked all or part of the month in April.
14 May 2020	The Prime Minister launched the disbursement of approximately US\$142 million cash aid for 5 million poor families; each family to receive about US\$ 30cash through mobile financial services (MFSs).

Support measures listed in FAO 2020a
Government subsidy for rice: Selling rice at 10 taka per kg (US\$ 0.12 per kg), a subsidy of more than 75%, to 5 million rural poor people holding Food Friendly Programme (FFP) cards.
The government increased the number of cards for the Food Friendly Programme and for the Open Market Sales OMS from 5 million to 10 million households normally not enrolled as Public Food Distribution System (PFDS) beneficiaries. All PFDS beneficiaries can receive subsidised rice at 10 taka per kg, wheat-flour, pulses, oil, etc., and public food distribution through OMS.
Gratuitous Relief and other social safety net programmes promised to distribute 1 million MT over three months starting in April 2020.
Informal sector jobless poor to be covered under substantially expanded social protection programmes, mostly subsidised and free food, for about 45 million rural and urban poor and vulnerable.
Domestic formal sector workers to receive unemployment benefits through the government's US\$ 8,5 billion (2.5% of GDP) stimulus package to private sector employers.
About US\$590 million is allocated to support poor farmers.
BRAC started cash transfers of 2000 taka (US\$ 24) to all its borrowers through bKash and decided not to take credit repayment instalments from its borrowers, and BRAC's Urban Development Program started supplying food baskets to the urban poor.
In FAO (2020b) it is mentioned that the volume of relief and food aid distributed by individuals and private organisations to flood-affected communities following cyclone Amphan (May 2020) was significantly lower than the volume distributed to flood-affected communities in recent years prior to the COVID-19 pandemic.

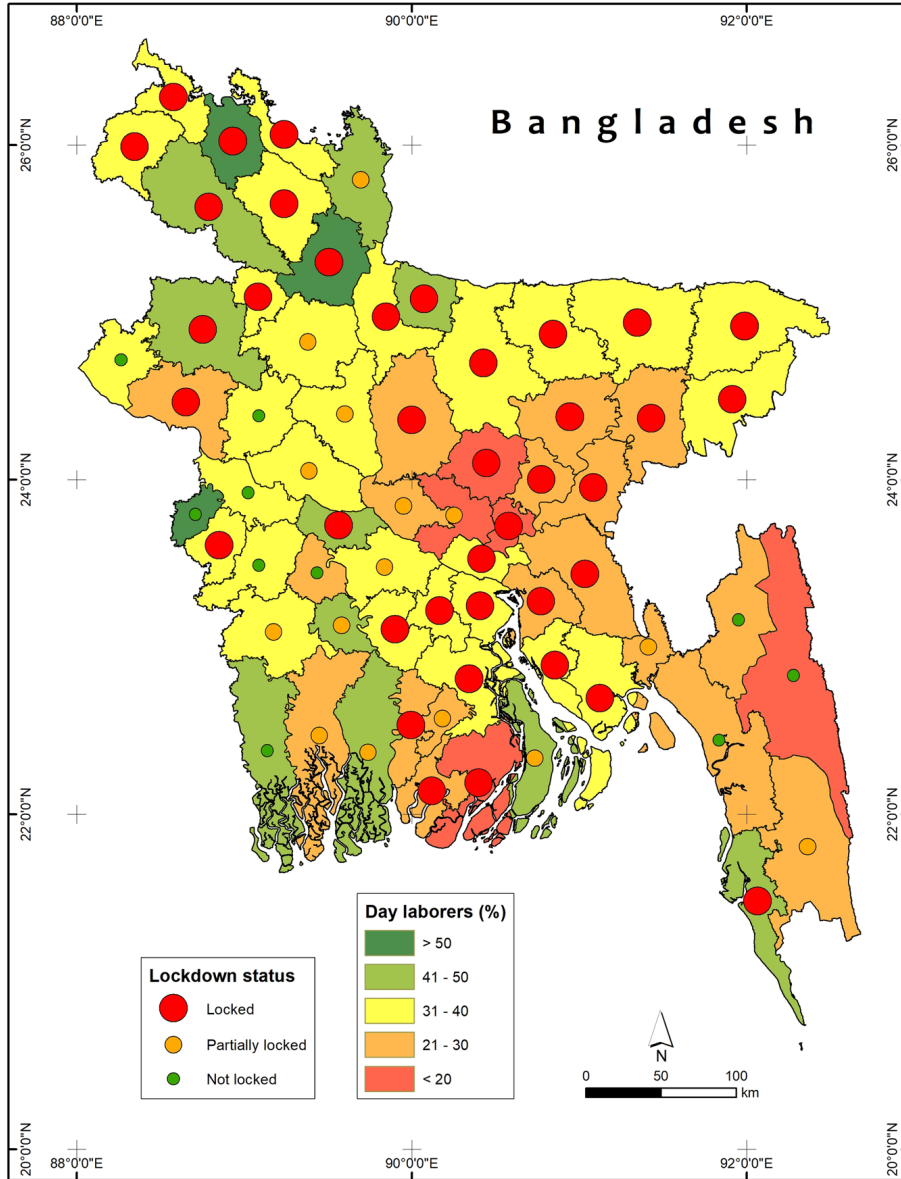


Figure A: Districts in Bangladesh under complete lockdown, partial lockdown, no lockdown at 17 April 2020 (Mottaleb et al. 2020)

ANNEX B: TEST FOR ATTRITION BIAS

Table A: Test for attrition bias

	N Interviewed	N Attrited	Mean Interviewed	Mean Attrited	Difference	S.E.	t-statistic	p-value	FDR q-value
<i>Age (follow-up)</i>	832	256	34.45	33.57	.878	.634	1.4	.167	0.568
<i>Education level higher than primary school</i>	832	256	.459	.457	.002	.036	.05	.953	1.000
<i>Nbr of children in the household (Wife of) household head</i>	832	256	1.84	1.74	.102	.078	1.3	.195	0.568
<i>No husband (baseline)</i>	832	256	.866	.809	.057	.026	2.25	.025	0.25
<i>Wealthscore^a</i>	832	256	.086	.094	-.009	.02	-.4	.677	1.000
<i>Quintile1</i>	832	256	.036	.03	.006	.003	2	.048	0.316
<i>Quintile2</i>	832	256	.321	.383	-.062	.034	-1.85	.067	0.336
<i>Quintile3</i>	832	256	.167	.164	.003	.026	.1	.91	1.000
<i>Quintile4</i>	832	256	.141	.148	-.008	.025	-.3	.755	1.000
<i>Quintile5</i>	832	256	.161	.172	-.011	.026	-.4	.683	1.000
<i>Work outside the home (baseline)</i>	832	256	.21	.133	.077	.028	2.75	.006	0.114
<i>Income use autonomy (baseline)</i>	832	256	.074	.086	-.012	.019	-.6	.55	1.000
<i>Food purchase decisions (baseline)</i>	832	256	-.024	-.021	-.002	.02	-.1	.914	1.000
<i>Food groups (baseline)</i>	832	256	.65	.686	-.036	.028	-1.3	.19	0.568
<i>Diet diversity (baseline)</i>	832	256	4.33	4.24	.09	.098	.9	.359	0.876
	832	256	.405	.367	.038	.035	1.1	.279	0.676

Note: ^a wealthscore calculated per age group per district using Equity tool

ANNEX C: CHANGE OVER THE YEAR WITH COVID-19 IN CONSUMPTION PER FOOD GROUP

Table B: Change over the year in the likelihood of non-fasting women consuming an item per specific food group

