Food Insecurity is Associated with Poor Outcomes in Filipino Children

Longitudinal Cohort Study on the Filipino Child
UNFPA-OPS Policy Notes Series_No. 6

Largo FM[a], Alegado JLG[a], Herrin AN[b], Borja JB[b], Mayol NL[b], Bechayda SA[b] and Bautista CAP[c]

[a]Department of Economics, School of Business and Economics and Center for Social Research and Education, University of San Carlos.

[b]USC-Office of Population Studies Foundation, Inc., University of San Carlos

[c]United Nations Population Fund, Philippines

Suggested citation:
Largo, F.M., Alegado, J.L.G., Herrin, A.N., Borja, J.B., Mayol, N.L., Bechayda, S.A., Bautista, C.A.P. (2020). Food Insecurity is Associated with Poor Outcomes in Filipino Children. Longitudinal Cohort Study on the Filipino Child. UNFPA-OPS Policy Notes Series_No. 6. USC-Office of Population Studies Foundation, Inc. Retrieved from https://www.opsusc.org/paper_series.php.

1. Background

The current COVID-19 crisis is expected to worsen the circumstances of previously vulnerable households. Among these are households who were suffering from some level of food insecurity. We adopt the definition of food security from the World Food Summit (1996), as a state where "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." These multiple dimensions of food security can be unbundled as the physical availability of food within national borders, accessibility through household production or market purchases, utilization of available and purchased food in the process of an active, and healthy life, and stability in these aspects of access and utilization (Braintrust, 2017). The COVID-19 pandemic and the resulting policy response has negatively affected all of these aspects as health, food, and social service systems have been disrupted.

Ultimately, food security is experienced at the level of households. It is then important to obtain measures of household food insecurity and their determinants to get the extent and depth of the problem. Doing so would enable for more targeted approaches to complement those that affect national and international dimensions of the problem

Recent global and national trends using these measures indicate that more may be needed to be done to mitigate the problem of household food insecurity. The United Nations Sustainable Development Goal 2 aims to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture." Target 2.1 under this goal seeks to "end hunger and ensure access by all people, in particular the poor and people invulnerable situations, including infants, to safe, nutritious and sufficient food all year round" by 2030. A specific indicator for this target is Indicator 2.1.2, the prevalence of

moderate or severe food insecurity in the population (United Nations, 2017). The Food and Agriculture Organization (2019) reports that prevalence of moderate or severe food insecurity for the world has been increasing from 23.2 percent in 2014 to 26.4 percent in 2018. African and Latin American countries typically exceed world prevalence rates while Asian populations track world rates. This increasing trend severely challenges the global target of zero hunger. The Philippines offers a slightly different picture. The Department of Science and Technology Food and Nutrition Research Institute (Capanzana, 2019), using the Household Food Insecurity Access Scale (HFIAS), reports a decreasing prevalence of moderate or severe food insecurity from 53.8 percent in 2015 to 41.6 percent in 2018. However, prevalence rates are higher compared to world rates. Household food insecurity is among the key determinants of malnutrition (Garcia, 1994). Some countries like the Philippines are more focused on alleviating malnutrition, which remains a major concern particularly among children (FNRI, 2013) rather than explicitly targeting food insecurity (NEDA, 2017). The recognition of the crucial nature of food security is implied for targets particularly involving the nutrition statuses of children. This is seen of particular importance as children are especially vulnerable given their dependent status and the fact they are acquiring human capital that will determine life trajectories.

