

Impacts of Development Aid to Mali 2008 – 2021

A Systematic Review of Evaluation Reports

Part III

Synthesis of 86 Program and Project Evaluations

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Humanitarian Assistance, Refugees, and Migration

The Evidence Base

Rigorous Impact Evaluations

Gelli, A., Tranchant, J.-P., Bliznashka, L. et al. 2018. *The impact of food assistance on food insecure populations during conflict in Mali*. Grantee Final Report. International Initiative for Impact Evaluation. Available at:

<https://www.3ieimpact.org/sites/default/files/GFR-TW6.1039-food-insecure-population-mali.pdf>

Good Enough Evaluations

Kara-consult. 2014. *Final evaluation of Catholic Relief Services' (CRS) Mali "Duwute" Project*. AID-FFP-G-12-00056. Available at:

https://pdf.usaid.gov/pdf_docs/PA00KFZH.pdf

Sacko, M. 2019. *Humanitarian WASH program in the regions of Mopti and Ménaka: Final evaluation report*. Available at:

<https://www.kirkensnodhjelp.no/en/news/publications/evaluations/emergency-wash-mali-final-evaluation/>

Three studies were included, two of which (Gelli et al. 2018; Kara-consult 2014) were concerned with improving food security and nutrition. The third study (Sacko 2019) evaluated a humanitarian WASH program.

The rigorous impact evaluation by Gelli et al. (2018) assessed the impact of different types of food assistance on food security, nutrition, and children's education during and after a period of conflict in the Mopti Region of Mali. Types of food assistance were general food distribution (GFD) and school feeding and targeted supplementary feeding (TSF). Funding was provided by the World Food Program (WFP) and UK Aid (via the former Department for International Development). The WFP provided food aid to almost 230,000 beneficiaries in the Mopti area in 2014 and 136,000 in 2015.

The theory of change behind Gelli et al.'s (2018) longitudinal, quasi-experimental study was that optimal nutrition depends on health, dietary, and behavioural factors, and is influenced by food security, care-giving resources, and environmental conditions. Food transfers increase food consumption, improving the quantity and quality of food consumed. Conflict may have lasting nutrition and health consequences for children, causing them to become stunted or their cognitive ability to be impaired.

Kara-consult (2014) is a mixed methods evaluation of Catholic Relief Services' "Duwute" (= 'self-help') project, an emergency food security project including cash for work (CFW)

undertaken in response to the political insecurity and conflict in 2012 which was compounded by food shocks resulting from a poor rainy season in 2013. The intervention took place in the communes of Dogofry, Koronga, and Guéniébé in Nara District, Koulikoro Region from September 2012. The project was due to be completed after one year but two no-cost extensions were granted and the project closed at the end of April 2014. The project was implemented by CRS with local partner Sahel Centre for Services, Studies and Eco-Development and Applied Democracy. It was funded by USAID and Food for Peace (FFP) (Kara-consult 2014).

The Duwute project was designed to increase access to food resources in the short term through a cash for work (CFW) scheme targeting 4,541 households in 50 villages. The CFW component provided a household income in return for work. The amount of the payment is not specified. Activities involved developing and repairing rural infrastructure such as dams and fishponds, constructing vaccination enclosures for cattle, digging pastoral wells, and maintaining rural roads. The project's prime objective was to improve the resilience of farmer and pastoral households to shocks affecting food security (Kara-consult 2014). As well as increasing access to food supplies, the project aimed, through training, to improve household practices concerning nutrition in 1,500 households and agriculture and natural resource management in 1,680 households, as well as to increase the ability of 50 communities to recognize and respond to shocks.

The third study (Sacko 2019) assessed the impact of Norwegian Church Aid's Humanitarian Water, Sanitation, and Hygiene (WASH) Program in the Mopti and Ménaka regions. The program was implemented by two local NGOs, the Initiative Malienne d'Appui au Développement Local (IMADEL) in Mopti and the Groupement des Artisans Ruraux de Intadeyné (GARI) in Ménaka. The intervention took place from November 2018 to December 2019. Funding of NOK 5.73 million (approx. US\$ 670,000) was provided by the Norwegian Ministry of Foreign Affairs. The program's overall objective was to enable 23,000 crisis-affected people to have better access to WASH services appropriate to their immediate needs. Communities targeted were those with an influx of returning refugees or internally displaced persons (IDPs), and their host communities.

At the time of program implementation, the security situation in central Mali was deteriorating sharply. Insecurity and displacement since 2012 had led to a humanitarian crisis and increasing tension around water points. Violence, destruction of livelihoods and infrastructure, and increasing human rights violations forced communities to flee their homes. At the commencement of the program there were 1,613 IDPs and 41,108 returnees in Mopti Region and 1,433 IDPs and 62,276 returnees in Ménaka Region. Displaced persons comprised about 20% of the population in the two program localities (Sacko 2019).

The program had four targeted outcomes:

- 1) Crisis-affected populations (women, men, boys, and girls) are guaranteed safe and equitable access to sufficient quantities of water of appropriate quality for drinking, cooking, and personal and domestic hygiene (15 litres per person per day);

- 2) Affected people have access to a safe, healthy, and hygienic living environment through the provision of safe, healthy, user-friendly, and gender-responsive sanitation services;
- 3) Affected people have access to improved hygiene practices, hygiene promotion, and the provision of hygiene products and services on a sustainable and equitable basis; and
- 4) Systematic communication with affected populations, established through appropriate feedback and communication mechanisms, during all phases of the emergency response.

Indicators were associated with each of the desired outcomes. To achieve these outcomes, it was decided following discussions with community representatives that 21 water points and 180 sanitation and handwashing facilities would be constructed or rehabilitated; local WASH committees would be established; management and maintenance training would be provided; and that there would be awareness raising of hygiene and disease prevention (Sacko 2019).

Methods

The impact of food assistance in conflict-affected areas in Mopti Region

Gelli et al. (2018) aimed to evaluate the effects of food assistance in conflict-affected areas. A village and household survey conducted in January 2012 as part of an abandoned school feeding scheme was used as a baseline. From January 2013 until December 2016, emergency aid was scaled up, with food assistance being provided by the WFP. An endline survey conducted by Gelli et al. (2018) in January 2017 used the baseline to assess the outcomes and impact of the WFP food assistance program. The study combined propensity score matching and difference-in-difference to analyse whether access to different types of food assistance had a causal effect on household food expenditure, consumption, and nutrient availability.

The baseline survey gathered data on about 1,500 households in 66 randomly selected villages in food-insecure rural areas of the Mopti Region (Gelli et al. 2018). Twenty-five households with children in the project's target 5–15 year age group were randomly selected for interviews in each community. Anthropometry measures were taken for children aged 2–15 and those aged 5–15 underwent literacy, numeracy, and cognition testing.

The project had two sets of priority research questions (Gelli et al. 2018). The first set categorized level of exposure to conflict, coping strategies, and access to food assistance. The second set was aimed at evaluating the impact of exposure to conflict on household food security and child malnutrition, and the mitigating effects of food assistance on conflict-affected populations. Interviews were held with staff from the Government of Mali and INGOs and with community stakeholders. Single-sex focus group discussions (FGDs) were held with family members and community health workers. This research informed the endline survey design and data analysis.

The endline survey in January 2017 was administered in 67 villages to 1,422 households (Gelli et al. 2018). Community input was solicited for a timeline of conflict and humanitarian aid. The value of household food and of nutrient consumption was calculated for 52 foods in 12 food

groups over a seven-day period. Anthropometry data were collected from children aged 2–15 years. Treatment households were matched with comparable control households from amongst those surveyed at baseline. The panel data made it possible to determine whether provision of food assistance enabled households to cope better with political and economic insecurity, and whether proximity to conflict influenced the effectiveness of aid.

The Duwute Project in Koulikoro Region

The prime objective of the Duwute project was to improve the resilience of farmer and pastoral households to shocks affecting food security. Kara-consult (2014) evaluated a cash for work (CFW) that was intended to increase access to food resources in the short term. The scheme benefited 4,541 households. Frequent monitoring took place during the project, and an internal evaluation was conducted in August 2013. Indicators were measured at baseline and after completion of the project. The objectives of the final evaluation were to measure the project's impact and sustainability.

Questionnaire surveys were administered in April 2014 to 357 beneficiary households and 38 non-beneficiary households. The sample was drawn up from the list of beneficiary villages in the communes of Dogofry, Koronga, and Guéniébé. The villages prioritized were those in which all CFW activities and training sessions had been carried out. Sample selection was not random, and there were differences of opinion regarding the transparency of the selection process, with the greatest discrepancy of opinion amongst the non-beneficiaries. Focus groups included traders, local government bodies, religious leaders, and INGOs operating in the area. An “ample proportion” of women was included. The majority of beneficiaries interviewed were men (67.7%), due to the fact that they were the heads of selected households and comprised most of the labour force in the CFW activities. Agriculture was the dominant local occupation and principal source of income, followed by day labour and petty trade. More women were interviewed in Dogofry, where they participated at a higher rate in project activities (Kara-consult 2014).

The humanitarian WASH program in Mopti and Ménaka regions

The evaluation by Sacko (2019) of Norwegian Church Aid's WASH program used a mixed methods approach that included document review and data collection and interviews. Field visits to permit beneficiary interviews and inspection of infrastructure were made to one commune in each of the circles of Bankass, Ténenkou, and Bandiagara in Mopti Region and the circles of Ménaka, Inekar, and Tidermen in Ménaka Region. 33 semi-structured interviews were conducted with staff of the implementing NGOs, technical services, and representatives of beneficiary communities. 24 focus group discussions were conducted with a total of 192 direct beneficiaries divided between six groups each of men, women, boys, and girls. In addition, quantitative data were collected from beneficiaries randomly selected from households at the different sites visited. A representative sample of 378 households (population = 23,000) was targeted. Quantitative data collected by questionnaire primarily addressed program performance issues. There was no baseline study but some data were available from a survey by program staff in April 2019.

Sacko's (2019) evaluation used the DAC criteria of relevance, effectiveness, efficiency, and sustainability. Impact was not included due to the difficulty of estimating causal attribution between program activities and changes in the health status and wellbeing of beneficiary communities immediately after the completion of the program, though some short-term impacts are mentioned.

Impacts

The impact of food assistance in conflict-affected areas in Mopti Region

Outcomes of the study by Gelli et al. (2018) include information on household expenditure and food consumption, and on child nutritional status and school enrolment, attendance, and attainment.

Overall, food assistance was found to have increased household expenditure on food and also non-food expenditures. Access to any type of food assistance program (general food distribution (GFD), school feeding (SF), or targeted supplementary feeding (TSF) at village level was found to decrease as proximity to armed groups increased, suggesting potential need was overtaken by the aid agencies' security considerations (Gelli et al. 2018). GFD was the most commonly reported type of food assistance, with 51 out of 63 village-level respondents reporting GFD had occurred in their village since 2012. School feeding and targeted supplementary feeding (TSF) schemes had been implemented in 26 and 24 villages, respectively, commonly in villages where GFD was also taking place, in line with WFP principles. Only 2% of households in the treatment group had received TSF, which made it difficult to estimate the impact of this type of assistance. 67% of households interviewed at endline reported not receiving any food assistance.

Average expenditure per adult increased by only FCFA 1,200 (less than USD 0.40) over the five-year period (Gelli et al. 2018). Households near to armed groups increased their food expenditure much more than those where there were no armed groups. However, calorie intake in the study population decreased by 136 calories per day. Consumption of protein, iron, and zinc also decreased, whilst consumption of vitamin A increased, almost doubling the baseline. Meat is a source of protein, iron and zinc; vitamin A is found in pumpkin, sweet potato, papaya, and red palm oil. Higher expenditure but reduced calorie intake near armed groups suggests food scarcity, higher prices, and reduced consumption. Alternatively, it may reflect a need by villagers to supply armed groups in return for security. Intake of calories, iron, and zinc tended to decrease the most in villages indirectly affected by the presence of armed groups and to decrease the least in villages directly affected by the presence of armed groups. In villages where armed groups were present, food assistance appeared to improve household micronutrient availability. However, the qualitative survey indicated that the results could not be attributed solely to the interplay of conflict and aid because, during the five years between baseline and endline, villages had also experienced drought, flash floods, and loss of harvest.

The presence of armed groups caused many households to flee their village. Health centres were closed and malnutrition in children and lactating women who were unable to flee increased. The prevalence of moderate acute malnutrition (MAM) decreased from 8% to 7% at

endline; that of severe acute malnutrition (SAM) increased from 5% to 6%. Negative effects observed on children's growth were concentrated in areas away from the conflict and in households which received at least two forms of food assistance. Children in villages directly affected by conflict grew by about 2 cm less. However, given all the variables in villages and household characteristics at baseline, as well as differing effects of conflict and aid distribution, the study concludes that there was no obvious relationship between child growth and aid status.

In terms of educational outcomes, the 48% enrolment level at baseline had decreased to 40% at endline, with the largest reduction, from 48% to 36%, among boys (Gelli et al. 2018). School feeding schemes had a positive impact on enrolment by 11 percentage points, and an additional half-year of schooling. School attendance by boys from households receiving GFD decreased by about 20% compared to the comparison group. When disaggregating by conflict intensity, data showed that receipt of any type of food aid led to increases in school enrolment in areas where conflict intensity was high, but GFD appeared to have a negative effect on attendance in these areas. In families receiving GFD, child labour, particularly that of boys, increased in parallel. School feeding schemes, however, resulted in a reduction in girls' participation in labour. Grade attainment increased slightly with school feeding. Children living in areas where armed groups were not present had lower educational outcomes than their peers in areas occupied by rebels ($p < 0.05$). The areas not occupied by armed groups correlated with survey reports of school dropout due to food shortages. At endline, 11% of children said they were unable to return to school after the 2012–13 conflict (Gelli et al. 2018).

Whilst the data appear to show many instances of correlation, causation is not conclusively shown, given many potential confounding variables. Overall, the study report is highly detailed but somewhat inconsistent and poorly organized, which hinders an understanding of project impact.

The Duwute Project in Koulikoro Region

The prime objective of the Duwute project (Kara-consult 2014) was to improve the resilience of farmer and pastoral households to shocks affecting food security. 91% of beneficiaries and 94% of non-beneficiaries believed that project activities that were part of the cash for work (CFW) scheme had had a positive impact on household capacity to respond to shocks and natural disasters. The CFW scheme had positively impacted on living conditions, including access to food, health, and education; the establishment or rehabilitation of necessary infrastructure; vegetable production; awareness of sanitation and hygiene and use of facilities; social cohesion; local technical and organisational skills; and understanding of environmental issues such as soil degradation. The activities with the greatest positive impact were said to be improvements made to ponds and marshlands; improved agricultural techniques; maintenance of rural feeder roads; and compost pits. Positive impacts of the Duwute project were reinforced by spillover effects, including the rise of the water table and regeneration of vegetation; access to building materials; and the motivation of neighbouring non-treatment villages to replicate similar CFW infrastructure works.

Project training sessions for villagers were considered useful. The agro-ecology training was considered especially relevant by 97% of respondents in Guéniébé, 86% in Koronga, and 80%

in Dogofry. Women formed the primary target for nutrition training. New food techniques learnt during the training sessions were applied in 61% of beneficiary households in Dogofry, 64% in Koronga, and 88% in Guéniébé. It needs to be borne in mind that, at the time, access to food was difficult and poverty widespread. An average of 87% of beneficiaries found the training to be an appropriate strategy to assist households to become more resilient to food-related shocks as well as to prepare a more balanced diet and reduce malnutrition (Kara-consult 2014).

The Duwute project had a positive impact on reducing food insecurity. Beneficiaries reported that more households experienced a greater number of food-secure months. The number of beneficiaries with access to less than one month's food stocks fell in all three communes, whilst the number of those with access to one to six months' supply increased. Access to food for 12 months increased two- to three-fold in Dogofry and Guéniébé, but decreased slightly in Koronga. Focus groups also reported improved living conditions, diversified income sources, improved purchasing power, and greater autonomy. Over 60% of beneficiaries believed that they could take up new income-generating activities, such as raising sheep and goats or establishing a bakery, thanks to the income from the CFW scheme and the training they had received (Kara-consult 2014).

The humanitarian WASH program in Mopti and Ménaka regions

The WASH program's overall objective was to enable 23,000 crisis-affected people to have better access to WASH services appropriate to their immediate needs. Information collected in the field indicated that there had been an overall improvement in access to water, hygiene, and sanitation services, resulting in a short term positive impact on many of the beneficiaries. In total, 23,446 people (7,375 men, 8,665 women, 4,011 girls, and 3,395 boys) were reached by the program. Of the 397 people interviewed during the evaluation, 97% (143 women and 241 men) stated that the intervention met their basic needs in the targeted sectors (Sacko 2019).

With respect to objective 1, 22 water points were constructed or rehabilitated to provide sufficient quantities of water of appropriate quality for drinking, cooking, and personal and domestic hygiene in accordance with SPHERE standards or local WASH cluster guidelines (Sacko 2019). These included human-powered pumps, village hydraulic systems, and wells. One hydraulic system was not sited according to expert recommendations based on depth of water table and flow capacity, but instead according to the wishes of the community, resulting in an inadequate supply of water to meet local needs. Several other sites also suffered problems with the new infrastructure. Nevertheless, 60% of respondents stated that the program had had a positive impact on the time taken to collect water, including waiting time, which was less than or equal to 30 minutes. Average quantity of water per day per beneficiary was 26 litres compared to the targeted 15 litres.

With respect to objective 2, 10,205 people (including 9,158 women and girls) had access to safe, gender-sensitive sanitation services (Sacko 2019). Prior to construction of latrines, plans were discussed with both men and women. Access ramps were provided for people with reduced mobility. However, only 40% of beneficiaries reported using latrines. Some said this was because they were out of order or too far away. Nevertheless, their construction had

doubled the use of latrines since the April 2019 survey when they were used by only 20% of adults in the intervention areas. A total of 180 hand washing devices and 1,365 hygiene kits were distributed. At the end of the program, 61% of beneficiary households said they generally used handwashing facilities.

With respect to objective 3, 15,519 people were reached with messages concerning hygiene through 146 awareness campaigns and 469 exchanges with individual households (Sacko 2019). Of the 397 respondents in the quantitative evaluation survey, 59% (and 75% of the women) reported washing their hands with soap at key times. Hand washing was cited by beneficiary communities as one of the main impacts of the program.

With respect to objective 4, a feedback and complaints system was set up between communities and the NGOs, but local authorities and beneficiary communities did not know how to escalate them. Ten complaints were received in Ménaka related to the quality of the infrastructure; those in Mopti concerned the need for more infrastructure (Sacko 2019).

Program activities were found to increase social cohesion and stability among the displaced populations, returnees, and their community or hosts, as all met around the water points. As a result of these groupings around water points, other aid organizations were more easily able to provide assistance (Sacko 2019).

Despite some positive outcomes and short-term impacts, the longer-term impacts of the intervention on health and hygiene and prevention of disease could not be assessed. These depend in part on the sustainability of the water supply and sanitation infrastructure, which, at some sites, had already failed, suggesting that the desired impacts would not be achieved (Sacko 2019).

Sustainability

The study by Gelli et al. (2018) makes no mention of sustainability. The project was intended to respond to an immediate need for food aid arising as a result of conflict.

The Duwute project (Kara-consult 2014) was not simply a cash for work project. The skills learned in the course of the work and the provision of training in agricultural techniques, natural resource management, and household nutrition were intended to increase beneficiaries' self-sufficiency and resilience and to make project benefits and impacts sustainable. Infrastructure requires maintenance after project closure. Beneficiaries of the Duwute project (Kara-consult 2014) saw the infrastructure such as fishponds and rural roads which they had been involved in constructing to be of great benefit, as did their communities. As a result, there was an increased likelihood of beneficiaries using their skills for the maintenance of infrastructure. Responsibility for upkeep of infrastructure was assigned to management committees in the beneficiary communes, ensuring that it continued to be seen as a community resource.

Beneficiary communities in the humanitarian WASH program (Sacko 2019) were closely involved in the planning and monitoring of water infrastructure development. Water

management committees were established at all intervention sites. The involvement of the beneficiary communities and also government technical services officers was intended to help ensure sustainability. However, the sustainability of the program also depends to a great extent on the quality of the infrastructure, some of which had already failed and required repair. Both the communities and technical services officers favoured the village hydraulic systems because of their potential sustainability and efficiency, and because communities were more inclined to pay for water services using this system, which would cover maintenance costs. Although management committees were functioning at some sites, they had not yet succeeded in making beneficiary communities pay for water services.

Barriers

As insecurity increased after 2012, it was often challenging for aid agencies to determine those most in need of food aid, and then to reach them, due to logistical and security challenges.

The WASH program (Sacko 2019) was adversely affected by poor security conditions which lengthened the period required to carry out program activities. Several drilling companies were forced to withdraw due to fear of robbery, kidnapping, and mines on the roads. In Bandiagara, Bankass, and Ténenkou, beneficiary communities were afraid to meet for program information sessions due to insecurity. In addition, some localities were cut off for two to three months due to the rains and resulting poor road conditions.

Summary

The impact of food assistance in conflict-affected areas in Mopti Region

The purpose behind Gelli et al.'s (2018) study was to evaluate the effects of food assistance in conflict-affected areas in the Mopti area. The study attempts to correlate exposure to conflict, food security, access to different types of food aid, household economy, child nutrition, and education and, where possible, to determine causal paths. There are also many village and household variables, plus environmental events, to take into account. As a result, the evaluation report became overly complex and appears unable to extrapolate a bigger picture. Repetition and confusion in the report may reflect a problem in data management and analysis. Overall, the broad scope of the study and its problems and limitations mean that the impacts of food assistance in conflict-affected areas cannot in this case be clearly and precisely determined. That said, there is some evidence that food assistance increased household expenditure on food and also on non-food expenditures. School feeding did have a short-term positive impact on nutrition and on school enrolment but its coverage was small and its ability to keep children in school, particularly boys, was limited by other factors related to the conflict and the need for labour. Unsurprisingly, access to any type of food assistance program (general food distribution (GFD), school feeding (SF), or targeted supplementary feeding (TSF) at village level was found to decrease as proximity to armed groups increased. Survey data suggest that levels of conflict and aid, and their impacts, vary from village to village, and that food aid may have had little medium-term impact.

The Duwute Project in Koulikoro Region

With regard to a cash for work scheme, Kara-consult (2014) reports that beneficiaries and non-beneficiaries interviewed believed that project activities that were part of the cash for work (CFW) scheme had had a positive impact on households' capacity to respond to shocks and natural disasters. The CFW scheme positively impacted living conditions, including access to food, health, and education; the establishment or rehabilitation of necessary infrastructure; vegetable production; awareness of sanitation and hygiene and use of facilities; social cohesion; local technical and organisational skills; and understanding of environmental issues such as soil degradation. The activities with the greatest positive impact were said to be improvements made to ponds and marshlands; improved agricultural techniques; maintenance of rural feeder roads; and compost pits. The cash for work scheme facilitated the development of local infrastructure, which was well received, as well as providing training and increasing skill levels amongst male beneficiaries. Unfortunately, the CFW activities did not attract many women. The Duwute project (Kara-consult 2014) was more than a cash for work project. The skills learned in the course of the work and the provision of training in agricultural techniques, natural resource management, and household nutrition were intended to increase beneficiaries' self-sufficiency and resilience in the long term and to make project benefits and impacts sustainable. Beneficiaries appreciated that the infrastructure that they had been involved in constructing was of great benefit, as did their communities. As a result, there was an increased likelihood of the infrastructure being maintained and seen as a community resource.

The humanitarian WASH program in Mopti and Ménaka regions

Finally, with regard to a WASH program providing 23,000 crisis-affected people with better access to WASH services, Sacko (2019) report that there was an overall improvement in access to water, hygiene, and sanitation services, resulting in a short term positive impact on many of the beneficiaries. Of the 397 people interviewed during the evaluation, 97% (143 women and 241 men) stated that the intervention met their basic needs in the targeted sectors (Sacko 2019). 22 water points were constructed or rehabilitated to provide sufficient quantities of water of appropriate quality for drinking, cooking, and personal and domestic hygiene. The new infrastructure had a positive impact on the time taken to collect water, including waiting time. As a result of the program, 10,205 people (including 9,158 women and girls) had access to safe, gender-sensitive sanitation services and 20% more people than at baseline reported using latrines. Furthermore, program activities were found to have a positive impact on social cohesion and stability among the displaced populations, returnees, and their community or hosts, as all met around the water points. As a result of these groupings, other aid organizations were more easily able to provide assistance (Sacko 2019).

The longer-term impacts of the intervention on health and hygiene and prevention of disease could not be assessed. These depend in part on the sustainability of the water supply and sanitation infrastructure, and also on the initiative of the local people to continue best practices and arrange for the infrastructure to be repaired (Sacko 2019). The involvement of the beneficiary communities and also government technical services officers in the humanitarian WASH program (Sacko 2019) was intended to help ensure sustainability. However, the

sustainability of the program also depends to a great extent on the quality of the infrastructure, some of which already required repair. Although management committees were functioning at some sites, they had not yet succeeded in making beneficiary communities pay for water services, which would provide the means to pay for future repairs.

Nutrition

The Evidence Base

Rigorous Impact Evaluations

Alvarez Morán, J.L., Alé, F.G.B., Charle, P. et al. 2018. The effectiveness of treatment for Severe Acute Malnutrition (SAM) delivered by community health workers compared to a traditional facility based model. *BMC Health Services Research*, 18, 207-216. Available at: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-018-2987-z>

Lopez-Ejeda, N., Charle-Cuellar, P., Alé, F.G.B. et al. 2020. Bringing severe acute malnutrition treatment close to households through community health workers can lead to early admissions and improved discharge outcomes. *PLoS ONE*, 15(2), e0227939. Available at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227939>

Rogers, E., Martínez, K., Alvarez Morán, J.L. et al. 2018. Cost-effectiveness of the treatment of uncomplicated severe acute malnutrition by community health workers compared to treatment provided at an outpatient facility in rural Mali. *Human Resources for Health*, 16, 12-20. Available at: <https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-018-0273-0>

Good Enough Evaluations

AIIER. 2019. *Évaluation finale "Dans les zones de Feed the Future" du projet USAID Nutrition et Hygiène / CARE dans la région de Mopti – Mali*. http://careevaluations.org/wp-content/uploads/Rapport-d%C3%A9valuation-FTF_Agri - F-Juin-19.pdf.

Bonde, D. 2016. Impact of agronomy and livestock interventions on women's and children's dietary diversity in Mali. *Field Exchange*, 51. Available at: <https://www.enonline.net/fex/51agronomylivestockmali>

CARE International. 2019. *Nutrition and hygiene: End of project report*. Available at: https://www.washagendaforchange.org/wp-content/uploads/2020/04/care_mali_nutrition_and_hygiene_final_report_2019.pdf

Government of Canada. 2016. *Rapport d'évaluation finale du projet "initiative for food security and nutrition in Segou"*. <https://www.careevaluations.org/wp-content/uploads/evaluations/ifons-linkages-evaluation-final.pdf/>.

ICF Consulting Services. 2016. *Evaluation of ECHO's intervention in the Sahel (2010–2014): Final report*. Available at: <https://www.alnap.org/help-library/evaluation-of-echo%E2%80%99s-intervention-in-the-sahel-2010-2014>

Iknane, A.A., Kone, Y., & Kaloga, M. 2019. *Évaluation finale du projet USAID / Nutrition – WASH dans les régions de Koulikoro, Ségou, et Mopti*. Available at: https://www.careevaluations.org/wpcontent/uploads/Rapport_Care_final_30_Septembre_19_revue.pdf/

Tilford, K.M. 2009. *Synergy and Action for Nutrition+ (SAN+): Child survival project – Koulikoro Region, Mali: Final evaluation report*. USAID / Helen Keller International.

Ten studies were included, four of which were rigorous impact evaluations. The outcome of interest for all studies was better nutrition and better health outcomes.

Three studies assessed the impacts, and efficiency of treatment of severe acute malnutrition by community health workers compared to that provided by traditional facility-based healthcare (Alvarez et al. 2018; Lopez-Ejeda et al. 2020; Rogers, et al. 2018). All three studies were based on rigorous methods.

Six studies assessed the impacts of multidimensional interventions for nutrition outcomes of vulnerable groups (AIER 2019; CARE International 2019; Government of Canada 2016; ICF Consulting Services 2016; Iknane et al. 2019; Tilford 2009).

Finally, one study assessed the impacts of agronomy and livestock interventions on nutrition and dietary diversity (Bonde 2016).

The following paragraphs provide more details on these studies.

Multidimensional interventions for nutrition outcomes of vulnerable groups

USAID and Feed the Future's program (CARE International 2019) was concerned with both nutrition and hygiene in nine districts in the Mopti, Ségou, and Koulikoro regions. The report covers project activities over its six-year period between October 2013 and September 2019. The project targeted children during the 1,000-day 'window of opportunity' between conception and the first two years of life through the promotion of community and health sector services, improved agricultural practices, nutrition education, and social behaviour change communication. The intervention was implemented by a consortium led by CARE International.