Likelihood of having consumed:		Proportion	S.E.	P> t
Dark green leafy vegetables	Δ	0.183	0.024	0.000
	Baseline	0.353	0.017	0.000
Other vegetables	Δ	-0.085	0.019	0.000
	Baseline	0.839	0.013	0.000
Other fruit	Δ	0.277	0.022	0.000
	Baseline	0.298	0.016	0.000
Pulses	Δ	0.076	0.024	0.001
	Baseline	0.490	0.018	0.000
Nuts	Δ	0.138	0.015	0.000
	Baseline	0.044	0.007	0.000
Dairy	Δ	0.193	0.019	0.000
	Baseline	0.138	0.012	0.000
Eggs	Δ	0.191	0.022	0.000
	Baseline	0.249	0.015	0.000
Vitamin A-rich fruits and vegetables	Δ	0.100	0.015	0.000
	Baseline	0.065	0.009	0.000
Grains and tubers	Δ	0.001	0.001	0.317
	Baseline	0.999	0.001	0.000
Meat, poultry, fish	Δ	0.045	0.018	0.011
	Baseline	0.828	0.013	0.000
N		802		

Note: Estimated using a linear probability model applying fixed effects panel regression. Excludes women whose reported consumption concerned a fasting day at baseline and/or follow-up

ANNEX D: RELATIONSHIPS BETWEEN WOMEN'S DIET DIVERSITY, WOMEN'S EMPOWERMENT AND WOMEN'S WORK OUTSIDE THE HOME AT BASELINE AND FOLLOW-UP

To put the change in women's empowerment in relation to the change in women's employment outside the home in perspective, we also estimated the relationship between women's empowerment and women's employment outside the home at baseline (*Equation 3* for $t=0$) and at follow-up (*Equation 3* for $t=1$) using Ordinary Least Square regression models. Similarly, we estimated the relationship between women's diet diversity and women's empowerment (including employment outside the home) at baseline and at . We ran the models once without and once with control variables.

$$Y_i = \gamma_0 + \gamma_1 X_i + \gamma_2 C_i + \varepsilon_i \quad (3)$$

With Y_{i0} baseline, respectively Y_{i1} follow-up, indicator of women's empowerment (*RQ II*), respectively women's diet diversity (*RQ IV*), measured for woman $i \in \{1, \dots, n\}$
 X_{i0} baseline, respectively X_{i1} follow-up, indicator of women's work outside the home (*RQ II*), respectively women's empowerment (*RQ IV*), measured for woman $i \in \{1, \dots, n\}$
 C_{i0} baseline, respectively C_{i1} follow-up, individual/household level control variables (*Husband works for pay, No husband, Age, Lowest wealth quintile, Nbr of children in the household, (Wife of) household head, Faridpur*), measured for woman $i \in \{1, \dots, n\}$

The relationship between women's involvement in food purchasing decisions and women's work outside the home was positive and statistically significant at baseline and follow-up (Table C). This positive relationship persisted from baseline to follow-up despite an overall negative trend in women's involvement in food purchasing decisions and positive trend in the likelihood of women working outside the home (as shown in RQ I).

At baseline, we did not find any evidence of significant relationships between any of the indicators of women's empowerment and women's diet diversity in our study population (Table D and E). At follow-up, the relationship of women's diet diversity with women's income use autonomy is significantly negative, with women's involvement in food purchase decisions positive and statistically significant, and with women's outside employment insignificant.

Table C: Relationship between women's empowerment and women's work outside the home at baseline and follow-up

	<i>Income use autonomy</i>	<i>Income use autonomy</i>	<i>Food purchase decisions</i>	<i>Food purchase decisions</i>
	(1)	(2)	(3)	(4)
Panel A. Baseline	OLS	OLS	OLS	OLS
γ_1 <i>Work outside the home</i>	-0.004	0.001	0.126***	0.119***
S.E.	0.039	0.041	0.043	0.044
t-statistic	-0.099	0.020	2.937	2.703
p-value	0.921	0.984	0.003	0.007
Constant	-0.023**	-0.072	0.657***	0.423***
S.E.	0.010	0.059	0.015	0.092
t-statistic	-2.301	-1.206	45.243	4.619
p-value	0.022	0.228	0.000	0.000
N	832	799	759	729
Control variables	No	Yes	No	Yes
R ²	0.000	0.008	0.008	0.074
Panel B. Covid-19 follow-up				
γ_1 <i>Work outside the home</i>	-0.060**	-0.069***	0.096***	0.099***
S.E.	0.025	0.026	0.031	0.031
t-statistic	-2.423	-2.620	3.075	3.156
p-value	0.016	0.009	0.002	0.002
Constant	-0.011	-0.066	0.602***	0.515***
S.E.	0.009	0.050	0.014	0.083
t-statistic	-1.151	-1.330	41.814	6.188
p-value	0.250	0.184	0.000	0.000
N	829	789	756	720
Control variables	No	Yes	No	Yes
R ²	0.008	0.029	0.010	0.064

Table D: Relationship between women's diet diversity and women's empowerment at baseline and follow-up

	<i>Food groups</i>	<i>Food groups</i>	<i>Diet diversity</i>	<i>Diet diversity</i>	<i>Food groups</i>	<i>Food groups</i>	<i>Diet diversity</i>	<i>Diet diversity</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Baseline	All	All	All	All	All	All	All	All
γ_1 Income use autonomy	-0.077	-0.111	0.008	0.004				
S.E.	0.171	0.169	0.061	0.062				
t-statistic	-0.448	-0.658	0.135	0.070				
p-value	0.654	0.511	0.893	0.944				
γ_1 Food purchase decisions					0.155	0.171	0.045	0.063
S.E.					0.126	0.132	0.047	0.048
t-statistic					1.234	1.294	0.970	1.327
p-value					0.218	0.196	0.332	0.185
Constant	4.328***	5.209***	0.405***	0.704***	4.236***	5.041***	0.380***	0.702***
S.E.	0.048	0.312	0.017	0.105	0.095	0.317	0.036	0.116
t-statistic	90.895	16.694	23.667	6.693	44.746	15.925	10.656	6.031
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	829	796	829	796	756	726	756	726
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.000	0.083	0.000	0.049	0.002	0.074	0.001	0.046
Panel B. Covid-19 follow-up								
γ_1 Income use autonomy	-0.794***	-0.636***	-0.151**	-0.110*				
S.E.	0.230	0.229	0.062	0.063				
t-statistic	-3.446	-2.775	-2.453	-1.751				
p-value	0.001	0.006	0.014	0.080				
γ_1 Food purchase decisions					0.349*	0.466**	0.123**	0.136***
S.E.					0.183	0.183	0.050	0.051
t-statistic					1.910	2.548	2.472	2.642
p-value					0.056	0.011	0.014	0.008
Constant	5.410***	5.874***	0.662***	0.785***	5.198***	5.703***	0.585***	0.682***
S.E.	0.062	0.384	0.017	0.105	0.133	0.424	0.036	0.119
t-statistic	87.789	15.297	39.470	7.483	39.153	13.434	16.161	5.748
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of women	805	767	805	767	734	700	734	700
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
R ²	0.013	0.088	0.006	0.065	0.005	0.087	0.008	0.069

Table E: Relationship between women's diet diversity and women's work outside the home at baseline and follow-up