Studies have linked household food insecurity with adverse health and education outcomes for children. In the United States and Canada, studies have linked household food insecurity with greater incidence of iron deficiency anemia and poor health in children, possibly linking the resulting nutritional deprivation to mental health problems and associated risk taking behaviors later in life (Gundersen and Ziliak, 2015; Metallinos-Katsaras et.al, 2016) Ke and Ford-Jones (2015). In developing countries, studies also point to an association between household food insecurity and health outcomes typically in young children. Higher incidences of undernutrition, indicated by child underweight or stunting or both, among food insecure households were reported by Abdurahman et.al (2016) in Ethiopia, Sreeramareddy et.al (2014) in Nepal, Ali et.al (2013) in Ethiopia, Bangladesh and Vietnam, and Chakona and Shackleton's (2018) in South Africa. The links to education outcomes in children have also been found in the United States and Canada in the form of lower subject scores (Jyoti et.al,2005; Anisef et.al, 2017) and University admissions (Anisef et.al, 2017). Studies linking food insecurity with poor school outcomes in developing countries are rare. Among the few studies, Hannum et.al (2012) find lower literacy scores for children from food insecure households in China. Belachew et.al (2011) found that household food insecurity predicted school absenteeism and grade achievement in Ethiopia.

The Longitudinal Cohort Study on the Filipino Child (Cohort Study; OPS, 2018)[1] presents an opportunity to contribute to this literature relating household food insecurity and child human capital outcomes in unique ways. It is one of the few surveys conducted in developing countries that is nationally representative of households with children. The comprehensive Cohort Study dataset allows the examination of determinants of household food security in terms of physical and economic access at the

[1] The Longitudinal Cohort Study on the Filipino Child is a collaborative undertaking of government agencies, development partners and demographic researchers aimed to examine how the lives of Filipinos are changed in the course of the implementation of the Sustainable Development Goals (SDG) agenda (OPS,2018). The research strategy is to prospectively observe a nationally representative sample of 4,952 Filipinos from age 10 through 24 (2016-2030) and collect data on significant life course milestones such as puberty, school completion, labor force entry/exit, sexual activity initiation and other reproductive health events, and marriage. Data collected at each survey round are analyzed to determine the interplay of child, household and community attributes that explain various health and socio-demographic outcomes among the cohort. Study findings will inform policy decisions, program design and service delivery efforts.

household level, household utilization processes, and the variability that is introduced to these by the occurrence of negative events such as natural disasters and man made disturbances. The data also support analysis of how household food insecurity influences child schooling and health outcomes among others.. The current COVID 19 pandemic has also reintroduced the consideration of widespread health related disturbances whose policy and personal consequences are likely to lead to deep disruptions and lead to greater household food insecurity. Given that previous studies show this will put children at a disadvantage in terms of health and education outcomes, the results of this study may give greater weight to policy action in the concerned areas. The subsequent sections discuss the Cohort Study Findings in this area and the resulting policy implications.

2. Cohort Study Findings

A. Determinants of Household Food Insecurity

The Cohort Study implemented the Food Insecurity Experience Scale(FIES) developed by the FAO., Cafiero et.al (2018) and Ballard et.al (2013) describe the development of the FIES and its properties. The FIES module is administered at each annual wave of the study. In this analysis we examine FIES data in two consecutive survey waves: at Wave 1 (2016) and Wave 2 (2018). The scale is based on a block of 8 questions shown in Table 1. Table 1 also shows the conceptual progression of the household experience in terms of severity.

Table 1. Food Insecurity Experience Scale Survey Module Questions

Questions on Household Experience for the Past 12 Months	Severity Progression
Mild Food Insecurity (FI) items: 1. You were worried you would not have enough food to eat? 2. You were unable to eat healthy and nutritious food? 3. You ate only a few kinds of foods?	Adequate access but worry about future access Compromising on quality and variety of food
Moderate FI: 4. You had to skip a meal? 5. You ate less than you thought you should? 6. Your household ran out of food?	Reducing quantity of food, skipping meals
Severe FI: 7. You were hungry but did not eat? 8. You went without eating for a whole day?	Experiencing hunger

The module tracks the household process along the severity of food insecurity as a managed sequential process. The scale score assigned to the household is computed as follows:

1. Not food insecure- (answered no to all 8 questions)
2. Mildy Food Insecure- (answered yes to any MILD item; but no to all the rest)
3. Moderately Food Insecure- (answered yes to any MODERATE item; any answer in MILD but all no on SEVERE)
4. Severely Food Insecure- (answered yes to any SEVERE item; any answer in MILD and MODERATE)

Table 2 shows the distribution of households by category for each wave. Households improved as whole across all levels of food insecurity in Wave 2 except for those that experienced mild food insecurity that increased in proportion. Indicative of the progressive process of household food insecurity, mean scores per category increase with severity.