The project sought to address both the immediate causes of malnutrition, including inadequate diet, and the underlying root causes, such as low-quality foods and poor hygiene. The project had four strategic objectives: 1) to increase access to diverse and quality foods; 2) to improve

nutrition and hygiene-related behaviour; 3) to increase utilization of high-impact nutrition and water, sanitation, and hygiene (WASH) services; and 4) to reinforce and scale up community-led total sanitation (CLTS). These were integrated in three pillars: nutrition-sensitive agriculture; nutrition-specific interventions; and WASH interventions. A social behaviour change package addressed agricultural production and consumption, nutrition, and hygiene-related practices, and behavioural drivers of malnutrition and poor hygiene. A focus on women's empowerment was intended to increase women's access to knowledge and agricultural resources and to influence how they fed their children. The program reached 68,383 pregnant and lactating women, approximately 173,000 children under two years old, and 17,520 smallholder farmers and their households (CARE International 2019).

Project activities in support of objective 1 included support for cereal production, erosion control and soil protection, promotion of market gardening, and strengthening the capacity of women producers in food processing. Activities under objective 2 included screening and referral of malnourished children, child preventive surveillance, and community capacity-building to support improved nutrition. Under objective 3, training was provided in the construction and maintenance of latrines, chlorination of household water, sustainable water management, and promotion of shops selling latrine construction equipment, soap, and water purification tablets. The fourth objective involved the scale-up of community-led sanitation projects and the capacity building of stakeholders. The project integrated environmental stewardship practices into its agricultural, nutrition, and WASH activities. This involved promotion of organic treatments in market gardens, support to women vegetable producers to produce organic manure, and latrine design and siting appropriate to the terrain to avoid contamination of groundwater (CARE International 2019).

ICF Consulting Services (2016) provides an evaluation of ECHO's Sahel Strategy. This is a regional, multi-sectoral, and multi-annual strategy funded by the Directorate General for the European Commission's Humanitarian Aid and Civil Protection Office (ECHO) in West Africa and implemented by multiple partners. The Sahel Strategy covers seven countries. We report only results referring to Mali. The evaluation covers a five-year period from 2010 to 2014, when 312 projects were implemented in six countries for a total value of 472.4 million euros. In Mali, 31 million euros were divested through 37 grant agreements. The projects in Mali aimed to reduce mortality due to malnutrition through food aid and treatment and to undertake small-scale prevention activities to address the root causes of malnutrition. ECHO's health interventions in the Sahel focused originally on provision of food aid and cash transfers. In 2013 and 2014, during the resurgence of conflict, its objectives were directed towards reducing mortality through the treatment of malnutrition. Activities included targeted supplementary feeding, support for community management of malnutrition, and capacity-building in local health centres. The intervention logic comprised a series of interlinked causal chains and assumed that no single line of action could generate the desired impact. Whilst in the short term a reduction in mortality is dependent on treatment, a more sustainable reduction depends on prevention, which requires broad support from national authorities.

In Mali, in 2010, 25,000 children under five were admitted and treated for SAM. The figure fell to 15,000 in 2011 but rose to over 52,000 in 2012 following the conflict and displacement. By

2013, it had risen to 103,000 and by 2014 to 118,000 (ICF Consulting Services 2016). ECHO projects in Mali treated malnutrition via therapeutic and supplementary feeding and sought to address some of its causes at the household-level, including food insecurity, disease, poor access to water, poor hygiene, and lack of sanitation. As well as nutrition and therapeutic feeding, project components included food assistance and cash transfers, coordination of local services, and water, sanitation, and hygiene (WASH) activities. It was believed that if severe acute malnutrition (SAM) rates were to fall and remain low, poverty, nutrition, and health must all be addressed. Implementation of such prevention activities at scale was beyond the scope of the Sahel Strategy, but it was considered appropriate for pilot prevention activities to be operated in parallel with treatment to assess potential benefits. ECHO projects were implemented in all regions of Mali except Bamako. The evaluation does not indicate the number of beneficiaries associated with the projects. The most affected households were very poor, and regional conflict, insecurity and displacement had increased their vulnerability.

Tilford (2009) provides an evaluation of the *Synergy and Action for Nutrition+* (SAN+) project, implemented in all nine health districts of Koulikoro Region by Helen Keller International and partners between 2005 and 2009, before the onset of armed conflict. The goal of the project was to improve the nutritional status and reduce the morbidity and mortality of children aged 0–23 months and to improve the nutritional status of pregnant and breastfeeding women. The Nutrition+ package of interventions included screening and treatment of malnourished children, deworming, malaria prevention, formation of support groups for mothers of young children, and training of community health workers. The target population included over 69,000 children and 190,000 women. Funding was provided by USAID's *Child Survival and Health Grants Program* (CSHGP).

Specifically, the objectives of the project were to improve nutrition in children by 1) decreasing the prevalence of underweight children under two; 2) increasing the number of children aged 6–23 months receiving Vitamin A supplements; 3) decreasing the prevalence of anaemia among children aged 6–23 months; and 4) improving the control of diarrhoea in infants and young children. Two further objectives were to improve the nutrition and health of pregnant and lactating women by decreasing the prevalence of anaemia and by improving maternal care postpartum. A final objective was to enhance the capacity of partners to plan, monitor, and sustain project interventions. The project was implemented through Mali's decentralized health system, at community-level health facilities (CSComs) and at district-level reference health centres (CSRefs) simultaneously in each of the nine districts of Koulikoro region. The estimated population of Koulikoro was 1,871,120, including 69,396 children aged 0–23 months and 190,840 women of reproductive age (Tilford 2009).

The nutrition component included training in the community and at health facilities and growth monitoring. Key messages focused on maternal nutrition and promoting complementary feeding starting at 6 months, with continued breastfeeding up to 24 months. To address the fact that many health facilities were not offering the full range of nutrition interventions, a strong behaviour change communication component was included. Cross-cutting strategies included the joint design, implementation, and evaluation of nutrition services delivery consistent with Ministry of Health and Ministry of Social Development protocols (Tilford 2009).

Allier (2019) evaluates a USAID nutrition and hygiene project implemented by a group consisting of Family Health International (FHI 360), the International Rescue Committee (IRC) and CARE International in Mali. Initially, three strategic objectives were defined: to increase access to and consumption of diversified, quality foods; to improve nutrition and hygiene behaviours; and to increase the use of high impact nutrition and water, hygiene and sanitation services.

To achieve these objectives, the project worked in concert with communities, government technical services, elected officials and community organizations in the fields of agriculture, nutrition-sensitive agriculture and water, hygiene and sanitation. The outcomes are measured by 1) number of hectares of land under technologies or management practices with United States Government (USG) assistance; 2) number of farmers who applied improved technologies or management practices with United States Government (USG) assistance; 3) number of people who received short-term training on agricultural sector productivity or food security; 4) total quantity of targeted nutrient-rich value chain products produced by direct beneficiaries of United States Government (USG) assistance for domestic consumption; 5) number of people trained in child health and nutrition; and 6) number of health facilities with established capacity to manage acute undernutrition.

Government of Canada (2016) evaluates the project entitled *Initiative for Food Security and Nutrition in Ségou (IFONS)*, implemented from June 2012 to June 2016 in six communes in the regions of Ségou and Macina and jointly executed by CARE Mali, CARE Canada, four government partners, and one national NGO (AMAPROS). The budget for this project was approximately US\$ 1.1 million. The objective of the project was to contribute to improved livelihood security and resilience for vulnerable women, girls, men, and boys with respect to acute and chronic malnutrition, to increase food production and consumption, and to improve the capacity of local government structures to engage different stakeholders effectively and transparently in development, planning, and implementation processes.

The project established communal and village committees (men and women), community health associations, and village committees for pregnant and breastfeeding women and heads of households. 24,222 people were reached through education and communication programs in nutrition, food, and food security. The application of eco-farming techniques covered more than 40.5 ha of marginal land. 621 village savings and loan associations (VSLAs) were trained in the identification of food processing micro-enterprises. 44 micro-projects, including 21 village cereal banks, ten market gardening areas, ten ploughing kits and three millet threshers were set up, and new grain storage warehouses were constructed (Government of Canada 2016).

Finally, Iknane et al. (2019) evaluated a project implemented by CARE International in the Koulikoro, Ségou, and Mopti regions of Mali and funded by the United States Agency for International Development (USAID). The program covered a five-year implementation period from October 2014 to September 2018, and extended to 2019. The main objective of the project was the improvement of the nutritional status and hygiene and sanitation practices of pregnant and lactating women and children under 2 years. The project took the following actions/ approaches: mobilizing resources for water points through the management by women's

associations; introducing a clean village contest as an incentive; the use and popularization of improved techniques for the construction of latrines through training of local masons; the use of materials and techniques adapted to the quality of the soil; peer-to-peer learning; a farmer field school approach for the appropriation of cultivation techniques; an integrated toolkit designed by the project; small feasible actions; community re-launch of the ATPC for certification; the construction of a borehole with a water tower for market gardening and the supply of drinking water to households; diversification of income-generating activities; and the integration of nutrition-sensitive agriculture.

Community health workers and prevention of malnutrition

In Mali, high rates of malnutrition and difficulties of access to rural areas hinder treatment for severe acute malnutrition (SAM) and potentially render it less effective. Community health workers (CHW) provide integrated management of malaria, diarrhoea, and pneumonia as well as screening, referral, and follow-up of children with malnutrition under an integrated Community Case Management (iCCM) system. The purpose of the trial by Alvarez Morán et al. (2018) was to explore the potential of integrating treatment of SAM within the iCCM strategy delivered by CHWs. It was hypothesized that the integration of SAM treatment would permit earlier identification of SAM, better access to treatment, and improved clinical outcomes.

Lopez-Ejeda et al. (2020) assess whether timely provision of treatment for SAM by CHWs could reduce the severity of SAM at admission to treatment and lead to better discharge outcomes. Their study is a secondary analysis of data from the study by Alvarez Morán et al. (2018), and its authorship is overlapping.

Rogers et al. (2018) examine and compare the costs and cost-effectiveness of SAM treatment by CHWs and by PHFs. This study is also based on the trial in Kita described by Alvarez Morán et al. (2018). Rogers et al. (2018) use activity-based costing methods to estimate costs of CHW-delivered care and facility-based care and employ a societal perspective to include all relevant costs incurred by institutions, beneficiaries, and communities. The study was funded by the Innocent Foundation.

Agronomy and livestock interventions

Bonde's (2016) evaluation examines the impact of agronomy and livestock interventions between 2011 and 2015 on dietary diversity amongst women and children in the Mopti Region, where acute malnutrition was prevalent despite surplus grain production. The project was funded by Agronomists and Veterinarians Without Borders (AVSF) and implemented in Bankass and Koro communes in Mopti Region (Bonde 2016). 78% of the population of these communes practise agriculture but malnutrition is prevalent. In Mopti region, the moderate acute malnutrition (MAM) rate is 12.7% and the SAM rate 5.9%. 50% of children had an insufficiently varied diet. The main objective of the AVSF program was to improve the diets of children aged between zero and two years and of women of childbearing age through plant and animal food production, training in nutrition, hygiene, and horticultural practices, and by improving food quality in 40 villages.

Methods

Three studies assessed the impacts and efficiency of the treatment of severe acute malnutrition by community health workers compared to that provided by traditional facility-based healthcare.

The study by Alvarez Morán et al. (2018) consisted of a one-year multi-centre, randomized intervention, which was conducted between February 2015 and February 2016 in the communes of Tambaga, Bougarabaya, and Kobiri in Kita District, during which treatment for uncomplicated SAM was provided at primary health facilities (PHF) in the control area and by both CHWs and PHFs in the intervention area. The identification of key indicators in a socio-demographic baseline survey implemented prior to the intervention permitted allocation of treatment between the treatment and control areas to be randomized and rationalized. The survey was administered to a cluster-randomized sample: clusters/villages were selected proportional to their population size, and then in each cluster a modified 'Expanded Program of Immunization' (EPI) sampling method was used to select individual households. In total, 699 children were admitted to the intervention group and 235 to the control group. 'Matched pair' analysis was used to mitigate the lower sample size in the control group. Children aged between 6 and 24 months formed the majority of admitted cases. Almost 50% of these cases were based on MUAC. All children with complicated SAM were referred to a nearby Stabilization Centre (Alvarez Morán et al. 2018).

Lopez-Ejeda et al. (2020) is a secondary analysis of data from the study by Alvarez Morán et al. (2018). This study disaggregates children by treatment provider (primary health facility vs. community health worker), independent of area, with the aim of assessing whether provision of treatment on a local basis through CHWs allows children to be admitted into treatment earlier and in a relatively less severe condition, with the potential for more favourable treatment outcomes, compared to care at a primary health facility. For this study, the intervention group consisted of all the children assessed and treated by the 17 CHWs in the three communes. The control group comprised all the children assessed and treated in the seven PHFs that covered the same three communes plus four others.

Rogers et al. (2018) examined costs associated with SAM treatment derived from accounting records and information obtained in key informant interviews with staff, partners, community leaders, and beneficiaries. Ten focus group discussions (five each in the intervention and control groups) were conducted in January 2016 in purposively selected villages to account for differing health system, demographic, and geographic characteristics. Sixty-eight carers with a child in treatment or recently discharged were asked about their travel time, costs, and local wage rates, in order to estimate foregone income. An activity-based cost analysis was developed to assign costs to program activities. All costs incurred by institutions, beneficiaries, and communities were included. Costs were allocated between eight cost centres: support; supervision and monitoring; training; sensitization and mobilization; screening; counselling; treatment; and household costs. Effectiveness data were collected during the trial (Alvarez Morán et al. 2018), and cost-effectiveness ratios were calculated for cost per child who had recovered.

Six studies assessed the impacts of multidimensional interventions for nutrition outcomes of vulnerable groups (AIIER 2019; CARE International 2019; Government of Canada 2016; ICF Consulting Services 2016; Iknane et al. 2019; Tilford 2009). All of these studies, with the exception of ICF Consulting Services (2016) use both qualitative and quantitative methods. Qualitative data were typically collected via stakeholder and beneficiary interviews. Quantitative data consisted of baseline and endline surveys among a representative sample for certain clusters, mostly villages. No study used panel data; hence attribution of observed effects may be spurious.

The evaluation of the Sahel Strategy (ICF Consulting Services 2016) involved desk research of ECHO policy and programming, online surveys provided by implementing partners, and field visits to selected projects. A purposive sample of projects was selected to capture the diversity of interventions and of the contexts in which they took place. Interviews were conducted with representatives of implementing partners, stakeholders from national and local authorities, health workers, local leaders, and a small number of project beneficiaries. Lack of time-series and district-level data on malnutrition indicators meant that it was not possible to determine how malnutrition had evolved in the project areas or to quantify project outcomes.

One study assessed the impacts of agronomy and livestock interventions on nutrition and dietary diversity (Bonde 2016). The study is based on both qualitative and quantitative methods. Qualitative data were collected via stakeholder and beneficiaries interviews. Quantitative data consisted of baseline and endline household surveys among a representative sample for certain clusters, mostly villages. Since it is not a real panel, attribution of observed effects may be spurious.

Relevance

Relevance was not specifically addressed by most of the studies, though the projects were clearly so. Considering the high levels of maternal mortality and that of children under five caused by malnutrition in the Sahel Region, an overall focus on treatment of malnutrition over prevention was necessary. However, ECHO's Sahel Strategy (ICF Consulting Services 2016) considered that this was not enough and that preventive measures were also needed and undertook various pilot projects. Although largely beyond the Sahel Strategy's scope, the evaluators believed that more projects could have integrated WASH and behavioural change activities, since these are relatively inexpensive and could have had a sustainable impact on the prevention of malnutrition.

CARE International's (2019) report on the USAID / Feed the Future project refers directly to relevance in this context. This was in connection with the inclusion of both agriculture and WASH as complementary components of their nutrition project. This was both relevant and effective in that it promoted healthy practices and enhanced positive health and nutritional outcomes. Collaboration with community members on the development of the *Agriculture, Nutrition, and WASH Toolkit* helped identify potential behavioural barriers as well as motivating factors. The toolkit's delivery to facilitators and trainers, was a means of disseminating good practices more widely amongst smallholder farmers and VSLA groups, particularly among women, and contributed to project sustainability.

Efficiency

Only Rogers et al. (2018) directly address efficiency. They found that in the trial comparing CHW-delivered care to outpatient facility-based care, supervision and monitoring consumed over half of the project budget. However, supervision costs would be expected to be high at the commencement of Integrated Community Case Management (iCCM) programs and efficiencies would likely be gained over time by employing national staff and integrating the supervision of different iCCM components.

Impacts

Impacts of multidimensional interventions for nutrition outcomes of vulnerable groups

The USAID nutrition and hygiene project (AIER 2019) found that there was an increase in the total quantity of nutrient-rich foods produced and consumed by direct beneficiaries, and an increase in sales of agricultural products by small holders. The evaluation also found considerable improvements in nutrition indicators. The percentage of children aged below five years that were on acute malnutrition went down from 30.4% to 25.8%, and the percentage of underweight children aged below five years went down from 19.6% to 16.9%. For most indicators, though, comparisons between baseline and endline values cannot be made since baselines values are either not provided or provided in a manner that does not allow comparison (for example, the baseline figure is expressed as a percentage of the total). On the hygiene indicators, the percentage of households using water and soap for handwashing increased from 35.3% to 77%, and the percentage of households using improved latrines increased from 57.7% to 91%.

The six-year USAID / Feed the Future program (CARE International 2019) integrated agriculture and WASH components with nutrition. The five to seven different activities under each strategic objective meant that the program reached many sectors of the population, including community leaders and government officials as well as farmers, craftsmen, and mothers. A major activity was the participatory development and distribution of the agriculture, nutrition, and WASH toolkit. As a result of extension workers using the toolkit in the rural areas, producers were able to diversify crops by introducing new hybrid varieties and drought-resilient grains, vegetables, and fruits and to learn food processing and storage techniques. In addition, women were trained in nutrition and hygiene. Many of the project's achievements are attributed to this activity, in particular greatly increased production of millet and sorghum, increased exclusive breastfeeding and a reduction in stunting, and increased functional literacy amongst women. Market gardening helped women generate an income as well as providing produce to support a more varied diet. Positive impacts of project activities related to hygiene are attributed to the implementation of community led sanitation and construction of latrines, and greater access to handwashing facilities (CARE International 2019).

The CARE International (2019) evaluation lists indicators under each strategic objective, with target and endline data and identifies progress made since the baseline survey in 2014. These data are expressed either as percentage rates, whereby it is possible to see whether targets

were missed or exceeded, or simply as numbers of people treated or reached. Overall, according to the data, the project met or exceeded many of its targets, particularly those for child health and nutrition. Some indicators were not met, and this was said in the report to be because the targets were too ambitious, e.g. a 200% increase in the number of households using recommended technologies for water treatment where 102% was achieved. Given the very large number of project beneficiaries, these were high targets and difficult to meet

The data tables record outcomes, whilst the positive impacts of the project are narrated as “success stories” (CARE International 2019) by beneficiaries and local officials, rather than through a more formal evaluation. The stories cover improved health and nutrition due to use of latrines, soap in handwashing, early and exclusive breastfeeding, avoidance of severe acute malnutrition through use of a nutritive baby food, and use of water purification tablets, and corroborate the outcomes data and information.

Government of Canada (2016) found that the project had a significant impact on reduction in the prevalence of chronic malnutrition among children aged 6 to 59 months, from 43% down to 26% (with a target of 38%). The rate of severe acute malnutrition (SAM) also decreased from 3.2% in 2012 to 2.4% in 2016. The study found that breastfeeding rates rose from 10.9% in 2012 to 36.6% in 2016. At the end of the project in 2016, the diets of men and women had a higher dietary diversity of 65.8% and 76.7% respectively.

Overall, the ECHO Sahel Strategy (ICF Consulting Services 2016) was judged effective in achieving its objective of reducing mortality linked to malnutrition in the beneficiary communities. In Mali, according to World Bank data, infant mortality declined from 155 per 1,000 births in 2007 to 118 per 1,000 in 2014. Since ECHO, together with UNICEF, was the main international actor supporting the treatment of malnutrition in the Sahel region it contributed to this positive impact. The reduction in mortality due to malnutrition was achieved principally by funding screening activities to increase the number of cases detected, increasing coverage and the number of health centres treating malnutrition, and funding supplies of therapeutic foods and medicine. However, global acute malnutrition (GAM) and SAM rates have not fallen in the Sahel, which may be due to factors such as an increase in refugee populations, poor harvests, and the fact that only since 2013 (two years before the evaluation) had implementing partners begun to address prevention of malnutrition. Apart from food assistance activities, this had not yet been funded at a large enough scale to impact on malnutrition. Food assistance was believed to have failed to reduce malnutrition because it did not address the root causes. WASH and community sensitization activities were considered likely to make a difference.

ECHO’s intervention logic assumed that no single series of input, activity, output, and outcome could generate the expected impact and that they were interdependent. The evaluation team (ICF Consulting Services 2016) found it difficult to measure the impact of the Sahel Strategy without a logframe showing indicators and targets. It was not possible to assess progress and determine impact, because ECHO and its partners did not keep records in a measurable and aggregate manner. The evaluation team relied on evidence in project reporting, anecdotal evidence provided by ECHO and its partners, and observations and information collected from

beneficiaries and local stakeholders in the field to draw conclusions about the impact of the Strategy.

Infant mortality declined in Mali during the period of the intervention, and the evaluation (ICF Consulting Services 2016) says that the Sahel Strategy contributed to reducing mortality rates directly. ECHO's most significant contribution was to increase the coverage of health centres offering nutrition treatment and the number of children under five screened and treated between 2010 and 2014. ECHO also helped build national capacity by training local health workers. From 2012, the Sahel Strategy sought to reduce dependency on food assistance and also the negative impacts of food aid on local markets through a 50% in cash, 50% in kind model. In transitioning from food aid towards prevention of malnutrition, ECHO was amongst the leaders of the resilience-building approach and sought to link food aid and treatment to the prevention of malnutrition. It was anticipated that other agencies would scale up its pilot programs in their own development activities. In Mali its focus was on improving health and hygiene.

In 2013–14 greater emphasis was placed on the integration of ECHO-funded actions into national systems. and the objectives for the next phase of the program in Mali in 2015–2020 shifted towards establishment of social safety nets. Implementing partners frequently collaborated closely with regional and local authorities. However, during the evaluation team's field visit in Mali, it was found that there had been communication issues with regional and local authorities and community representatives. The authorities had not been very involved in the design phase of the project, reportedly due to their lack of interest or capacity. Representatives of some local communities said that they were not well informed about activities in their area, the decisions taken by project partners, and why some areas and districts were targeted and others not (ICF Consulting Services 2016). Timely provision of information could have been beneficial in generating support for project activities and having a more positive local impact.

ECHO's commitment to autonomy meant that, in some cases, activities were not necessarily aligned with national policies and practices where the latter were considered by ECHO to be inappropriate. For example, in Mali, the health system was largely based on cost recovery, whilst the ECHO projects provided free access to all children under five. National authorities and health workers interviewed reported that provision of free healthcare created competition between health centres benefiting from NGOs financial support and those operating without support. ECHO was advocating for the Malian government to provide free healthcare to families most in need, but, in the meantime, the free healthcare offered by ECHO-funded health centres drew patients away from the national health centres where they had to pay, undermining and doing harm to these essential local services. Disparities in the salaries offered by ECHO and by the national government also had a negative impact (ICF Consulting Services 2016).

Iknane et al. (2019) report some positive results of the project focusing on improvement of the nutritional status and hygiene and sanitation practices of pregnant and lactating women and children under two years. Their key informants noted a reduction in the number of cases of diarrhoea, acute malnutrition and anaemia in pregnant women. Regarding village savings and credit associations, it was noted that communities in 17 villages spontaneously set up their own savings and credit system. The report also noted that most indicators had improved since the

mid-term evaluation in 2017 The prevalence of stunting or chronic malnutrition had gone down from 15.7% in 2014 to 8.4% in 2017, but increased slightly to 9.6% in 2019. The target at the end of the project was not reached. This could be explained by the exacerbation of insecurity compared to 2017, which would have had an impact on the population's ability to properly implement activities related to agriculture and the marketing of their products. These results are based on a before-and-after survey.

The SAN+ project, aimed at improving nutritional status and reducing morbidity and mortality in children, met many of its targets and in cases where the achievements were not statistically significant gains were nevertheless recorded (Tilford 2016). When results from the National Nutrition Week campaigns were included, targets were met or exceeded for 10 out of 17 indicators. For the remaining seven indicators, the endline survey results demonstrated that the SAN+ team made progress towards reaching most of its targets. However, as is the case with other multi-year programs, other factors such as a good harvest or interventions by other donors may have contributed to the results recorded. The six-monthly National Nutrition Weeks organized by the Ministry of Health and several partners, including the SAN+ team, targeted the same population groups and likely also contributed to positive outcomes. With respect to the main objective – to improve nutritional status through decreasing the prevalence of underweight children under two years, several indicators at the endline greatly exceeded their targets. These included exclusive breastfeeding and the complementary feeding of infants. The potential impact – healthier children not suffering from malnutrition – was not specifically discussed. Activities associated with objectives 2, 3, and 4, e.g. consumption of Vitamin A, deworming treatment, and control of diarrhoea, helped explain the progress toward achieving the first objective, as the report indicates, and therefore had an indirect impact on improved nutritional status. The focus on results and outcomes, and the implicit assumption of positive impact is not uncommon in evaluation reports (Tilford 2016).

The SAN+ project team, with the Ministry of Health, successfully reintegrated nutrition interventions into health services offered at community and district level facilities. These included the Nutrition+ package for Community Management of Acute Malnutrition (CMAM), a component supported by other funding sources. The project also increased community awareness of the importance of nutrition and through the community health centres and provided the means of sustaining this awareness. The decisions to implement the SAN+ project through the existing health system and to add a therapeutic component to prevention activities were key factors in achieving positive outcomes (Tilford 2016). Capacity-building activities with Ministry of Health personnel, especially those at the community health centres, led to a marked improvement in the quality of nutrition services offered. The successful reintegration of the Nutrition+ package was seen by the Ministry as a model to be replicated in other areas (Tilford 2016).

Impacts of community health workers on malnutrition

In Alvarez Morán et al.'s (2018) trial comparing treatment of children with severe acute malnutrition (SAM) by community health workers (CHW) to the standard treatment at a primary healthcare facility (PHF), those in the intervention group were treated by either a CHW or PHF

whilst all those in the control group were treated at a PHF. CHWs were already involved in screening for SAM and, with minimal training, were able to provide appropriate treatment within the community without compromising treatment outcomes. The intervention group treated by CHWs reported cure ratios of 94.2% compared to 88.6% in the control group, which may partly be due to children being able to access treatment earlier. Whilst clinics and PHFs continue to have an important role in the detection and admission of cases, CHWs can take treatment to the more distant communities. This can potentially have a major positive impact on treating and reducing the prevalence of SAM in many more communities in Mali and other countries (Alvarez Morán et al. 2018).

Lopez-Ejeda et al.'s (2020) analysis was based on a regrouping of the children in Alvarez Morán et al.'s (2018) study described above. A total of 552 children (59.4%) were treated by CHWs in the community, and 378 children (40.6%) received outpatient treatment at PHFs. The proportion of children cured was higher in the CHW group (95.9%) than in the PHF group (88.7%) and the probability of not being cured in the PHF group was 3.3 times higher. Analysis also showed that children treated by CHWs were 51% more likely to recover than those treated at clinics, but this may reflect initial health conditions – the study shows that children treated by CHWs generally had a less severe form of SAM at admission.

Lopez-Ejeda et al. (2020) report a previous analysis on the cost-effectiveness of CHWs as treatment providers, showing that families can save half the time and one-third of the cost of treating their children at the PHFs. The saving potentially has a secondary positive impact in that it may prevent families from delaying treatment and allow children to be admitted before their condition becomes severe. Less severe disease at admission was also associated with reduced length of treatment, therefore having a positive impact on the children and their families, and also freeing up space for other patients.

Rogers et al.'s (2018) analysis of Alvarez Morán et al.'s (2018) study focused on cost and cost effectiveness of treatment by community health workers versus that at a health facility. In the trial, there were unequal numbers of children in the treatment and control groups (the base case). Since this posed some challenges for determining cost-effectiveness, a sensitivity analysis was used to model an equal number of children in each group, using the sample size (n=617) in the intervention area during the trial (the modelled scenario). This allowed an assessment of cost and cost-effectiveness assuming equal availability and accessibility.

