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IMPACT EVALUATION

The Impact of Humanitarian Aid on Food Insecure Populations During Conflict in Mali

Summary Evaluation Report

February 2018

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Commissioned by the

WFP Office of Evaluation

Report number: OEV/ 2018/003

WFP World Food Programme wfp.org

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Executive Summary

1. Four of the evaluations look at the impact of WFP programmes on nutrition and food security in the Sahel. This evaluation looks at the impact of conflict on access to aid and food assistance in humanitarian crises for vulnerable households in Mali.

2. Mali, a vast landlocked country at the heart of West Africa in the Sahel region, is one of the least developed and most food insecure countries in the world. Mali has suffered from a series of political, constitutional and military crises since January 2012, including the loss of government control of northern territories from April 2012 until January 2013. A range of humanitarian aid interventions was scaled up in response to these complex crises. This evaluation uses data from a unique pre-crisis baseline to evaluate the impact of WFP nutrition-related humanitarian aid interventions: blanket supplementary feeding (BSF), targeted supplementary feeding (TSF), targeted food assistance (GFD), and school feeding (SF) on the food security and nutrition of rural populations in the Mopti and Bamako regions in Mali.

3. The report answers the following evaluation question:

- What is the impact of conflict on child malnutrition, household food security, and other developmental outcomes?

In addition, the impact evaluation report includes a qualitative analysis of conflict-afflicted populations to identify patterns of conflict exposure.

4. The impact evaluation includes a longitudinal, quasi-experimental evaluation based on two survey rounds, five years apart. Baseline data allow for the matching of households who received the interventions (treatment) with comparable households that did not receive them (controls), which strengthens the internal validity of the evaluation. The evaluation uses matched difference-in-difference propensity score matching estimators to determine whether access to different forms of food assistance improves household (food) expenditures, food and nutrient consumption, and nutrition status of children (as captured by anthropometry indices). Data were collected from 66 communities randomly selected from within food-insecure districts.

5. Households that received food assistance were found to have higher total expenditures and food expenditures (measured through the estimated value of total food consumed, including food assistance) and higher micronutrient availability. Disaggregating by degree of conflict exposure suggested that the positive effects on children's height, caloric consumption, and micronutrient consumption were mostly concentrated in areas not in the immediate vicinity of the conflict, unlike the increase in food expenditures, which were driven by households located in close proximity to armed groups. The effects were also concentrated on households receiving at least two forms of food assistance, such as general food distribution and school feeding, as compared to those receiving only one form of assistance or no assistance.

6. Evidence from this evaluation suggests that there is scope to improve the design and scale up of humanitarian aid interventions during conflict. In terms of intervention design, systematically bundling different forms of food assistance alongside general food distribution may be an effective strategy to support vulnerable populations during conflict. In terms of implementation, increasing coverage and scale of nutrition-specific interventions (for example, specialised complementary foods alongside those provided to households as part of general food distribution) is critical to support nutrition outcomes. However, humanitarian operations during conflict face important trade-offs between, on the one hand, programme scale and effectiveness

and, on the other hand, the practicalities of operating in areas under the control of armed groups, and dealing with issues such as security, governance and transparency.

7. The following points for consideration have been posited in light of the evaluation's nutrition-related outcomes:

8. Point 1: WFP and cooperating partners should improve the design and increase the coverage of humanitarian aid interventions in order to provide continued support and positive impacts on the food security of conflict-affected populations.

This point is addressed to the WFP country office and other international organizational partners including the United Nations and national governments, who should consider strengthening their food-assistance programmes in Mali to facilitate scalable long-term relief from food insecurity in acute conflict situations.

9. Point 2: WFP and other humanitarian aid actors should consistently provide a combination of complementary forms of assistance to food insecure populations in conflict environments.

In conflict contexts, food assistance can provide a platform to improve children's growth outside the priority age group for nutrition interventions (during the first 1000 days). This highlights the need to complement nutrition interventions with other forms of food assistance. This point is aimed at the WFP country office in Mali and the regional bureau in order to encourage them to adapt their programme designs to increase their capacity to promote holistic interventions addressing food insecurity, malnutrition and consumption in conflict-affected areas.