	<i>Food groups</i>	<i>Food groups</i>	<i>Diet diversity</i>	<i>Diet diversity</i>
	(1)	(2)	(3)	(4)
Panel A. Baseline	All	All	All	All
γ_1 <i>Work outside the home</i>	0.080	0.164	0.050	0.081
S.E.	0.201	0.201	0.066	0.068
t-statistic	0.398	0.816	0.762	1.186
p-value	0.690	0.415	0.447	0.236
Constant	4.323***	5.207***	0.402***	0.699***
S.E.	0.049	0.311	0.018	0.105
t-statistic	88.083	16.728	22.659	6.653
p-value	0.000	0.000	0.000	0.000
N	829	796	829	796
Control variables	No	Yes	No	Yes
R ²	0.000	0.083	0.001	0.051
Panel B. Covid-19 follow-up				
γ_1 <i>Work outside the home</i>	0.072	0.263	0.007	0.047
S.E.	0.174	0.172	0.045	0.044
t-statistic	0.410	1.529	0.144	1.072
p-value	0.682	0.127	0.885	0.284
Constant	5.413***	5.924***	0.663***	0.796***
S.E.	0.067	0.386	0.018	0.105
t-statistic	80.692	15.362	36.318	7.566
p-value	0.000	0.000	0.000	0.000
N	803	765	803	765
Control variables	No	Yes	No	Yes
R ²	0.000	0.083	0.000	0.063

ANNEX E: ANALYSIS WITH ALTERNATIVE INDICATOR OF WOMEN'S EMPLOYMENT: WOMEN'S LABOR CONTRIBUTIONS TO HOUSEHOLD PRODUCTION

As discussed in the pre-analysis plan (Lecoutere et al. 2020), initially, we intended to also examine the extent to which changes in women's empowerment are related to changes in women's labor contributions to household production (RQ II) and the extent to which changes in women's diet diversity are related to changes in women's labor contributions to household production (RQ IV).

If labor markets (for hired agricultural labor) have been constrained because of transport or other restrictions, the involvement of women in household farm production possibly increased. If so, this may have enhanced women's bargaining power and increased women's control over the use of income and women's decision-making power about food purchases in their households. Any such increase in women's empowerment, however, is hypothesised to be smaller than any increase that would follow from women having more access to employment outside the home relative to men.

We defined an indicator *Labor contributions* taking the value 1 if the female respondent made any labor contributions to household production. The baseline value of the indicator is 1 if the female respondent reported at baseline working outside the home or if she answered affirmatively to the question asked at follow-up whether she spent any days working on the farm or fields of her household last year in the same agricultural season. Otherwise, it is zero. The follow-up value of the indicator is 1 if the female respondent reported at follow-up working outside the home or if she reported at follow-up to have spent (many) more days or the same amount of days (if she spent any last year) working on the farm or fields of her household this year as compared to last year in the same agricultural season. Otherwise, it is zero. *Change over the year in the female respondent's labor contributions* takes the value 1 if the follow-up value of the indicator *labor contributions* is 1 and the baseline value zero, takes the value minus 1 if the

follow-up value is zero and the baseline value 1, and takes the value zero if end and baseline values are equal.

The results addressing RQ I, II and IV (Tables F, G, and H) are similar to results of the models that include women's work outside the home, except that change in women's income use autonomy is negatively related to change in women's labor contributions while it was not significantly related with women's work outside the home.

E.1. RQ I: Change over the year with COVID-19 in women's labor contributions to household production

Table F: Change over the year with COVID-19 in women's labor contributions to household production

	<i>Δ Labour contributions</i>	
	(1) Ord Prob	(2) Ord Prob
Constant (α_0)	1.248	1.408
S.E.	0.058	0.210
t-statistic	21.372	6.721
p-value	0.000	0.000
2nd cut point	1.392	1.251
S.E.	0.063	0.205
Prob pr($\Delta Y = -1$)	0.106	0.106
S.E.	0.011	0.011
p-value	0.000	0.000
Prob pr($\Delta Y = 0$)	0.812	0.812
S.E.	0.014	0.014
p-value	0.000	0.000
Prob pr($\Delta Y = 1$)	0.082	0.082
S.E.	0.010	0.009
p-value	0.000	0.000
Control variables	No	C
N	830	829
R ²		
Pseudo R ²	0.000	0.008
Log pseudo lkh	-507.934	-503.879

Note: Models (1-2) with dependent variable Δ Labor contributions estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; Control variables C={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}

E.2. RQ II: Relationship between change over the year with COVID-19 in women's empowerment and change in women's labor contributions to household production

Table G: Relationship between change over the year with COVID-19 in women's empowerment and change in women's labor contributions

	<i>Δ Income use autonomy</i>			<i>Δ Food purchase decisions</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
β₁ Δ Labour contributions = -1	0.049	0.046	0.057	0.036	0.039	0.038
S.E.	0.042	0.046	0.047	0.055	0.060	0.059
t-statistic	1.166	0.984	1.203	0.645	0.660	0.634
p-value	0.244	0.326	0.229	0.519	0.509	0.526
β₁ Δ Labour contributions = 1	-0.117	-0.113	-0.111	0.036	0.038	0.033
S.E.	0.042	0.047	0.046	0.064	0.072	0.073
t-statistic	-2.751	-2.396	-2.412	0.558	0.527	0.450
p-value	0.006	0.017	0.016	0.577	0.598	0.653
Constant	0.008	0.007	-0.087	-0.056	-0.055	0.150
S.E.	0.014	0.021	0.069	0.019	0.026	0.108
t-statistic	0.571	0.324	-1.246	-2.916	-2.142	1.389
p-value	0.568	0.746	0.213	0.004	0.033	0.165
Control variables	No	ΔC	ΔC + Z	No	ΔC	ΔC + Z
N	830	754	754	757	687	687
R ²	0.010	0.010	0.020	0.001	0.008	0.017

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{$ Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur $\}$; Models (4-6) exclude women without children at baseline.

E.3. RQ IV: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's labor contributions to household production

Table H: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's labor contributions

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
$\beta_1 \Delta$ Labour contributions = -1	0.602	0.569	0.624	0.292	0.290	0.311
S.E.	0.212	0.215	0.221	0.131	0.132	0.136
t-statistic	2.837	2.644	2.827	2.230	2.190	2.300
p-value	0.005	0.008	0.005	0.025	0.028	0.022
$\beta_1 \Delta$ Labour contributions = 1	0.423	0.403	0.411	0.201	0.192	0.187
S.E.	0.257	0.260	0.262	0.142	0.143	0.145
t-statistic	1.644	1.550	1.570	1.420	1.340	1.290
p-value	0.101	0.122	0.117	0.156	0.179	0.197
Constant	1.019	0.913	1.114	1.159	1.069	1.000
S.E.	0.077	0.170	0.377	0.061	0.111	0.220
t-statistic	13.146	5.372	2.952	18.989	9.660	4.554
p-value	0.000	0.000	0.003	0.000	0.000	0.000
2nd cut point				0.354	0.452	0.525
S.E.				0.050	0.106	0.218
Δ Labour contributions = -1						
AME pr($\Delta Y = -1$)				-0.056	-0.055	-0.059
S.E.				0.026	0.025	0.026
p-value					0.030	
				0.027		0.023
AME pr($\Delta Y = 0$)				-0.054	-0.055	-0.059
S.E.				0.024	0.025	0.026
p-value					0.028	
				0.026		0.022
AME pr($\Delta Y = 1$)				0.111	0.110	0.117
S.E.				0.049	0.050	0.051
p-value				0.024	0.027	0.021
Δ Labour contributions = 1						
AME pr($\Delta Y = -1$)				-0.039	-0.036	-0.035
S.E.				0.028	0.027	0.027
p-value				0.156	0.182	0.199
AME pr($\Delta Y = 0$)				-0.037	-0.036	-0.035
S.E.				0.026	0.027	0.027
p-value				0.156	0.179	0.196
AME pr($\Delta Y = 1$)				0.076	0.073	0.070
S.E.				0.053	0.054	0.054
p-value				0.155	0.178	0.196
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	801	779	779	801	779	779
R ²	0.011	0.020	0.026			
Pseudo R ²				0.004	0.009	0.011
Log pseudo lkh				-766.969	-740.873	-739.400

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

ANNEX F: ANALYSIS BY AGE GROUP

F.1. Women 27 years and older

F.1.1. Women 27 years and older: RQ I: Change over the year with COVID-19 in women's work outside the home and women's empowerment