In the base case, *treatment by community health workers (CHWs) was more cost-effective* than outpatient facility-based care, at US\$ 244 per child treated compared with US\$ 442 for facility-based care, and US\$ 259 per child recovered for CHW care and US\$ 501 for facility-based care. Under the modelled scenario, the average cost per child treated by CHWs was US\$ 238 compared with US\$ 188 in the outpatient facility. The cost per child recovered was US\$ 253 and US\$ 214, respectively. Under this scenario, *outpatient facility-based care was more cost effective than CHW-delivered care*.

Univariate sensitivity analyses showed a difference in range of costs per child in the control group between the base case (USD 469 to USD 555) and the modelled scenario (US\$ 151 to US\$ 245). The findings suggest that achieving good coverage is a key factor in improving the

cost-effectiveness of CHW-delivered treatment for SAM in this context. This is partly due to fixed costs being spread over a higher number of beneficiaries when coverage is increased. In the intervention group, supervision and monitoring of CHWs had the highest share of costs, though this might be reduced over time (Rogers et al. 2018).

Impacts of agronomy and livestock interventions on nutrition

Improved dietary diversity scores in the AVSF intervention (Bonde 2016) suggest that increased crop production, provision of small livestock, and training in cheese production and nutrition contributed positively to improving food access for beneficiary households. The proportion of households with acceptable food consumption increased from 67% to 85% during the lean period (June to September), exceeding the forecasted 75%. In the post-harvest period, the percentage of households with acceptable food consumption rose from 81% to 89%, close to the target of around 90%.

The dietary diversity score during the lean season for children aged 24–59 months (FAO methodology) rose from 3.9 food groups out of nine to 4.4 groups by the end of the project. The percentage of mothers with a low food diversity score (≤ 3 food groups) decreased between the baseline (46%) and the final post-harvest survey (26%), this decrease being statistically significant ($p < 0.05$). For infants aged 6–23 months (WHO methodology), the average dietary diversity score increased from 2.3 to 3 food groups out of seven by the end of the project. Small-scale livestock breeding had a significant impact ($p < 0.05$) on the dietary diversity scores of mothers, and, in addition, income generated facilitated greater access to other foods (Bonde 2016).

Sustainability

Government of Canada (2016) recognized that the sustainability of the IFONS project required that beneficiaries, government officials and other community authorities take ownership of the project. Also necessary was the establishment of effective management tools for the continuation of the project.

The USAID / Feed the Future project (CARE International 2019) worked closely with government and local authorities and took pains to ensure that at least some of its work would be sustainable after project closure. To help ensure continuity and sustainability, the project promoted community ownership and involvement in project activities. Community members and representatives from local, regional, and national government participated in the planning, implementation, and monitoring of activities, which gave them a sense of ownership and the skills to carry the project forward. Capacity-building of beneficiaries and local stakeholders was a key component. Local organizations such as village savings and loans associations (VSLA), were used to disseminate good practice in nutrition and WASH. Farmer field schools helped build capacity of small-scale producers, and those trained shared their knowledge with their neighbours. The project also helped to build the capacity of the local extension services through training and provision of equipment. Nutrition Activities Support Groups were established in some health districts. The project also partnered with VSLA groups in the establishment and

operation of sanitation shops, which made WASH products locally available and also enhanced women's income-generating activities. Local WASH committees and builders were trained in the management and maintenance of WASH infrastructure. Several partnership agreements were signed and implemented between government departments and local organizations for the provision of health, agriculture, and sanitation services. The project also supported sector planning and the establishment of Mali's sanitation information platform (*SANIYA*).

ECHO's Sahel Strategy (ICF Consulting Services 2016) helped build national capacity by training community health workers and volunteers, setting up databases and registration systems, and establishing malnutrition screening facilities and protocols with the idea that other donors would build on its work. The Sahel Strategy's program in Mali began as an emergency intervention providing food aid and only later looked towards treating and preventing malnutrition as a means of sustaining a reduction in mortality.

Iknane et al. (2019) expected that the nutrition and WASH gains would continue beyond the project's end. All levels of stakeholders in the village WASH committees and both female and male leaders expressed their motivation to sustain positive behavioural changes. Mobilization by community health workers was expected to have an ongoing impact. Stakeholders expressed a general perception that the measures improved the health of families. The open-defecation-free strategy proved to be useful in consolidating the program's achievements and ensuring its sustainability.

Training and capacity-building provided by the SAN+ project (Tilford 2016) improved the nutrition knowledge and skills of healthcare providers at community health centres and improved collaboration with the Ministry of Health, as a result of which the Ministry planned to replicate the SAN+ project approach at a national level. This was seen as a means of sustaining the work of the project, though without provision of funding the level of activity could not be sustained.

Interventions of the AVSF program (Bonde 2016), which involved improved agronomic practices and provision of small livestock to increase dietary diversity, were not likely to be sustainable in the long-term. No provision was made for animal feed in the lean period or for veterinary services, and it was found that mothers had little knowledge of dietary requirements for young children.

Barriers

The Government of Canada (2016) mentioned a few constraints: women found it more difficult to attend communal meetings than to attend village meetings, since attending community meetings often involves transportation and also authorization from their husbands. Other constraints were distance from the sites and lack of human resources for monitoring and evaluation.

The USAID / Food for Future project (CARE International 2019) and ECHO's Sahel Strategy intervention (ICF Consulting Services 2016) were hampered by the security situation in Mali. In

the area of operation of the USAID / Food for Future project (CARE International 2019), the security situation progressively worsened in the course of the project. Petty crime and banditry led to theft of equipment and vehicles, and then, with the movements of jihadists and armed groups, there were targeted killings, intercommunity conflict, and mass killings. Travel in certain areas was prohibited, making it increasingly difficult to reach beneficiary communities and strongly impacting on project activities.

Security also impinged on ECHO's intervention (ICF Consulting Services 2016) and led to food insecurity. Immediate challenges included reaching beneficiaries living in remote areas for screening and potential treatment; treating nomadic persons who move away from health districts mid-treatment; overcoming high drop-out rates of patients, which can hinder their recovery; the low technical capacity of health workers; and high turnover rates of staff from INGOs and in local health centres, which resulted in a loss of institutional knowledge. ECHO also was also faced with the problem of recognizing the need to scale up activities to prevent malnutrition, whilst not being itself in a position to do so and needing to rely on national government and donor willingness to fund both treatment and prevention.

Both these projects had also to take account of droughts which affected food security and hindered post-conflict economic recovery. Droughts led to increased pressure on limited water supplies for agriculture, and harvests were affected by pests, leading to a decline in production and limited availability of food products. In response, the USAID / Food for Future project (CARE International 2019) promoted fast-yielding drought-tolerant crop varieties and trained farmers on soil conservation and restoration, as well as the use of organic pesticides. The various shocks impacted on household savings, which also affected the activities of VSLAs.

Iknane et al. (2019) described not only socio-cultural constraints but also religious burdens. For women's empowerment, the lack of women's financial capacity was a constraint. Despite efforts to raise awareness through the various communication channels implemented by the Nutrition-WASH project, women's empowerment is still dependent on their financial autonomy and also on their ability to free themselves from the socio-cultural constraints of their environment. The level of education of women could contribute to positive changes in this direction, without upsetting the socio-cultural fundamentals of the localities concerned.

Summary

In rural Mali, malnutrition is the main avoidable factor related to child mortality (Lopez-Ejeda 2020). Prevention and treatment are hampered by conflict and drought, which are partly responsible for increasing the numbers of those affected by malnutrition. As a result of the large number of children suffering from severe acute malnutrition (SAM), several of the interventions reviewed in this report focused on its treatment. Others were more concerned with its prevention through improving nutrition and health.

Impacts of multidimensional interventions for nutrition outcomes of vulnerable groups

Six studies assessed the impacts of multidimensional interventions for nutrition outcomes of vulnerable groups (Allier 2019; CARE International 2019; Government of Canada 2016; ICF Consulting Services 2016; Iknane et al. 2019; Tilford 2009).

Allier (2019) found that the USAID nutrition and hygiene project contributed to a considerable decrease in acute malnutrition and underweight among young children, and in an increase in various hygiene practices. All levels of stakeholders in the village WASH committees and both female and male leaders expressed their motivation to sustain positive behavioural changes.

Government of Canada (2016) found a reduction in the prevalence of chronic malnutrition and severe acute malnutrition among children aged six to 59 months, and breastfeeding increased substantially. During the implementation of the project, the stakeholders exhibited considerable ownership and political will in continuing the project. The constraints mentioned by the report include various cultural, political, geographical and technological barriers.

Iknane et al. (2019) found a reduction in the number of cases of diarrhoea, acute malnutrition, and anaemia in pregnant women, but underweight remained. Stunting slightly decreased over the full project period.

USAID / Feed the Future's project (CARE International 2019) targeted children during their first 1,000 days through the promotion of improved agricultural practices, health sector services, nutrition education, and behaviour change communication. The agriculture, nutrition and WASH toolkit had a positive impact in passing key messages throughout the target population via trained local extension workers. Positive impacts narrated by beneficiaries include improved child health and nutrition resulting from early and exclusive breastfeeding and also use of nutritive baby food. Positive impacts of the project's WASH component were the implementation of community led sanitation and construction of latrines, and greater access to handwashing facilities. Community Health Workers appeared to have a larger impact on changing hygiene and nutrition related behaviours.

The SAN+ project, aimed at improving nutritional status and reducing morbidity and mortality in children, met many of its targets (Tilford 2016). Among the achievements were higher uptake of exclusive breastfeeding, the complementary feeding of infants, better deworming treatment, and control of diarrhoea. To what extent these immediate outcomes contributed to the hoped for impact – overall healthier children – was not explored in this evaluation. However, the report noted that the SAN+ project team, with the Ministry of Health, successfully reintegrated nutrition interventions into health services offered at community and district level facilities. The decision to implement the SAN+ project through the existing health system and to add a therapeutic component to prevention activities were key factors in achieving positive outcomes (Tilford 2016). Capacity-building activities with Ministry of Health personnel, especially those at the community health centres, led to a marked improvement in the quality of nutrition services offered (Tilford 2016).

The massive ECHO Sahel Strategy (ICF Consulting Services 2016) was judged effective in achieving its objective of contributing to reducing mortality linked to malnutrition in the beneficiary communities. In Mali, according to World Bank data, infant mortality declined from 155 per 1,000 births in 2007 to 118 per 1,000 in 2014. Since ECHO, together with UNICEF, was the main international actor supporting the treatment of malnutrition in the Sahel region it is likely that it contributed to this positive impact. The reduction in mortality due to malnutrition was achieved principally by funding screening activities to increase the number of cases detected, increasing coverage and the number of health centres treating malnutrition, and funding supplies of therapeutic foods and medicine.

Impacts of community health workers on malnutrition

Three studies assessed the impact of treatment of severe acute malnutrition by community health workers (CHW) compared to that provided by traditional facility-based health care (Alvarez Moran et al. 2018; Rogers et al 2018; Lopes Ejeda et al. 2020). The study by Alvarez Morán et al. (2018) found that treatment by CHWs was effective and not inferior to that provided by PHFs. It had a positive impact on the treatment of malnutrition in children. Rogers et al. (2018) showed that CHWs could be cost-effective, given an adequate level of coverage, though the authors doubted whether this could be achieved in contexts such as Mali. Lopez-Ejeda et al. (2020), who based their study on the fieldwork of Alvarez Morán et al. (2018) confirmed their conclusions regarding the efficacy of treatment by CHWs and the impact that early diagnosis had on treatment outcomes.

It is noteworthy that the trial by Alvarez Morán et al. (2018) involving treatment of malnutrition by community health workers, the SAN+ nutrition and health project (Tilford 2009), and the USAID / Feed the Future nutrition and hygiene project (CARE International 2019), which all worked closely with their target communities and provided capacity building and training were the most likely to be sustainable. The more projects can rely on local resources, the greater the likelihood that their impacts will be sustainable. These projects, like others, were impacted by adverse events and circumstances, whether violence and conflict, drought conditions, or difficulties in bringing in supplies. Projects operating at the height of the conflict in 2012–2014, such as the agronomy and livestock project evaluated by Bonde (2016), the Sahel Strategy (ICF Consulting Services 2016), and the USAID / Feed the Future nutrition and hygiene project (CARE International 2019) nevertheless managed to have a positive impact.

Impacts of agronomy and livestock interventions on nutrition

The AVSF project (Bonde 2016), which was concerned with improving nutrition and dietary diversity through agriculture and livestock-based interventions, found that the introduction of drought-resistant crops and small livestock had a positive impact on increasing dietary diversity in beneficiary households and helped to prevent malnutrition in mothers and children. It is not clear whether the impact can be sustainable.

Rural Development and Climate

The Evidence Base

Rigorous Impact Evaluations

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Good Enough Evaluations

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Cabinet Africain d'Études et Conseils (CAEC). 2016. *Évaluation finale de la 1ère phase du « Projet d'appui à la restauration du système Faguibine (PARF) » : Rapport final*.

CARE. 2017. *Cash assistance to households affected by food insecurity in Goundam and Niafunké Districts (Rapport d'évaluation finale du projet)*.

Dianka, M. & Nienta, I. 2017. *Rapport d'évaluation finale du projet: « Renforcer la capacité d'adaptation et la résilience des communes de Sandare, Massantola, Cinzana et M'Pessoba face aux changements climatiques dans le secteur agricole au Mali »*. Canadian International Development Agency / UNDP.

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United States Agency for International Development (USAID). 2020. *Final performance evaluation of the cereal value chain activity in Mali*.

A total of 26 studies were included, of which 9 were rigorous. Two of these (Dillon 2011a, 2011b) focused on the impacts of irrigation, and two (Beaman et al. 2013; Pettersson & Wikström 2016) were concerned with fertilizer application. One study (Osei et al. 2018) discussed mobile phone use as a tool for agricultural extension services, and one (Dao et al. 2021) compared the impacts of unconditional cash and in-kind transfers. Two studies (Beaman et al. 2014a, 2014b) examined rural credit schemes. The final rigorous impact evaluation (Mitchell et al. 2018) was of the Millennium Villages Project, a multisector project aimed at implementing the Millennium Development Goals. Methods used by rigorous evaluations consisted of randomized experiments, propensity score matching, pre and posttests among control and treatment groups, pre and post testing among treatment groups only with panel data, inverse probability weighted regression adjustment, and RCT.

The good enough evaluations typically used a qualitative or mixed methods approach, based on desk reviews, field visits, and stakeholder interviews. One study (GIZ 2019) assessed the impact of improved small-scale irrigation techniques on economic and nutritional status. One study (CARE 2017) provided cash transfers to try to improve food security during the lean season. JAICA (2010) evaluated a project providing safe drinking water in rural communities. The study by Oxfam America (2013) was an assessment of Oxfam's own Savings for Change program. Two studies by USAID (2013, 2020) and one by Transition International & Transtec (2020) evaluated projects focused on improving agricultural and fish value chains to improve productivity and also food security. One study (Hodge & Bosma 2015) was concerned with the conservation of endemic livestock. Three studies (CAEC 2016; Touré et al. 2013; Nelen et al. 2019) examined projects aiming to strengthen resilience and improve food security in wetland areas. Six studies (Dianka & Nienta 2017; FAO & WFP 2019; Halle & Doumbia 2020; the Bureau de la Coopération Suisse au Mali 2015a, 2015b; and the Drylands Coordination Group 2015) reviewed projects focused on strengthening resilience and adaptation to climate change and improving food security in the drier areas of Mali.

The following table summarizes the evidence base, structured by sectors.

Sector	Rigorous	Good enough
Irrigation Projects	Dillon 2011a, Dillon 2011b	GIZ 2019
Fertilizer Projects	Beaman et al. 2013; Petterson & Wikstroem 2016	
Extension Services	Osei et al. 2018	
Cash and In-Kind Transfers	Dao et al. 2021	CARE 2017
Drinking Water		JAICA 2010
Rural Credit	Beaman et al. 2014a; Beaman et al. 2014b	Oxfam America 2013
Millennium Villages	Mitchell et al. 2018	
Improving Food Security and Reducing Poverty through the Agricultural Value Chain		USAID 2013; USAID 2020; Transition International & Transtect 2020
Conservation of Endemic Livestock and their Habitat		Hodge & Bosma 2015
Resilience in Wetland Areas		CAEC 2016; Toure et al. 2013; Nelen et al. 2019
Resilience in Dryland Areas		Dianka & Nienta 2017; FAO & WFP 2019; Halle & Doumbia 2020; Bureau de la coopération Suisse au Mali 2015a; Bureau de la coopération Suisse au Mali 2015b; Drylands Coordination Group 2015

Irrigation-focused projects

Two rigorous studies (Dillon 2011a, 2011b) are concerned with the impact of irrigation schemes on increasing agricultural production, consumption and income, and their efficacy in reducing poverty.

Dillon's (2011a) rigorous impact evaluation was concerned with whether the scale of an irrigation project resulted in differing impacts on household production and consumption. His study was based on panel data from a survey by the International Fund for Agricultural Development (IFAD) in 1997–1998 and a multi-topic household survey that Dillon himself undertook in northern Mali in 2006. His study on irrigation is restricted to a subsample of households in the circle of Niafunké, Tombouctou Region, where donor-financed irrigation

schemes use motorized pumps to redistribute water from the Niger River through irrigation channels. The program was sponsored by Cornell University and Clark Atlanta University, and by the International Food Policy Research Institute (IFPRI).

There are many small-scale schemes and one large-scale scheme in the circle of Niafunké. Dillon (2011a) compared small-scale village projects (< 50 ha) with the large-scale project (≥ 300 ha). He used a subsample of 651 agricultural households, 52% of which had access to irrigation, 43.5% of these to small-scale irrigation and 8.6% to large-scale irrigation. Irrigation is primarily used for rice cultivation. Small-scale irrigators each cultivated about 2.85 ha, of which 1.04 ha was rice, and large-scale irrigators 0.63 ha. Production per hectare was larger among small irrigators (4,496 kg/ha) than large-scale irrigators (3,819 kg/ha). However, higher production per hectare among small-scale irrigators did not lead to greater per capita consumption relative to the large-scale irrigators. Small-scale irrigators had about 60,000 FCFA (US\$ 120) higher income levels than large-scale irrigators, but differences between the small irrigators was high.

A second rigorous evaluation by Dillon (2011b) used the same data but looked at the effects of small-scale irrigation on poverty reduction, asset accumulation, and informal insurance compared to households that did not have access to irrigation. The study focused on 245 households in the Soboundou commune in the Circle of Niafunké. Mean agricultural production for small-scale irrigators was 2.1 tonnes, compared with only 216 kilograms for farmers using rain-fed agriculture. Median agricultural capital was approx. 32,000 FCFA (US\$ 70) per household. Household consumption was also higher for farmers using irrigation. Other factors contributing to their higher agricultural productivity included labour, crop choice, area cultivated, and input utilization. All villages with access to irrigation increased agricultural production over the eight-year period between surveys; in villages without irrigation, only two-thirds increased production. The irrigation projects also led to asset accumulation and informal sharing within villages, which helped households mitigate risk, particularly during the lean season.

One non-rigorous report assesses a project designed to improve the economic and nutritional status of a rural population in Mali through better small-scale irrigation techniques (GIZ 2019). Named Support to the Sub-Sector of Small-scale Irrigation (PASSIP) in Mali, this project was implemented by Malian Ministry of Agriculture, the National Department for Rural Engineering (Direction nationale du génie rural, DNGR) and its regional structures, from 2017 to 2019, with a total cost of EURO 28,674,118, including EURO 6.6 million from the EU & EURO 10.4 million from Canada. The project's target population was 29,000 small-scale irrigation farmers of both genders in the regions of Koulikoro, Sikasso, Mopti, Tombouctou, Kayes, and Gao. PASSIP's main activities included the expansion of the irrigation infrastructure, with plans for micro-dams and irrigation areas; support to Mali's Ministry of Agriculture in developing conditions of the legal framework and coordinating the national program for small-scale irrigation, as well as training its staff to improve adherence to standards in construction and operation of the irrigation infrastructure; training to farmers on improved techniques of rice and vegetable cultivation, post-harvest technology, agricultural entrepreneurship, and the processing and marketing of agricultural products.

Fertilizer-focused projects

Field trials of intensive fertilizer use show substantial increases in yields, but they typically take place on experimental plots rather than in farmers' fields where the impact might be different. In a rigorous impact evaluation, Beaman et al. (2013) evaluated a project conducted in 2010, in which free fertilizer was provided to female rice farmers in the Bougouni District of Sikasso Region in southern Mali. The project investigated how the women used the fertilizer and what changes they made in their agricultural practices, and whether there was any impact on profitability.

In Bougouni District, rice is farmed on non-irrigated land and almost exclusively by women (Beaman et al. 2013). Seed is broadcast over the plot, rather than small plants being transplanted. Fertilizer is recommended by agricultural extension officers and believed to substantially increase yields. However, only about 30% of women use fertilizer, even with government price subsidies of 33–43%. The women in the sample were above average in terms of fertilizer usage for Africa, at about 38 kg/ha, but they achieved relatively low yields of only 1,600 kg/ha. This contrasts with the irrigated rice zone where fertilizer usage was about 113 kg/ha and yields about 4,500 kg/ha. The rice crop is mostly used for own consumption.

A rigorous impact evaluation by (Pettersson & Wikström 2016) was concerned with an ecological sanitation investment program that aims to improve sanitation and fertilizer practices through the recycling of nutrients from human excrement. Through a program run by the organization CREPA (Centre régional pour l'eau potable et l'assainissement à faible coût) from March 2006 to May 2009, 163 EcoSan facilities were constructed in the municipality Guégnéka, consisting of the small town Fana and its surroundings. EcoSan facilities consist of small separate buildings at the household level. They are urine-diverting dry toilets (UDDT) that separate fecal matter from urine into separate containers. After a month's storage the urine is sanitized and can be used as fertilizer whilst feces need to be stored for 6–8 months. Eligibility to participate in the program was conditional on three criteria: 1) having own land to cultivate; 2) being at least 10 household members; 3) being able to contribute to the construction of the own toilet as well as to others' facilities, for a period of six months, in cash or in kind through materials or labour. The final selection of households to benefit from the subsidies was made by village councils. Other activities include beneficiary training on how to maintain the toilet and proper use of excreta in farming (dosage to be applied in agricultural activities).

Extension services

In a rigorous impact study, Osei et al. (2018) evaluated the impact of a mobile phone extension service providing voice reminders at key times pre- and post- harvest. It was implemented in 2014–2017 by the Association Malienne d'Éveil au Développement Durable (AMEDD) as part of a program aimed at enhancing grain marketing support services in the Koutiala, Sikasso, and Yorosso circles of Sikasso Region. The overall aim of this component was to strengthen the capacity of aggregators, both farmer cooperatives and private aggregators, to provide services to smallholder grain farmers and give them the opportunity to obtain contracts with bulk buyers. AMEDD identified several problems facing grain farmers, including poor quality grain and

reduced yields due to poor pre- and post-harvest management, limited access to post-harvest inputs, low organizational skills, and lack of access to grain output markets.

Good grain quality was a prerequisite for linking farmers to bulk buyers. The intervention evaluated by Osei et al. (2018) provided training in pre- and post-harvest handling practices and thereafter sought to determine whether timely reminders about pre- and post-harvest grain handling and management would have a positive impact on the quality and yield of the crop, the award of sales contracts, and higher prices for farmers. The theory of change was that reinforcement of training through the add-on intervention of timely mobile phone reminders would nudge farmers in the treatment group to act on their knowledge to a greater extent than would be observed among the control group who did not receive reminders. The expected outcome was lower crop losses among the treatment group, which would contribute to higher grain value and increased household income. Other interventions sought to strengthen the capacities of cooperatives and private operators to provide production and post-harvest services and to improve crop marketing by encouraging contracts between buyers and aggregators.

Cash and in-kind transfers

Dao et al. (2021) carried out a rigorous impact evaluation of FAO's project *Productive safety nets as a tool to reinforce the resilience in the Sahel* ("Cash+"), which was implemented in Mauritania and in the Circle of Nioro, in the Kayes Region of Mali from April 2015 until February 2017. The project was funded by the Government of Finland and the evaluation by FAO and the Universidad de los Andes. The project aimed to strengthen the resilience of vulnerable households affected by food insecurity through distributions of unconditional cash and in-kind transfers, training, and activities intended to improve productive capacity. The FAO specifically targeted communes where it could create synergy with existing initiatives. The evaluation focused on the impacts of the project in Mali and, in particular, the different effects on male and female beneficiaries.

The FAO project (Dao et al. 2021) provided two parallel interventions of equal financial value, one consisting primarily of a cash transfer ("Cash Only"), and the other a cash transfer together with some goats and training in livestock breeding and children's nutrition ("Cash+"). Five communes were purposively targeted as being the most vulnerable to economic hardship and food insecurity and also because they were already benefiting from initiatives by other donors. Some of the 36 beneficiary villages in the targeted communes were selected on poverty criteria, others were chosen at random. Priority was given to households with children under five, women-led households, and those of marginalized communities. Initially, there were 750 beneficiary households, but following receipt of additional funding an additional 150 households were assisted. Half of each group of beneficiaries received the Cash Only treatment and half received Cash+. The initial group of beneficiaries received their transfers in March–April 2016, before the lean season, the second group in January 2017. In each village, all the beneficiary households received the same type of treatment. Training was provided to two beneficiary women per village on nutrition, child feeding, and hygiene.

A baseline survey and market survey were carried out in late 2015. A post-distribution monitoring survey was conducted in mid-2016 and an endline survey in December. In October–

November 2017, the FAO conducted another survey to evaluate the longer term impact of the project on beneficiaries. This included some non-beneficiary households as a comparison group (Dao et al. 2021).

CARE (2017) carried out a non-rigorous impact evaluation of a program designed to improve food security in northern Mali through cash transfers to vulnerable populations during the lean period in 2016, a time when there is little or no fresh produce available from their farms. Also called "Cash Assistance to Households Affected by Food Insecurity in Goundam and Niafunké Districts in Mali", this project targeted 4,200 vulnerable households, including 3,490 conflict-affected households (returnees and internally displaced persons) and 710 households affected by floods. By the end of the project, available resources allowed for the inclusion of 1,035 additional households. In general, the cash transfer consisted of three transfers of 60,000 FCFA francs (US\$ 120) per beneficiary. The project was financed by Food for Peace / USAID and implemented by CARE Mali with a total budget of US\$ 2,264,696.

Supply of drinking water

A non-rigorous study evaluates a water supply project, aimed at increasing the reliable supply of safe drinking water in rural communities in the Kayes, Ségou, and Mopti regions where water service coverage remains particularly limited (JAICA 2010). The project's main outputs were the provision of 233 boreholes with hand pumps and three small water facilities for the aforementioned communities. With a total budget of 1,493 million yen, the water supply project was funded by the Japanese Government and implemented by Mali's National Water Department (DNH) at the Ministry of Mines, Energy and Water, from March 2005 to March 2007.

Rural credit

Beaman et al.'s (2014a) rigorous impact evaluation studied an improved method for managing informal village-based savings and loans groups whereby women were trained in an oral accounting system so that they themselves could keep track of outstanding loans and savings balances. The study took place in 500 villages in the circles of Ségou, Bla, San, and Tominian in Ségou Region and was funded by Oxfam America, Freedom from Hunger, and the Strømme Foundation.

At baseline in 2009, fewer than 30% of villages had a formal credit institution within 15 km. Informal savings services – Rotating Savings and Credit Associations (ROSCA) and Accumulating Savings and Credit Associations (ASCA) – have evolved to fill the gap, though they may not reach the poorest or more remote communities. The majority of members of these associations are women. Members of ROSCAs save weekly and designate an individual to take home the entire week's savings; members of ASCAs share between them an accumulated pot once a year (Beaman et al. 2014a).

Saving for Change (SfC) builds on the ASCA model (Beaman et al. 2014a). Twenty or so women form a group, elect officers, set by-laws, and collect savings from each member at weekly meetings. Each group sets its own level of contributions, the interest rates on loans, and

penalties for late contributions. Each woman is asked to describe a savings goal at the beginning of each cycle. Weekly contributions are paid into a communal pool. When a woman needs a loan, she proposes the amount to the group, which then discusses whether there are sufficient funds available and prioritizes requests. Since literacy rates were low, SfC staff trained women in an oral accounting system so that they themselves could keep track of outstanding loans and the total savings balances of each woman. The entire group has to agree on a common time at which to receive the annual payout. Interest paid on the loans gives each member a positive interest rate at the payout. If the needs of group members all fall at the same time of the year, e.g., in the lean season, SfC can help members smooth consumption.