Introduction

Background

10. Undernutrition affects 800 million people globally, with most undernourished people living in low- and middle-income countries[1]. Conflict and political instability are acknowledged as important drivers of undernutrition for unstable populations. Depriving populations of access to food is often an explicit war tactic, with armed conflicts often responsible for weakening food production and health systems, and undermining the functioning of markets and institutions[2]. Food deprivation and insecurity have been found to profoundly impact mortality, morbidity, and malnutrition, among other health issues[3]. Children exposed to violent conflict at an early age or in utero are found to be more likely to suffer from moderate or severe acute malnutrition (MAM/SAM)[4]. The identification of the mechanisms linking conflict exposure to mortality, morbidity and malnutrition, however, remains elusive. Only an estimated 20 percent of excess mortality stems from direct deaths due to warfare violence[5], and while the literature has identified several potential mechanisms underlying the impact of conflict, more systematic evidence is needed, especially in contexts of low to moderate violent conflicts. Delivering timely and adequate food assistance to conflict-affected populations is therefore critical to avoid an increase in

[1] FAO, IFAD and WFP. 2015. "The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress." Rome, FAO.
[2] Justino, Patricia. 2012. "War and Poverty" in The Oxford Handbook of the Economics of Peace and Conflict, ed. Michelle Garfinkel and Stergios Skaperdas. Oxford University Press.
[3] Altare, Chiara and Debarati Guha Sapir. 2013. The Burden of Armed Conflict: A Public Health Approach.
[4] Alderman, Hoddinot and Kinsey 2006; Camacho 2008; Akresh et al. 2012; Domingues and Barre 2013; Minoiu and Shemyakina 2014.
[5] Same as footnote 4

acute malnutrition, but often challenging logistically for aid actors, as it often means siding with one party in the conflict.

Context

11. Mali, a vast landlocked country at the heart of West Africa in the Sahel region, is one of the most food insecure countries in the world, ranked 179 out of 188 on the United Nations Development Programme's 2015 human development index. Life expectancy is 58 years and the infant mortality rate is 78 per 1,000 live births. Mali has suffered from a series of political, constitutional and military crises since January 2012. In particular, the situation was aggravated by the loss of government control of northern territories from April 2012 until January 2013. As of November 2016, the number of Malian refugees exceeded 135,000, internally displaced people numbered more than 36,000 and approximately 25,000 people were counted as returnees (UNHCR, 2016). Amidst these crises, the complex emergency situation, combining country wide drought and the conflict in the north, was the focus of two projects by the United Nations World Food Programme in Mali.

Timeline

12. This impact evaluation took place between 2012 and 2016. Baseline data were collected in 2012 as part of a cluster randomised controlled trial that had to be stopped due to the onset of conflict, and were complimented by a longitudinal panel dataset from the Armed Conflict Location and Event Data (ACLED) project spanning a 20-year period, with a focus on the years overlapping WFP programme timelines. Data was aggregated by the average monthly number of fatalities by type of conflict. WFP provided information on the number of beneficiaries for the 2014-2015 period, operation type, and administrative region. The number of beneficiaries was divided by population figures to estimate the coverage of food assistance in the evaluation population. A second round of primary data was collected in January 2017, along with a secondary data analysis that took place in 2016/2017, along with disbursement of survey questionnaires.

Summary of Intervention, Theory of Change, and Evaluation Questions

Description of WFP intervention

13. The complex emergency situation of drought combined with chronic political instability and conflict was the focus of two WFP projects: i) emergency operation (EMOP) 200389 "Assistance to Drought-Affected Populations in Mali"; and ii) regional EMOP 200438 "Assistance to Refugees and Internally Displaced Persons (IDPs) Affected by Insecurity in Mali". These projects were able to reach approximately 100,000 internally displaced persons and 200,000 vulnerable people[6] in the targeted regions of the country. The first EMOP was implemented alongside a country programme and a protracted relief and recovery operation (PRRO), which started in late January 2013 and ended in 2014. The second EMOP was implemented to continue to provide assistance during 2015. Project activities were carefully planned in order to support complementarity with the WFP country programme, which targets similar interventions to chronically food-insecure populations through food

[6] Vulnerable peoples in the context of this evaluation are identified as: pregnant women, nursing mothers, the sick, the elderly, and children for whom healthcare and school services are no longer available.

assistance/cash for assets, nutrition, and school feeding. Table 1 details the WFP food assistance activities in northern Mali from January 2013 onwards.