Table 2 Proportions of Wave 2 Enumerated Households by Levels of Food Insecurity per Wave

	Wave 1 N-4,950		Wave 2 N-4,7340	
Levels of Food Insecurity	Proportion*	Mean Household Scale Score**	Proportion*	Mean Household Scale Score**
No Food Insecurity	15.03	0	22.71	0
Mild Food Insecurity	18.16	1.79	22.31	1.71
Moderate Food Insecurity	32.63	3.76	28.69	3.51
Severe Food Insecurity	34.18	6.02	26.30	5.77
Total	100.00		100.00	

*Proportions within waves are significantly different between categories, p<0.01
**Mean scores within waves are significantly different between categories, p<0.01

Using repeat measures of FIES allows for characterizing households in terms of episodic or persistent exposure to food insecurity/security. We find that household food insecurity may change across waves indicating a heterogeneity of households that would need to be accounted for in terms of a policy response.

Table 3 presents data on these change categories stratified by Luzon, Visayas and Mindanao, the country's three major island groups and the study's sampling domains. We note that, compared to Luzon, the Visayas and Mindanao have higher incidences of persistent or worsening household food insecurity over time. As these two island groups do not lack for physical access to food resources (PSA, 2019a), vulnerability to food insecurity may be attributed to insufficient economic access. The Philippine Statistics Authority (PSA) reports that the poorest provinces and local government units are located in these two domains (PSA, 2019).

Table 3. Households by Categories in Food Security Status by Domain (n=4,731)

Food Security Status	Domain			
	Luzon	Visayas	Mindanao	Over-all
Persistently Food Secure	15.02	2.54	8.22	10.60
Improved in Wave 2	40.62	36.55	36.16	38.56
Same Condition in Wave 1 and 2	18.72	19.19	16.29	18.15
Worsened in Wave 2	17.37	20.82	22.04	19.36
Persistently Severely Food Insecure	8.28	20.91	17.29	13.33

Significantly different proportions tested using Pearson Chi-Squared Statistic p<0.01

We see in Table 4 community characteristics significantly associated with food insecurity status that weave in to the economic access storyline. We see that food secure households account for a significantly larger proportion of urban compared to rural households, patterns for food insecure households are not as clear. While Geographically Isolated and Disadvantaged Areas (GIDA) communities have a much lower proportion of food secure households, this result is not so distinct for food insecure households in terms of persistent severity. This is also the case in distinguishing food insecurity persistence between households in agricultural and non-agricultural communities. It is worth noting that among the 3 domains, Mindanao has the highest proportion of sample households in agricultural communities (70.76 percent) in comparison to the Visayas (61.58 percent) and Luzon (53.71 percent) (OPS, 2019).

Table 4. Selected Community Characteristics of Cohort Study Households as of Wave 2

Food Security Status	Rural	Urban[a]	Non-GIDA	GIDA[b]	Non-Agricultural	Agricultural[c]
Persistently Food Secure	7.91	13.59	10.97	3.14	11.04	10.30
Improved in Wave 2	36.67	40.67	38.68	36.27	41.23	36.78
Same Condition in Wave 1 and 2	20.41	15.63	17.63	28.64	16.57	19.21
Worsened in Wave 2	22.01	16.4	19.41	18.23	17.19	20.81
Persistently Severely Food Insecure	12.99	13.70	13.31	13.72	13.97	12.9
Total	100.00	100.00	100.00	100.00	100.00	100.00

[a]Significantly different proportions between Urban and Rural households tested $p<0.01$

[b] Borderline significant different proportions between GIDA and Non-GIDA households $p<0.10$

[c]Significantly different proportions between Non-Agricultural and Agricultural Community Residence $p<0.1$

Two household level characteristics are explored that indicate a household's vulnerability: poverty and exposure to negative events that result in damage to property and life. Table 5 shows the proportion of households according to persistence and severity of food insecurity by membership in the Pantawid Pamilyang Pilipino Program (4Ps), the country's flagship conditional cash transfer program for the poorest households.