The SfC project (Beaman et al. 2014a) was implemented across 500 study villages covering over 6,000 households in the Ségou Region of central Mali. 209 villages were offered SfC treatment whilst the remaining 291 villages served as a control. Treatment villages were divided into catchment areas of about 15 villages. Hired agents of a local NGO worked with the SfC in a given village for one year before transitioning to a role supporting a ‘replicating agent’, a woman from the village. Treatment villages were randomly assigned to one of two replication types. Replicating agents in structured replication villages participated in a formal, three-day training and received a pictorial guide and certificate. In organic replication villages, replicating agents were not provided with any formal training or resources.

One non-rigorous evaluation (Oxfam America 2013) also assessed the Saving for Change (SfC) program, which was designed to increase access to credit to marginalized groups. This evaluation was much broader than that of Beaman et al. (2014a) and covered the period 2008–2012. Since its inception in 2008, the program had served a total of 423,654 members organized into 18,804 groups in four regions of Mali (Kayes, Koulikoro, Ségou, and Sikasso). The program was funded by Oxfam America, Freedom from Hunger, and the Strømme Foundation.

A rigorous impact assessment report by Beaman et al. (2014b) evaluated a program designed to increase agricultural investments and profits through randomized credit offers at the village level in Mali. The project’s main activity was to offer microloans and unrestricted cash grants to farmers. In the case of loans, the project provided capital to them at the beginning of the planting season and required payment as a lump sum after the harvest. In total, the project included 198 villages. The loans were marketed, implemented, serviced, and financed by Soro Yiriwaso, a Malian microcredit organization (and an affiliate of Save the Children, an international NGO based in the United States). The cash grants were implemented by Innovations for Poverty Action.

Millennium Villages Multisector Project

Mitchell et al. (2018) carried out a rigorous impact evaluation of the Millennium Villages Project (MVP). This was a ten-year, multisector project initiated in 2005 and operating at 14 sites in ten sub-Saharan countries. Each site included at least 25,000 inhabitants. Activities at four of the sites were subsequently discontinued. The original, highly ambitious aim was to achieve the Millennium Development Goals (MDG) within five years in rural villages. Additional funding enabled the project to be extended to ten years and to include longer term strategies to achieve

the MDGs by 2015. The project was set up by the Earth Institute at Columbia University, UNDP, and Millennium Promise. The evaluation was funded by The Open Society Foundations, the Islamic Development Bank, and the governments of Japan, South Korea, Mali, Senegal, and Uganda. Integrated interventions were implemented in poverty, agriculture, nutrition, education, health, and infrastructure.

In Mali, the MVP was implemented around Tiby in Ségou Region (Mitchell et al. 2018). “Core areas” covering several neighbouring villages were designated as “MV1”. The project was extended to “MV2” sites as additional resources became available but these received a less intensive intervention than MV1 areas. MV1s had up to about 6,000 inhabitants. A cluster of MV1 and MV2 sites together had 25,000–80,000 inhabitants. In Mali, there were eight villages in the MV1 area, with the number of households in each ranging from 40 to 320. Cross-sectional surveys were conducted every two years during project implementation in the MV1s. Comparison villages were not part of the original project design.

The evaluation of the MVP (Mitchell et al. 2018) was an endline study which took place in March to December 2015. The survey addressed the project’s effects on the outcomes of interest within the MV1s; attainment of the MDGs and other project-specific targets; and the amount spent in the MV1s. The evaluation focused only on the MV1 core intervention areas.

Improving food security and reducing poverty through agricultural value chain development

A non-rigorous study evaluates the *Integrated Initiatives for Economic Growth in Mali (IICEM)* performance evaluation, a multi-year economic growth activity designed to reduce poverty through increasing agricultural productivity, employment, and incomes in Mali (USAID 2013). Agricultural productivity is deemed as crucial to reducing food insecurity in Mali, as rural households with livelihoods dependent on agriculture are the most vulnerable. The IICEM project benefits 442 producer groups covering almost 11,000 ha from the regions of Tombouctou to Sikasso. The project’s activities include developing a value-chain approach at the farmer level on millet, sorghum, and rice production; capacity building to increase production; and investments in equipment, materials, seeds, as well as irrigation infrastructure. These measures, as well as linking farmers with banks, processors, and traders are expected to expand markets, increase sales volumes, and farmers’ income.

In a non-rigorous study, USAID (2020) evaluates the impact of the *Cereal Value Chain (CVC)* activity in Mali, a project designed to increase agricultural production and incomes through direct interventions with farmers and value-added income-generating activities carried out by value chain actors, including financial support services, to producer organisations (POs), input suppliers, and private businesses. CVC assumes that strengthening the cereal value chain can be achieved through the facilitation of sustainable relationships among several value chain actors, which includes a prominent role for the private sector in the production and commercialization of rice, sorghum, and millet value chains. Interventions activities varied according to crop type and included the establishment of Community Agrobusiness Teams with producer organizations (1,000+) and training with Cereal Value Chain coaches (activity implementation agents); financial intermediation between banks and producer organizations; and the provision of input supply (mainly fertilizer) to rice producers since banks had stopped

lending due to insecurity. The project operated for five years (2013–2018) as part of the Feed the Future strategy for the sorghum, millet, and rice value chains in Mali, and was implemented by ACDI/VOCA with local NGOs Nyèta Conseils and G-Force with a total budget of US\$ 39,461,076. In terms of target population, CVC operated primarily in the Sikasso and Mopti regions, covering 117 communes in Sikasso and Mopti and two communes in Ségou.

The five-year *Program to Strengthen Agricultural Value Chains for Food Security* (Programme de renforcement des chaînes de valeurs Oignon/Échalote et Poisson/Pisciculture au Mali) was part of a cooperation between Mali and The Netherlands (Transition International & Transtec 2020). The program aimed to diversify and improve the nutritional quality of food, strengthen local capacity, increase incomes, and improve the efficiency of water use in agriculture. It had a budget of 7.6 value chains that together involved about 62,000 people in Ségou, Mopti, and Bamako regions.

The project objective was to help onion and fish value chains become more resilient and more efficient, and to promote trade so that, by project closure, both value chains would be operating along market lines (Transition International & Transtec 2020). The project used the "markets for the poor" approach in its implementation. This approach combines the objectives of competitiveness and inclusion of the poor and disadvantaged. It seeks to identify constraints and their causes, as well as potential solutions. By identifying and addressing the systemic causes of problems, the program aimed to achieve broad-based impacts and sustainability. Interventions aimed to make improvements in input and service delivery systems rather than directly providing or subsidizing them. The project worked with numerous input suppliers and producer groups to develop seed stocks and sustainable store management models and collaborated with local and national technical and financial institutions. Targets were set for the amount and quality of inputs used, yields, production practices, post-harvest systems, stable pricing, turnover, and income.

For fish farming, the objective was to develop a model for financing the inputs for fish farming, particularly farming by women, and to set up a pilot operation. The project worked with individuals, women's and men's groups, and village management committees to increase skills and capacity, and with suppliers of artisanal and semi-modern hatcheries and feed mills manufacturing pellet feed. Service providers were trained by the project to support the fish farmers' and processors' needs (Transition International & Transtec 2020).

A baseline study is referenced by Transition International & Transtec (2020), but without information as to how the data were obtained. At baseline, the shallot/onion value chain represented approximately 25,000 people in Ségou and Mopti, 14,000 of whom were women. The fish value chain represented 37,000 people in Mopti and Bamako, most of whom were villagers farming local ponds.

Conservation of endemic livestock and their habitat

A non-rigorous impact evaluation assessed the *Sustainable Management of Globally Significant Endemic Ruminant Livestock of West Africa*, a project designed to implement an integrated program aimed at removing existing barriers to the in-situ conservation of three priority endemic

ruminant livestock (ERL) species – N'dama cattle, Djallonké sheep, and the West African dwarf goat – to improve their productivity (Hodge & Bosma 2015). Conservation measures are crucial in these areas as they are affected by trypanosomiasis, which generates socio-economic problems by affecting livestock and thence livelihoods. Additionally, the project develops and implements models for community-based conservation and management of critical habitat for these species, thereby demonstrating strategies for preserving unique genetic trait / habitat complexes of global significance. The most significant was testing whether there is a link between endemic livestock and the conservation of natural resources. Project activities include the rehabilitation of zoo-technical centres, training for beneficiaries on participatory community management of livestock, creation of community-based livestock marketing associations, creation of platforms for stakeholder participation in policy, regulation revisions, and development programs relevant to ERL preservation, among others. The project was implemented by UNOPS, and it was funded by Global Environment Facility (GEF) and African Development Bank (AfDB) for the 2005–2015 period.

Strengthening resilience and improving food security in wetland areas

The Support Project for the Restoration of the Faguibine (*Projet d'Appui à la Restauration du Faguibine*) (PARF), the subject of a non-rigorous evaluation by CAEC (2016), was originally a one-year project from 2011–2012, subsequently extended until the end of 2016 as a result of interruptions caused by insecurity. The Faguibine drainage system in the Tombouctou Region, formerly a highly productive and biodiverse wetland complex, had dried up and lost almost all of its capacity to provide ecosystem services due to deforestation, dam construction, and the effects of climate change. When the Faguibine system is flooded, agriculture, fishing, and dry season grazing are possible, and transport by dugout canoe facilitates the marketing of goods. The system also provides water for local communities and for livestock.

The PARF project (CAEC 2016) was intended to assist the Malian Government Office for the Development of Faguibine (OMVF) in vegetation clearance to improve the flow of water from the Niger River and to reduce food insecurity among the people living in this remote area. It aimed to improve the standard of living of about 175,000 people in 20 communes. To supplement agro-silviculture and fish-farming, the project undertook capacity building and environmental protection activities, and also supported local initiatives. The project was integrated into communal development plans and in line with Mali's food security and community nutrition strategies. It was implemented by the OMVF and UNDP. Funding of 3.9 billion FCFA (approx. US\$ 6.7 million) was provided by the Norwegian Embassy.

Equipment was purchased for vegetation clearance works and a parking area with maintenance workshop were constructed for the repair and storage of machinery. Feeder channels were cleaned to improve water flow and allow the resumption of agriculture, livestock-rearing, fishing, and forestry. The project was also involved in stabilizing dunes and protecting channel banks, restoring fauna and flora, and tree planting. A larger area was made available for agriculture, which contributed to increased production and higher incomes for the beneficiaries. Warehouses were constructed for food storage to improve food security (CAEC 2016).

The Support Program for Local Economies of the Communities of Youwarou and Niafunké (PACY) (*Programme d'Appui aux Économies locales des Collectivités de Youwarou et de Niafunké*), the subject of a non-rigorous evaluation by Touré et al. (2013), commenced in 2004 and continued through three successive phases. The project was implemented by the HELVETAS / AFAR consortium and funded by the Swiss Agency for Development and Cooperation (SDC). The report title and Terms of Reference indicate “phase 2” as the subject of review. However the dates in the title and the Terms of Reference (2010–2013) coincide with Phase 3 and are compatible with contemporary political events. Phase 3 is sometimes referred to as “PACY2”, which may be the source of the confusion. Phase 3 was said to have included Youwarou and Niafunké circles. However, the report largely focuses on activities in Youwarou.

The PACY program (Touré et al. 2013) had two main objectives: that the Circle and communes of Youwarou in Mopti Region and the Intercommunal Council of Development of the Lakes of Tanda and Kabara in Niafunké Circle, Tombouctou Region, would collaborate in their respective areas in the construction of hydro-agricultural infrastructure to support local producers and contribute to higher agricultural productivity. The sustainable agriculture component included rice-growing, market gardening, cattle rearing, and fishing. A secondary objective was the strengthening of local governance through the inclusion and empowerment of stakeholders. Phase 3 was focused particularly on the circle of Youwarou, where all the communities had recently set up an “Intercollectivity”, known as Bolongal, to manage projects identified as being of territorial and Circle interest. In Niafunké Circle, work continued to strengthen the Intercommunal Council formed by three communes with the purpose of impounding local lakes. This collaborative local development strategy made it possible to carry out large-scale projects such as lake impoundment and the digging of irrigation channels that were beyond the capacity of a single community.

Nelen et al. (2019) prepared a non-rigorous evaluation of the *Programme d'Aménagement du Delta Intérieur du Niger* (Development Program of the Inner Niger Delta) (PADIN-II). The program was implemented in 2013–2018 in 24 communes classified as vulnerable to food insecurity in four circles of the Mopti Region. Implementation was led by CARE Mali and financed by the Netherlands Embassy in Bamako at a cost of 7.87 billion FCFA (approx. US\$ 13.5 million). The program’s main objective was to improve the living conditions of 20,000 households (120,000 individuals) of agro-pastoralists and fishermen in the wetlands of the Inner Niger Delta (DIN) and Sourou Plain. The latter is a protected Ramsar site. The program aimed to increase production of rice and grains and improve productivity in both nomadic and sedentary (agro-pastoralist) households; to increase household income; and to strengthen the resilience of the most vulnerable through support to community-based organizations and local authorities.

Small village irrigated perimeter sites (PPIVs) of up to 30 ha were equipped with water pumps for drainage. Seeds and fertilizers were provided free of charge to beneficiaries in the first year, and charged at 25%, 50%, 75%, and 100% of cost in succeeding years. A winter rice crop was followed by a high value crop such as potatoes. In addition, market gardening perimeters (PM) of 1–2 ha were allocated to women in the intervention villages. These were aimed at improving

household nutrition and also providing an income. Women's savings and loans associations were also set up or restored (Nelen et al. 2019).

Ponds and floating cages were constructed to support fish-farming. Planting of bourgou grass (*Echinoecloa stanina*) increased the grazing area available to pastoralists in the inner delta. An increase in the numbers of cattle was intended to support milk production. Warehouses were built in some of the villages to store rice and/or market garden products pending a favourable market price. Community-based organisations were trained in governance, transparency of financial management, and environmental best practice (Nelen et al. 2019).

Strengthening resilience and adaptation to climate change, and improving food security in dryland areas

A non-rigorous impact study by Dianka & Nienta (2017) evaluated the project *Improving Adaptive Capacity and Resilience to Climate Change in the Agricultural Sector in Mali*, which aims to reduce the risk of food insecurity due to climate change by increasing beneficiaries' adaptive capacities in agricultural production. Agriculture is fundamental to Mali's economy and employs over 80% of its population; however, only 14% of the land are considered arable. Given the scarcity of productive land, the agricultural sector in Mali is very sensitive to climatic variations, including drought and desertification, which have been occurring for several decades. Increased demographic pressure has led to the conversion of marginal or forested land into agricultural land, resulting in shorter fallow periods and general degradation of soil fertility. Thus, the project focused on two components. First, capacity-building, which included a training program for local authorities on how to integrate climate change into the communes' social, economic, and cultural development plans and sectoral development policies and strategies, and training on the economics of climate change adaptation to upskill government officials on cost-benefit analysis and other skills). Second, strengthening the resilience of agricultural production systems, through equipping farmers with market gardening technologies such as resilient seed varieties and organic fertilizers and the use of agroforestry; improving community infrastructure (i.e., micro-dams, community market gardening wells, and solar pumping systems); and promoting income-generating activities, including the establishment of a sewing unit, a soap and ointment production unit, and the installation of shelling machines and solar dryers. In terms of geographical scope, the project covered four communes (Sandaré, Massantola, M'Pessoba, and Cinzana) in the regions of Kayes, Koulikoro, Sikasso, and Ségou. The project commenced in 2013 and ended in 2016, and it was funded by the Least Developed Countries Fund (LDCF) through the Global Environment Facility (GEF) with a total budget of US\$ 2,145,000.

FAO & WFP's (2019) non-rigorous evaluation assessed the *Support to the Resilience of Vulnerable Populations in Northern Mali* project, which aimed to increase food security and resilience to climate shocks among vulnerable populations. Given the context of high food insecurity and chronic malnutrition, which was accentuated by the 2012 crisis in Mali, this project was based on the belief that resilience could be achieved by increasing, protecting, and diversifying agricultural production and strengthening the capacities of small-scale producers. To achieve this, several activities were undertaken, such as food distribution programs for poor

households during the lean season; rehabilitation of infrastructure and seed storage facilities; promotion of market gardening; installation of solar water pumps in small market gardening areas; and delivery of resilient seeds. The project was financed by the EU, with a total budget of 10,000,000 euros and an expected duration of three years, from 2015 to 2018. The two implementing partners, the Food and Agriculture Organisation and the World Food Program, each received half of the funds for project implementation.

Halle & Doumbia (2020) carried out a non-rigorous impact evaluation of the project entitled *Renforcement de la résilience des groupements de femmes productrices et des communautés vulnérables aux changements climatiques au Mali* (Strengthening the Resilience of Women Producer Groups and Communities Vulnerable to Climate Change in Mali), the “Mali-Women Project”. The project was implemented during 2015–2019 in ten communes in the Koulikoro, Kayes, and Sikasso regions by the Agency for the Environment and Sustainable Development (AEDD). Funding of US\$ 5.46 million was provided by UNDP through the Least Developed Countries Fund, with co-financing by UNDP of US\$ 500,000. The latter was to reinforce the efforts of the project, but not directly to finance its activities.

The goal of the Mali-Women Project (Halle & Doumbia 2020) was to contribute to reducing vulnerability and increasing adaptive capacity to cope with adverse impacts of climate change in the intervention regions by promoting the transfer and adoption of adaptive technologies. Its objective focused on strengthening the adaptive capacities of women's groups and producer groups to secure livelihoods against the impacts of climate change and to increase socio-economic resilience in vulnerable communes. Major project components were to ensure access to water for the development of livelihoods and to invest in resilient cropping practices and crop diversification to improve nutrition and diversify income. A major project strategy was to promote gender equality through the inclusion and empowerment of women and local communities in project formulation and activity planning. Project priorities were identified by local stakeholders, and the participation of commune mayors in the Steering Committee (COPIL) reinforced the involvement of local actors.

The main problems attributed to climate change that were to be addressed by the project were decreased access to water and reduced availability of food, both of which carried the risk of conflict; an increased workload for women; lack of technical, institutional, and financial capacity at communal level to plan and implement climate change adaptation measures; and limited access to climate information and financial support (Halle & Doumbia 2020).

A non-rigorous impact assessment evaluated a program designed to increase food security and resource management among farmers in Mali (Bureau de la Coopération Suisse au Mali 2015a). The project's main activities included the establishment of an agricultural advisory system composed of trainers and qualified farmers' advisors in the fields of agriculture, livestock, market gardening, and the processing and marketing of local products. Capacity building was also developed in several ways, such as through the rehabilitation of market garden wells and adequate drainage systems; the use of solar energy; conservation techniques for market garden products; the promotion of lobbying and advocacy; and the inclusion of agricultural organizations in policy discussions with the state on key agricultural issues, such as

land tenure, inputs for the sector, and financing of equipment. In terms of geographical scope, the project covered the regions of Sikasso, Ségou, Mopti, and Gao. It was financed by HELVETAS, a Swiss development organisation, with a total budget of CHF 3,700,000. The project commenced in 2004, and the evaluation assesses its third phase, which began in 2012 and ended in 2015.

A second non-rigorous report by the Bureau de la Coopération Suisse au Mali (2015b) evaluated the third phase of the *Urban Social Development Program* (PDSU), also called the *Sigida Kura Program*, which aimed to increase food security and job creation in agriculture in the Koutiala Region. To achieve this outcome, the project has focused on two components: improving basic economic infrastructure and structuring of the local economy, and strengthening organizational and income-generating capacities of farms, private managers, women, and young people. It is believed that these components give local actors the means (agricultural land, water, yields) to create more wealth and jobs. Among the project activities, implementers constructed a livestock park access road, two tracks, and rehabilitated two weekly markets. The *Sigida Kura Program* lasted from 2011 to 2015, and it was implemented by the Miniankala Kafo inter-community organization with the technical support of a contractor, Kene Conseils. The funding for the program was provided by the Swiss Agency for Development and Cooperation with a total budget of CHF 3,300,000.

The non-rigorous impact carried out by the Drylands Coordination Group (2015) evaluated the *Sahelian and Sudano-Sahelian Food Crop Establishment Project*, which aimed to increase agricultural resilience to climate hazards in Mali. In the Sahelian and Sudano-Sahelian zones, periods of drought often occur at the time of sowing, at the beginning of the winter season. This dry season is expected to last longer with climate change, resulting in a depressing effect on the germination of food crops. To combat this phenomenon hostile to crop establishment, the project transferred various agricultural technologies, such as the soaking of sorghum, millet, and maize seeds, as well as groundnut, cowpea, and voandzou (Bambara groundnut) seeds, and the manual and mechanical placement of microdoses of fertilizer and millet or sorghum seed. Implemented by Drylands Coordination Group through its member NGOs and the Institute of Rural Economy, the project commenced in 2009 and ended in 2013. It was funded by the Norwegian Agency for Development (Norad), and benefitted 294 farmers.

Methods

Irrigation-focused projects

Dillon's first study (2011a) was concerned with whether the scale of an irrigation project resulted in differing impacts on household production and consumption. In this rigorous study, Dillon (2011a) was forced to construct the counterfactual through randomized experiments since each household either had access to irrigation or not. Counterfactual groups were constructed from the single large-scale irrigation project and the small-scale projects. Restricting the analysis to a single circle made it possible to control for variation across circles. Propensity scores were used to match households with similar observable characteristics, varying only with the treatment,

i.e., access to irrigation. Average treatment effect on the treated (ATT) was estimated with respect to agricultural production, agricultural income, and consumption per capita.

In his second study, (Dillon 2011b) investigated the effects of small-scale irrigation on poverty reduction, asset accumulation, and informal insurance. He quantified first-order impacts on household production and consumption using matched treatment and comparison groups, and analyzed second order effects on the household's risk-mitigation strategies, including savings and informal food sharing. Propensity score matching and matched difference-in-difference estimators were used to assess the average treatment effect on the treated (ATT) for small-scale irrigators relative to non-irrigators.

GIZ's (2019) non-rigorous evaluation employed a qualitative approach that included the desk review of project documents, two field visits to Sikasso and Bougouni regions, 15 semi-structured interviews with key informants, and interviews and focus group discussions with beneficiaries to evaluate the impact of PASSIP, a project designed to improve the economic and nutritional status of a rural population in Mali through better small-scale irrigation techniques.

Fertilizer-focused projects

Beaman et al. (2013) evaluated a project conducted in 2010, in which free fertilizer was provided to female rice farmers in the Bougouni District of Sikasso Region. In 2010, a baseline survey was administered to a randomly selected sample of one woman per household. Of the 416 respondents interviewed, 383 had cultivated rice in the season prior to the survey and constituted the sample frame. Beaman et al. (2013) set up two treatment groups across 23 villages: the first group received the recommended quantity of fertilizer per hectare; the second group received half of this amount. Women were randomly assigned to one of two treatment groups or to the control group. 135 women received the recommended quantity per hectare; 123 received half of that quantity; and the 125 in the control group received no fertilizer. Although the areas of rice plots were measured to determine the quantity of fertilizer required, there was variation in the amounts received per hectare since plot sizes were put into 'buckets', e.g. between 1,500 and 2,500 m² in area, and all plots in a bucket received the same quantity of fertilizer. This introduced a degree of imprecision at the outset. A 30-minute explanation of how to use the fertilizer was provided on delivery. Immediately after the harvest, 378 out of 383 primary respondents were surveyed. The study examined the effects of the fertilizer transfers on input usage, output, and profits using multiple regression analysis.

Beaman et al.'s (2013) study was intended to reveal farmer choices when their fertilizer availability was increased exogenously, for example whether they transferred some to other farmers, stored it, or sold it, or adjusted complementary inputs and effort. From a methodological perspective, the use of two treatment groups presented a challenge in measuring the returns to a given input. Furthermore, changes to complementary inputs made it difficult to isolate returns to the fertilizer.

Pettersson & Wikström's (2016) rigorous evaluation adopted a quantitative approach based on propensity score matching to evaluate the impact of an ecological sanitation investment program that aimed to improve both sanitation and fertilizer practices through the recycling of

nutrients from human excrement. Propensity score matching was used because the selection of beneficiaries was not random. First, evaluators interviewed 155 of the 163 households with beneficiaries, mostly in rural areas, but also some in urban areas. Secondly, control households were selected in collaboration with CREPA to try to find households meeting the eligibility criteria for a UDDT. 97 control households in Fana and 135 households in the surrounding villages were interviewed. In addition, the evaluators conducted 231 interviews with (rural) households from another municipality (Kéréla) in which CREPA had no engagement of any kind. In total, there were 610 interviews (150 beneficiaries and 460 controls). In addition to interviews, the authors sampled fertilizers from a selection of toilets in the study and analyzed the nutrient content.

Extension services

Osei et al. (2018) undertook a rigorous evaluation of the impact of a mobile phone extension service providing voice reminders at key times pre- and post-harvest. Targeted farmers in all 99 program villages were trained using the training of trainers (ToT) approach. 44 villages were randomly assigned to treatment. A random sample of farmers received mobile phone reminders based on information provided in the training module. The reminders were sent at the time when the knowledge needed to be applied. The remaining 55 villages served as the control group. In each village the sample comprised about 14 trained farmer households, yielding a total sample size of 1,434. 613 farmers were in the treatment group and 821 farmers in the control group. Sampling took place in February 2015, followed by baseline data collection and training in pre- and post-harvest handling. Eight customized messages were sent to each of 704 farmers located in the treatment villages before, during, and after the harvest, from September 2016 until January 2017. This was followed by an endline survey.

Cash and in-kind transfers

FAO's Cash+ project (Dao et al. 2021) aimed to strengthen the resilience of vulnerable households affected by food insecurity through distributions of unconditional cash and in-kind transfers, training, and activities intended to improve productive capacity. The impact evaluation was based on the FOA's 2017 post-closure dataset. Lack of a comparison group in the baseline survey precluded a more rigorous evaluation. The evaluation data set comprised 1,151 households, of whom 336 had received Cash Only, 344 who had received Cash+, and 471 who formed the control group. The latter lived in neighbouring villages that did not receive the intervention. They were chosen according to the Household Economy Analysis (HEA) framework and comprised vulnerable households considered as poor and very poor.

The evaluation team's impact analysis (Dao et al. 2021) covered food security, dietary diversity, hygiene practices, food and non-food expenditures, livestock production, non-farm activities, and aspirations and expectations. Outcomes and impacts were compared between treatment groups, and between each treatment group and the control group. The study used the inverse-probability-weighted regression adjustment (IPWRA) method to assess impacts. The IPWRA combines two models, one predicting treatment status and the other predicting outcomes by performing weighted regression. Analysis of heterogeneous effects of the project on beneficiaries was intended to unpack the average treatment effects and involved comparing

impacts on households headed by men and women, households with different labour constraints, and those with different poverty levels.

CARE (2017) adopts a quantitative methodology based on survey analysis to evaluate the impact of the *Cash Assistance to Households Affected by Food Insecurity Program* in Goundam and Niafunké Districts, a program designed to increase food security in Mali. The universe for the selection was the target group of households that were supported by the project during implementation, which were randomly drawn from a pre-established list sectioned from the project database. The choice of villages was made based on accessibility criteria and the security situation at the time of the assessment. The sample size (400 households) was calculated with a 95% confidence level, distributed in the municipalities of Dianké, Fittouga, Léré, N'Gorkou, Soumpi, Goundam, Tonka, and Doukouria. In terms of project indicators, the evaluators assessed beneficiaries' food consumption score, domestic hunger index, coping or survival strategies –reducing the amount of food at mealtimes, receiving aid from friends, etc. – as well as their demographic characteristics.

Supply of drinking water

JAICA's (2010) evaluation on the water supply project, which aims to increase a reliable supply of safe drinking water in rural communities in the Kayes, Ségou, and Mopti regions, adopts a quantitative approach based on a social survey. First, evaluators selected 26 out of 63 villages in Mopti taking into account the population size. Within the selected villages, a social survey was conducted with over 630 households, based also on the villages' population size. In addition, a control group was established by surveying a set of 100 households in non-target villages. The survey questionnaire applies an ordinal scale whenever possible to enable statistical analysis. Questions related to water supply from the project borehole, its use for drinking water, water drawing, sanitation, health, education, household income, and facility maintenance. Statistical analysis was performed using SPSS.

Rural credit

Beaman et al. (2014a) evaluated an improved method for managing informal village-based savings and loans groups whereby women were trained in an oral accounting system so that they themselves could keep track of outstanding loans and savings balances. The study examined the impact of the intervention on women's access to finance, economic activities such as small business operations and farming, food security, assets, social capital, and intra-household bargaining power. The evaluation team undertook a randomized evaluation of the impacts of the SfC program using panel data from a household survey at baseline and endline. These surveys included an adult, household, and village questionnaire. Randomization was stratified by commune, with re-randomization at village level to ensure a balance of village characteristics. Additional high-frequency surveys aided examination of consumption-smoothing across seasons.