Table 1: WFP food assistance activities (from Jan 2013 onwards)

Intervention	Targets	Objectives	Activities
Blanket supplementary feeding programme (BSFP)	Children 6-59 months old, and pregnant and lactating women	Blanket supplementary feeding to help prevent increase in MAM	Provide children half a sachet of Plumpy'Sup per day. Providing Supercereal and vegetable oil to pregnant and lactating women Nutrition and hygiene messages for mothers
Targeted supplementary feeding programme (TSFP)	Children 6-59 months with MAM and malnourished pregnant and lactating women	Treat MAM among children 6-59 months and malnourished pregnant and lactating women	Targeted supplementary feeding, providing 92g of Plumpy'Sup per day, Rely on partners and community health workers' screening and referral capacities, as well as functioning of health centres.
Targeted food assistance (TFA)	Food-insecure populations, internally displaced populations. Women headed households, households which have lost income/ assets, and households with elderly or disabled people	Assist all accessible moderately and severely food-insecure households and non-displaced people, displaced people, and host communities	Provide 2,100 kcal per person per day, consisting of cereals, pulses, vegetable oil and salt, with Supercereal to increase micronutrient intake
School feeding (SF)	Primary school children in areas with high food insecurity	Prevent hunger and provide incentives to arrive on time and attend school until lunchtime; school attendance will also reduce the exposure of children to other risks	Two daily meals will be provided: a morning porridge of Supercereal and a mid-day meal consisting of cereal, pulses, vegetable oil and salt

Theory of change

14. The theory of change for this evaluation of WFP nutrition programmes is predicated on the 2013 Lancet Series framework on Maternal and Child Nutrition (Black et al., 2013). This framework describes how optimal nutrition depends on health, dietary, and behavioural determinants, and is influenced by underlying food security, care-giving resources and environmental conditions. Effects on nutritional status could arise through: changes in food access and availability, changes to care-giving practices, changes in health status, or contamination or loss of water sources due to conflict. In addition, differential effects can be expected on displaced versus host families, in terms of exposure to new infectious diseases, or on changes in food

intake and care. The closure of health centres and schools would not only affect health and education outcomes directly, but could also have other negative spill-overs onto the community. Conflict can also result in long-lasting consequences and affect long-term outcomes. Children that are affected during critical growth stages can become stunted or cognitively impaired. Similarly, conflict can cause farmer households to suffer irrecoverable economic shocks and become destitute for multiple years after the conflict has ended. Emerging evidence suggests that conflict can severely undermine the most elaborate coping strategies used by households and prompt reliance on informal networks.

Evaluation Questions

15. This evaluation aimed to evaluate the impact of food assistance on household food security and children's nutritional status in conflict-affected rural populations in Mali, through both qualitative and quantitative data. Two levels of outcomes were considered in the survey population, based on the analysis of the programme's theory for food-assistance interventions. The first set of outcomes included alternative measures of household food security estimated from the consumption and expenditure survey modules using adult equivalents. The second set of outcomes focused on anthropometric measures of the nutrition status of young children[7]. The quantitative data employed a mixed-methods quasi-experimental methodology to characterize exposure to conflict and humanitarian assistance within the survey population. They answered the following key question:

- What is the impact of conflict and food assistance on child malnutrition and other developmental outcomes?

In addition, the impact evaluation report includes a qualitative analysis of conflict-afflicted populations to identify patterns of conflict exposure.