Table I: Change over the year with COVID-19 in women's work outside the home and women's empowerment

	Δ Work outside the home		Δ Income use autonomy			Δ Food purchase decisions		
	(1) Ord Prob	(2) Ord Prob	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Constant (α_0)	1.806	1.546	0.012	0.021	-0.174	-0.062	-0.056	0.150
S.E.	0.095	0.416	0.015	0.021	0.129	0.019	0.026	0.173
t-statistic	18.989	3.718	0.820	1.003	-1.353	-3.210	-2.177	0.870
p-value	0.000	0.000	0.413	0.316	0.177	0.001	0.030	0.385
2nd cut point	1.073	1.346						
S.E.	0.062	0.407						
Prob pr($\Delta Y = -1$)	0.035	0.036						
S.E.	0.007	0.007						
p-value	0.000	0.000						
Prob pr($\Delta Y = 0$)	0.823	0.823						
S.E.	0.015	0.015						
p-value	0.000	0.000						
Prob pr($\Delta Y = 1$)	0.142	0.142						
S.E.	0.014	0.014						
p-value	0.000	0.000						
Control variables	No	C	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	621	621	624	568	568	580	529	529
R ²			0.000	0.005	0.024	0.000	0.017	0.022
Pseudo R ²	0.000	0.005						
Log pseudo lkh	-345.063	-343.288						

Note: Models (1-2) with dependent variable Δ Work outside the home estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; Models with dependent variables Δ Income use autonomy (3-5), resp. Δ Food purchase decisions (6-8), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Husband's income $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (6-8) exclude women without children at baseline.

F.1.2. Women 27 years and older: RQ II: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

Table J: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

	Δ Income use autonomy			Δ Food purchase decisions		
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
$\beta_1 \Delta$ Work outside the home (-1)	-0.072	-0.096	-0.102	-0.001	0.022	0.016
S.E.	0.078	0.079	0.079	0.120	0.129	0.129
t-statistic	-0.922	-1.213	-1.293	-0.004	0.167	0.127
p-value	0.357	0.226	0.197	0.997	0.867	0.899
$\beta_1 \Delta$ Work outside the home (+1)	-0.083	-0.082	-0.079	0.008	0.024	0.024
S.E.	0.044	0.048	0.048	0.053	0.057	0.057
t-statistic	-1.868	-1.687	-1.649	0.146	0.426	0.422
p-value	0.062	0.092	0.100	0.884	0.670	0.673
Constant	0.026	0.035	-0.147	-0.063	-0.060	0.142
S.E.	0.017	0.023	0.130	0.022	0.027	0.172
t-statistic	1.543	1.529	-1.124	-2.933	-2.182	0.824
p-value	0.123	0.127	0.262	0.003	0.030	0.410
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	621	565	565	577	526	526
R ²	0.007	0.012	0.031	0.000	0.017	0.022

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{$ Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur $\}$; Models (4-6) exclude women without children at baseline.

F.1.3. Women 27 years and older: RQ III: Change over the year with COVID-19 in women's diet diversity

Table K: Change over the year with COVID-19 in women's diet diversity

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
Constant (α_0)	1.147	1.145	1.951	1.218	1.209	1.369
S.E.	0.080	0.189	0.614	0.068	0.125	0.367
t-statistic	14.330	6.058	3.176	17.986	9.639	3.734
p-value	0.000	0.000	0.002	0.000	0.000	0.000
2nd cut point				0.284	0.304	0.145
S.E.				0.052	0.117	0.364
Prob pr($\Delta Y=-1$)				0.112	0.110	0.110
S.E.				0.013	0.013	0.013
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=0$)				0.500	0.498	0.498
S.E.				0.020	0.021	0.021
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=1$)				0.388	0.392	0.392
S.E.				0.020	0.020	0.020
p-value				0.000	0.000	0.000
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	600	584	584	600	584	584
R ²	0.000	0.013	0.020			
Pseudo R ²				0.000	0.006	0.006
Log pseudo lkh				-575.217	-555.301	-555.012

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

F.1.4. Women 27 years and older: RQ IV Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment, respectively change in women's work outside the home

Table L: Relationship between change over the year with Covid-19 in women's diet diversity and change in women's empowerment

	Δ Food groups			Δ Diet diversity			Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob	(7) OLS	(8) OLS	(9) OLS	(10) Ord Prob	(11) Ord Prob	(12) Ord Prob
β_1 Δ Income use												
autonomy	-0.407	-0.363	-0.354	-0.072	-0.037	-0.038						
S.E.	0.214	0.218	0.219	0.116	0.120	0.121						
t-statistic	-1.908	-1.661	-1.616	-0.620	-0.310	-0.310						
p-value	0.057	0.097	0.107	0.533	0.757	0.753						
β_1 Δ Food purchase decisions							0.452	0.489	0.466	0.249	0.288	0.282
S.E.							0.170	0.173	0.174	0.100	0.104	0.105
t-statistic							2.662	2.834	2.670	2.490	2.760	2.690
p-value							0.008	0.005	0.008	0.013	0.006	0.007
Constant	1.150	1.129	1.872	1.219	1.208	1.361	1.142	1.095	1.867	1.216	1.189	1.311
S.E.	0.080	0.188	0.608	0.068	0.125	0.368	0.084	0.199	0.620	0.070	0.131	0.382
t-statistic	14.400	5.995	3.077	17.979	9.628	3.693	13.524	5.513	3.013	17.451	9.076	3.435
p-value	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.001
2nd cut point				0.283	0.305	0.153				0.271	0.321	0.200
S.E.				0.052	0.117	0.366				0.054	0.122	0.380
AME pr($\Delta Y=-1$)				0.014	0.007	0.007				-0.048	-0.055	-0.053
S.E.				0.022	0.022	0.023				0.020	0.020	0.021
p-value				0.533	0.756	0.753				0.015	0.007	0.009
AME pr($\Delta Y=0$)				0.014	0.007	0.007				-0.046	-0.053	-0.052
S.E.				0.022	0.023	0.024				0.019	0.019	0.019
p-value				0.534	0.757	0.753				0.013	0.006	0.007
AME pr($\Delta Y=1$)				-0.028	-0.014	-0.015				0.095	0.108	0.106
S.E.				0.044	0.046	0.046				0.038	0.038	0.039
p-value				0.533	0.757	0.753				0.012	0.005	0.006
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	600	584	584	600	584	584	557	543	543	557	543	543
R ²	0.006	0.018	0.024				0.011	0.031	0.037			
Pseudo R ²				0.000	0.006	0.007				0.005	0.016	0.016
Log pseudo lkh				-575.041	-555.257	-554.966				-535.167	-514.738	-514.411

Note: Models (1-3, resp. 7-9) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6, resp. 10-12) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}; Models (1-12) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up, models (7-12) additionally exclude women without children at baseline.