Oxfam America (2013) employed a mixed methods strategy to evaluate Saving for Change (SfC), a program designed to increase access to credit to marginalized groups by enabling women to organize and self-manage savings and credit groups. The study was based on a

randomized control trial (RCT) that measured the socio-economic impacts of the program in 500 villages (6,000 households) over a three-year period, with detailed socioeconomic surveys administered at the household level in 2009 (baseline) and again in 2012 (endline). In addition, a subset of 600 households from both treatment and control villages was also selected to participate in additional high-frequency surveys between June 2010 and January 2012 on topics including health, financial transactions, assets, income-generating activities and consumption. Additionally, the evaluation team also conducted community interviews, focus group discussions, key informant interviews (with technical and replicating agents, NGO coordinators, female members and nonmembers and their husbands, and other key opinion leaders in villages) both in 2009 and 2012.

Beaman et al. (2014b) employed a randomized control trial to evaluate a program designed to increase agricultural investments and profits through microloans. The sample consisted of 198 villages, located in two units (an administrative division larger than the village but smaller than a region) in the Sikasso region of Mali. The randomization consisted of two steps: first villages were assigned to either loan (88) or no-loan (110) treatment. In loan villages, anyone could receive a loan by joining a women's association created for the purpose. Second, after loan participation had been decided, those households who did not borrow were randomly assigned to either receive a grant or not. As a result, evaluators could assess whether there was any difference in average returns between those who decided to borrow and those who did not borrow.

Millennium Villages Multisector Project

Mitchell et al. (2018) evaluated the Millennium Villages Project (MVP), a series of integrated interventions that were intended to achieve the MDGs by 2015. Baseline data collected by the MVP were not used due to quality concerns. In its place, the evaluation used demographic and health survey data from 2006 or earlier, which included many of the outcomes of interest. The evaluation took the form of an endline study in 2015.

In Mali, there were eight villages in the MV1 core area. Five comparison villages were selected retrospectively by the evaluators. These best-matched the treatment villages on possible confounding variables (Mitchell et al. 2018). No data had previously been collected by the project in these villages. A two-stage sampling process was conducted within each MV1 and comparison village. The first stage involved equal-probability simple random sampling of 300 households in each MV1 and comparison village. The second stage involved equal-probability systematic sampling from a list of people grouped by household and ordered randomly. Cross-sectional survey data on 40 outcomes of interest were collected in both the MV1s and comparison villages. These outcomes of interest were selected from the categories of poverty, agriculture, nutrition, education, child health, maternal health, HIV and malaria, and water and sanitation, and comprised a subset of MDG indicators and proxies and project-specified outcomes. Selected outcomes were combined into outcome indices.

Project impacts were estimated as differences between the measured outcomes in the MV1s and in comparison villages. This comparison had not been part of the original project design, which had instead focused on target attainment in the MV1s. Targets were based on official UN

MDG targets, international standards, or, where neither existed, goals set by MVP sector leaders (Mitchell et al. 2018).

Improving food security and reducing poverty through agricultural value chain development

USAID (2013) adopts a qualitative method to evaluate the impact of the *Integrated Initiatives for Economic Growth in Mali* (IICEM) performance evaluation, a multi-year economic growth activity designed to reduce poverty through increasing agricultural productivity, employment, and incomes. The methodology includes five or six group interviews for each cropping system – rice, potato, corn, mango, sorghum or millet – and assessment of relative changes in productivity, access to market, prices, credit, and processors, comparing the previous situation and that with IICEM. The evaluation covers the period of the second phase of IICEM from 2010 to 2013, and was conducted from May to August 2013.

USAID (2020) employs a qualitative method to evaluate the impact of the Cereal Value Chain activity in Mali (CVC), a project designed to increase agricultural production and incomes through direct interventions with farmers and value-added income-generating activities carried out by value chain actors, including financial support services to producer organisations, input suppliers, and private businesses. The qualitative approach includes desk review of project documents, primary data collection through 11 focus group discussions, 26 key informant interviews, 17 telephone interviews with former mentors and mentees, and field missions in all CVC activity areas: Sikasso, Ségou, Mopti, and Tombouctou regions. The qualitative data analysis program NVivo was used to code all the notes and transcripts.

Transition International & Transtec (2020) evaluated the “fish and onion” project, which sought to enable shallot/onion and fish value chains to become more resilient and efficient, so that they would be able to operate along market lines. The evaluation assessed the achievements of the program against its targets for the full five-year period according to the DAC criteria of relevance, effectiveness, efficiency, and sustainability. Following a review of project documentation including the logframe, interviews were held with government stakeholders, implementation partners and representatives of local organizations concerned with the regulation and operation of the fish and onion/shallot sectors. Field visits were made to select project areas to assess the different types of intervention. Semi-structured meetings were held with key stakeholders and partners, including community authorities, organizations involved in water management, and beneficiary onion growers and fish farmers. Project achievements were graded in one of four equal bands, between 0% and 100%.

Conservation of endemic livestock and their habitat

Hodge & Bosma (2015) employ a qualitative approach to evaluate *Sustainable Management of Globally Significant Endemic Ruminant Livestock of West Africa*, designed to implement an integrated program aimed at removing existing barriers to the in-situ conservation of three priority endemic ruminant livestock (ERL) species – N'dama cattle, Djallonké sheep, and the West African dwarf goat, to improve their productivity. The methodology includes a desk review of relevant documents, field visits to Mali to meet with stakeholders (project teams, national partners, and beneficiaries), and non-structured interviews.

Strengthening resilience and improving food security in wetland areas

(CAEC 2016) evaluated the PARF project which involved vegetation clearance in the Faguibine drainage system to improve the flow of water, and in turn to reduce food insecurity and improve the standard of living of people living in the area through agro-silviculture, fish-farming, and environmental protection activities. The requirement for a project evaluation was included in the project's logical framework. Following a literature review, semi-structured interviews were conducted with local authorities, technical officers, and representatives of project staff. Despite a deteriorating security situation, field visits were made to assess the quality and state of completion of infrastructural works and the extent and productivity of agriculture and market gardening activities. Focus group discussions were held with farmers, herders, and fishermen. Women were interviewed in parallel groups. The sample of beneficiaries interviewed comprised 16 villages in six (30%) of the project's 20 intervention communes. Achievements were assessed against indicators in the project's logframe and scored on a scale from 1 to 10, where 1 was very unsatisfactory and 10 was very satisfactory.

The objectives of the PACY program in Youwarou and Niafunké (Touré et al. 2013) were to facilitate the collaboration of the Circle and local communities in the construction of hydro-agricultural infrastructure to support local producers and contribute to higher agricultural productivity. The sustainable agriculture component included rice-growing, market gardening, cattle rearing, and fishing. Following a review of project documentation and meetings with program managers in Bamako, the evaluation team visited Mopti Region and Youwarou. It held interviews with local officials and focus group discussions with regional councils as well as customary authorities, women's groups, and agriculture, water, and forestry officers, and livestock technical officers. Program implementation and impact were measured against a set of indicators.

Nelen et al. (2019) evaluated the PADIN-II program aimed at improving the living conditions of agro-pastoralists and fishermen in the wetlands of the Inner Niger Delta and Sourou Plain through the development of irrigated plots and market gardens in the villages, fishponds, and improved grazing for cattle to support milk production. The evaluation involved a literature review and study of the program's logframe and indicators. Field visits were conducted to the irrigated perimeter sites, market gardens, fishponds, bourgou plantations, and milk collection centres. During the visits, focus group discussions were conducted with beneficiary rice farmers, agro-pastoralists, and women's groups. Key informant interviews were held with representatives of local authorities, community officials, and entrepreneur and farmer associations. Quantitative data were collected on production and income and, where possible, regarding the sustainability of equipment and infrastructure provided under the program. These data were compared to indicators in the logframe. Important aspects highlighted in the evaluation were the anchoring of the program in the local political-institutional context, and the program's exit strategy for transferring investments, resources, functions, and responsibilities to stakeholders and local authorities.

Strengthening resilience and adaptation to climate change, and improving food security in dryland areas

Dianka & Nienta (2017) use a qualitative methodology to evaluate the project *Improving Adaptive Capacity and Resilience to Climate Change in the Agricultural Sector in Mali*, which aims to reduce the risk of food insecurity due to climate change by increasing beneficiaries' adaptive capacities in agricultural production. The method consists of a desk review of project documents and key informant interviews with 32 stakeholders.

FAO & WFP (2019) adopt a qualitative methodology to evaluate the *Support to the Resilience of Vulnerable Populations in Northern Mali* project, which aims to increase food security and resilience to climate shocks of vulnerable populations. The method consists of a desk review of project documents, 62 key informant interviews, 326 individual phone interviews with beneficiaries, 72 focus group discussions (FGD) with 720 beneficiaries in 23 villages in all four regions, and 23 FGDs with 230 non-beneficiaries.

The Mali-Women Project (Halle & Doumbia 2020) sought to contribute to reducing vulnerability and increasing adaptive capacity to cope with adverse impacts of climate change by promoting the transfer and adoption of adaptive technologies. Project documentation reviewed included an indicator framework but it was determined that the indicators, though relevant, were not SMART or specific enough for project monitoring and evaluation purposes. Meetings were held with key project staff and stakeholders in Bamako, followed by focus group discussions with stakeholders in the communes. Stakeholders included members of local management committees, project beneficiaries, particularly women, local NGOs, technical services officials, and contractors. Visits were made to the intervention communes to assess project results and impacts. Evaluation questions were prepared so as to assess project progress; responses were analyzed and triangulated against field observations and the Project Document. Rating scales were used to summarize achievement. Effectiveness was judged on a six-point scale, sustainability on a four-point scale, relevance on a two-point scale, and impact on a three-point scale.

The Bureau de la Coopération Suisse au Mali (2015a) employs a qualitative approach to evaluate a program designed to increase food security and resource management among farmers in Mali. The method includes a desk review of project documents, field visits, and interviews with key informants, including beneficiaries. These included the National Coordination of Farmers' Organizations, Association of Professional Farmers' Organizations, Regional Committee of Rural People's Consultation, local authorities, socio-professional associations, and the decentralized technical services of the State. The report does not indicate how many interviews were carried out in total.

The Bureau de la Coopération Suisse au Mali (2015b) uses a qualitative approach to evaluate the impact of the *Urban Social Development Program*, which aims to increase food security and job creation in agriculture in the Koutiala region. The methodology includes desk review of project documents, field visits to the Koutiala region, and 115 interviews with key informants, including beneficiaries.

The Drylands Coordination Group (2015) employs a qualitative methodology to evaluate the impact of the Sahelian and Sudano-Sahelian Food Crop Establishment Project, which aims to increase agricultural resilience to climate hazards in Mali . The method consists of a desk review of project documents, interviews with key informants – DCG and NGO members, mayors, and government officials, 80 individual interviews with farmers, and focus group discussions.

Impacts

Irrigation-focused projects

Dillon (2011a), comparing the relative impacts of small-scale and large-scale irrigation on household production, income, and consumption, found that the effects of small-scale irrigation were larger in terms of both production per hectare and agricultural income. Small-scale irrigation yielded a statistically significant estimate of 2.1 to 2.4 tonnes/ha, whereas large-scale irrigation had a point estimate of 0.94 to 1.1 tonnes/ha. With respect to agricultural income, estimates of the effect of small-scale irrigation were also generally higher, between 133,283 FCFA and 142,527 FCFA (US\$ 267–285). However, estimates of the effect of large-scale irrigation had a wider range, which included that of the small-scale irrigators.

The differential effects on consumption per capita were less clear (Dillon 2011a). Estimates of the effects of large-scale irrigation on consumption per capita were much larger than those for small-scale irrigation, despite the larger production effects of small-scale irrigators. The estimates are, however, larger than the overall contribution of household income from agricultural production. The discrepancy might be explained as a result of non-farm employment opportunities near the large-scale irrigation scheme, investment of agricultural surplus in non-farm activities, or the potentially reduced costs of agricultural inputs, which would lead to increased profits. Estimates of the effects of small-scale irrigation were less precise and there were no statistically significant effects on consumption. The results lack robustness, perhaps due to heterogeneous treatment effects or to the influence of unobservables.

Dillon's second study (2011b), which investigated the impacts of small-scale irrigation on poverty reduction, asset accumulation, and informal insurance, found significant impacts on welfare when using propensity score matching and by calculation of difference-in-differences estimator. The magnitudes of the effects estimated with propensity score matching were larger than the difference-in-differences estimates. The effect of irrigation on total agricultural production ranged from 1.25 to 1.90 tonnes per household, which was statistically significant at the 1% level. Irrigation also greatly increased agricultural production per hectare, with increases in yield ranging from 2.5 to 3.8 tonnes/ha. The impact of irrigation on food availability and total household consumption varied from 735,908 FCFA to 776,213 FCFA (US\$ 1,635–1,725), depending on the estimator used.

Use of small-scale irrigation also impacted positively on household savings and asset accumulation (Dillon 2011b). Livestock, a standard asset, and an indicator for the sharing of

food were estimated using propensity score matching. Households with access to irrigation had more livestock and were 20% more likely to engage in informal food sharing with non-irrigators in their village. This finding suggests that impact estimates that rely solely on consumption aggregates (cf. Dillon 2011a) may underestimate welfare gains by ignoring household savings and asset accumulation, and development of an informal insurance network. Furthermore, the positive impact extends beyond an individual household, providing secondary benefits to other households in the village and changing the pattern of risk. Increased agricultural production also reduces the prices of outputs, which benefits the landless and net food consumers.

GIZ (2019) concludes that there is no evidence, due to the short evaluation period, to assess the impact of PASSIP, a project designed to improve the economic and nutritional status of a rural population in Mali through better small-scale irrigation techniques.

Fertilizer-focused projects

Beaman et al.'s (2013) study examined the choices of women rice farmers when availability of fertilizer was increased exogenously, for example whether they stored it, or sold it, or adjusted complementary inputs and effort. About half of the treatment group received a full allocation of fertilizer and the remainder received a half allocation. It was found that fertilizer provision greatly increased the likelihood that women farmers in both groups used fertilizer and also that they applied a greater quantity. The full treatment group used 33 kg more than the control, which was about 70% of their allocation. The half treatment group used 21 kg more than the control group, which was most or all of the fertilizer given to them. This indicates that some fertilizer was stored, shared, or sold.

Beaman et al. (2013) found that the increase in fertilizer use had no impact on the amount of family labour used on the women's rice plots. A portion of the fertilizer allocation replaced cash expenditure on fertilizer. Women in the half treatment group spent 2,413 FCFA (US\$ 5) less on fertilizer, and those in the full treatment 3,012 FCFA (US\$ 6) less. Other inputs could be purchased as a result of the free fertilizer distribution. Both treatment groups increased their expenditure on herbicides and spending on hired labour also increased, though to a lesser extent. Total input expenses, excluding fertilizer and family labour, increased significantly for the full treatment group, by 3,004 FCFA (US\$ 6) compared to 1,705 FCFA (US\$3.40) for the half-treatment group.

Increases in inputs, including fertilizer, resulted in a large positive impact on the value of the crop, with that in the half-treatment group being about 53% of that of the full treatment, and greater than the control group (Beaman et al. 2013). However, the data show a small, negative impact on profit (less than USD 3), calculated as the value of output less the value of inputs other than family labour. The confidence interval is large, partially reflecting measurement error but also highlighting substantial variability in profits.

Since women who received fertilizer increased both the quantity of fertilizer used and that of complementary inputs such as herbicides and hired labour, it is difficult to isolate the impact of

increased fertilizer application. Weather conditions or other factors may also have influenced the quality of the harvest (Beaman et al. 2013).

On the ecological sanitation investment program in Mali, Pettersson & Wikström (2016) conclude that using human fertilizer has the potential to decrease the use of artificial fertilizer (allowing beneficiaries to save more money), but it does not result in increased agricultural productivity. The evaluation's findings indicate that households with ecological sanitation substitute artificial fertilizer with human fertilizer at 10 to 15% of the average household use of artificial fertilizers. However, there is no significant difference between the effect of an artificial fertilizer and a human fertilizer on agricultural productivity.

Extension services

Osei et al. (2018) evaluated the impact of a mobile phone extension service providing voice reminders about pre- and post-harvest grain handling at key times pre- and post-harvest. It was found that the mobile phone reminders had a significant positive impact on the timing of the grain harvest, which took place two weeks earlier than in the control group. There was also a significant positive impact on the adoption of improved grain storage methods. The reminders reduced pre-harvest grain losses significantly but had no impact on post-harvest losses, which increased overall from 17.7% at baseline to 40.9% at endline. This was attributed to weather-related factors. It was expected that losses would be relatively smaller among the treatment group and, in fact, the reminders did reduce their pre-harvest losses by 14 percentage points relative to the mean loss of 33% in the control group. Regarding the lack of impact on post-harvest grain losses, these were already very low, at about 5%, and further reductions would have been difficult to achieve.

The reminders had no impact on the likelihood of farmers selling their harvest through aggregation centres, nor on farmers' income from crops (Osei et al. 2018). Although Sikasso Region is known as the breadbasket of Mali, grain market participation in the study area was low, with fewer than half of all grain farmers selling any output. Some farmers who did have contracts with aggregation centres defaulted because prices were higher on the open market. Focus group discussions and key informant interviews indicated that many farmers considered their grain harvest to be for consumption and important for food security rather than income generation. Food shortages were reduced among the treatment group by 7 percentage points compared with the control group.

Since cotton was the dominant cash crop in the study area and not grain (Osei et al. 2018), it might have been predicted before the project began that farmers in the area would not sell grain in large quantities to aggregators but instead sell small quantities at the farm gate or in local markets. Yet according to AMEDD, the organisation which implemented the project, a government ban on cross-border cereal trade impacted on grain sales. The intention had been that farmers would sell their increased output to large buyers within or outside Mali, preferably the latter, since foreign traders offered better prices.

Cash and in-kind transfers

FAO's Cash and Cash+ transfer project, *Productive safety nets as a tool to reinforce the resilience in the Sahel* (Dao et al. 2021), aimed to strengthen the resilience of vulnerable households affected by food insecurity through distributions of unconditional cash and in-kind transfers, training, and activities intended to improve productive capacity. The impacts of the Cash Only and Cash+ treatments were compared, and each of these with the control.

The evaluation found that Cash+ beneficiary households had 85.4% more livestock than if they had received Cash Only (Dao et al. 2021). This suggests that livestock holdings were maintained and expanded after the project ended and were a form of long-term capital. Revenues from livestock production gained by Cash+ beneficiaries were 68.5% higher than if they had not received any treatment and 88.2% higher than those who had received Cash Only. Cash+ treatment had a particularly strong impact on increased livestock holdings in labour-constrained households, in female-headed households, and in less wealthy households. Cash+ households were 70% more food secure than if they had not been project beneficiaries and 7% less likely to experience food insecurity than if they had received Cash Only. Cash+ male-headed and labour-unconstrained households benefited more from improved food security. Cash Only female-headed households with 'wealth' below the median became less food insecure. Some of those who received Cash Only may have used it to satisfy immediate needs and as a result it had no lasting impact. No impact was observed on non-food expenditure. No impact or slightly negative impacts were found on dietary diversity, perhaps because the limited nutrition training provided was insufficient. Both Cash+ and Cash Only beneficiaries had developed better hygiene practices, most notably in female-headed households and those less well off. However, there was no impact on water purification practices.

The project did not have any second-order impacts on outcomes related to the beneficiaries' non-farm activities or their life aspirations, perhaps because the cash transfer was too small to make a difference (Dao et al. 2021). Negative impacts on non-farm activities were found among female-headed households who reduced their non-farm activities as a result of the additional income. There were no significant impacts on respondents' expectations of increased income after two years, nor for better socioeconomic conditions after five years. There were, however, positive and significant impacts on both Cash Only and Cash+ beneficiaries' aspirations for their children's education. Cash Only and Cash+ beneficiaries were respectively 51.9% and 16.3% more likely to hope their children would attend university. The Cash Only beneficiaries were also 48% less likely to express that they wanted no education for their children. Aspirations for children's education in households headed by women were higher than in those headed by men and among labour-constrained households. The lower level of aspirations of the Cash+ beneficiaries was further intensified with those characteristics.

Dao et al. (2021) report that their impact evaluation was negatively affected by the lack of a comparison group at baseline and the consequent inability to use the baseline survey. In addition, other donor projects were assisting communes receiving the intervention during the same period, resulting in difficulty in attributing impacts to the FAO project.

CARE (2017) concludes that the *Cash Assistance to Households Affected by Food Insecurity Program* in Goundam and Niafunké Districts contributed to an increase in food security in the targeted areas. Comparing the baseline and final assessments, the study reveals that the number of households with limited access to food and who are food insecure dropped from 50.5% to 2%, a difference of 48.5 percentage points. Additionally, households reporting hunger fell from 53% to 2%, and fewer households were forced to adopt coping strategies, such as resorting to less preferred foods (a decrease from 76% in the baseline assessment to 36.6%); reducing the amount of food at mealtimes (down from 54.3% to 33%); borrowing food or relying on help from friends or relatives (down from 21.9% to 17.6%); reducing food consumption by adults in favour of children (down from 83.8% to 8.9%), and finally reducing the number of meals consumed per day (down from 54.3% to 3.8%). In terms of poverty reduction, the report reveals that the cash transfers rarely contributed to household investments, particularly because they only covered about 60% of beneficiaries' food needs. Overall, these results show a significant positive impact on the living conditions of households, a potential place for cash-transfer programs in a post-conflict context, and an opportunity for project improvement by focusing on linking cash transfer to development actions.

Supply of drinking water

JAICA (2010) concludes that the water supply, which aimed to increase a reliable supply of safe drinking water in rural communities in the Kayes, Ségou, and Mopti regions, had some positive impacts, although a causal relation could not be stated for all the findings. Among the positive impacts, the study shows that there was a significant increase in access to potable water. Before the project, the proportion of households having access to boreholes was 7%, and afterwards 65% of households used water from boreholes installed by the project for drinking and cooking. Secondly, there was a strong correlation ($p < 0.001$) between the project's activities in increasing access to potable water and improvement in basic sanitation for beneficiaries, which led to a reduction of infant diarrhoea, more frequent laundry activities, and greater use of water for drinking and cooking.

Rural credit

Beaman et al. (2014a) evaluated the Saving for Change (SfC) village-based savings and loans groups in which women were trained in an oral accounting system so that they themselves could keep track of outstanding loans and savings balances. Those who joined the schemes were likely to come from larger and wealthier households, as measured by food consumption per capita. Adopters were also more likely to have had to resort to a costly coping strategy within the previous year. Adopters scored highly on the social integration index, the community action index, and the intra-household decision making power index. About 37% of women in the baseline sample had joined an SfC by endline. No differences were observed based on the gender of the household head or on ethnicity. Membership of SfCs had a negative impact on membership of ROSCAs and other ASCAs.

Beaman et al.'s (2014a) study found that access to the SfC groups led to an increase in total savings of 30% and a three percentage point increase in the likelihood of receiving a loan in the

previous year. In Malian culture, it is embarrassing to ask family members for a loan, so the SfC program may have provided a more acceptable source of credit. The amount of the most recent share-out averaged US\$30.64, which was most frequently used for food (47%) and for small businesses (27%). Just under half of SfC members reported having received a loan from the group during the 12 months before the survey. The most frequently reported need for a loan was food, followed by small business expenses.

Beaman et al. (2014a) found that the SFCs had a positive impact on household food security. Weekly food consumption falls in the lean season for all households but those in treatment villages experienced a smaller decline. SFCs appeared to allow households to smooth consumption throughout the year. There was a small increase in total food consumption but monthly household expenditures on non-food items did not differ in treatment and control villages. There was no impact on the value of outputs at the household level, though women in SfC villages gained about US\$ 6 more in agricultural value, a 23% increase. Agricultural inputs, considered better measures of impact than outputs, did not change. The average share-out of about US\$30 was sufficient to purchase a sheep or goat, and households significantly increased their livestock holdings. There was no statistically significant increase in small business profits as a result of treatment, but there was “suggestive evidence”, significant at the 10% level, of increases in both business expenses and sales in treatment villages compared to control villages. No evidence was found of increased investment by the treatment group in education or health. There was no impact on women’s decision-making power, involvement in the community, or social capital.

In the villages where replication of SfC groups was structured, the groups had significantly more SfC members than where it was organic (Beaman et al. 2014a). Furthermore, total savings were higher in the structured villages, though the difference was barely statistically significant. NGO endorsement was unlikely to be responsible for the sustained usage of SFCs: at the time of the evaluation, the average SfC member had participated for almost 24 months and fewer than 10% who joined the group had subsequently left.

Oxfam America (2013) concluded that Saving for Change (SfC), whereby marginalized groups had increased access to credit and women were able to self-manage savings and credit groups, led to small but positive and statistically significant economic effects compared to control villages where SfC was not introduced. The SfC intervention led to overall increases in savings (an increase of 130%), amounts of money borrowed from savings groups by women in SfC villages (12% more women in treatment villages reported borrowing from savings groups), and household livestock holdings (which increased in value by 13% in treatment villages). Additionally, the program also led to an improvement in scores in Freedom from Hunger’s food security index, which dropped by four percentage points in treatment villages, suggesting that the project helped households overcome consumption obstacles throughout periods of greater food insecurity. However, there were also many areas in which no significant differences were found between treatment and control villages. There was no measurable impact of SfC on how households dealt with health expenses, and small or no significant impacts on school enrolment, business development or expansion, agricultural inputs, or household and agricultural assets.

Beaman et al. (2014b) concluded that the program designed to increase agricultural investments and profits through microloans in Mali had some effects. First, the cash grants in no-loan villages led to a significant increase in investments in cultivation. There was more land being cultivated (8%), more fertilizer use (14%), and overall more input expenditures (14%). These households also experienced an increase in the value of their agricultural output and in profits by 13% and 12%, respectively. Additionally, the report informs that there was a significant increase in investments in cultivation and an increase in profits from relaxing capital constraints. This impact on profit even persists after an additional agricultural season. Thus in this environment, capital constraints are limiting investments in cultivation. Secondly, the report also finds that farmers who most productively use capital are more likely to take loans. This suggests that households which chose to borrow, and were thus self-selected out of the sample frame in loan villages, had higher marginal returns than those who did not choose to borrow. As a result, the report concludes that the returns to capital in cultivation are heterogeneous and that higher marginal-return farmers self-select into borrowing more so than low marginal return farmers. In agriculture, the lending process generates positive self-selection so farmers who benefit the most from relaxing capital constraints are more likely to choose to borrow.

Millennium Villages Multisector Project

Mitchell et al. (2018) evaluated the *Millennium Villages Project (MVP)*, a ten-year, multisector project initiated in 2005 with the aim of achieving the Millennium Development Goals (MDG) in ten rural areas in Sub-Saharan Africa, including in the Tiba area of Ségou Region, Mali. Integrated interventions were implemented in poverty reduction, agriculture, nutrition, education, health, and infrastructure. Although the project's goal to achieve all of the MDGs was not met, "impact estimates" for 30 of the 40 outcomes averaged across all ten project sites were significant (at the 95% level). Substantial effects were seen in agriculture and health.

Limitations in the project's design resulted in the lack of a comparison group (Mitchell et al. 2018). The intention was to focus on target attainment in the MV1s, based on official UN MDG targets. The evaluators retrospectively therefore set up their own comparison villages. In Mali, there were five. Project impacts were estimated as differences between measured outcomes across a set of indices in the MV1s and in the comparison villages. The indices combined various outcomes along "hypothesized causal pathways". For example, bednet ownership, bednet use, and malaria prevalence were grouped together in the HIV and malaria index. Project effects and target attainment were estimated with statistical uncertainty and are thus prone to error. Project impact and target attainment were estimated for each outcome index.

The actual impacts of the project cannot be known, and the findings referred to as impacts by Mitchell et al. (2018) are an approximation. In the MV1 core village in Mali, data appeared to indicate positive impacts in three indices – the maternal health and the stunting and mortality in children under five indices, and in the HIV and malaria indices – as well as the overall index. Impact on the agriculture index was barely positive. Negative impacts of the project were observed in the poverty, nutrition, child health, and water and sanitation indices, and marginal in the education index. A similar pattern was observed in the Bayesian impact analyses, in which the probability for a hypothesis is updated as more evidence becomes available. In the Bayesian

analysis, however, there was a stronger positive impact on the agriculture index and on child health. Mali was one of five sites where project spending was below the recommended range of US\$ 101–127 per person. Overall, estimated impacts were most substantial in agriculture and health, least so in poverty, nutrition, and education. Maternal health was the best-performing index, with four of the five outcomes meeting their targets.

Improving food security and reducing poverty through agricultural value chain development

USAID's (2013) evaluation does not provide robust evidence on the impact of the *Integrated Initiatives for Economic Growth in Mali* (IICEM), a multi-year economic growth activity designed to reduce poverty through increasing agricultural productivity, employment, and incomes. Although USAID reports that stakeholders were unanimous in attributing to the project an improvement in technical conditions, there is a lack of measurable findings to sustain these assumptions owing to the lack of reliable data.