Evaluation Design, Methods, and Implementation

Quantitative research

16. In the quantitative element of the evaluation, the evaluation population was divided into two categories: (i) the extent of humanitarian assistance received over the years after the conflict and (ii) the extent to which the area was affected by conflict. A quasi-experimental methodology was used to estimate the impact of food assistance in conflict-affected areas. To estimate the effect of food assistance, the evaluation looked at the average treatment effect on the treated (ATT). For determining the impact of food aid, potential selection bias was accounted for through propensity score matching using the pre-crisis baseline. The likelihood of receiving aid was estimated to be conditional on a range of covariates measured before the intervention. Included in the propensity score were a range of household and village characteristics measured at baseline. The propensity score was estimated using a logit estimator and was used to weight the treatment and control samples to conduct a kernel propensity score difference-in-difference.

[7] Nutritional status is measured as: (i) weight-for-height z-score and prevalence of wasting amongst children 2-5 years, (ii) height-for-age z-score and prevalence of stunting amongst children 2-5 years, (iii) weight-for-age z-score and prevalence of underweight children aged 2-5 years, and (iv) BMI-for-age z-score among children aged 6-15 years.

Qualitative research

17. The qualitative research was collected in order to analyse and map the intensity of conflict and humanitarian aid in evaluation areas, identify vulnerable sectors of the population, and analyse targeting mechanisms adopted during the provision of humanitarian aid. The research was carried out in the Bamako and Mopti regions at both district and community levels. Bamako houses key central-level stakeholders, while Mopti contains areas that were both occupied by and free from non-governmental forces during the civil conflict. Three tiers of interviews assisted the evaluation sample:

a) In Bamako - with key stakeholders who provided humanitarian assistance.

b) At the district level in Mopti - with mayors, health workers, and community stakeholders.

c) In selected communities in same-sex focus groups - with adult men and women and individually with the same persons.

Data Collection

18. The primary data for this longitudinal evaluation involved two rounds of surveys (2012 and 2017) in the Mopti region of Mali. The baseline in 2012 was undertaken as a part of a cluster-randomized trial of school feeding that had to be abandoned due to the onset of conflict[8]. Data were collected from 1,500 households in 66 communities (villages) randomly selected among food-insecure districts in the region. Twenty-five households with children in the original target 5-15 year age group were randomly selected for interviews within each community. The sampling of households was conducted through interviews with village chiefs and other community level stakeholders, building a list of enlarged households in the villages within the school catchment area. At baseline, questionnaires collected data at household level and for each relevant household member separately. All children aged 2-15 within each restricted household in the survey sample were selected for anthropometry measures. In addition, all children aged 5-15 also underwent tests of literacy, numeracy and cognition. As part of this evaluation, a follow-up survey was undertaken in January 2017, including all the 66 villages in the Mopti region baseline sample. New survey modules were added to explore conflict exposure and receipt of humanitarian aid, as well as a range of other potential health outcomes not covered at baseline.

19. The end line survey included questions on different forms of food assistance that WFP or other development partners may have provided to the evaluation populations. Alongside general food distribution/targeted food assistance, targeted supplementary feeding, and school feeding, modalities of the WFP food assistance for assets (FFA) programme ran in parallel to the EMOP. The end line survey conducted in January 2017 asked village and household respondents about their experience with food assistance.

Trends in Conflict and Assistance During Study Period

20. According to the Armed Conflict Location and Event Data project database, the preceding 20-year period saw a total of 1,304 conflict-related events and 3,071

[8] Gelli, A., Masset, E., Diallo, A.S., Assima, A., Hombrados, J., Watkins, K. and Drake, L., 2014. "Agriculture, nutrition and education: on the status and determinants of primary schooling in rural Mali before the crises of 2012". International Journal of Educational Development, 39, pp.205-215.

fatalities in Mali. Over 80 percent of the total conflict-related events and fatalities are concentrated in the five year period between 2012 and 2016.

Conflict exposure at village and household level

21. From the survey data collected as part of the evaluation, 23 percent of participating households were exposed to violence linked with the presence of armed groups. The village questionnaire included questions on the behaviours of armed groups. Whereas 16 percent of the villages reported experiencing the presence of armed groups in the village itself, 77 percent of them reported that armed groups were present in the region. There was an overlap between the presence of armed groups and conflict-related violence. Whereas 16 percent of households experienced conflict-related violence in villages free from the presence of armed groups (whether they were present in the region or not), 47 percent experienced conflict-related violence in villages where armed groups were present.