Table 5. Household Membership in the 4Ps Program as of Wave 2

Food Security Status	Non-member	Member
Persistently Food Secure	16.61	4.23
Improved in Wave 2	37.00	40.22
Same Condition in Wave 1 and 2	16.67	19.72
Worsened in Wave 2	17.97	20.82
Persistently Severely Food Insecure	11.75	15.01
Total	100.00	100.00

Significantly different proportions $p<0.01$

We see that the proportion of non-4Ps members that are persistently food secure is 4 times that of 4Ps members. The proportion of 4Ps members are higher for every food insecurity persistence category including those that are persistently severely food insecure. However, it is worth noting that the percentage of 4Ps beneficiaries that were food secure increased from 4% in Wave 1 to 8% in Wave 2.

Table 6 shows the mean number of occurrences of negative events leading to damages to property and life and natural disasters experienced since 2013. We find that households which are persistently food secure suffer less than one event resulting to damage to life or property with mean occurrences increasing with persistence of food insecurity status. The same is true for natural disasters experienced by food secure versus food insecure households. These indicate that food insecure households tend to be those that are vulnerable to these negative events.

Table 6. Mean Number of Occurrences of Events with Damages to Life or Property and Natural Disasters as of Wave 2

Food Security Status	Events with Damages	Natural Disasters
Persistently Food Secure	0.62	2.12
Improved in Wave 2	1.35	2.44
Same Condition in Wave 1 and 2	1.52	2.37
Worsened in Wave 2	1.24	2.37
Persistently Severely Food Insecure	1.80	2.71

Significantly different means across food security categories $p<0.01$

Beyond the above variables, we look at a broader set of variables that indicate various aspects of household access to food, its utilization, and variability of this access. Table 7 shows the results of a multinomial logit regression relating the probability of being a food insecure household of a particular persistence and severity with these variables.

We start with household variables which indicate economic access. We use measures of household's purchasing power. One is a household's monthly income. The Cohort Study records monthly household income for what households consider good months and poor months. For this analysis, we use the latter measure as it presents a lower bound where a household will likely devote a larger proportion of its budget to food. If food as a whole is a normal good and necessary, we would expect access to increase with an increase more significantly with this lower limit rather than the upper limit. Membership in the 4Ps program of the government is designed for the poorest households and would be another indicator of economic access with membership likely to result in greater household food insecurity. The household crowding index (HCI)computes the number of people per number of rooms in the household. This is used an indicator of economic access as well with the expectation that a higher index score would lead to greater household food insecurity not only due to the larger number of persons to feed but also due to a lower wealth base indicated by the number of rooms in the house. We find that as expected, a higher household income in poor months lowers the likelihood of food insecurity across all categories. Membership in the 4Ps and a higher HCI increases the likelihood of households being food insecure across all categories.

Parents are postulated to play an important role in the acquisition of food inputs and the transformation of these inputs into enough nutritionally adequate meals. The number of parents present is expected to positively affect this process as well as the aptitude of the parent that will be most prominent in household production, the mother. The latter's education level is an important determinant of her productivity in this process. For this analysis, this is represented by the mother's achievement of at least a high school level education. Whether or not the mother's being employed positively affects food insecurity remains to be seen as wage work is likely to compete with house work with its trade-off from the greater market goods bought by higher income versus the mother's time productivity in house work. The mother's achievement of at least a high school level education reduces the likelihood of all categories of household food insecurity. The number of parents is only significantly protective for the most severe and persistent type of food insecurity category.