Table M: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's work outside the home

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
β_1 Δ Work outside the home (-1)	0.257	0.195	0.201	0.204	0.181	0.181
S.E.	0.433	0.451	0.444	0.235	0.240	0.239
t-statistic	0.593	0.431	0.452	0.870	0.750	0.760
p-value	0.553	0.666	0.651	0.386	0.451	0.449
β_1 Δ Work outside the home (+1)	0.100	0.069	0.100	0.113	0.087	0.094
S.E.	0.229	0.231	0.231	0.130	0.131	0.132
t-statistic	0.434	0.296	0.432	0.870	0.660	0.710
p-value	0.664	0.767	0.666	0.386	0.507	0.475
Constant	1.124	1.133	1.923	1.194	1.191	1.333
S.E.	0.089	0.190	0.619	0.071	0.127	0.369
t-statistic	12.657	5.959	3.109	16.739	9.415	3.615
p-value	0.000	0.000	0.002	0.000	0.000	0.000
2nd cut point				0.304	0.318	0.177
S.E.				0.057	0.118	0.367
Work outside the home (-1)						
AME pr($\Delta Y = -1$)				-0.039	-0.034	-0.034
S.E.				0.045	0.045	0.045
p-value				0.389	0.453	0.451
AME pr($\Delta Y = 0$)				-0.039	-0.035	-0.035
S.E.				0.045	0.047	0.046
p-value				0.385	0.450	0.447
AME pr($\Delta Y = 1$)				0.078	0.069	0.069
S.E.				0.090	0.092	0.091
p-value				0.385	0.451	0.448
Work outside the home (+1)						
AME pr($\Delta Y = -1$)				-0.022	-0.016	-0.018
S.E.				0.025	0.025	0.025
p-value				0.388	0.508	0.476
AME pr($\Delta Y = 0$)				-0.022	-0.017	-0.018
S.E.				0.025	0.025	0.026
p-value				0.385	0.506	0.474
AME pr($\Delta Y = 1$)				0.043	0.033	0.036
S.E.				0.050	0.050	0.050
p-value				0.385	0.506	0.474
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	598	582	582	598	582	582
R ²	0.001	0.014	0.020			
Pseudo R ²				0.001	0.007	0.007
Log pseudo lkh				-573.2	-553.522	-553.199

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Δ Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

F.2. Women younger than 27 years

F.2.1. Women younger than 27 years: RQ I: Change over the year with COVID-19 in women's work outside the home and women's empowerment

Table N: Change over the year with COVID-19 in women's work outside the home and women's empowerment

	Δ Work outside the home		Δ Income use autonomy			Δ Food purchase decisions		
	(1) Ord Prob	(2) Ord Prob	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Constant (α_0)	1.830	4.056	-0.022	-0.071	0.231	-0.006	-0.004	0.878
S.E.	0.168	0.957	0.024	0.034	0.273	0.037	0.053	0.462
t-statistic	10.921	4.240	-0.889	-2.055	0.849	-0.151	-0.082	1.900
p-value	0.000	0.000	0.375	0.041	0.397	0.880	0.935	0.059
2nd cut point	1.534	-0.510						
S.E.	0.137	0.923						
Prob pr($\Delta Y=-1$)	0.034	0.034						
S.E.	0.013	0.012						
p-value	0.007	0.004						
Prob pr($\Delta Y=0$)	0.904	0.904						
S.E.	0.020	0.020						
p-value	0.000	0.000						
Prob pr($\Delta Y=1$)	0.063	0.062						
S.E.	0.017	0.016						
p-value	0.000	0.000						
Control variables	No	C	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	208	208	208	188	188	179	160	160
R ²			0.000	0.029	0.038	0.000	0.026	0.082
Pseudo R ²	0.000	0.056						
Log pseudo lkh	-78.7911	-74.4149						

Note: Models (1-2) with dependent variable Δ Work outside the home estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; Models with dependent variables Δ Income use autonomy (3-5), resp. Δ Food purchase decisions (6-8), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Husband's income $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (6-8) exclude women without children at baseline.

F.2.2. Women younger than 27 years: RQ II: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

Table O: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

	Δ Income use autonomy			Δ Food purchase decisions		
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
$\beta_1 \Delta$ Work outside the home (-1)	0.066	0.068	0.109	-0.214	-0.072	-0.004
S.E.	0.130	0.135	0.141	0.158	0.115	0.113
t-statistic	0.505	0.502	0.773	-1.356	-0.623	-0.039
p-value	0.614	0.616	0.441	0.177	0.534	0.969
$\beta_1 \Delta$ Work outside the home (+1)	-0.086	-0.116	-0.107	-0.177	-0.163	-0.162
S.E.	0.062	0.054	0.061	0.130	0.155	0.137
t-statistic	-1.383	-2.156	-1.763	-1.363	-1.053	-1.181
p-value	0.168	0.032	0.080	0.175	0.294	0.239
Constant	-0.018	-0.067	0.272	0.014	0.007	0.890
S.E.	0.026	0.036	0.277	0.040	0.055	0.479
t-statistic	-0.702	-1.878	0.981	0.345	0.123	1.858
p-value	0.483	0.062	0.328	0.731	0.902	0.065
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	208	188	188	179	160	160
R ²	0.005	0.036	0.046	0.014	0.032	0.088

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{$ Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur $\}$; Models (4-6) exclude women without children at baseline.

F.2.3. Women younger than 27 years: RQ III: Change over the year with COVID-19 in women's diet diversity

Table P: Change over the year with COVID-19 in women's diet diversity

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
Constant (α_0)	1.040	0.605	0.944	1.156	0.810	1.145
S.E.	0.140	0.386	1.354	0.114	0.241	0.776
t-statistic	7.408	1.569	0.698	10.177	3.355	1.476
p-value	0.000	0.118	0.486	0.000	0.001	0.140
2nd cut point				0.368	0.747	0.427
S.E.				0.091	0.245	0.772
Prob pr($\Delta Y=-1$)				0.124	0.123	0.123
S.E.				0.023	0.023	0.023
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=0$)				0.520	0.515	0.515
S.E.				0.035	0.035	0.035
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=1$)				0.356	0.362	0.363
S.E.				0.034	0.034	0.034
p-value				0.000	0.000	0.000
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	202	196	196	202	196	196
R ²	0.000	0.040	0.046			
Pseudo R ²				0.000	0.024	0.033
Log pseudo lkh				-195.212	-184.867	-183.234

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

F.2.4. Women younger than 27 years: RQ IV Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment, respectively change in women's work outside the home

Table Q: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment

	Δ Food groups			Δ Diet diversity			Δ Food groups			Δ Diet diversity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	OLS	OLS	Ord Prob	Ord Prob	Ord Prob	OLS	OLS	OLS	Ord Prob	Ord Prob	Ord Prob
β_1 Δ Income use												
autonomy	-0.482	-0.460	-0.451	0.114	0.155	0.156						
S.E.	0.398	0.409	0.412	0.244	0.251	0.253						
t-statistic	-1.210	-1.124	-1.095	0.470	0.620	0.620						
p-value	0.228	0.262	0.275	0.639	0.538	0.536						
β_1 Δ Food purchase decisions							0.203	0.087	0.080	0.230	0.225	0.287
S.E.							0.311	0.327	0.329	0.170	0.173	0.180
t-statistic							0.652	0.265	0.243	1.360	1.300	1.590
p-value							0.515	0.791	0.809	0.175	0.194	0.112
Constant	1.026	0.544	1.004	1.160	0.831	1.124	1.028	0.541	0.709	1.096	0.738	-0.030
S.E.	0.142	0.391	1.346	0.115	0.247	0.772	0.153	0.431	1.722	0.119	0.262	0.913
t-statistic	7.241	1.390	0.746	10.048	3.358	1.455	6.736	1.254	0.412	9.244	2.813	-0.033
p-value	0.000	0.166	0.457	0.000	0.001	0.146	0.000	0.212	0.681	0.000	0.005	1.023
2nd cut point				0.365	0.727	0.449				0.403	0.797	1.591
S.E.				0.091	0.249	0.769				0.099	0.267	0.910
AME pr($\Delta Y=-1$)				-0.023	-0.030	-0.030				-0.050	-0.046	-0.058
S.E.				0.049	0.048	0.048				0.038	0.037	0.038
p-value				0.636	0.535	0.533				0.185	0.207	0.127
AME pr($\Delta Y=0$)				-0.019	-0.027	-0.027				-0.034	-0.034	-0.043
S.E.				0.042	0.044	0.044				0.025	0.027	0.027
p-value				0.644	0.544	0.543				0.178	0.195	0.113
AME pr($\Delta Y=1$)				0.043	0.057	0.057				0.084	0.081	0.101
S.E.				0.091	0.092	0.092				0.061	0.062	0.063
p-value				0.639	0.538	0.536				0.170	0.191	0.108
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	202	196	196	202	196	196	174	168	168	174	168	168
R ²	0.007	0.046	0.052				0.002	0.041	0.056			
Pseudo R ²				0.001	0.025	0.034				0.005	0.034	0.048
Log pseudo lkh				-195.086	-184.650	-183.016				-169.886	-159.500	-157.159

Note: Models (1-3, resp. 7-9) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6, resp. 10-12) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-12) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up, models (7-12) additionally exclude women without children at baseline.