Food assistance and conflict in the evaluation population

22. Access to any food assistance programme at village level decreased as proximity with armed groups increased. Whereas food assistance was potentially available for all households living in villages unaffected by armed groups, the proportion decreased to 90 percent in villages indirectly affected (that is, groups were present in the region but not in the village) and to 76 percent in villages directly affected by presence of armed groups. Availability of at least two forms of food assistance was, however, roughly similar at the two extremes of the conflict spectrum and was highest in villages indirectly affected by armed groups. Looking at the modalities of aid, increased proximity to armed groups reduced access to general food distribution. The likelihood of having access to general food distribution and targeted supplementary feeding, however, was highest in villages indirectly affected (43 percent), lowest in villages directly affected (12 percent), and in between these figures in unaffected villages (31 percent). Finally, the likelihood of having access to general food distribution and school feeding was twice as high in directly and indirectly affected villages (about 40 percent) as it was in unaffected villages (20 percent). This data suggests that school feeding may have been systematically used as an emergency platform for scaling up food assistance in conflict-affected areas.

Changes in outcomes during the evaluation period

23. One effect of the crisis in Mopti was that households only increased average expenditures per adult equivalent by less than FCFA 2200 over the whole period, corresponding to less than USD 0.7 per year. It is unsurprising, then, that calories intake per adult equivalent decreased by 136 calories per day on average. Daily consumption of protein, iron and zinc also tended to decrease in the evaluation population. In contrast, consumption of vitamin A increased by 430 micrograms, a near doubling of the baseline value. Insights from the qualitative research confirmed that households had been exposed to a range of shocks and stresses throughout the five year survey period, including erratic rainfall, drought, flash flooding, poor harvests, loss of harvest due to pests, and migration to the south in search of employment in the mining sector.

Impact Analysis

24. The first set of estimates considers the entire evaluation population. As can be seen in Table 1, general food distribution was found to increase total expenditures, whereas school feeding and the combination of two forms of aid were found to increase food expenditures. In terms of total expenditures, the effect of general food distribution was estimated at an increase of 20 per cent from baseline. For food expenditures, the impact of school feeding was equivalent to an increase of 21 per cent from baseline values.

25. There were also positive effects on micronutrient availability from household food consumption during the seven day recall period. Households who received two forms of aid were found to have a statistically significant increase in their availability of calories, protein, iron and vitamin A. The magnitude of these effects was substantial, ranging from 29 per cent of the baseline value for calories to 50 per cent of the baseline value for vitamin A. Consumption of vitamin A also strongly increased for recipients of school feeding. A marginally significant negative effect of two forms of aid was found for the weight-for-height z-scores for children under the age of five, however, no effects were found on the prevalence of MAM[9]. This is attributed to low coverage of targeted supplementary feeding in the evaluation population, which is consistent with literature on social transfers. These studies highlight that the provision of household food transfers, or general food distribution alone, without specific complementary foods targeting young children, generally does not result in improvements on nutrition outcomes of young children.

Table 1: Estimations of the impact of food assistance on household food expenditures, food consumption and on children's height. Full sample, Mali.

	Any aid	GFD	SF	1 form	2 forms
	(1)	(2)	(3)	(4)	(5)
Monthly expenditures (FCFA)	2332.37	3208.77*	2228.95	2159.05	2804.18
	(1522.6)	(1947.04)	(1480.4)	(1995.67)	(2028.2)
	[1970]	[1973]	[1962]	[1968]	[1649]
Monthly food expenditures (FCFA)	1873.02	2680.5	2364.1*	1468.1	3108.3**
	(1567.08)	(1915.8)	(1393.5)	(2152.0)	(1434.3)
	[1971]	[1974]	[1963]	[1969]	[1646]
Food expenditure as % of budget	-0.001	0.000	0.008	-0.001	-0.015
	(0.016)	(0.021)	(0.021)	(0.017)	(0.026)
	[1969]	[1972]	[1961]	[1968]	[1645]
Calories (kcal) consumed daily	-2979.5	-4463.1	1390.9	-4057.4	970.95*
	(3515.6)	(6211.8)	(1285.1)	(4633.7)	(502.4)
	[1996]	[1998]	[1987]	[1994]	[1674]
Protein (gram) consumed daily	-62.1	-95.4	36.5	-91.3	36.7**