Table 7. Estimated Results of Multinomial Logistic Regression for Patterns of Food Insecurity among the Cohort Study in Waves 1 and 2 (n=4,734)

Variable	Coefficients			
	Improved in Wave 2	Same Condition	Worsened in Wave 2	Persistent Food Insecure
Household Income in Poor Months	-0.0000***	-0.0000***	-0.0000***	-0.0001***
Household is Recipient of 4Ps (1 = Yes)	0.7745***	0.6363***	0.7210***	0.5932***
Household Crowding Index	0.1928***	0.2040***	0.2086***	0.2860***
Mother has more than Elementary Education (1 = Yes)	-0.9180***	-0.8529***	-0.6586**	-1.4733***
Mother is Currently Working (1 = Yes)	-0.0719	-0.2797*	-0.1457	-0.2255
No. of Parents around the House	-0.2483	-0.1169	-0.1428	-0.6159***
IC is Beneficiary of School-Based Feeding Program (1 = Yes)	0.5758***	0.5541***	0.7815***	0.9135***
Household Consumes from Backyard Garden (1 = Yes)	-0.4229***	-0.1284	-0.2718	-0.3508*
Distance to Nearest Market (1 = Requires a Ride)	0.2447	0.3464*	0.5619***	0.2226
Type of Cooking Fuel Used by Household (1 = LPG)				
Charcoal	0.7063***	0.8492***	0.6209**	0.9480***
Wood	0.8508***	0.9606***	0.8245***	1.0709***
Others	0.4191	0.7310	0.8208*	1.1846**
Access to Improved Water Service (1 = Yes)	-0.7185	-0.5683	-0.8952	-0.7234
Access to Improved Toilet Facility (1 = Yes)	-0.5245	-0.6089	-0.5821	-0.8667
Household's Garbage is Collected or Composted (1 = Yes)	0.0427	0.0767	-0.1148	0.0916
Household Resides in Geographically Isolated and Disadvantaged Area (1 = Yes)	-0.3139	-0.1577	-0.0784	-0.3601
Community's Main Livelihood is Agriculture (1 = Yes)	-0.3320*	-0.2700	-0.3736*	-0.4545**
Domain (1 = Luzon)				
Visayas	1.1397***	1.0968***	1.5378***	1.8498***
Mindanao	0.2977	0.2097	0.4058**	0.9883***
Population Density of Household's Barangay	0.0000	0.0000**	0.0000**	0.0000*
Ave. Price of Rice in the Household's Barangay	-0.0239*	-0.0369***	-0.0167	0.0004
Presence of Coop, Bank, or Remittance Center (1 = Yes)	0.0296	-0.0256	-0.1396	0.2320
No. of Natural Disasters Experienced by Household	0.0789	0.0152	0.0122	0.2194**
No. of Events Experienced by Household Resulting in Damage to Crops, Property, & Loss of Lives	0.1401**	0.1580***	0.0895	0.1699***

***Significant P<0.01, **Significant p<0.05,* Significant p<0.1

A household's ability to access supplementary food resources is expected to improve household food security. For this, we look at whether the index child is a beneficiary of school based feeding program (SBFP) of the Department of Education and whether the household is able to access food from a backyard garden. An index child being a beneficiary in positively associated with a household being food insecure across categories of severity and persistence. This may be seen positively in that this indicates the SBFP is able to reach vulnerable index children. However, it also indicates that the latter is not enough to reverse food insecurity statuses for the entire household. Teasing out how and why this is so may be pursued further in another setting. Backyard gardens increase the likelihood that food security

improves across waves for food insecure households relative to persistently food secure households but not for the most severe and persistent categories of household food insecurity.

We indicate physical access to food by whether or not a household is near to a market where it may purchase food items. We find that distance to a market is positively associated with household food insecurity only for those whose food insecurity status has worsened across waves.