USAID's (2020) study does not provide sufficient evidence to assess the impact of Cereal Value Chain activity in Mali (CVC), a project designed to increase agricultural production and incomes through direct interventions with farmers and value-added income-generating activities carried out by value chain actors. The study lacks measurable impacts as its findings come mostly from interviews with beneficiaries. On the one hand, these interviews revealed a positive perception of the program: informants felt that the value chain financing model between CVC and Planète Distribution, a private business in the Mopti region, significantly expanded lending to farmers by formalizing sales contracts for inputs prior to the rice season and a value of paddy equal to the inputs, albeit this model has not increased commercial financing to producers of millet and sorghum. On the other hand, not only did the project lack a baseline and endline survey for comparison in terms of agricultural productivity and revenue, but also the quantitative survey data obtained for CVC were unable to show any impact of the gender mentoring program, which was aimed at decreasing disparities in production and revenue between men and women, on women in mixed POs because the 2018 data did not contain the gender-related questions of the 2017 impact survey. Further analysis is required to assess the impact of the CVC program in Mali.

Transition International & Transtec (2020) evaluated the “fish and onion” project, which sought to enable shallot/onion and fish value chains to become more effective and resilient, so that they would be able to operate along market lines. Achievements were assessed against baseline data obtained in 2015. However, there is some lack of consistency between results data presented and also a lack of clarity in more than one section of the evaluation report. All indicators related to access and use of quality inputs appear to have been exceeded, as were targets for good production practices and yields, though the figures are not always consistent between sections. Some producers apparently increased their production yield or area farmed, and some of these reported an increase of 30%. Regarding post-harvest treatment, the volume of shallots processed and marketed increased substantially and greatly exceeded the target. The desired 20% decrease in price fluctuations was also exceeded. 48% of farmers increased their production by at least 30% and 46% increased their income by the same amount,

exceeding the targets in both cases. The turnover of input suppliers, and those organizations involved in crop storage and processing, also increased beyond target.

The “Market for the Poor” approach enables beneficiaries to adopt and scale up processes specific to their needs. For example, the scaling up of collective storage facilities by shallot and onion producers was a strong incentive for producers to cluster around these facilities. 90 strengthened clusters were focused on 65 stores that had been constructed at shared cost. Positive impacts of this were the storage of 1,000 tonnes of shallots in the third year of the project, and access to bulbous shallot seed of homogeneous quality for winter production (Transition International & Transtec 2020).

The project appears to have impacted all stages and actors in the value chain, though actual figures may not be reliable. Overall, 200 ha were planted, yielding a reported harvest of 3,500 tonnes at a value of 900 million FCFA (US\$ 1.8 million). Beneficiaries are said to have saved a total of 250 million FCFA (US\$ 500,000) in seed purchase costs and also had better access to other inputs. Suppliers benefited financially through improved packaging as well as increased demand. Four varieties were adopted for the rainy season and planted by 2,000 producers. Yield was 1,000 tonnes at a value of 400 million FCFA (US\$ 800). The marketing period was extended by the adoption of varieties with a longer shelf-life, resulting in better valorization of production. Mechanized crushing technology improved both the productivity and quality of processed shallots, and the more remote growers benefitted from mobile shredders transported by tricycle. More than 3,000 tonnes of crushed and dried shallots were said to have been sold for a value of 3 billion FCFA (US\$ 600 million) (through an agro-industry contract (Transition International & Transtec 2020).

The mutually supportive links between producers and input suppliers, especially seed suppliers, had a positive impact on the economic development of all the value chain actors. Growth also led to improved access to credit, potentially further expanding the value chain. Further along the value chain, wholesalers and traders responded to the increased supply and helped to increase producers' incomes. Improved storage facilities enabled producers to capitalize on higher off-season prices (Transition International & Transtec 2020).

Demonstrations of fish farming barely started until year 3 of the project, which considerably delayed its development and popularization. For the fish-farming value chain, quality inputs including fingerlings were available but their use was hindered by lack of credit for producers. Dissemination of information and equipment and also fish feeding were negatively impacted in some areas when fish farmers and suppliers were not able to travel freely between sites due to lack of security. Fish farming is a nascent sector and capacity is still very limited, particularly in fry production, which impacts on productivity. There is a seasonal effect, and a more lively market outside the major fishing periods. Marketing networks are beginning to specialize and to differentiate the fresh local product from imported frozen fish sold at low prices. More support from the government would help stimulate broader uptake of fish farming.

Traditional fish farming in natural ponds and waterways on the plains had the potential to become more productive and sustainable, but it was not strongly adopted by the target

populations. Lack of cold chain logistics for transporting fish to market is a major hindrance (Transition International & Transtec 2020).

Conservation of endemic livestock and their habitat

Hodge & Bosma's (2015) evaluation does not provide sufficient evidence to evaluate the impact of the *Sustainable Management of Globally Significant Endemic Ruminant Livestock of West Africa*, a project designed to implement an integrated program aimed at removing existing barriers to the in-situ conservation of three priority endemic ruminant livestock species to improve their productivity.

Strengthening resilience and improving food security in wetland areas

The PARF project, evaluated by (CAEC 2016), involved vegetation clearance in the Faguibine drainage system to improve the flow of water and to increase food insecurity and the standard of living through agro-silviculture, fish-farming, and environmental protection activities. Impacts on activities made possible by the drainage works were assessed based on reduced risk of food insecurity; beneficiaries' mastery of strategies to prevent insecurity; access to quality seeds; the existence and operation of grain banks; capacity building of the beneficiaries and their ability to use their skills and knowledge; and the project's contribution to local economic development.

The dredging and cleaning of channels, much of it by manual labour, exceeded the planned 404,000 m³ by 7%, allowing improved access to water for agriculture, livestock, and fishing (CAEC 2016). PARF made available improved seeds and inputs and beneficiaries received training on cultivation techniques, composting, and pest control via the local agricultural extension service. According to project staff, the infrastructure works and PARF inputs and training had a positive impact on the area planted and on crop production, despite late delivery of some inputs. However, according to the regional agriculture office, an increase was only seen in rice planting and production, whilst other crops saw a significant decline. It is unclear whether this was due to the project's activities or to poor rainfall over the previous two years and/or displacement due to insecurity. Market garden outputs increased greatly in the intervention area, which had a positive impact on the diversification of diet and income. However, sales were poor because all the produce arrived at the market at the same time, and, due to the security problems, producers were unable to send their produce to other markets. Higher rice and vegetable crop yields had a positive impact on household food security and the hunger gap was reduced from five to three months.

Increased water availability and grazing had a positive impact on livestock and fishing. PARF's distribution of cattle feed and bourgou seeds and provision of vaccinations for livestock helped improve animal nutrition and health, though the selection of beneficiaries by local authorities was deplored. Planting of bourgou was possible on only 60 ha out of the planned 120 ha because of the early withdrawal of water, which reduced the potential impact for pastoralists. Fish catches improved in the flooded area and the project took measures to protect the fishing zones (CAEC 2016).

Two grain stores with a capacity of 500 tonnes were constructed but completion was delayed due to the security crisis and at the time of the evaluation they did not contain grain (CAEC 2016). Likewise, the maintenance workshop was built but was not operational because the equipment was being stored for security reasons in Bamako. However, only four of the 30 pieces of equipment had been obtained and, according to staff, the equipment was inadequate for the scale of work. Despite the efforts and progress made, impact was limited because regulation of the Faguibine system requires a much higher level of resources to undertake the dredging of the 120 km length of channels in the intervention zone.

PARF also supported local environmental protection activities, including bank stabilization work and planting of trees, including fruit trees, and provided small equipment to planters and nurserymen. Removal of animal carcasses and sanitization of the area, as well as the dredging of channels, provided jobs for about 3,000 local youth.

Despite numerous constraints, the project is said to have had positive impacts on the local population. It contributed to the regularization of the Faguibine water system, increased rice cultivation and vegetable production, and had a positive impact on economic development, especially of women. It also assisted communities to adapt to the effects of climate change. Overall, food insecurity and the standard of living of the people in the intervention areas of the Faguibine system improved as a result of the project, even though there remained considerable drainage clearance still to be achieved (CAEC 2016).

The objectives of the PACY program in Youwarou and Niafunké (Touré et al. 2013) were to facilitate the collaboration of the Circle and local communities in the construction of hydro-agricultural infrastructure to support local producers and contribute to higher agricultural productivity. The intercollectivity of Bolongal was created in December 2010 in response to the locally-felt need to pool their resources to manage infrastructure developments beyond the capacity of a single community and to ensure the inclusive economic development of the local population. Its creation impacted positively on social cohesion.

With the support of the PACY program, Bolongal and the Intercommunal Council for the Development of Lakes Tanda and Kabara in Niafunké, succeeded in completing 18 infrastructure projects, including dykes and wells, which are operational (Touré et al. 2013). The development of pastoral wells supports livestock passing through the commune of Farimaké and permits use of bourgou grazing areas. The new hydrological infrastructure also enabled the introduction of crops such as lettuce, potato, tomato, and aubergine. This contributed greatly to increased food security and improved nutrition. About 720 farmers, including more than 560 women, were also able to increase their income. The implementation of these projects helped the communities in Youwarou to overcome problems concerning equitable access to land, which in the past had caused conflict.

Market gardening activities take place throughout the year and the women of Youwarou no longer need to go to Mopti to buy vegetables. Some women said they had earned between 55,000 and 75,000 FCFA (US\$ 110–150) per year from sales of produce surplus to family needs. Money was used to pay for their children's healthcare and schooling, and they also set up their own savings scheme. The women have been able to contribute to household expenses

and have improved their status in the household. As a result of Bolongal, they have gained more equitable access to land and resources in the delta. The management committee and traditional authorities have promised to respect the quota of at least 10% of agro-pastoral investments for the benefit of women and youth (Touré et al. 2013).

The PADIN-II program, evaluated by Nelen et al. (2019), sought to improve the living conditions of agro-pastoralists and fishermen in the wetlands of the Inner Niger Delta and Sourou Plain through the development of irrigated plots and market gardens in the villages, fishponds, and improved grazing for cattle to support milk production. The program developed the entire planned area of 307 ha of village irrigation schemes (PPIV) in the intervention zone and the main irrigation channel was lined to reduce water loss. Beneficiaries included 279 women farmers out of a total of 1,144 (24%). The irrigated perimeter areas resulted in increased rice production, which had a positive impact on supply and food security. The number of households with year-round availability of rice increased from 19% in 2013 to 46% in 2018, as some beneficiaries were able to improve their food supply from four to twelve months. Not all farmers could maintain the same high yield, and not all supplemented the rice with a second crop. All of the planned market gardens were developed, benefitting 3,500 households in various villages. Wells and boreholes with solar power kits were constructed in key areas, though there was still a risk of water shortages. Training in composting and support in crop choice improved yields. The availability of fresh vegetables had a positive impact on the nutritional quality of meals and family health, and sales of surplus produce increased household income. Three out of five planned fishponds were completed and their management handed over to a cooperative.

In 2018, as a result of the irrigated crops, market gardening, and fish-farming, 96% of households had an acceptable level of consumption and only 1.6% reported experiencing hunger. In the lean season, 100% of households had been able to eat at least one meal per day. Although there was clear progress in achieving production outcomes for agro-pastoralist and fish-farming households, Nelen et al. (2019) could not deduce from the available evidence that the project had impacted the more than 96,000 individuals and 15,700 households reported. Interviews by the evaluation team showed that women's workload had increased as a result of these interventions. New savings and loans groups had a positive impact on women's access to credit.

Pastoral development was focused on improved grazing for the herds and increasing milk production and its distribution through milk collection centres. 540 ha of bourgou grass were planted, though the siting of some of the fields was said not to be appropriate. Three tanks were constructed to provide water for the animals in the dry season. At the time of the evaluation (Nelen et al. 2019), bourgou planting had not yet had a significant impact on the quantity of milk collected at the dairy centres. The program was continuing to promote intensive livestock production by providing animal feed and through artificial insemination in order to improve the genetic potential of local breeds for milk production. Three out of the planned five milk collection centres were completed but operating far below breakeven point. Milking, milk packaging, and sales were carried out by women but the centres were run by men. The milking centres will only have a positive impact on producers and consumers if they offer other services needed by nomadic and sedentary pastoralists. These include timely collection of milk, security of sale and

lower transaction costs, diversification of products (which has already begun), and the possibility of bartering in place of cash transactions. Complementary services such as sale of seed and livestock feed and veterinary services would attract agro-pastoralists to the centres. Some of these ideas were being worked into the program but had not yet had any impact. It is far from clear that the milk production component will have any major impact on standard of living, given its low level of implementation. PADIN-II did not achieve its objective of developing the Sourou Plains due to insecurity in the delta and Sourou area. However, a strategic environmental assessment was undertaken and planning was begun for an Integrated and Sustainable Development Program for the Sourou Plains.

The program was also concerned with risk management, particularly with respect to predicting and mitigating the risks of flooding, and building resilience. 83% of the communes had installed the planned drainage infrastructure by the end of the project and had undertaken reforestation and planting of bourgou grass to mitigate risk of flooding. The impact of this work had yet to be tested. Nelen et al. (2019) considered that preparation of community mitigation plans required more advice and monitoring.

Agro-pastoralists include families who practise extensive transhumance, families whose herds migrate at certain times of the year over small distances, and sedentary families who have taken up livestock farming. Transhumant pastoralists were the most marginalized of the program's proposed beneficiaries. Nelen et al. (2019) considered that the program had an agricultural bias which favoured sedentary families. Overall, the development of pastoral areas was only partial. Land and access rights to the bourgou plantations had not been satisfactorily established within and between communities and in one case outsiders came in, cut the bourgou, and sold it. PADIN wanted to improve the feeding of herds from these sites and to support milk production. All this reinforced existing tensions in the area, going against the principle of "do no harm".

Strengthening resilience and adaptation to climate change, and improving food security in dryland areas

Dianka & Nienta's (2017) study on the project *Improving Adaptive Capacity and Resilience to Climate Change in the Agricultural Sector in Mali* does not provide sufficient evidence to assess whether the project achieved its intended impacts on reducing the risk of food insecurity due to climate change. Due to the qualitative nature of the study, which consisted only of a desk review and 32 key informant interviews, there is a lack of quantitative measures to assess the impact of this program. Moreover, the evaluation report states that "the indicators defined for the overall project objective are output indicators that do not allow for a long-term assessment of the progress achieved by the project's development vision nor verifiable impacts in the short term".

FAO & WFP's (2019) evaluation does not provide enough evidence to assess the impact of the *Support to the resilience of vulnerable populations in northern Mali* project, which aims to increase food security and resilience to climate shocks of vulnerable populations. This is due to a lack of measurable outcomes related to the project's goals on food security, social cohesion, and resilience to environmental shocks. Although the report states that the project had positive effects, the evidence provided refers to outputs instead of outcomes, such as the number of

survey respondents who received social transfers, seeds, fertilizers, and agricultural and dietary training. In addition, there is no baseline against which to compare to the survey results.

The Mali-Women Project (Halle & Doumbia 2020) sought to contribute to reducing vulnerability and increasing adaptive capacity to cope with adverse impacts of climate change by promoting the transfer and adoption of adaptive technologies. For the evaluation of the achievement of the project objective, a single indicator "Number of households with more secure access to livelihoods in the context of current and future climate change" was created. Although the number of beneficiary households greatly exceeded the target of 5,000, the indicator, not being SMART, did not define the meaning of "more secure access to livelihoods", making it impossible to ascertain achievement. Strengthening and diversification of livelihoods and income sources for vulnerable populations in the targeted areas was rated satisfactory.

Indicator targets for an innovative approach and for sustainable climate-resilient technologies, the number of households participating in climate risk reduction and awareness activities, and the number that increased their per capita income as a result of applying adaptation measures were generally met, though the indicators do not allow for any qualitative assessment of the outcome nor any impact assessment (Halle & Doumbia 2020). The functioning of the project cereal banks was considered fragile. Training in agro-meteorology and the distribution of adapted seeds took place, but lack of follow-up did not permit measurement of impact. For the only innovative technology of the project, the forage perimeter areas, the infrastructure was not developed. The proposed livestock activities for women were linked to the forage perimeters and so were not realized.

The impact of the project was assessed in terms of its contribution to national climate change objectives as well as progress in environmental, economic, social/institutional, and innovative technologies (Halle & Doumbia 2020). The overall impact of the project was rated minimal (level 2 out of 3). The project was too small to have an impact on climate change activities at national level. The impact of environmental activities was also rated minimal. Although, locally, the water table was recharged and some species of flora and fauna had returned around micro-dams and ponds, lack of integration and continuity of effort limited any ecological impact. The impact of economic activities was rated minimal. The women prioritized the generation of income and food production in the market gardens, but their income was small. Market gardening was, in many cases, suboptimal due to there being too little water available for the area under cultivation. Micro-dams, ponds, and other infrastructure were still under construction or only partially completed, limiting the area available for cereal production. Valorization of crops was not developed.

The social and gender impact was rated significant at commune level, whilst institutional impact was rated minimal due to the limited performance of most committees and structures (Halle & Doumbia 2020). The project provided capacity building in the communes and encouraged management by the beneficiaries, especially by women. Market gardening fostered strong social cohesion among the women and strengthened their position in society and promoted gender equality. Men's perception of the role of women and their importance greatly improved due to the success of women's activities. Management and monitoring committees were set up

to manage infrastructure and activities but the support provided to the committees and the communes was insufficient for them to be able to take the initiative, with the exception of a single market garden area where women were extending the installation on their own initiative.

Nevertheless, according to Halle & Doumbia (2020), the project contributed to the reduction of poverty, malnutrition, food insecurity and rural-urban migration. The project was also said to have strengthened resilience to climate change. Evidence for this wide-ranging assessment is not provided.

The Bureau de la Coopération Suisse au Mali's (2015a) evaluation provides some positive results of a program designed to increase food security and resource management among farmers in partner organizations. The study shows that the project contributed to an increase in the production of agro-pastoral enterprises by 14% compared to the period 2008–2011 and, as a result, an increase in food security. The annual food coverage rate has risen from six to nine months for 30% of the family farms of the partner organisations, from nine to ten months for 45%, and finally from 11 to 12 months for 25% of the farms. The report also mentions other positive results, such as the transformation of local organisations into key players in grassroots development and a reduction of rural exodus of young people, but does not provide indicators to evaluate the project's impact in these areas.

The Bureau de la Coopération Suisse au Mali (2015b) reported that they could not measure the impact of the *Urban Social Development Program*, which aimed to increase food security and job creation in agriculture in the Koutiala region, given recurrent delays in project implementation. Therefore, the evaluation presents some of the project's short-term effects only on the Fienso perimeter (the only infrastructure in operation). In terms of socio-economic impacts, the project has contributed to an increase in rice yields from 3.36 t/ha before the development to 5.6 t/ha after, an increase of 67% in this first production season, and a reduction in the seasonal exodus (from 80% to 5%) by retaining of 75% of the young people who would have left. There were also some spill-over effects: there was an increase in revenue for the Commune of Zangasso through the increase in the payment of taxes by the taxpayers of Fienso, with recovery rate up from 45% before the development to 75% after.

The Drylands Coordination Group (2015) reports that the *Sahelian and Sudano-Sahelian Food Crop Establishment Project*, has achieved its goal of increasing agricultural resilience to climate hazards in Mali. Although the qualitative nature of the evaluation does not allow for a causal attribution, interviewees revealed that the agriculture techniques led to an increase of yields of food crops by 50–100% with the correct use of seed soaking and microdosing technologies. The evaluation also reports some unintended consequences, such as an increase in the number of animals in the village owing to the extra income from the sale of surplus cereal; a decrease in incentives for the exodus of young people from rural areas; and an increase of solar panels and TV antennas. However, caution should be taken in analyzing these unintended results, as no quantifiable measures are provided.

Sustainability

Irrigation-focused projects

The studies on irrigation by Dillon (2011a,b) were not intended to be sustainable.

GIZ (2019) concludes that PASSIP, a project designed to improve the economic and nutritional status of a rural population in Mali through better small-scale irrigation techniques, is sustainable. Nevertheless, the project presents some risk factors, such as the dependency of beneficiaries on farm inputs and fertilizers provided by the project. The irrigation infrastructure would most likely continue, in spite of some necessary rehabilitation works, as qualitative data indicate increasing project ownership and capacity building by small-scale irrigation farmers, who have internalized maintenance works for irrigation schemes as well as protection of soil resources.

Fertilizer-focused projects

The study on fertilizer use by Beaman et al. (2013) was not intended to be sustainable.

Pettersson & Wikström (2016) do not assess sustainability. However, their study on the use of human excrement as fertilizer took place almost two years after the project had closed, and a large proportion of the beneficiaries were continuing to use human excrement for agricultural purposes. Whether optimal use was being made of the excrement is not known. However, the project was sustainable at some level and households were saving some money by not having to purchase as much artificial fertilizer, even though their agricultural yields differed little from those of the control group.

Extension services

Osei et al. (2018) did not anticipate the intervention involving mobile phone alerts being sustainable, though they did discuss its potential scalability. It was noted that it was not necessary to provide mobile phones as most farmers had their own, which would reduce costs.

Cash and in-kind transfers

Dao et al. (2021) refer to “the unrepeatability of the project”. They say that the way in which the activities are implemented matters a lot for the program’s final results, referring particularly to the level of training and coaching, monitoring, role-model exposure, and support given to beneficiaries. This is also true of its sustainability. Since 2018, within the framework of the Emergency Safety Nets Project, the Government of Mali has learned from the FAO Cash+ project and supplemented cash transfers with accompanying measures to help its beneficiaries develop income-generating activities, mostly in agriculture.

CARE’s (2017) evaluation on the *Cash Assistance to Households Affected by Food Insecurity Program in Goundam and Niafunké Districts* does not address sustainability concerns.

Supply of drinking water

JAICA (2010) concludes that the water supply project, which aimed to increase a reliable supply of safe drinking water in rural communities in the Kayes, Ségou, and Mopti regions, was sustainable. First, the study states that there was community ownership of the water project. In the villages where community water committees, which are responsible for regular maintenance of boreholes with hand pumps, are no longer functioning, the village chiefs or elders assumed the responsibility in facility maintenance. Secondly, it was expected that the Government of Mali would make further efforts to address issues related to the maintenance, technical abilities, and financial resources, such as the ability of water management committees to maintain the boreholes with hand pumps. Not only is water supply one of the Malian government's strategic priorities, but the government also allocated the financial resources as planned during the project duration.

Rural credit

The potential sustainability of the Saving for Change (SfC) project is not specifically mentioned by Beaman et al. (2014a). Nevertheless, many of the existing branches of SfC appear from the report to be self-managed, able to continue without donor support, and sustainable. A potential problem arises regarding their replication: the structured replication method was the more successful method in starting a new branch and attracting members but this involved NGO support through training and certification and the provision of a booklet. Organic replication had none of these and was less successful. Given that after project staff have departed SfC will have to rely on organic replication, sustainability in terms of extending its reach may be limited.

Oxfam America (2013) reports that the SfC program was sustainable. First, there was community ownership of the project, since control villages had introduced SfC spontaneously (notably in Djidje where this was found in the sample). Secondly, the evaluation assesses that if the sponsors should withdraw support in the near future, they would still expect to see significant impacts from SfC ten years from now, which would make this program stand out among development projects in sub-Saharan Africa in terms of its potential for long-term sustainability and self-replication.

Beaman et al. (2014b) do not assess the sustainability of a program designed to increase agricultural investments and profits through microloans in Mali.

Millennium Villages Multisector Project

The Millennium Villages Project was unwieldy and not sustainable. In Mitchell et al.'s (2018) study there is no reference to any measures taken to ensure that any outcomes and impacts might become so. Achieving the MDGs was seen as hitting a target rather than ensuring a long-term sustainable impact on the beneficiaries. The evaluation report's depth of focus on any single country is insufficient to judge whether any impact could have been sustainable in Mali.

Improving food security and reducing poverty through agricultural value chain development

USAID's (2013) study concludes that the *Integrated Initiatives for Economic Growth in Mali* (IICEM) a multi-year economic growth activity designed to reduce poverty through increasing agricultural productivity, employment, and incomes, is not sustainable in the long-term. Evaluators noted from key informant interviews that once the IICEM facilitation ended, the direct funding used for agricultural supplies had stopped and the farmer/producer organizations had ceased operation, resulting in farmers having to sell their harvest individually. In addition, financial services providers – banks and credit unions – perceive agricultural production as high risk for credit, especially millet and sorghum production. The dropped corn, millet, and sorghum groups were not able to maintain sustainable credit linkages for these crops because banks will only provide production credit for subsistence cereals crops if a project or other creditable entity is present to facilitate loan repayment.

USAID (2020) reports that the Cereal Value Chain activity in Mali (CVC), a project designed to increase agricultural production and incomes through direct interventions with farmers and value-added income-generating activities carried out by value chain actors, is sustainable. The authors noted that all nine Community Agrobusiness Teams – a sort of farmers' association that provides training to producers – remained properly functioning and provided all services to producer organizations after the project ended. There were, however, some threats to project sustainability, such as the lack of state inputs in replacement of CVC services, such as agricultural techniques and new technologies, and the farmers' dependency on a single lender. The latter component is a risk since the project model could collapse if the sole bank were to stop providing loans, as other banks did after the outbreak of the civil conflict in 2012.

Transition International & Transtec (2020) evaluated the “fish and onion” project, which sought to enable shallot/onion and fish value chains to become more effective and resilient, so that they would be able to operate along market lines. The project sought sustainability through developing and maintaining close links with the Malian authorities and technical services. This aimed to ensure post-project monitoring in the regions. Links were also established with the rural communities, to make the project activities part of their long-term vision. The contact helped build trust between the project teams and the communities, which facilitated greater improvement in the performance of the shallot and onion sectors. Access to quality seed and bulbous seed can be sustainable because both producers and suppliers have seen the benefits. For the fish sector, links were developed with fry producers and established aquaculture producers which could lead to sustainability. Much, however, depends on whether the projects can survive the impacts of climate change and any future insecurity.

Despite links with authorities, the project worked directly with rural communities and did not fully integrate the value chains in the regional and national context or include the authorities in project implementation and management in preparation for the time post-closure when their involvement would be needed to ensure sustainability (Transition International & Transtec 2020).

Conservation of endemic livestock and their habitat

Hodge & Bosma's (2015) evaluation concludes that the project for the *Sustainable Management of Globally Significant Endemic Ruminant Livestock of West Africa* is sustainable. The project focused on implementing an integrated program aimed at removing existing barriers to the in-situ conservation of three priority endemic ruminant livestock species is financially sustainable because Mali has its own research centre and department in charge of livestock and environment, and because the government has approved a budget to cover the project activities for capacitating local actors.

Strengthening resilience and improving food security in wetland areas

The PARF project, evaluated by (CAEC 2016), involved vegetation clearance in the Faguibine drainage system to improve the flow of water and to reduce food insecurity and improve the standard of living of people living in the area through agro-silviculture, fish-farming, and environmental protection activities. The project improved the skills and capacity of local people involved in the project with a view to their taking credit for its achievements and being able to continue with the activities. However, if the drainage works are to continue, additional equipment will be required and it is not known if the project supplied the remainder of the promised equipment. Provision by PARF of small equipment such as shovels, wheelbarrows, and watering cans, and the high level of local organisation and management of the market gardening cooperatives suggests that these activities will be able to continue, provided, however, that seed can be obtained. Continued activity and project sustainability will largely depend on improved security in the area. Without that, there is likely to be increased displacement and abandonment of agriculture and market gardening, and, over time, the re-silting of water channels.

The objectives of the PACY program in Youwarou and Niafunké (Touré et al. 2013) were to facilitate the collaboration of the Circle and local communities in the construction of hydro-agricultural infrastructure to support local producers and contribute to higher agricultural productivity. The program's sustainability is fragile due to lack of establishment of land ownership rights. If this had been attended to, the management committees that were set up, the various training courses in market gardening and in administrative and financial management, could have increased the likelihood of the program's sustainability.

Technical errors during the planning and design of the supply channels to the market gardens meant that they suffered damage during the first season of operation. The users were themselves forced to spend up to 700,000 FCFA (US\$ 1,400) on repairs. The 300 FCFA (US\$ 0.006) a month contributed by the women to a savings group was intended to maintain and repair damage to wells and other structures, for routine maintenance of the market garden area, and to purchase seeds and other materials, but not for major works. The women have taken the initiative to try to manage their gardens without the support of the project, which means that, provided the major structures are not damaged, this aspect of the project will be sustainable.