Table R: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's work outside the home

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
β_1 Δ Work outside the home (-1)	-0.297	-0.332	-0.275	-0.128	-0.234	-0.241
S.E.	0.420	0.422	0.472	0.240	0.273	0.287
t-statistic	-0.706	-0.788	-0.584	-0.530	-0.860	-0.840
p-value	0.481	0.432	0.560	0.594	0.391	0.401
β_1 Δ Work outside the home (+1)	0.604	0.584	0.520	0.598	0.604	0.532
S.E.	0.584	0.605	0.635	0.301	0.304	0.328
t-statistic	1.035	0.964	0.819	1.990	1.990	1.620
p-value	0.302	0.336	0.414	0.047	0.047	0.105
Constant	1.011	0.551	0.763	1.135	0.762	0.978
S.E.	0.150	0.387	1.415	0.119	0.244	0.807
t-statistic	6.741	1.425	0.540	9.574	3.128	1.212
p-value	0.000	0.156	0.590	0.000	0.002	0.228
2nd cut point				0.405	0.812	0.608
S.E.				0.096	0.249	0.809
Work outside the home (-1)						
AME pr($\Delta Y = -1$)				0.026	0.045	0.046
S.E.				0.048	0.051	0.053
p-value				0.588	0.382	0.391
AME pr($\Delta Y = 0$)				0.021	0.040	0.041
S.E.				0.041	0.049	0.051
p-value				0.607	0.410	0.420
AME pr($\Delta Y = 1$)				-0.047	-0.085	-0.087
S.E.				0.089	0.099	0.103
p-value				0.596	0.391	0.401
Work outside the home (+1)						
AME pr($\Delta Y = -1$)				-0.121	-0.116	-0.101
S.E.				0.065	0.062	0.065
p-value				0.060	0.062	0.120
AME pr($\Delta Y = 0$)				-0.099	-0.103	-0.090
S.E.				0.049	0.051	0.055
p-value				0.045	0.043	0.101
AME pr($\Delta Y = 1$)				0.220	0.219	0.191
S.E.				0.108	0.108	0.116
p-value				0.042	0.042	0.100
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	202	196	196	202	196	196
R ²	0.007	0.046	0.051			
Pseudo R ²				0.008	0.034	0.040
Log pseudo lkh				-193.568	-183.113	-181.89

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household, Faridpur}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

ANNEX G: ANALYSIS BY DISTRICT

G.1. Faridpur District

G.1.1. Faridpur district: RQ I: Change over the year with COVID-19 in women's work outside the home and women's empowerment

Table S: Change over the year with COVID-19 in women's work outside the home and women's empowerment

	Δ Work outside the home		Δ Income use autonomy			Δ Food purchase decisions		
	(1) Ord Prob	(2) Ord Prob	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Constant (α_0)	1.822	1.294	0.019	0.036	-0.031	-0.064	-0.080	0.033
S.E.	0.119	0.278	0.019	0.030	0.096	0.023	0.033	0.142
t-statistic	15.357	4.650	0.981	1.175	-0.328	-2.754	-2.425	0.233
p-value	0.000	0.000	0.327	0.241	0.743	0.006	0.016	0.816
2nd cut point	1.308	1.863						
S.E.	0.086	0.296						
Prob pr($\Delta Y = -1$)	0.034	0.035						
S.E.	0.009	0.009						
p-value	0.000	0.000						
Prob pr($\Delta Y = 0$)	0.870	0.870						
S.E.	0.017	0.017						
p-value	0.000	0.000						
Prob pr($\Delta Y = 1$)	0.095	0.095						
S.E.	0.015	0.014						
p-value	0.000	0.000						
Control variables	No	C	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	409	409	410	375	375	374	343	343
R ²			0.000	0.004	0.009	0.000	0.007	0.015
Pseudo R ²	0.000	0.011						
Log pseudo lkh	-188.308	-186.262						

Note: Models (1-2) with dependent variable Δ Work outside the home estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; Models with dependent variables Δ Income use autonomy (3-5), resp. Δ Food purchase decisions (6-8), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Husband's income $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}\}$; Models (6-8) exclude women without children at baseline.

G.1.2. Faridpur district: RQ II: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

Table T: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

	Δ Income use autonomy			Δ Food purchase decisions		
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
$\beta_1 \Delta$ Work outside the home (-1)	0.002	-0.007	-0.005	-0.131	-0.110	-0.093
S.E.	0.101	0.103	0.105	0.117	0.118	0.119
t-statistic	0.019	-0.064	-0.049	-1.124	-0.932	-0.787
p-value	0.985	0.949	0.961	0.262	0.352	0.432
$\beta_1 \Delta$ Work outside the home (+1)	-0.022	-0.019	-0.027	-0.048	-0.026	-0.012
S.E.	0.065	0.067	0.070	0.069	0.069	0.068
t-statistic	-0.349	-0.281	-0.378	-0.692	-0.382	-0.171
p-value	0.727	0.779	0.706	0.489	0.703	0.864
Constant	0.021	0.038	-0.033	-0.055	-0.073	0.036
S.E.	0.021	0.032	0.096	0.026	0.035	0.142
t-statistic	1.009	1.181	-0.346	-2.137	-2.083	0.254
p-value	0.314	0.239	0.729	0.033	0.038	0.800
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	409	374	374	373	342	342
R ²	0.000	0.004	0.009	0.004	0.009	0.016

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{$ Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household $\}$; Models (4-6) exclude women without children at baseline.

G.1.3. Faridpur district: RQ III: Change over the year with COVID-19 in women's diet diversity

Table U: Change over the year with COVID-19 in women's diet diversity

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
Constant (α_0)	1.153	1.252	1.593	1.227	1.221	1.048
S.E.	0.098	0.277	0.524	0.084	0.184	0.303
t-statistic	11.801	4.513	3.039	14.557	6.647	3.456
p-value	0.000	0.000	0.003	0.000	0.000	0.001
2nd cut point				0.316	0.337	0.519
S.E.				0.065	0.174	0.302
Prob pr($\Delta Y=-1$)				0.110	0.106	0.107
S.E.				0.016	0.016	0.016
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=0$)				0.514	0.511	0.510
S.E.				0.025	0.026	0.026
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=1$)				0.376	0.383	0.383
S.E.				0.025	0.025	0.025
p-value				0.000	0.000	0.000
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	391	376	376	391	376	376
R ²	0.000	0.012	0.023			
Pseudo R ²				0.000	0.008	0.013
Log pseudo lkh				-372.475	-353.919	-352.157

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

G.1.4. Faridpur district: RQ IV Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment, respectively change in women's work outside the home