The transformation of food into enough nutritionally adequate meals and further transformation into health outcomes is also contingent on complementary inputs in both processes. We look specifically at the level of cooking technology as indicated by the cooking fuel used and the state of water and sanitation in the household. The expectation is the more facilitative the cooking technology and the better the availability of water and sanitation inputs, the more productive these transformation processes are. We find that relative to the use of liquefied petroleum gas, the use of more involved cooking technologies in terms of time and effort, based on the use of wood and charcoal, increases the likelihood of household food insecurity relative to those that use LPG. The water and sanitation variables (access to improved water service, improved toilets, and garbage disposal) did not appear to significantly affect the likelihood of household food insecurity.

Controlling for other variables, residence in the Visayas increases the likelihood of every category of household food insecurity relative to residence in Luzon, while this is only true for residence in Mindanao for persistently severe food insecurity. The risk of being persistently severely food insecure is reduced by residence in a predominantly agricultural community. If we do not control for domain, this protective effect is found for all patterns of household food insecurity. We were constrained to not use a variable to indicate residence in an urban community due to association with other explanatory variables. The indicator used instead is population density of the barangay of residence. We see that that this variable indicates that the likelihood of household food insecurity increases with more dense barangays for some categories of household food insecurity. The price of rice in the community was also expected to indicate physical access with lower rice prices indicating greater access and hence higher household food security. The findings, however, indicate otherwise for the less serious categories of persistence and severity, a counter intuitive result that merits further investigation. The presence of cooperatives and banks is used to indicate the level of financial inclusion of the community on the average. The availability of financial services not only enables households to obtain credit to smooth consumption across good and bad earnings periods but also to elevate earning power through entrepreneurial activity. This does not appear to be significantly affecting household food insecurity, however.

Finally we looked at the effects of measures of exposure of households to negative events. Exposure to events that cause damage to lives and property is positively associated with household food insecurity while exposure to natural disasters is significantly associated with higher risk of being persistently severely food insecure.

B. Food Insecurity and Child Health and Education Outcomes

We then look at the links between household food insecurity and select education and health outcomes. We run regressions with these outcomes and household food insecurity as covariates controlling for the

variables used in the multinomial logit regression above. The household food insecurity variable used for this purpose is one that indicates whether the household had ever experienced any form of food insecurity as of Wave 2. Table 8 provides a summary of the mean values of these indicators and results of these regressions showing the relevant coefficients for the household food insecurity variable.

Table 8. Summary of Prevalence and Results for Logistic and Ordinary Least Squares Estimations for Child Outcomes and Household Food Insecurity as of Wave 2 (n=4,734)

Outcome Variable	Mean Values	Coefficient
Being Hungry but did not Eat (1 = Yes)	0.37	0.9328***
Being Stunted (1 = Stunted)	0.30	0.6822***
Low Diet Diversity (1 = Consumed < 4 of 9 Food Groups)	0.55	-0.2135
Missed School in the Past 30 Days (1 = Yes)	0.54	0.4273***
Repeated a Grade in Current School Year (1 = Yes)	0.03	0.6706
Received a Grade of Below 81 (1 = Yes)	0.28	0.5624***
Not Aspiring for College Education (1 = Yes)	0.17	0.5694**
IC Mom Not Aspiring Child's College Education (1 = Yes)	0.17	0.9958***
CBCL School Scale (z-score)	0.00	-0.1626**

***Significant P<0.01, **Significant p<0.05,* Significant p<0.1

The index child was asked separately if he or she had ever experienced hunger and not eating in the 6 months previous to the interview. Thirty seven percent of index children answered in the affirmative in wave 2. Being in a household that ever experienced food insecurity increased the likelihood of the child answering in the affirmative. As a child may be shielded from household food insecurity by parents bearing the brunt of such insecurity, household food insecurity in the sample is such that this is not always possible. Index child low diet diversity was not significantly associated with household food insecurity. As the trade-off for quantity over quality is part of the management process of household food insecurity, this result suggests that low diet diversity is also present in food secure households but its exact nature and underlying determinants may be different.