[9] As discussed in the report, there were considerable problems with the comparisons in anthropometry between the two time points, as the age distribution of the children in the two rounds was very different. Also, this effect was marginally significant, and was not verified in the robustness analysis using a single cross section at end line. The results of the analysis of the single cross section found no evidence of the impact of food assistance on the anthropometry-related indices at follow-up, including both in the whole sample and in the different subgroups (involving no armed group presence, presence of armed group in the region and presence of armed groups in the village).

	(73.3)	(108.3)	(30.3)	(112.15)	(17.4)
	[1979]	[1982]	[1971]	[1978]	[1650]
Iron (mg) consumed daily	-16.7	-25.9	9.0	-23.4	7.73**
	(21.5)	(36.1)	(8.0)	(23.0)	(3.67)
	[1982]	[1984]	[1973]	[1980]	[1653]
Zinc (mg) consumed daily	-40.6	-59.2	13.57	-53.3	7.08
	(45.6)	(91.2)	(16.6)	(53.3)	(5.8)
	[1992]	[1994]	[1983]	[1990]	[1664]
Vitamin A (mcg) consumed daily	128.4	168.4	270.3***	88.3	247.04*
	(84.5)	(113.4)	(82.9)	(95.8)	(147.7)
	[1978]	[1981]	[1970]	[1975]	[1651]
Dietary diversity score	0.026	0.291	-0.231	0.051	-0.251
	(0.157)	(0.195)	(0.252)	(0.189)	(0.274)
	[2290]	[2294]	[2282]	[2288]	[1920]
Height (cm)	-0.107	-0.652	0.045	-0.305	0.818
	(1.444)	(1.784)	(1.529)	(1.445)	(3.201)
	[1947]	[1953]	[1960]	[1956]	[1866]
WHZ score	-0.18	-0.21	-0.26	-0.10	-0.40*
	(0.12)	(0.19)	(0.16)	(0.14)	(0.22)
	[2340]	[2346]	[2341]	[2340]	[2022]

Heterogeneity analyses

26. The evaluation conducted heterogeneity analyses based upon a village's proximity to armed conflict using three subgroups: i) villages unaffected by the presence of armed groups, ii) villages indirectly affected by the presence of armed groups (present in the region but not in the village), and iii) villages directly affected by the presence of armed groups. Disaggregating by degree of conflict exposure showed that the effects on children's height and caloric and micronutrient consumption were mostly concentrated in areas not in the immediate vicinity of the conflict, unlike the increase in food expenditures, which were driven by households located in close proximity to armed groups. Decreasing calories, coupled with increased expenditures, suggest that the increases in expenditures in household in proximity to armed groups may be driven by increases in prices.

27. In villages located in regions with no armed groups, assistance in the form of school feeding was seen to have a positive impact on food expenditures and general food distribution was found to increase total expenditures. Iron consumption was seen to be lower for households receiving two forms of aid, while a marginally significant negative effect of general food distribution was found in the weight-for-height z-scores for children under 5, though there were no effects on the prevalence of MAM. The results for the weight-for-height z-scores are to be interpreted with caution as the age distributions in the children under 5 in the two survey rounds were not comparable, and the sensitivity analysis undertaken as part of this evaluation found no evidence of these effects.

28. In villages where armed groups were present in the region, but not in the village, households receiving two forms of aid were found to have increases in calorie (47 percent), protein (74 percent), iron (68 percent), and zinc (35 percent) intake. General food distribution was found to increase calorie intake by 52 percent and zinc by 64 percent, while school feeding increased vitamin A consumption by 48 percent. The use of two forms of aid in combination increased the height of children aged 2-5 years by 7cm in treated households. A marginally significant negative effect of general food distribution was seen on the weight-for-height z-scores in children under 5.