The PADIN-II program, evaluated by Nelen et al. (2019), sought to improve the living conditions of agro-pastoralists and fishermen in the wetlands of the Inner Niger Delta and Sourou Plain

through the development of irrigated plots and market gardens in the villages, fishponds, and improved grazing for cattle to support milk production. Farmers working on the irrigation plots and in market gardens will be able to continue after closure of PADIN-II. The PPIVs are technically sustainable as a result of the lining of the main canals and the construction of ring dikes, but maintenance will be required to reduce water loss. The ring dykes protect the rice fields from herds and prevent degradation of the canals. Beneficiaries were encouraged to apply organic manure to their rice plots and compost to market gardens, which avoids reliance post-project on potentially scarce and expensive artificial fertilizer. It was recommended that farmers prepare and plant at the same time in order to harvest at the same time, so as to avoid excessive use of motor pumps. However, the project did little to support valorization and marketing of the produce, which could have improved its sustainability. The pastoral developments were, in principle, sustainable and, provided that security is good, communities would be able to seed more areas. However, lack of agreement between the different users of the pastoral lands had a serious negative impact on the sustainability of this component.

The program established a management committee and structure for all the program schemes, provided training, and supplied working capital, whilst gradually withdrawing from management and funding (Nelen et al. 2019). The functioning of producer organizations and management committees was hampered by low literacy levels and lack of training in administrative and financial management. Once a development was completed, its management was entrusted to the community authority and management committee in the presence of the local authority. However, arrangements for this were made late in the program and it was not clear whether the communities had the means and skills to maintain the facilities and manage their activities. Had the communes and local councils been involved in project implementation, difficulties associated with transfer of infrastructure at the end of the program could have been reduced.

Strengthening resilience and adaptation to climate change, and improving food security in dryland areas

Dianka & Nienta (2017) conclude that the project *Improving Adaptive Capacity and Resilience to Climate Change in the Agricultural Sector in Mali*, which aimed to increase food security and community resilience to climate change, is sustainable. The study concludes that the different actors involved in this project were expected to continue the project activities and maintain the project's achievements in terms of climate change adaptation strategy. Interviews revealed that there was high project ownership, which was strengthened by the setup of various local committees and the replication of agricultural practices by beneficiaries. Lastly, there were also local funds allocated for the continuation of activities, such as the Agency for Local Authority Investments Fund and the Mali Climate Fund.

FAO & WFP's (2019) report does not provide a conclusion on whether the *Support to the resilience of vulnerable populations in northern Mali* project, which aims to increase food security and resilience to climate shocks of vulnerable populations, is sustainable. The evaluation states that it was early to assess sustainability concerns because the project had just been completed at the time of the evaluation. Nevertheless, it presents some elements of sustainability as follows: it was expected that beneficiaries would continue project activities with

the equipment, existing technological knowledge, investments, and management committees at their disposal. On the other hand, the absence of water in the market gardening perimeters (which might result in abandonment) and the lack of community ownership of processing units and fishponds, made project sustainability daunting.

The Mali-Women Project (Halle & Doumbia 2020) sought to contribute to reducing vulnerability and increasing adaptive capacity to cope with adverse impacts of climate change by promoting the transfer and adoption of adaptive technologies. Project sustainability was considered moderately unlikely. Many aspects of the project were incomplete or reliant on components that were still in progress. At the environmental level, local regulations for sustainable exploitation of the natural resources were still lacking. The project enabled beneficiaries with market gardens and micro-dams to set up savings to provide for maintenance and minor repairs but not to repair broken pumps and underground pipes, which was already necessary. The financial resources of the communes were inadequate to cover such additional expenses. Contradictory assessments of the two operational cereal banks suggest that seed availability might not be sustainable, nor the economic and nutritional benefits that the adapted seed might bring. The sustainability of women's improved status was considered likely to depend on the continuity of market gardening. Although the communal authorities and local communities were provided with some training in management of project activities, they would not have the financial resources to continue them.

The Bureau de la Coopération Suisse au Mali's (2015a) evaluation did not provide sufficient evidence to evaluate whether the program designed to increase food security and resource management among farmers was sustainable. The study highlights some elements of sustainability, such as project ownership among beneficiaries and the central position national farmers' organizations play in the application of the Agricultural Orientation Law, adopted in 2006, which constitutes the long-term vision for the agriculture sector. However, farmers' organizations still did not have the financial independence to run their activities without external support.

The Bureau de la Coopération Suisse au Mali (2015b) reports that the *Urban Social Development Program*, which aimed to increase food security and job creation in agriculture in the Koutiala region, was not sustainable. The report identifies the limited capacity of local governance bodies as the main threat to project sustainability, because it limited the empowerment of local actors, and prevented the continuity of project activities. This happens because, for example, local communes lack the human resources and financial means to conduct, monitor, and evaluate the training courses on the management of hydro-agricultural infrastructure.

The Drylands Coordination Group's (2015) evaluation of the *Sahelian and Sudano-Sahelian Food Crop Establishment Project*, which aimed to increase agricultural resilience to climate hazards in Mali, did not assess sustainability concerns.

Barriers

Irrigation-focused projects

Dillion (2011a,b) reported no specific barriers to project implementation.

GIZ (2019) concludes that the main barriers for project implementation of PASSIP, a project designed to improve the economic and nutritional status of a rural population in Mali through better small-scale irrigation techniques, are related to lack of convergence on goals and strategies among the development agencies involved in the project, and limited ownership and institutional weakness of the Malian Government. Firstly, the report mentions that the understanding of priorities by both implementing agencies (KfW and GIZ) was not always congruent. The design of the program appeared to be a mixture of both understandings, influenced and conditioned by additional funds from the co-financing agreements from the EU and Canada since 2014. Secondly, implementation was affected by the limited ownership and institutional capacity of the Government of Mali, which led to the use of project resources by subcontracted NGOs and consultants to substitute official services.

Extension services

According to AMEDD, which implemented a project providing mobile phone reminders at key times during the agricultural season (Osei et al. 2018), the project faced two main challenges: a government ban on cross-border cereal trade and the unwillingness of some farmers to comply with contract agreements. In the former case, the project had promised to increase farmers' cereal output and improve the quality of their yield so that they would be able to sell to large buyers in Mali or neighbouring countries, with the latter presenting better prospects in terms of price. Unfortunately, for the project, the Government of Mali refused to let cereal traders sell grains to foreign buyers. The second issue relating to non-adherence to a contract arose because prices were higher in the open market at the time when farmers were expected to sell their crop to aggregators. Both challenges were barriers to achievement of the planned outcomes, but they also indicated a lack of liaison with the Government of Mali and a lack of foresight that beneficiaries acting on the mobile phone messages would harvest and market their crop before other farmers when their grain could fetch a higher price.

Improving food security and reducing poverty through agricultural value chain development

USAID (2013) reports that country instability, especially after the military coup d'état in 2012, undermined the implementation of the *Integrated Initiatives for Economic Growth in Mali* (IICEM), a multi-year economic growth activity designed to reduce poverty through increasing agricultural productivity, employment, and incomes. Beneficiaries in the north of the country were the most affected, as the closing of banks prevented them from accessing credit lines and the conflict led to an increase in living expenses and the price of fuel used for irrigation. In addition, IICEM staff were limited or pulled out of the region and markets also closed. Additional effects of the crisis included the delay in fertilizer provision and a drop in demand for rice due to the distribution of rice food aid by humanitarian organizations.

Transition International & Transtec (2020) evaluated the “fish and onion” project, which sought to enable shallot/onion and fish value chains to become more effective and resilient, so that they would be able to operate along market lines. The project faced a number of constraints, in particular insecurity. The rise of inter-ethnic conflicts in the centre of the country restricted access to parts of the intervention area. Project activities were severely limited and the communes of Youwarou and Ténenkou had no support for much of the implementation period. The project relied on partner groups to carry out some basic activities and project monitoring.

The effects of climate change also impacted on the project. Low rainfall in 2017 had a significant impact on the 2017/18 shallot and onion season; flooding in 2019 destroyed several fish farms along the Niger River in Bamako Region (Transition International & Transtec 2020).

Conservation of endemic livestock and their habitat

Hodge & Bosma (2015) identified the main barrier to successful implementation of the *Sustainable Management of Globally Significant Endemic Ruminant Livestock of West Africa* project was political unrest. They report that the project suffered delays due to unrest, which had not ceased, but that the project management strategy was adaptive enough to allow for the completion of the infrastructure activities.

Strengthening resilience and improving food security in wetland areas

The PARF project, evaluated by (CAEC 2016), involved vegetation clearance in the Faguibine drainage system in Tombouctou Region to improve the flow of water, to reduce food insecurity and improve the standard of living of people living in the area through agro-silviculture, fish-farming, and environmental protection activities. The socio-political crisis in 2012 and suspension of bilateral cooperation led to severe disruption to project activities and the withdrawal of project staff from the intervention area.

The objectives of the PACY program in Youwarou and Niafunké (Touré et al. 2013) were to facilitate the collaboration of the Circle and local communities in the construction of hydro-agricultural infrastructure to support local producers and contribute to higher agricultural productivity. The implementation of the program was adversely affected by the security crisis in 2012. There was general insecurity in the intervention area and some activities had to be suspended or terminated. Program staff withdrew from the area, and local authority supervisors, technical services staff, and local people were displaced. At the time of the evaluation some had returned, but the program team remained in Mopti. In the rainy season, roads linking the communes in Youwarou Circle were in poor condition, limiting access to the area.

The PADIN-II program (Nelen et al. 2019), which sought to improve the living conditions of agro-pastoralists and fishermen in the wetlands of the Inner Niger Delta and Sourou Plain, was also affected by political insecurity. Areas on the left bank of the rivers were particularly affected. Many people in the Mopti region were displaced due to insecurity or suffered as a result of criminal activity. This led to deteriorating relations between ethnic groups and people being forced to abandon their income-generating activities. The ongoing presence of armed terrorist groups and the constant risk of attacks, kidnappings, and explosions hampered field visits by

the evaluation team. Several sites were no longer safe to visit or were inaccessible due to lack of transport.

Strengthening resilience and adaptation to climate change, and improving food security in dryland areas

FAO & WFP (2019) report that two factors, insecurity and organisation at the agency level, negatively impacted the implementation of the *Support to the resilience of vulnerable populations in northern Mali* project, which aimed to increase food security and resilience to climate shocks of vulnerable populations. Frequent attacks, difficulties in moving around in certain areas, and new infrastructure being attacked by jihadists, all contributed to delays in project implementation as companies selected for work and services and government staff could not move around freely. Secondly, at the FAO level, the procurement of goods and services for the project was managed in Bamako whilst sub-offices implemented the activities. This led to lengthy processes and project delays. With WFP, procurement and recruitment of contractors were included in its protocol with implementing NGO partners, resulting in more flexibility to place orders directly without going through WFP administration.

The Mali-Women Project (Halle & Doumbia 2020) sought to contribute to reducing vulnerability and increasing adaptive capacity to cope with adverse impacts of climate change by promoting the transfer and adoption of adaptive technologies. Barriers to project achievements included women's limited access to financial support and access to markets, limited support to women in developing and implementing identified climate change resilient activities and practices, and a lack of climate information related to production.

The Bureau de la Coopération Suisse au Mali (2015a) concluded that the main barriers for the implementation of a program designed to increase food security and resource management among farmers in Mali were related to poor security and political instability as well as climate hazards. Insecurity in the aftermath of the 2012 crisis led to several negative outcomes in the Mopti and Gao regions, such as the interruption of project activities, the theft of agricultural products and livestock by armed groups, and the lack of supervision and monitoring of project activities which involved provision of technical support services (agriculture, livestock, water, and forestry). The study reports that the targeted areas were subject to a drop in rainfall and disruption of the agricultural calendar as a result of climate change and reduction in vegetation cover. As a result, the budget made available for agriculture failed to cover all the needs of the producers.

Summary

Many of the included evaluations were of projects with a relatively narrow focus. In such cases, it was possible to assess impacts, at least in the short term. However, eight evaluations concluded that it was not possible to reliably estimate an impact. This was the case for one project on irrigation (GIZ 2019), the two value chain projects (USAID 2013, 2020), a project on the conservation of endemic livestock (Hodge & Bosma 2015), and four projects on resilience and food security in dryland areas (Dianka & Nienta 2017; FAO & WFP 2019; Bureau de la

coopération Suisse au Mali 2015b; Halle & Doumbia 2002), and. The fact that many project evaluations using a qualitative methodology could not identify or assess impact appears mostly due to methodological failures by project designers and/or implementers, such as the lack of a baseline and an endline survey or poor monitoring and data collection and capture. For complex multidimensional projects with many different outcomes or impacts, it was also difficult to establish a clear assessment of what was achieved (for example, Mitchell et al. 2018).

In the following paragraphs, we summarize those impacts for which the evaluation reports have provided reasonably credible evidence.

Irrigation projects

Dillon's (2011a) study, comparing the relative impacts of small-scale and large-scale irrigation on household production, income, and consumption, showed substantial gains in agricultural production and agricultural income for both large- and small-scale irrigators, with substantially larger benefits accruing to small-scale irrigators. Similarly, Dillon (2011b), investigating the impacts of small-scale irrigation, found significant positive impacts on total agricultural yield and yield per hectare and on food availability and household consumption. In addition the use of small-scale irrigation impacted positively on household savings and asset accumulation. There were also spillover effects as households shared food with others in their village. Both projects had the potential to be sustainable and have a long term impact, provided that there was sufficient water for irrigation and the pumps continued to operate. Unfortunately, the 2012 security crisis would likely have disrupted agriculture in the area.

Fertilizer projects

Beaman et al.'s (2013) study examined the choices of women rice farmers when availability of fertilizer was increased exogenously, for example whether they chose to store it, or sell it, or to adjust complementary inputs and effort. Provision of fertilizer impacted positively on women's use of fertilizer and the quantity applied, but it also permitted an increase in other inputs, such as herbicides and labour. The impact of fertilizer provision on yield, quality of grain, and income cannot therefore be isolated.

Pettersson & Wikström (2016), evaluating an ecological sanitation program, concluded that using human fertilizer had the potential to decrease use of artificial fertilizer, thus allowing beneficiaries to save more money, but that it did not result in increased agricultural productivity. Whilst results indicated that economic gain might be small, implying limited economic household incentives for investing in such solutions, the study did not take into account positive health effects at the household or community level.

Extension services

Osei et al. (2018) evaluated the impact of a mobile phone distributed reminder on best harvest practices. The reminders reduced pre-harvest grain losses significantly. There was also a significant positive impact on the adoption of improved grain storage methods.

Cash and in-kind transfers

FAO's Cash and Cash+ project (Dao et al. 2021) aimed to strengthen the resilience of households affected by food insecurity through distributions of unconditional cash and in-kind transfers. The impacts on households receiving Cash+ (cash, with some goats and training in their care) were greater than those receiving cash only. Cash+ households were 70% more food secure than if they had not been project beneficiaries and 7% less likely to experience food insecurity than if they had received Cash only. Cash+ treatment had a particularly strong impact on increased livestock holdings in the poorer, labour-constrained, and female-headed households. Negative impacts on non-farm activities were found among female-headed households who reduced their non-farm activities as a result of the additional income.

CARE's (2017) qualitative evaluation of the *Cash Assistance to Households Affected by Food Insecurity Program* concluded that cash transfers in the lean season did have a positive impact on food security, though it is likely that the impact was confined to a single season. The additional income was mainly spent on food.

Drinking water

JAICA (2010), in their qualitative evaluation, concluded that the water supply project, which aimed to increase a reliable supply of safe drinking water in rural communities, had a positive impact in increasing access to clean water and that this was correlated with improved sanitation and reduced infant diarrhoea. The clean water supply might be a contributory cause but this could not be determined.

Rural credit

Beaman et al.'s (2014a) evaluation of the Saving for Change (SfC) village-based savings and loans groups, in which women were trained in an oral accounting system so that they themselves could keep track of outstanding loans and savings balances, found that access to the SfC groups led to a 30% increase in total savings. The SFCs had a positive impact on household food security, and a payout before the lean season appeared to allow households to smooth consumption throughout the year.

Beaman et al. (2014b) found that a program designed to increase agricultural investments and profits through microloans in Mali had some positive effects. The cash grants led to a significant increase in investments in cultivation and in agricultural output and profit. This impact on profit even persisted after a subsequent agricultural season.

Agricultural value chains

We lack robust evidence that value chain projects had significant positive impacts in Mali largely due to methodological issues.

Strengthening resilience and improving food security in wetland areas

Clearing water channels of vegetation had a positive impact on water viability for rice growing, resulting in increased yields. Market gardening facilitated by water channels on the village

perimeter, was particularly successful. The construction of pastoral wells benefited transhumant herders and enabled them to graze their cattle in the new bourgou grasslands.

Strengthening resilience and adaptation to climate change in dryland areas

Six studies were concerned with strengthening resilience and adaptation to climate change in the drier areas. Among these, the projects evaluated by Dianka & Nienta (2017) and FAO & WFP (2019) do not provide sufficient evidence to assess impact.

The impact of the Mali-Women Project (Halle & Doumbia 2020) is likely to have been small, given the generally low level of achievement reported by the evaluation. Yet, according to the authors, it contributed to the reduction of poverty, malnutrition, food insecurity and rural-urban migration. However, this cannot be substantiated from the evidence available.

Bureau de la Coopération Suisse au Mali's (2015a) evaluation provided evidence indicating a positive impact on food security. This project's main activities included providing trainers and qualified farmers' advisors in the fields of agriculture, livestock, market gardening, and the processing and marketing of local products.

Bureau de la Coopération Suisse au Mali (2015b) reported some positive short-term effects, including an increase in rice production and reduction in the seasonal exodus of young people. To achieve this outcome, the project had focused on two components: improving the basic economic infrastructure and creating an income-generating capacities of farms.

The Drylands Coordination Group (2015) reported that the *Sahelian and Sudano-Sahelian Food Crop Establishment Project*, had achieved its goal of increasing agricultural resilience to climate hazards. This was achieved by transferring agricultural technologies, such as the soaking of sorghum, millet, and maize seeds, as well as groundnut, cowpea, and voandzou seeds, and the manual and mechanical placement of microdoses of fertilizer and millet or sorghum seed.

With regard to sustainability, the following picture emerges. Several of the projects, such as those on irrigation by Dillon (2011a,b) and Beaman (2013) were studies that were not intended to be sustainable. Other evaluations, such as that of Pettersson & Wikström (2016), did not assess sustainability. The evaluation by JAICA (2010) of the water supply project provided evidence to show that the project was sustainable as a result of community ownership of the project and allocation by the Malian government of funding during the course of the project to address future maintenance issues. The Saving for Change (SfC) interventions evaluated by Beaman et al. (2014a) and Oxfam America (2013) were also judged to be sustainable, due to community ownership of the projects and the likelihood that impacts from SfC would continue into the future. Evidence in Beaman et al. (2014a) suggests, however, that replication of SfC branches without donor support is likely to be less efficient and effective.

Sustainability of the projects aimed at strengthening resilience, improving food security, and adapting to climate change was undermined by difficulties associated with extreme weather, local conflicts over land ownership, and political insecurity, as well as reduced access to equipment and agricultural inputs. The market gardening activities associated with some of the

projects were most likely to be sustainable, provided that water supplies could be maintained and seed made available. This was due to the ownership of the component by the local women.

Project sustainability in Mali has been continually threatened by political insecurity during and after the coup d'état in 2012.

With regard to barriers, we note the following. By far the most frequently mentioned barrier to better project implementation was a lack of security which restricted access to some of the intervention areas (Transition International & Transtec 2020; FAO & WFP 2019) and, in some cases, resulted in the withdrawal of project staff and displacement of the local population (CAEC 2016; Touré et al. 2013; Nelen et al. 2019; Bureau de la Coopération Suisse au Mali 2015a). Without security, crops and livestock may be abandoned since local people are displaced. Infrastructure will not be maintained and project equipment is at risk. In the north of the country, the closing of banks prevented beneficiaries from accessing credit lines, and the conflict led to an increase in living expenses and the price of fuel used for irrigation. Additional effects of the crisis included the delay in fertilizer provision and a drop in demand for rice due to the distribution of rice food aid by humanitarian organizations.

The ongoing presence of armed terrorist groups and constant risk of attacks, kidnappings, and explosions hampered project activities. Several sites were no longer safe to visit or were inaccessible due to lack of transport. Frequent attacks, difficulties in moving around in certain areas, attacks by jihadists on new infrastructure, all contributed to delays in project implementation as companies selected for work or to provide services, as well as government staff, could not move around freely. In the centre of the country, the rise of inter-ethnic conflicts restricted access to parts of the intervention area.

Other barriers mentioned were women's limited access to financial support and access to markets, limited ownership and institutional weakness of the Malian government for an irrigation project, and a government ban on cross-border cereal trade that prevented farmers from selling their grain to foreign buyers.

Women's Rights and Gender Equality

The Evidence Base

Rigorous Impact Evaluations

Heath, R., Hidrobo, M. & Roy, S. (2020). Cash transfers, polygamy, and intimate partner violence: Experimental evidence from Mali. *Journal of Development Economics*, 143, 102410. Available at:

<https://www.sciencedirect.com/science/article/pii/S0304387818314810>

Johnson, A., Goss, A., Beckerman, J. & Castro, A. (2012). Hidden costs: the direct and indirect impact of user fees on access to malaria treatment and primary care in Mali. *Social Science and Medicine*, 75(10):1786–92. Available at: <https://www.childhealthtaskforce.org/resources/journal-article/2012/hidden-costs-impact-user-fees-malaria-treatment-mali-plos-journal>

Koloma, Y. & Alia, H. (2014). Gendered impact of microcredit in Mali: An evaluation by propensity score matching. *Strategic Change*, 23(7–8), 517–530. Available at: <https://doi.org/10.1002/jsc.1993/>

Plouffe, V., Bicaba, F., Bicaba, A. & Druetz, T. (2020). User fee policies and women's empowerment: A systematic scoping review. *BMC Health Services Research*, 20(1), 982. Available at: <https://doi.org/10.1186/s12913-020-05835-w/>

Good Enough Evaluations

Desrumaux, A. & Ballo, B. (2014). « Protéger la prochaine génération » : promouvoir l'abandon des mutilations génitales féminines dans le district sanitaire de Kayes au Mali. *Santé Publique*, 2014/HS (S1), 51–58. Available at: <https://www.cairn.info/revue-sante-publique-2014-HS-page-51.htm>

Keita, M., Bleck, J. & Mahamane, F. (2015). *Women's empowerment program Mali. Evaluation: 2009–2013*. International Law and Policy Institute. CARE Report 3/8.

Tango International (2016). *CARE Mali Pathways (Projet Nyeleni): Evaluation final*. TANGO International.

UNPSO & TMC Consulting Group (2018). « *Projet d'amélioration de l'accès des femmes victimes de violences sexuelles et basées sur le genre à la justice et à la sécurité dans le processus de consolidation de la paix au Mali*. United Nations Peacebuilding Support Office and TMC Consulting Group Afrique.

Vigneri M. & Lombardini, S. (2017). *Women's empowerment in Mali: Impact evaluation of the educational project: "Girls CAN - Promoting Secondary Education in West Africa."* Oxfam Policy & Practice.

In total, nine studies were included. Four of these were deemed to be rigorous.

Three studies (of which one rigorous) focus on female genital mutilation (FGM), intimate partner violence (IPV), gender-based violence (GBV), and access to justice for women. Two studies (both rigorous) focus on the utilization of health services and empowerment of women through the abolition of user fees. Two studies focus on the multidimensional empowerment of women through village savings and loan associations (VSLA) One study focuses on education outcomes for girls. One study (rigorous) focuses on poverty alleviation for women through microcredit.

Female genital mutilation, intimate partner violence, gender-based violence, and access to justice

Heath et al. (2020) assess the impact of cash transfers to households on intimate partner violence (IPV). The premise is that poverty affects individuals' mental health and cognitive function, increasing stress and negative affective states that are risk factors for men perpetrating IPV. Thus, cash transfers may decrease IPV by reducing poverty, thereby reducing stress and improving the emotional well-being of household members including men. Furthermore, cash transfers may decrease IPV by reducing arguments over expenditure, such as those that arise from women having to ask for money for daily needs when men do not have enough to give. The investigated cash transfer program was called *Programme de Filets Sociaux (Jigisemejiri)*. The program initially operated in six regions (Sikasso, Ségou, Mopti, Koulikoro, Kayes, and Gao) and the District of Bamako, and its cash transfer component reached approximately 62,000 poor households. The paper measures IPV using the internationally validated WHO Violence Against Women instrument. Three outcomes are investigated. These are emotional violence, physical violence, and any controlling behaviours over the past 12 months. The identification strategy was based on a two-stage randomized control trial implemented in five regions of Mali: Sikasso, Koulikoro, Kayes, Ségou, and Mopti, with a sample size of 3,080 households across 90 communes.

Desrumaux & Ballo (2014) focus on the practice of female genital mutilation (FGM), and evaluated the effects of the *Protecting the Next Generation* project supported by the French NGO Équilibres & Populations (EquiPop) and its Malian partner, the Association Malienne pour le Suivi et l'Orientation des Pratiques Traditionnelles (AMSOPT). The objective of this project was to enable 250 villages in the Kayes district of Mali to permanently abandon the practice of FGM. The project consisted of communication and education on the topics of sexual health, rights, and procreation, human rights, and the harmful effects of traditional practices and social pressures. The interventions involved discussions and community exchanges on the decision to abandon the practice of FGM. At the end of the interventions in each village, facilitators organized a public "surrender ceremony" which brought together community members and marked the official abandonment of the practice. In addition, this project facilitated the training of healthcare professionals, including gynaecologists, doctors, and healthcare workers, on the detection and management of complications associated with female circumcision. Facilitators identified women suffering from complications associated with excision, and accompanied them to local health centres for diagnosis. In total 1,328 women entered these care programs.

Finally, an evaluation conducted by the UN PSO and TMC Consulting Group Afrique (2018) discussed a project led by UN Women, UNFPA, and MINUSMA, which focused on the promotion of rights and access to justice and support for female victims of gender-based violence (GBV), capacity building of the judicial system on issues of sexual violence and GBV, raising community awareness towards the importance of women's protection and access to justice, and the implementation of norms and standards consistent with the Women, Peace, and Security Agenda throughout the ongoing peacebuilding process in Mali. This project took place between January 2015 and June 2016, before being extended until December 2017, and was implemented in the regions of Timbuktu, Gao, Ménaka and Taoudéni in Mali. This evaluation

does not offer a description of the activities undertaken in the project, other than to say that these concern the capacity building of justice bodies, the promotion of women's access to justice, advocacy for the consideration of victims of conflict-related GBV in the justice process, and the development of a national action plan on Women, Peace, and Security (UN Resolution 1325).

Utilization of health services and empowerment through the abolition of user fees

Plouffe et al. (2020) perform a systematic scoping review on the effect of user fee policies on women's empowerment in four African countries and one South Asian country. User fees can entail any combination of drug costs, supply and medical material costs, entrance fees or consultation fees. They are typically paid for each visit to a health service provider, although in some cases follow-up visits for the same episode of illness can be covered by the initial payment.¹ Plouffe et al. (2020) cover six studies one of which was on Mali (Johnson et al. 2012). Johnson et al. (2012) conduct an ethnographic study with the objective to identify consequences of user fees on gender inequality, food insecurity, and household decision-making for a group of women living in poverty. Ethnographic life history interviews were conducted with 24 women in Yirimadio, Mali in 2007. Participants across a broad socio-economic spectrum were selected using purposive sampling. Semi-structured interviews were used to collect data on participants' past medical history, socio-economic status, social and family history, and access to health care.

Multidimensional empowerment through village savings and loan associations (VSLA)

Two reports (Keita et al. 2015; Tango International 2016) evaluate the impacts of a village savings and loan association (VSLA) across regions of Mali on different measures of gender equality and agricultural productivity. These measures include the attitudes of respondents to aspects of women's rights and economic security, participation in decision-making bodies and fora, and control over their bodily autonomy and fertility, as well as behaviours of poor women farmers in aspects of food and nutritional security, resilience of livelihoods (coping and adaptation strategies, incomes/expenditures, savings, and assets), and women's empowerment index scores.

Keita et al. (2015) evaluate the *Women and Girls Empowerment Program* (PEF), funded by CARE Norway and implemented by a consortium of NGOs from CARE International in Mali as well as seven Malian NGOs. The report assesses the impacts of implementing village savings and loan associations which took place over a span of five years (2009–2013) in the regions of Ségou, Mopti, and Tombouctou in Mali. Beneficiaries of this program were women and girls between 15 and 49 years of age, comprising 200,000 people in 30,000 households. The evaluation does not provide details on other activities undertaken by the program.

The desired impact of this program was identified as changes in the living conditions of women and girls, especially of those most vulnerable living in central and northern Mali, which was achieved by addressing the root causes of social inequalities which affected access to

¹ <https://www.who.int/bulletin/volumes/86/11/07-049197.pdf?ua=1>

resources, knowledge, and power. This program was intended to contribute to the strengthening of women's and girls' economic power, capacity for action and expression, the resilience of female-headed households, and the capacity of governance and efficiency of civil society in these regions.