Table V: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment

	Δ Food groups			Δ Diet diversity			Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob	(7) OLS	(8) OLS	(9) OLS	(10) Ord Prob	(11) Ord Prob	(12) Ord Prob
β_1 Δ Income use												
autonomy	-0.349	-0.229	-0.227	0.028	0.110	0.096						
S.E.	0.249	0.260	0.259	0.138	0.143	0.144						
t-statistic	-1.401	-0.881	-0.876	0.200	0.770	0.670						
p-value	0.162	0.379	0.381	0.839	0.440	0.505						
β_1 Δ Food purchase decisions							0.331	0.284	0.246	0.202	0.208	0.214
S.E.							0.227	0.234	0.237	0.130	0.133	0.136
t-statistic							1.457	1.215	1.039	1.560	1.560	1.570
p-value							0.146	0.225	0.300	0.119	0.118	0.116
Constant	1.159	1.232	1.559	1.226	1.232	1.064	1.142	1.119	1.298	1.191	1.137	0.805
S.E.	0.098	0.278	0.527	0.084	0.184	0.305	0.107	0.302	0.588	0.087	0.195	0.335
t-statistic	11.849	4.436	2.959	14.549	6.679	3.489	10.709	3.706	2.206	13.724	5.819	2.403
p-value	0.000	0.000	0.003	0.000	0.000	0.001	0.000	0.000	0.028	0.000	0.000	0.016
2nd cut point				0.317	0.328	0.504				0.309	0.383	0.725
S.E.				0.065	0.174	0.303				0.068	0.186	0.335
AME pr($\Delta Y=-1$)				-0.005	-0.020	-0.017				-0.040	-0.040	-0.041
S.E.				0.026	0.026	0.026				0.026	0.026	0.027
p-value				0.839	0.443	0.507				0.124	0.123	0.122
AME pr($\Delta Y=0$)				-0.005	-0.022	-0.019				-0.036	-0.037	-0.038
S.E.				0.027	0.028	0.028				0.023	0.024	0.024
p-value				0.839	0.439	0.504				0.120	0.120	0.117
AME pr($\Delta Y=1$)				0.011	0.042	0.036				0.076	0.078	0.079
S.E.				0.053	0.054	0.054				0.049	0.049	0.050
p-value				0.839	0.439	0.504				0.116	0.115	0.113
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	391	376	376	391	376	376	356	342	342	356	342	342
R ²	0.005	0.014	0.025				0.006	0.018	0.029			
Pseudo R ²				0.000	0.009	0.014				0.003	0.014	0.020
Log pseudo lkh				-372.457	-353.656	-351.959				-343.445	-325.039	-323.171

Note: Models (1-3, resp. 7-9) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6, resp. 10-12) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}; Models (1-12) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up, models (7-12) additionally exclude women without children at baseline.

Table W: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's work outside the home

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
β_1 Δ Work outside the home (-1)	-0.896	-0.803	-0.738	-0.077	-0.060	-0.045
S.E.	0.455	0.478	0.484	0.211	0.221	0.232
t-statistic	-1.971	-1.680	-1.526	-0.370	-0.270	-0.190
p-value	0.049	0.094	0.128	0.714	0.786	0.845
β_1 Δ Work outside the home (+1)	-0.204	-0.306	-0.214	-0.062	-0.143	-0.165
S.E.	0.317	0.324	0.322	0.188	0.186	0.189
t-statistic	-0.642	-0.944	-0.664	-0.330	-0.770	-0.870
p-value	0.521	0.346	0.507	0.742	0.442	0.385
Constant	1.204	1.291	1.567	1.234	1.235	1.034
S.E.	0.106	0.278	0.524	0.089	0.186	0.303
t-statistic	11.338	4.648	2.990	13.869	6.632	3.419
p-value	0.000	0.000	0.003	0.000	0.000	0.001
2nd cut point				0.305	0.320	0.530
S.E.				0.069	0.176	0.301
Work outside the home (-1)						
AME pr($\Delta Y=-1$)				0.015	0.011	0.008
S.E.				0.040	0.040	0.042
p-value				0.712	0.785	0.845
AME pr($\Delta Y=0$)				0.015	0.012	0.009
S.E.				0.041	0.043	0.045
p-value				0.717	0.787	0.846
AME pr($\Delta Y=1$)				-0.029	-0.023	-0.017
S.E.				0.080	0.083	0.087
p-value				0.714	0.786	0.845
Work outside the home (+1)						
AME pr($\Delta Y=-1$)				0.012	0.026	0.030
S.E.				0.035	0.034	0.034
p-value				0.742	0.442	0.384
AME pr($\Delta Y=0$)				0.012	0.028	0.032
S.E.				0.036	0.037	0.037
p-value				0.743	0.445	0.390
AME pr($\Delta Y=1$)				-0.023	-0.054	-0.062
S.E.				0.071	0.070	0.071
p-value				0.742	0.442	0.385
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	390	375	375	390	375	375
R ²	0.008	0.020	0.028			
Pseudo R ²				0.000	0.009	0.014
Log pseudo lkh				-371.732	-352.962	-351.124

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

G.2. Patuakhali District

G.2.1. Patuakhali district: RQ I: Change over the year with COVID-19 in women's work outside the home and women's empowerment

Table X: Change over the year with COVID-19 in women's work outside the home and women's empowerment

	Δ Work outside the home		Δ Income use autonomy			Δ Food purchase decisions		
	(1) Ord Prob	(2) Ord Prob	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Constant (α_0)	1.803	1.461	-0.011	-0.025	-0.124	-0.034	-0.020	0.258
S.E.	0.115	0.284	0.017	0.022	0.101	0.025	0.032	0.157
t-statistic	15.622	5.151	-0.617	-1.111	-1.224	-1.342	-0.620	1.644
p-value	0.000	0.000	0.538	0.267	0.222	0.180	0.536	0.101
2nd cut point	1.047	1.413						
S.E.	0.075	0.278						
Prob pr($\Delta Y = -1$)	0.036	0.035						
S.E.	0.009	0.009						
p-value	0.000	0.000						
Prob pr($\Delta Y = 0$)	0.817	0.817						
S.E.	0.019	0.019						
p-value	0.000	0.000						
Prob pr($\Delta Y = 1$)	0.148	0.148						
S.E.	0.017	0.017						
p-value	0.000	0.000						
Control variables	No	C	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	420	420	422	381	381	385	346	346
R ²			0.000	0.008	0.018	0.000	0.010	0.025
Pseudo R ²	0.000	0.007						
Log pseudo lkh	-238.062	-236.369						

Note: Models (1-2) with dependent variable Δ Work outside the home estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; Models with dependent variables Δ Income use autonomy (3-5), resp. Δ Food purchase decisions (6-8), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Husband's income $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}\}$; Models (6-8) exclude women without children at baseline.

G.2.2. Patuakhali district: RQ II: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

Table Y: Relationship between change over the year with COVID-19 in women's empowerment and change in women's work outside the home

	<i>Δ Income use autonomy</i>			<i>Δ Food purchase decisions</i>		
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
<i>β₁ Δ Work outside the home (-1)</i>	-0.073	-0.107	-0.107	0.019	0.116	0.092
S.E.	0.087	0.091	0.092	0.156	0.165	0.166
t-statistic	-0.836	-1.176	-1.163	0.121	0.704	0.558
p-value	0.404	0.240	0.246	0.904	0.482	0.577
<i>β₁ Δ Work outside the home (+1)</i>	-0.109	-0.109	-0.113	-0.013	-0.009	0.001
S.E.	0.049	0.054	0.055	0.067	0.077	0.078
t-statistic	-2.220	-2.005	-2.070	-0.200	-0.120	0.008
p-value	0.027	0.046	0.039	0.842	0.905	0.993
Constant	0.006	-0.008	-0.108	-0.032	-0.022	0.250
S.E.	0.019	0.024	0.100	0.028	0.035	0.158
t-statistic	0.338	-0.318	-1.080	-1.142	-0.644	1.583
p-value	0.736	0.751	0.281	0.254	0.520	0.114
Control variables	No	ΔC	ΔC + Z	No	ΔC	ΔC + Z
N	420	379	379	383	344	344
R ²	0.013	0.021	0.032	0.000	0.012	0.026

Note: Models with dependent variable Δ Income use autonomy (1-3), resp. Δ Food purchase decisions (4-6), estimated using OLS; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{ \Delta$ No husband, Δ Husband's income $\}$, $Z = \{ \text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household} \}$; Models (4-6) exclude women without children at baseline.