Being stunted at age 11 was significantly associated with household food insecurity. This is indicative of chronic food insecurity that may have extended well into the child's early childhood years. As the adolescent period is perceived as another window for catch up growth, continuing household food insecurity at this stage endangers this second opportunity.

Among education outcomes, household food insecurity is also positively associated with children missing classes, receiving low grades, and not aspiring for college. What is more, household food insecurity is also positively associated with having the index child's mother not aspiring for college. Finally, household food insecurity is negatively associated with school competency as measured by the Child Behavior Checklist (CBCL) normalized score.

3. Policy Implications

Braintrust (2017) provides a comprehensive review of Philippine public policy in the area of food security and nutrition. Food security and consequently nutrition is hampered by widespread poverty and high food prices. High food prices, especially of the basic staple rice, lead households to reduce both the quantity and quality of food consumed. High prices are a result of restrictive trade policies that limit imports of key commodities such as rice, and structural inefficiencies in the food production system that limits local food production and depresses income for agricultural sector participants. The country is also susceptible to climate and other natural disasters given its geographic location and man made disasters such as fire and armed conflict from various insurgencies. The policy response suffers from several deficiencies in planning, implementation and coordination. The perennial lack of resources for resource constrained government is ever present and is compounded by these deficiencies. It would be reasonable to assume that such a system would be particularly vulnerable in the face of the massive negative shock such as a pandemic that disrupts numerous parts of the food system and where a concerted efficient policy response is imperative.

Findings from the Cohort Study help in distilling the household experience within this system and policy environment to the level of household experiences with food security. Its use of the Food Insecurity Experience Scale ensures comparability with studies that aim to track the worldwide effort to achieve the Sustainable Development Goal to end hunger by 2020. Its comprehensive database enables correlation among determinants of household food insecurity, levels of food insecurity, and child outcomes.

The Cohort Study bears out some of the assertions of the Braintrust (2017) policy review. It affirms the important role given to household incomes and poverty in determining household food insecurity. Income poverty is being addressed by the government through a sustained development effort and sectoral level initiatives aimed at reducing household poverty rates from 30 percent in 2015 to 20 percent in 2022. This is on top of existing safety net initiatives such as the 4Ps and School Based Feeding Program (SBFP) that are found to have reached their targeted households as food insecure households were found to be likely beneficiaries of these programs. However, these programs are shown to supplement household efforts and may not be enough to fully reverse household food insecurity, hence the need for a multifaceted approach that includes but is not limited to these safety nets. In the context of the current pandemic, the existence of an existing safety net like the 4Ps may help channel emergency aid to affected households as the infrastructure for identifying and reaching target households are in place. This is also the case for the SBFP as school participation is quite high at the ages for intended SBFP beneficiaries. The continued benefit from the School Based Feeding Program, however, may be endangered as it is not clear if the program will be sustained in a blended learning environment or from deep budget re-alignments from the pandemic policy response.

Policy success also appears to be the case for another protective household characteristic, the mother's education. A previous policy note in this series combs through the gender disparity literature that shows the success of female students in completing various stages of education in the Philippines [Citation for Gender Disparity Note]. The presence of more parents in the household is found to be protective for the most affected households, those that had severe food insecurity that persisted across waves. This would suggest that policy that supports households on the basis of parental absence such

as the Solo Parent's Welfare Act of 2000 (Republic Act 8972) would be policy that would be helpful in this regard and would be recommended for ensuring implementation and monitoring of its provisions effectiveness. Households with single parents would also be especially susceptible in environments like the current pandemic as single parent income streams are hampered and labor commitments within and outside the household are complicated by regulations restricting mobility.