29. In villages where armed groups were present, a positive impact was seen on food expenditures when receiving any form of aid. Consumption of zinc was also significantly increased for recipients of any food aid (or one form of aid). No other statistically significant results were found.

Qualitative Analysis

30. Households located in villages where armed groups were present, were more likely to have reduced their travels than households living in villages where armed groups were absent. The qualitative data highlighted that security services such as the police and the army were largely absent throughout the evaluation period, with services limited to occasional patrols by the Malian army in villages that were un-occupied by armed groups. The analysis of the data suggests that the effects of the armed groups' presence in the municipalities was pervasive.

31. Respondents indicated that the presence of armed groups caused men, able-bodied household members, and entire families to flee. Data indicates that, as many postnatal consultations were interrupted, many pregnant women who were unable to flee found their antenatal care suspended. This exposed children to higher risks of infection and morbidity. It is in this context that respondents highlighted the fact that malnutrition in children and lactating women increased considerably. As such, the focus groups discussions identified the most vulnerable groups as pregnant women, nursing mothers, the sick, old people, and children for whom health care and school services were no longer available.

32. Additional insights from the qualitative research confirmed that, in addition to conflict, households were exposed to a range of shocks and stresses throughout the five year survey period, including erratic rainfall, drought, flash flooding, poor harvests, loss of harvest due to pests, and migration to the south in search of employment in the mining sector.

Discussion

33. The survey data showed that during the five years since the conflict escalated, households experienced continued food insecurity, as well as decreases in overall food consumption and micronutrient availability. Over one in five households in the evaluation were exposed to violence linked to the presence of armed groups. Of the different forms of aid, general food distribution was more common, followed by school feeding. The coverage of targeted supplementary feeding, a key intervention to prevent and treat acute malnutrition, was extremely low, targeting only 24 villages (2 percent of the evaluation population). However, survey data also indicated that access to aid tended to decrease as proximity to armed groups increased, as highlighted by the higher likelihood of conflict-affected households living in villages without any access to aid, and a lower likelihood of living in villages with one form of food assistance. In order for assistance to reach the most vulnerable populations, the evaluation findings

suggest that the logistics of safely scaling up aid in conflict areas may override the necessity to quickly reach the most vulnerable populations.

34. Survey data, along with qualitative focus-group interviews, indicated that the presence of armed groups overlapped with conflict-related violence, and reduced mobility within the communities, including visits to farms, markets, health centres, and schools. This confirms the potential for conflict to affect a households' food security and nutrition through a range of direct and indirect channels. In the context of Mali, it is important to note that, although coverage of these services was not pervasive before the conflict peaked in 2013, the interruptions in the few communally available services were likely to have directly affected the nutrition and health outcomes in vulnerable age groups.

35. Household and village surveys suggest that a range of humanitarian aid interventions were scaled up in the evaluation areas during the five year period following the 2012 coup, including food assistance (mostly general food distribution and school feeding). The coverage of targeted supplementary feeding, which is a key intervention used to prevent acute malnutrition, was extremely low in the evaluation population during this period, indicating the reduced likelihood of identifying the possible effects of WFP food assistance on malnutrition in infants and young children. Despite this, the scaling up of humanitarian aid interventions by WFP and cooperating partners had important positive impacts on the food security of the targeted population. There was indicative evidence of the protective effects on total household and food expenditures, as well as on food consumption and changes in height for children aged 2-5 years at baseline.

36. The analysis of the nutrition status of young children was hampered by the well documented issue of the measurement of dates of birth in areas of low parental education like Mali[10]. To minimise the bias from measurement error, the scope of the analysis was limited to changes in height within the youngest cohort of the evaluation population, as well as on the weight-for-height z-scores of children aged 2-5 years. The analysis of the panel data identified a large protective effect of aid on the height of children aged 2-5 at baseline, where armed groups were present near the targeted communities. The effect was concentrated on households receiving at least two forms of aid (usually general food distribution with school feeding). In the cross-sectional evaluation in children aged 2-5 years, a marginally significant negative impact was found on weight-for-height, and no effects on acute malnutrition. Further sensitivity analysis focussing on measurement of the dates of birth is currently underway to allow more detailed assessment of child nutrition in the evaluation population.