G.2.3. Patuakhali district: RQ III: Change over the year with COVID-19 in women's diet diversity

Table Z: Change over the year with COVID-19 in women's diet diversity

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
Constant (α_0)	1.088	0.933	0.886	1.179	1.083	1.046
S.E.	0.099	0.227	0.551	0.080	0.145	0.323
t-statistic	11.008	4.114	1.607	14.668	7.482	3.242
p-value	0.000	0.000	0.109	0.000	0.000	0.001
2nd cut point				0.294	0.404	0.443
S.E.				0.063	0.138	0.317
Prob pr($\Delta Y=-1$)				0.119	0.119	0.119
S.E.				0.016	0.016	0.016
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=0$)				0.496	0.495	0.495
S.E.				0.025	0.025	0.025
p-value				0.000	0.000	0.000
Prob pr($\Delta Y=1$)				0.384	0.386	0.386
S.E.				0.024	0.024	0.024
p-value				0.000	0.000	0.000
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	411	404	404	411	404	404
R ²	0.000	0.033	0.037			
Pseudo R ²				0.000	0.009	0.010
Log pseudo lkh				-398.156	-387.954	-387.485

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with Prob predicted probability per category of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

G.2.4. Patuakhali district: RQ IV Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment, respectively change in women's work outside the home

Table AA: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's empowerment

	Δ Food groups			Δ Diet diversity			Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob	(7) OLS	(8) OLS	(9) OLS	(10) Ord Prob	(11) Ord Prob	(12) Ord Prob
β_1 Δ Income use												
autonomy	-0.507	-0.447	-0.466	-0.089	-0.081	-0.094						
S.E.	0.286	0.288	0.293	0.163	0.166	0.168						
t-statistic	-1.770	-1.550	-1.593	-0.550	-0.490	-0.560						
p-value	0.077	0.122	0.112	0.585	0.627	0.577						
β_1 Δ Food purchase decisions							0.427	0.477	0.475	0.264	0.284	0.291
S.E.							0.197	0.200	0.202	0.115	0.118	0.118
t-statistic							2.165	2.387	2.350	2.300	2.410	2.470
p-value							0.031	0.018	0.019	0.021	0.016	0.014
Constant	1.080	0.906	0.796	1.178	1.079	1.028	1.080	0.936	1.119	1.179	1.085	0.994
S.E.	0.099	0.227	0.556	0.080	0.145	0.327	0.103	0.236	0.583	0.083	0.152	0.356
t-statistic	10.924	3.990	1.432	14.655	7.448	3.146	10.516	3.960	1.918	14.182	7.148	2.788
p-value	0.000	0.000	0.153	0.000	0.000	0.002	0.000	0.000	0.056	0.000	0.000	0.005
2nd cut point				0.295	0.409	0.461				0.298	0.416	0.508
S.E.				0.063	0.138	0.322				0.066	0.144	0.351
AME pr($\Delta Y=-1$)				0.018	0.016	0.018				-0.053	-0.056	-0.057
S.E.				0.033	0.033	0.033				0.024	0.024	0.024
p-value				0.586	0.627	0.577				0.026	0.020	0.018
AME pr($\Delta Y=0$)				0.016	0.015	0.017				-0.047	-0.050	-0.051
S.E.				0.030	0.030	0.031				0.020	0.021	0.021
p-value				0.584	0.626	0.576				0.020	0.016	0.013
AME pr($\Delta Y=1$)				-0.034	-0.031	-0.036				0.100	0.106	0.109
S.E.				0.062	0.063	0.064				0.043	0.043	0.043
p-value				0.585	0.626	0.576				0.019	0.014	0.012
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	411	404	404	411	404	404	375	369	369	375	369	369
R ²	0.008	0.039	0.043				0.011	0.050	0.054			
Pseudo R ²				0.000	0.009	0.010				0.007	0.018	0.018
Log pseudo lkh				-397.999	-387.828	-387.316				-362.37	-352.382	-352.06

Note: Models (1-3, resp. 7-9) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6, resp. 10-12) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables ΔC ={ Δ No husband, Δ Household income, Market challenges}, Z ={Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}; Models (1-12) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up, models (7-12) additionally exclude women without children at baseline.

Table AB: Relationship between change over the year with COVID-19 in women's diet diversity and change in women's work outside the home

	Δ Food groups			Δ Diet diversity		
	(1) OLS	(2) OLS	(3) OLS	(4) Ord Prob	(5) Ord Prob	(6) Ord Prob
β_1 Δ Work outside the home (-1)	1.018	0.821	0.893	0.299	0.203	0.209
S.E.	0.416	0.444	0.451	0.297	0.309	0.311
t-statistic	2.446	1.848	1.981	1.010	0.660	0.670
p-value	0.015	0.065	0.048	0.315	0.512	0.501
β_1 Δ Work outside the home (+1)	0.468	0.427	0.427	0.359	0.357	0.355
S.E.	0.283	0.280	0.282	0.156	0.154	0.155
t-statistic	1.654	1.525	1.516	2.310	2.310	2.290
p-value	0.099	0.128	0.130	0.021	0.021	0.022
Constant	0.982	0.871	0.842	1.125	1.045	1.026
S.E.	0.110	0.226	0.548	0.084	0.145	0.323
t-statistic	8.948	3.852	1.538	13.335	7.194	3.178
p-value	0.000	0.000	0.125	0.000	0.000	0.002
2nd cut point				0.358	0.451	0.472
S.E.				0.069	0.139	0.319
Work outside the home (-1)						
AME pr($\Delta Y=-1$)				-0.059	-0.039	-0.041
S.E.				0.059	0.060	0.061
p-value				0.317	0.513	0.502
AME pr($\Delta Y=0$)				-0.054	-0.037	-0.038
S.E.				0.054	0.056	0.056
p-value				0.315	0.512	0.501
AME pr($\Delta Y=1$)				0.113	0.076	0.079
S.E.				0.112	0.116	0.117
p-value				0.313	0.511	0.501
Work outside the home (+1)						
AME pr($\Delta Y=-1$)				-0.071	-0.069	-0.069
S.E.				0.032	0.031	0.031
p-value				0.025	0.026	0.027
AME pr($\Delta Y=0$)				-0.065	-0.065	-0.064
S.E.				0.028	0.028	0.028
p-value				0.020	0.019	0.020
AME pr($\Delta Y=1$)				0.136	0.134	0.133
S.E.				0.058	0.057	0.057
p-value				0.019	0.019	0.020
Control variables	No	ΔC	$\Delta C + Z$	No	ΔC	$\Delta C + Z$
N	410	403	403	410	403	403
R ²	0.015	0.044	0.048			
Pseudo R ²				0.007	0.015	0.016
Log pseudo lkh				-394.654	-384.687	-384.232

Note: Models (1-3) with dependent variable Δ Food groups (3-5) estimated using OLS; Models (4-6) with dependent variable Δ Diet diversity estimated using ordered probit (Ord Prob), with AME average marginal effect of explanatory variable of interest ΔX on the probability of each of the categories of ΔY ; S.E. robust standard error; False Discovery Rate (FDR) q-value correcting for multiple hypotheses testing; Control variables $\Delta C = \{\Delta$ No husband, Δ Household income, Market challenges $\}$, $Z = \{\text{Age, Lowest wealth quintile, (Wife of) household head, Nbr of children in the household}\}$; Models (1-6) exclude women whose reported consumption concerned a fasting day at baseline and/or follow-up.

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