There are indications that gardening for supplemental food sources is protective of households from being food insecure. The most visible community gardening program is the Gulayan sa Paaralan Program implemented by the Department of Education together with the Department of Agriculture. The Gulayan sa Paaralan program is an extension of the Gulayan Para sa Masa program which intended to aid identified rural households considered to be especially vulnerable establish backyard gardens. This was extended into the Gulayan sa Barangay program for 4Ps beneficiaries.The disruptions in mobility of both people and goods during the pandemic has led to a resurgence of urban gardening and the policy support for it. The Department of Agriculture has instituted the Revitalized Urban Agriculture and Gardening Project as part of its Plant, Plant, Plant program response to the COVID 19 Pandemic (Department of Agriculture, 2020). Given the uncertainty regarding the period of disruptions and the occurrence of future disruptions like COVID 19, serious consideration must be given to broad policy and resource support for urban gardening efforts including policy evaluation to determine extent and intensity of program implementation. The same can be said for the Gulayan sa Paaralan and Barangay programs.

Access to markets is also expected to be reduced with physical distance to these markets. As proximity has been shown to be protective and reduce the likelihood of food insecurity it would be advisable to implement temporary market locations such as mobile markets implemented by some local government units in recent months. It would be worthwhile to build in this capability in any disaster response program to cover both humanitarian response and market access restoration. This is on top of programmatic location zoning for regular markets. These are local government initiatives and it would be interesting to find out the motivations for market placement in regular times and disaster episodes.

As the use of charcoal and wood are particularly indicative of an increased likelihood of food insecurity, it would be important to determine the channels through which this association occurs. One could be that time intensive fuels present an important resource cost on households that diminishes the ability to prepare a number of nutritionally beneficial meals. Another could be that this reflects community characteristics such as the lack of physical access to more convenient cooking fuels such as LPG or electricity or its relative prohibitive cost that also limit access to food supplies. Determining the appropriate channel would inform a policy response. What is more the choice of cooking fuel also has implications on household health as indoor pollution is a concern for fuels like wood.

If geographical targeting is be implemented, households in the Visayas domain would appear to be especially vulnerable and deserving of special attention. As earlier pointed out, the Visayas domain is home to some of the poorest provinces and localities in the country that may not have the protective factors of relative affluence as found in Luzon or the agricultural community characteristic in Mindanao. Households in this domain would then suffer from high food prices and relatively low incomes as a result. The households in this domain would be more vulnerable to any shocks that affect both physical access and economic access. This is related to the result that population density is positively correlated with household food insecurity. The recent pandemic highlighted a group where the intersection of

these factors is particularly deleterious, the urban poor. The urban poor do not enjoy the high incomes of households who are able to capitalize on the affluence of urban centers nor do they have the ability to access supplementary food resources like those in the rural areas. The urban area lockdowns recently experienced would have been particularly hard on these households. Understandably the policy response prioritized the poor throughout the country. However, where this aid was especially urgent, it would appear that problems of identification and distribution were acute. This is especially true for those who do not qualify for the safety nets reserved for the lowest income tiers but are also substantially affected by the urban lockdowns. Implementing such identification systems would be a priority policy and urban areas would be priority implementation areas.

Variability is seen in the household food security status itself as seen by the movements of households across categories across the two waves. This heterogeneity would require a nuanced approach. Priority interventions would be warranted for those that are chronically severely food insecure while some less drastic measure involving various insurance mechanisms may be called for households who move from one category to another due to unforeseen events. This is important as vulnerability to negative events is also borne out by the Cohort Study results. The crafting and implementation of disaster mitigation, response, and resilience plans at various levels of government is required for a proper response. The Philippine experience with policy response to natural disasters and armed conflict has left much to be desired although there are success stories. Given the unusual nature of success stories, it would be instructive to examine them closely and how they transcended the usual insurmountable complications of the usual ineffective policy response.

The current pandemic has demonstrated the susceptibility of Philippine households to disruptions in the food and related systems. Given that household food insecurity has been also demonstrated to be positively associated with child outcomes in health and education, these disruptions may have effects that last well beyond the current period as children at the ages of 10 and 11 are on the cusp of major changes in health and educations acquisition with the onset of adolescence. This note, hopefully, gives more weight to directed policy interventions in this light.

4. References

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