Limitations

37. The findings presented in this report are limited by four important considerations. Firstly, as allocation of treatment was not random, selection bias related to unobserved characteristics remains a possibility. Secondly there is the potential for selection bias from attrition during the follow up, as important differences were found in the baseline characteristics between households lost to follow up, and those included in the analysis. The third limitation relates to the sample

[10] Oshaug, A, J Pedersen, M Diarra, MA Bendech and A Hatloy. 1994. "Problems and pitfalls in the use of estimated age in anthropometric measurements of children from 6 to 60 months of age: a case from Mali." J Nutr 124:636–644.; Grellety, E and MH Golden. 2016. "The Effect of Random Error on Diagnostic Accuracy Illustrated with the Anthropometric Diagnosis of Malnutrition." PLoS ONE 11(12).; Larsen, Anna Folke, Derek D Headey and William A. 2017. Masters. 2017. "Misreporting month of birth: Implications for nutrition research." IFPRI Discussion Paper 1617, Washington, D.C.: International Food Policy Research Institute (IFPRI).

size, which is low due to a combination of attrition rate and missing observations for control variables. This contributed to a reduction in the scope of the evaluation and placed limitations on the team's ability to conduct subgroup analyses. Finally, the challenge of conducting household surveys in a conflict context such as Mali, where access to information and movement were often restricted was a fourth limitation. This had potential consequences on the breadth of qualitative data that could have been collected.

Points for Consideration

38. The following points for consideration concern primarily the World Food Programme country office but are also relevant for higher technical and policy-making levels, as well as global and local actors (NGOs, other United Nations agencies, donors and academic bodies among others) who aim to improve the way humanitarian assistance is administered and received in conflict environments.

39. Point 1: WFP and cooperating partners should improve the design and scale up of humanitarian aid interventions in order to provide continued support and positive impacts on the food security of conflict-affected populations.

The findings of this evaluation show that access to aid tended to decrease as proximity to armed groups increased, suggesting that the logistics of safely scaling up aid in conflict areas may override the necessity to reach the most vulnerable populations. This, however, should not hinder humanitarian actors from attempting to reach vulnerable populations in conflict environments. Increasing the coverage of nutrition-specific interventions during conflict, including specialised complementary foods as supplementary feeding, appears to be a critical gap. This coverage gap may also be caused by the need to have elements of the health system working at community level to ensure adequate service provision. As health systems are often targeted by conflict actors, highlighting this may pose a critical constraint on operations in conflict settings.

Additionally, it is important to have more available data regarding the cost of various food assistance packages in order to promote effectiveness analyses of WFP programming in Mali. This point is addressed to the WFP country office and other international organizational partners including the United Nations and national governments, who should consider strengthening their food-assistance programmes in Mali to facilitate scalable long-term relief from food insecurity in acute conflict situations.

40. Point 2: WFP and other humanitarian aid actors should consistently provide a combination of complementary forms of assistance to food insecure populations in conflict environments.

The findings suggest that in terms of intervention design, systematically bundling different forms of food assistance alongside general food distribution may be an effective strategy to support vulnerable populations during conflict. The provision of household food transfers, or general food distribution alone without specific complementary foods targeting young children, generally does not result in improvements to nutrition outcomes of young children[11]. Food transfers are seen to have a protective effect on food security and nutritional status of vulnerable populations. In conflict contexts, food assistance can provide a platform to improve

[11] Ruel, MT, H Alderman, the Maternal and Child Nutrition Study Group. 2013. "Nutrition- Sensitive Interventions and Programs: How Can They Help to Accelerate Progress in Improving Maternal and Child Nutrition?" The Lancet 382(9891):536–51.

children's growth outside the priority age group for nutrition interventions (during the first 1000 days). This highlights the need to complement nutrition interventions with other forms of food assistance. This point is aimed at the WFP country office in Mali and the regional bureau to encourage them to adapt their programme designs to increase their capacity to promote holistic interventions addressing food insecurity, malnutrition and consumption in conflict-affected areas.

Rome, February 2018, OEV/2017/003

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