The report by TANGO International concerns the CARE Pathways Project, also known as the Nyéléni Project, which was funded by the Bill and Melinda Gates Foundation and implemented by CARE and multiple partners between 2012 and 2016. This project serves poor women farmers who are members of village savings and loan associations. It included 442 groups of beneficiaries comprising 15,000 participants in 106 villages in the regions of Ségou and Mopti. The objective of the Pathways project was to achieve increased agricultural productivity for poor women farmers and to support empowered and equitable farming supply chains. The project collected data on food security and livelihoods, agricultural productivity, and gender equality.

Education outcomes for girls

Vigneri & Lombardini (2017) evaluated the project *Girls Can – Promoting secondary education for girls in West Africa*. The project was implemented by Oxfam in conjunction with the Association d'Appui à l'Auto Développement Communautaire (AADeC), a local NGO, in collaboration with the Centre d'Animation Pédagogique (CAP) of Baguinéda, and the Ministry of National Education. It commenced in October 2011 in 17 primary schools and eight secondary schools and ended in December 2015.

The overall objective of this project was to promote the successful transition of adolescent girls from primary to secondary school. This was achieved by rolling out a variety of activities to support the change from within the community. These activities include setting up mothers' associations to conduct training and sensitization activities, as well as microfinance activities. Girls' clubs were created to conduct awareness activities for girls on reproduction health and violence against women. School staff were trained, and meetings were organized with parents to discuss the importance of girls' education.

The project targeted 3,752 girls, 2,370 of whom were in 17 primary schools in the Circle of Kati, in the Koulikoro Region. The overarching objective of the project was to increase the retention rate of girls in all 25 schools (in both the primary and secondary cycles) by 50%, and also to increase the successful transition of girls from primary to secondary school by 30%.

The identification strategy was based on a quasi-experimental design using propensity score matching. Empowerment was measured with a tool developed by Oxfam Great Britain based on a composite index.

Poverty alleviation for women through microcredit

Koloma & Alia (2014) investigate whether microcredit has a role in poverty alleviation and whether the impact was more significant for female beneficiaries than for the male counterparts. The dataset used is based on surveys conducted in 2007–2008 in Mali. This dataset includes gendered information on the use of microcredit and covers a large sample that compares 2,400 microfinance client households, among which around 70% were microcredit beneficiaries. Since

the program was not randomly assigned, the paper uses propensity score matching to conduct a statistically valid comparison between microcredit beneficiaries and non-beneficiaries. The paper applies a non-linear principal component analysis on economic activities and generates a binary indicator of poverty status of women and men.

Methods

The rigorous impact evaluations in this sample utilized qualitative and quantitative methods to measure findings. The qualitative data were typically collected through meta literature review and desk research whereas all the quantitative research used survey data. Three reports (Heath et al. 2020; Koloma & Ali 2014; Johnson et al. 2012) used control groups for comparison and one report also utilized baseline data. One report employed randomized control trials whereas the other two reports used propensity score matching (Koloma & Ali 2014; Vigneri & Lombardini 2017).

Methods utilized in the 'good enough' evaluations were similar, though slightly less comprehensive in their approaches. Keita et al. (2015) tracked evolutions in the attitudes of respondents over the course of the VSLA program. The evaluation was carried out in the regions of Ségou, Mopti, and Tombouctou in 2014. Researchers employed a baseline of villages surveyed in 2009, and an endline in 2014. This research included a total of 917 households, of which 555 households were treated (i.e., a VSLA was installed) and 362 households resided in villages which were untreated and served as the comparison group for this research.

It is important to note that for the baseline and endline of the study by Keita et al. (2015), respondents were randomly selected from a household census list, meaning that the evaluation did not select the same households for both surveys. It is thus not a panel design. Rather, in each village, a representative number of households were randomly selected both for baseline and endline. The evaluation then compared the village average values in treated villages with the village average values in untreated villages. Average differences between baseline and endline in treated villages could then be compared to average differences between baseline and endline in untreated villages. If the intervention had an impact, then the difference before and after the intervention should be larger in treated villages.

However, this evaluation frequently reported differences between treated and untreated villages at the endline only, which is not a measure of the effect of the intervention, but rather a measure for general trends in these villages. For the purposes of this review, we will only report the observed impacts which are based on comparisons between treated and non-treated villages at baseline and endline, that is, the difference-in-difference. We will not report differences which were only measured at the endline.

The report by TANGO International (2016) involved a baseline survey with 517 households. Respondents were randomly selected from a sample of all households containing a female VSLA member in the Pathways program. Thus, male and female heads of households and female primary decision-makers in households were interviewed. The evaluation also included

visits to seven randomly selected villages, which were evenly distributed between the regions of Ségou and Mopti. The qualitative research included focus groups with female members of VSLAs and also engaged men and key members of the community.

Initially, in a two-step selection process, 71 VSLA clusters were randomly drawn from the sample using the probability height-proportional (PPT) method based on the number of women in CARE VSLAs. In the second stage of sampling, 12 female VSLA members were randomly selected from each cluster. The data collected involved the same households throughout the baseline survey and final assessment. However, the evaluators noted that the overall final assessment was significantly reduced in sample size from that of the baseline.

The evaluation by Desrumaux & Ballo (2014) was conducted through institutional interviews in Bamako and Kayes in Mali as well as in Paris, France, in addition to a field mission involving focus groups and interviews from ten randomly selected villages. In total, 34 focus group discussions were carried out throughout the ten villages of Kayes, in addition to individual interviews involving village chiefs, presidents, women's associations, religious authorities, relay doctors and health workers, and employees of the project. A total of 465 people were interviewed during this evaluation. According to researchers, the villages were chosen based on their degree of advancement in the process of abandoning the practice of FGM, which ranged from total abandonment to a strong reluctance. Other factors which affected the selection of the villages included ethnic composition and their distance from the town of Kayes.

Finally, the report by the UNPSO & TMC Consulting Group considered quantitative and qualitative data, including semi-structured individual interviews, focus groups discussions, centred life stories, observations with target groups, and documentary review. This evaluation took place from May to July 2018 in the regions of Tombouctou, Gao, and the District of Bamako.

Impacts

Female genital mutilation, intimate partner violence, gender-based violence, and access to justice

Heath et al. (2020) investigate the impacts of Mali's national cash transfer program on instances of IPV, with a focus on the effects on polygamous households with male heads of household. Approximately 40% of households in West Africa are thought to be polygamous. Using a randomized control trial, Heath et al. (2020) found that the program caused significant decreases in IPV in polygamous households. Physical violence decreased by 7.2 percentage points, emotional violence decreased by 12.6 percentage points, and controlling behaviours decreased by 16.1 percentage points. However, the intervention had limited effects in monogamous households. Evidence on mechanisms suggests that the program led to significant decreases in men's stress and anxiety in polygamous households and larger reductions in disputes in polygamous households compared to monogamous households.

Desrumaux & Ballo (2014) found that during the *Protecting the Next Generation* project, 80 of the 100 villages examined had signed a letter to abandon the practice of female circumcision. Of these, 61 villages had abandoned the practice altogether (meaning that no excision of girls was performed after the start of the project), and in 19 villages, the FGM was partially abandoned. However, six of the intervention villages were reluctant to develop project activities.

Finally, the evaluation by the UNPSO & TMC Consulting Group (2018) found somewhat promising results associated with the project led by UN Women, UNFPA, and MINUSMA. In respect of the first objective concerning the strengthening of the judicial system in order to address conflict-related violence and victims' access to justice, the evaluation found that the percentage of GBV cases brought to justice increased from 1% to 13.72% over the course of the project, according to the project's annual report in June 2016. Researchers also observed an increase in the number of complaints filed by victims with the justice system, from 7 to 157 across the span of the project.

With respect to the second objective of the project, to support greater access to justice and security for the victims of conflict-related violence, the evaluation found that 47.2% of victims of GBV received access to medical care through health centres. However, there was no reported baseline associated with this figure, which is a significant weakness in this evaluation. The third objective of this project related to the general diffusion of norms pertaining to women, peace, and security in Mali in order to improve the protection of women and of victims of conflict-related GBV. The evaluation found that the Government of Mali created a national action plan on Women, Peace, and Security (UNSCR 1325), spanning from 2015–2017, and subsequently renewed in 2018. In terms of gender mainstreaming in peacebuilding efforts in Mali, the evaluation noted the creation of a gender sub-committee in the Committee on Truth, Justice, and Reconciliation (CVJR) and the establishment of an adviser to the National Commission on Demobilization, Disarmament, and Reintegration (CNDDR). However, it is not possible to determine whether these outputs resulted in substantial impacts for the diffusion of WPS norms and/or the protection of women and victims of GBV in the process of peacebuilding.

Utilization of health services and empowerment through the abolition of user fees

Plouffe et al. (2020) reviewed nine articles concerning three low-income countries (Burkina Faso, Mali, Sierra Leone) and two lower-middle income countries (Kenya, India). Four of them examined a direct association between user fee policies and women's empowerment, whilst the others addressed this issue indirectly, mostly by examining gender equality or women's decision-making in the context of free healthcare. The evidence suggests that user fee removal contributed to improving women's capability to make health decisions through three mechanisms: 1) women's capability to make health decisions was improved because they no longer had to negotiate access to household resources prior to receiving healthcare; 2) removing the burden of having to sell goods or borrow money from neighbours or family, especially their husbands, increased their self-esteem and preserved their dignity; 3) their social position and bargaining power within the household increased due to greater decision making and reduced marital tension. However, women's healthcare decision-making power remained still very weak because of social norms that are prevalent in the household, the community, and

the healthcare centres. In addition, women continue to endure limited access to and control over resources (mainly education, information, and economic resources).

Similarly, Johnson et al. (2012) found that user fees for health care not only decreased utilization of health services, but also resulted in delayed, incomplete, or inadequate care, compromised food security and household financial security, and reduced agency for women in health care decision making. The effects of user fees were amplified by conditions of poverty, as well as gender and health inequality; user fees in turn reinforced the inequalities created by those very conditions.

Multidimensional empowerment through village savings and loan associations

Keita et al. (2015) report results of VSLAs on women in the domains of women's economic security; women's participation in decision-making, and women's control over their body and fertility. Within the first domain, women's economic security was measured in relation to a woman's role in the family, her right to study, her right to work outside the home, possession and control of property by a woman, and so on. Men and women were asked to give their assessment of the above aspects based on a Likert scale. Results suggest that VSLAs helped women to increase financial autonomy (as measured by the possession of savings). VSLA households were also better able to cope with financial shocks than non-VSLA households.

With regards to women's participation in decision-making, VSLA membership increased perceptions of women about their decision-making authority in the household and the community.

Finally, VSLA membership also increased perceptions of women's control over fertility and bodily autonomy, and led to a change in attitude toward gender-based violence (such as domestic violence or sexual harassment).

The evaluation by TANGO International (2016), found somewhat positive trends in food security and livelihood indicators as a result of VSLA membership. Whilst the average dietary diversity score for all households surveyed remained the same, a change was observed among female-headed households, which had gained access to one additional food group on average after the intervention (5.7 vs. 6.2 from baseline to post-intervention, respectively).

Furthermore, a decrease was reported in the number of households reporting food shortages in the three months prior to the survey (from 30% at baseline to 19% at final assessment). The women surveyed were also more likely to use an integrated approach to improving agricultural production. For example, in 2012, 19% of women surveyed declared that they had adopted three or more of the practice pathways that CARE considered to be improved; three years later this percentage increased to 26%. Positive economic trends were also found in terms of monthly per capita income, with a net growth rate of farm and non-farm household income per capita from US\$ 9.24 at baseline to US\$ 11.05 at final evaluation.

It was also found that in all households women's decision-making power over household assets had increased from 10% to 47% between the first and second survey. As for control over agricultural goods, almost half (48%) of women reported decision-making power compared to

an initial 17%. Similarly, women's decision-making authority over production increased from 31% at baseline to 75% at final evaluation, and joint ownership of assets also increased (ownership of household assets from 7% to 34%, sale of assets from 7% to 43%), as did control over household income and expenditures, from 8% to 34%. Women reported greater decision-making capacity on household income and expenditure after the intervention (48% compared to 25% before the intervention). Women's control over agricultural income in male-headed households also increased, from 23% compared to 6% at baseline. As for women's decision-making power over land, almost 35% of women said that they could make decisions about selling or buying land, compared to only 14% initially.

Evaluators found an increase in the number of women who rejected sexual and gender-based violence in households, from 14% at baseline to 26% at the final evaluation. Conversely, the rejection of domestic violence actually decreased in men by more than half (55%) to less than 20% at final assessment. In terms of empowerment (as assessed by the Women's Empowerment Index) results showed that the average score for beneficiaries of the Pathways project increased from 0.32 to 0.46, while the rate for women in male-headed households increased from 0.30 to 0.45.

Education outcomes for girls

Vigneri & Lombardini (2017) found a very small positive effect of the project on women's empowerment. Founded on a measurement tool developed by Oxfam Great Britain, the report measured women's empowerment by first identifying what it means for a girl to be empowered in the context of south Mali, and then combining these dimensions into a multidimensional index. Girls in the intervention group scored positively in 70% of the 20 empowerment indicators whereas girls in the comparison group scored positively in 67%.

With regard to educational achievements, it was found that 55% of girls in the treatment group successfully moved on to secondary school, compared with 47% in the comparison group. School results were better among girls participating in the project than among girls in the comparison group. Equitable treatment of boys and girls in school was found to be reported significantly more among girls in the intervention group than among girls in the comparison group.

Poverty alleviation for women through microcredit

Koloma & Ali (2014) analyzed the effect of microcredit on poverty reduction and differential effects on women. They found that incidence of poverty was 9% lower among microcredit borrowers in comparison to non-borrowers. Furthermore, this effect was larger for women (12%) than men (7%).

Sustainability

Interestingly, discussions of sustainability are rather absent from these evaluations.

Heath et al. (2020) mention a key policy implication of their findings of targeting household heads, and in particular men. If impacts of cash transfers on men's emotional wellbeing are not sustained once the transfer program ends, and there are no sustained impacts on women's empowerment, then it is likely that relationship dynamics will also revert to the way things were before the program (Roy et al. 2018)². Thus, a key policy implication of these findings is that some aspects of vulnerable women's lives can improve if their husbands are made better off, but that these effects may depend on household structure and may not be sustained after programs end unless improvements in well-being persist for their husbands as well.

Plouffe et al. (2020) report that user fee removal policies alone are not enough to improve women's healthcare decision-making power. Comprehensive and multi-sectoral approaches are needed to bring sustainable change regarding women's empowerment. A focus on "gender equitable access to healthcare" is needed to reconcile women's empowerment and the efforts to achieve universal health coverage.

The VSLAs assessed by TANGO International (2016) were said to be sustainable, making them an appropriate vehicle for a wider process of empowerment in communities.

Desrumaux & Ballo (2014) suggested that the next phase of the anti-FGM project should further emphasize a human rights-based approach to FGM, as opposed to a strictly health focus that was used in the previous phases of this project. To do this, the knowledge and skills of facilitators towards rights-based aspects of FGM should be strengthened in the future. However, Desrumaux & Ballo (2014) also acknowledge that the precariousness of funding led to a halt in field activities at the end of each phase, thus hampering sustainability.

UNPSO & TMC Consulting Group (2018) found that collaboration between state and non-state actors, the establishment of centres for GBV, and the appointment of gender focal points in police units were important mechanisms to perpetuate the actions taken in this initiative. Going forward, UNSPO and TMC urge the Malian government to play its leadership role in this endeavour, by mobilizing national resources for the continuity of these actions. Based on these considerations, this project does not appear to be sustainable.

Johnson et al. (2014), Keita et al. (2015), and Koloma & Alia (2014) do not discuss the sustainability of the projects in their studies.

² Roy, S., Jinnat, A., Narayan, D. & Agnes, Q. 2015. "Flypaper effects" in transfers targeted to women: Evidence from BRAC's "Targeting the Ultra Poor" program in Bangladesh. *Journal of Development Economics*, 117(2015), pp. 1–19.

Barriers

Security and accessibility

A common barrier cited within all of the 'Good Enough' evaluations is the general lack of access to participants in certain villages and regions of Mali due to security concerns (Desrumaux & Ballo 2014; Keita et al. 2015; TANGO International 2016; UNPSO & TMC Consulting Group 2018). For example, UNSPO & TMC Consulting (2018) note that efforts to improve awareness and knowledge in communities were less successful in rural regions of Mali, due to the remoteness of the intervention areas, the general lack of security in Mali, and the inaccessibility of services. These factors demonstrated a negative impact on the level of information and knowledge among women and girls in these areas. This evaluation concluded that the general insecurity within Mali remains an obstacle to monitoring and evaluating the effectiveness of this project. Similarly, the report by TANGO International (2016) explains that many of the respondents who could not be included in the final evaluation survey were excluded due to security problems in their villages.

Funding

The lack of access to predictable and adequate funding is identified as an important barrier to projects in this sample (Desrumaux & Ballo 2014; UNPSO & TMC Consulting Group 2018).

Summary

In total, nine studies were included in the Women's Empowerment / Gender Equality category. Four of these were deemed to be 'Rigorous', and five were classified as 'Good Enough'.

Three studies (of which one rigorous) focus on Female Genital Mutilation (FGM), Intimate Partner Violence (IPV), Gender Based Violence (GBV), and access to justice for women. Two studies (both rigorous) focus on the utilization of health services and empowerment through the abolition of user fees. Two studies focus on multidimensional empowerment of women through Village Savings and Loan Associations (VSLA). One study focuses on education outcomes for girls. One study (rigorous) focuses on poverty alleviation for women through microcredits.

Female genital mutilation, intimate partner violence, gender-based violence, and access to justice

Heath et al. (2020) found that cash transfer caused a decrease in IPV in polygamous households. There were, however, limited effects in monogamous households.

The report by Desrumaux & Ballo (2014) showed some promising trends in the elimination of the practice of FGM, particularly in terms of raising awareness and community support for this issue. The intervention combined communication and education with training of healthcare professionals, including gynaecologists, doctors, and healthcare workers, on the detection and management of complications associated with female circumcision. 80 of the targeted 100

villages had signed a letter stating they would abandon the practice of female circumcision, and 61 villages had abandoned the practice altogether.

Finally, a project led by UN Women, UNFPA, and MINUSMA, focusing on better access to justice for female victims of gender-based violence found that more GBV cases were brought to justice, and more victims received medical treatment. However, there are no reliable baselines associated with these trends, hence it is difficult to attribute the outcomes to the project. The evaluation also noted that the Government of Mali created a national action plan on Women, Peace, and Security (WPS) (UNSCR 1325), created a gender sub-committee in the Committee on Truth, Justice, and Reconciliation, and established an adviser to the National Commission on Demobilization, Disarmament, and Reintegration. However, it is not possible to determine whether these outputs resulted in substantial impacts for the diffusion of WPS norms and/or the protection of women and victims of GBV in the process of peacebuilding.

Utilization of health services and empowerment through the abolition of user fees

Plouffe et al. (2020) report that user fee removal contributed to improving women's capability to make health decisions, but that the size of the effect was rather small.

Johnson et al. (2012) found that user fees for health care not only decreased the utilization of health services, but also resulted in delayed, incomplete or inadequate care, compromised food security and household financial security, and reduced agency for women in health care decision making.

Vigneri & Lombardini (2017) found that a combination of a variety of activities (mothers' associations, microfinance activities, girls' clubs, school staff training, and parental meetings) had a small positive effect on perceptions of girls' empowerment (measured by a survey-based composite index).

Multidimensional empowerment through village savings and loan associations (VSLA)

Keita et al. (2015) found that the establishment of village savings associations for women led to increased savings, to improved perceptions of women's economic decisions making, and to improved perceptions of women's bodily autonomy and attitudes towards the acceptability of GBV among women.

TANGO International (2016) found that the creation of village savings and loan associations helped to increase agricultural productivity for poor women farmers. Female-headed households slightly increased food security. Women reported using better agricultural methods and increased household incomes. Finally, women also increased their perceived control over agricultural goods, decision-making authority over production, and joint ownership of assets, as well as increased decision-making capacities over household income and expenditures. Finally, women also reported increased decision-making power with regard to health decisions. At the endline, beneficiaries scored higher on a survey based empowerment index.

Education outcomes for girls

Vigneri & Lombardini (2017) found that a multidimensional intervention (including the setting up of mothers' associations, training activities, microfinance activities, creation of girls' clubs, awareness activities for girls on reproductive health and violence against women, training for school staff, and outreach to parents) led to small improvements in girls' educational achievements.

Poverty alleviation for women through microcredits

Koloma et al. (2014) found that the effect of microcredits in reducing poverty had a stronger impact on women than men.

Only two evaluations discussed sustainability. Heath et al. (2020) mentioned that it was possible that the impact of cash transfers on men's emotional wellbeing was not sustained once the transfer program ended and that the reduction of IPV would wane. Plouffe et al. (2020) reported that user-fee removal policies alone may not be enough to improve women's healthcare decision-making power. Comprehensive and multi-sectoral approaches might be needed to bring sustainable change regarding women's empowerment.

Education

The Evidence Base

Rigorous Impact Evaluations

Aurino E., Tranchant, J.-P. Diallo, A.S. & Gelli, A. 2019. School feeding or general food distribution? Quasi-experimental evidence on the educational impacts of emergency food assistance during conflict in Mali. *Journal of Development Studies*. 55 (Suppl. 1), 7–28. Available at: <https://doi.org/10.1080/00220388.2019.16878744>

United States Agency International Development (USAID). 2017. *End of project report: Nos enfants apprennent à lire (Our Children Learn to Read)*.

United States Agency International Development (USAID). 2020. *Final evaluation of the USAID / Mali Education Emergency Support Activity (EESA)*. Available at: https://pdf.usaid.gov/pdf_docs/PA00X2KJ.pdf

Good Enough Evaluations

Safarha, E., Hoffman, V., Zaas, D. et al. (2020). *Food for education and child nutrition program, phase III in Mali: Endline evaluation report*. Available at

<https://impajint.com/sites/default/files/project-reports/MGD-Mali-Endline-Evaluation-Report.pdf>

Traoré, S. et al. (2017). *Revue externe du « Programme d'Appui à la Formation Professionnelle (PAFP) »*. Bureau de la coopération suisse au Mali et Cité du Niger. Available at <https://www.eda.admin.ch/countries/mali/fr/home/internationale-zusammenarbeit/projekte.html/dezaprojects/SDC/en/1998/7F00736/phase7>

Five studies were included.

One report evaluates the impact of two food-based social protection programs on schooling in emergency situations among children in Mopti, central Mali (Aurino et al. 2019). The program included Generalized Food Distribution (GFD) – a type of non-conditional food transfer, consisting of food rations of cereals, pulses, vegetable oil, and salt, along with fortified super cereal to increase micronutrient intake, and emergency school feeding – a food transfer conditional on school attendance, such as daily hot lunches of cereals, pulses, and vegetable oil and complemented by local condiments, provided throughout the school year as an incentive for parents to enrol and keep their children in school. These programs were implemented during 2015 and 2016 by the World Food Program (WFP), after the liberation of occupied zones by the government of Mali in the aftermath of the 2012 crisis.

Two evaluations assess the impact of projects aimed at increasing literacy rates among Malian children (Safarha et al. 2020; USAID 2017), through the delivery of in-person, online training to teachers in a literacy method focused on shared reading, with the provision of school meals.

The first of these literacy evaluations (USAID 2017) assesses a project designed to enhance early grade literacy by training teachers in a different literacy approach, called balanced literacy, in Mali's Sikasso region. Named *Our Children Learn to Read (OCLR)*, this project was implemented by the Malian Ministry of Education (MEN) and the Education Development Center Inc (EDC), a non-profit organization, between February 2015 and April 2017. The total grant amount for the OCLR project was US\$ 329,265, and it was funded by the United States Agency for International Development (USAID), World Vision, and the Australian Government. Balanced literacy is a teaching method focused on shared reading, in which teachers structure activities over a week and weave them together to reinforce students' competencies, including, for instance, games for learning language mechanics, activities in which students build sentences to share their life experiences, and guided readings. To achieve the project's goal of increasing literacy through the balanced literacy program, the implementing partners delivered tablets with a mobile application in which there were videos of teachers demonstrating effective reading and writing instructional techniques, as well as in-person training on how to use the app and how to implement the new literacy method. A second component of the project included access to interactive radio instruction (IRI), which featured 30-minute radio programs that modeled strategies and techniques to enhance student learning. All activities were provided in Bamanankan (Bambara), the mother tongue of the region.

The second literacy evaluation (Safarha et al. 2020) assessed the *Food for Education and Child Nutrition (McGovern-Dole) III* project, an initiative designed to improve the literacy rates for school-aged children, as well as health and hygiene attitudes and practices. It targeted 74,006 children in 291 schools in the regions of Mopti and Koulikoro in Mali. This five-year program (FY2015–FY2020) was implemented by Catholic Relief Services (CRS) and funded by the United States Department of Agriculture (USDA) with a total budget of US\$29.9 million. The project delivered numerous activities, such as capacity building to school management committee members, expansion of illustrated report cards, provision of literacy materials to schools, and training for teachers and administrators on the balanced literacy approach. Other outputs included the provision of school meals and take-home rations, distribution of vitamin A and deworming medication, and the formation of savings and internal lending community groups.

One report evaluates USAID/Mali's *Emergency Education Support Activity (EESA)*, a program designed to maintain and increase the safety and accessibility of primary schools in regions affected by violent conflict (USAID 2020). EESA was implemented by CAMRIS International from January 2016 to December 2018. Key activities included technical assistance to the Government of Mali to restore its education system in conflict-affected areas, including school construction and remediation; water, sanitation, and hygiene (WASH) activities; infrastructure and hygiene training; and capacity building. This last project component involved teachers (for development of conflict-sensitive skills, gender awareness, and professional development); community and school management committees (for emergency planning and school management); and regional education authorities (for education management systems) to ensure that schools were safe and their community was equipped to respond to emergencies caused by armed conflict. In terms of the targeted population, the project worked with 250 schools in rural areas in five northern and central regions of Mali that were affected by civil war, namely, Ségou, Mopti, Tombouctou, Gao, and Kidal, with around 80,000 beneficiaries, in particular returnee and resident learners who were displaced by the 2012 conflict. The USAID EESA project was funded by USAID for three years with the total estimated cost of EESA plus a fixed fee being US\$14,575,565. The final evaluation of USAID/Mali's Emergency Education Support Activity was conducted by The Mitchell Group between January and April 2020.

Fi. 2017). In Mali, training opportunities were not adapted to the needs of the labour market because the labour force lacked skills, and the products of the education/training system did not correspond to employers' demands. The vast majority of the workforce in Mali is young, rural, and illiterate, with a median age of 14 years. This under-qualified workforce cannot, therefore, contribute sufficiently to the competitiveness of companies and therefore to economic growth. At the same time, the country's economy is not very diversified, being highly dependent on the primary sector (which corresponds to 80% of the active population) and foreign aid (13% of the country's GDP). To overcome this issue, the program promoted a series of activities for the development of the dual apprenticeship training system in agricultural trades, such as trainings on agroecology, the use of hydro-agricultural facilities, lowland rice cultivation, and market gardens, as well as the marketing of agricultural products. The PAFP project started its operation in 1998, and by the time of the evaluation, the project encountered itself in its fourth phase. This fourth phase (2014–2017) was co-financed by the Swiss Cooperation Bureau and

the Danish Embassy in Mali with a total budget of 21 million Swiss francs, and benefited 40,000 people.

Methods

Two reports adopt a mixed-method strategy (Aurino et al. 2019; USAID 2017), and three reports adopt a qualitative methodology (Safarha et al. 2020; Traoré et al. 2017; USAID 2020).

Aurino et al. (2019) employ a difference in differences weighted estimator to evaluate the impact of two food-based social protection programs on schooling in conflict situations among children in Mopti, central Mali. The study relies on longitudinal household and village data for five years, based on a cluster-randomized trial, and has both a baseline, conducted in January 2012 and an endline undertaken in January 2017. Seventy villages were randomly sampled among the most food-insecure communes in Mopti, with the idea of sampling two villages within each sample commune. Sampling villages in this fashion allowed evaluators to employ propensity score matching, a statistical technique that allows for the artificial construction of a control group by matching each treated unit with a non-treated unit with similar characteristics. Interviews were conducted randomly and permitted the collection of detailed information on household food security, economic activities, and socio-demographics. Additional qualitative research was also conducted as evaluators interviewed key humanitarian stakeholders, including the individuals linked to the Government, the WFP, international non-governmental organizations, and commune stakeholders (such as mayors and health workers). To disentangle the relationship between exposure to conflict and receipt of food assistance, the analysis focused only on conflict events in the aftermath of the coup, when civil unrest was at its peak (2012–2014), and it evaluates the impact of food assistance only in the subsequent period (2014–2016). The probability that a household received food assistance during 2014–2016 is thus estimated based on 2012 household and village characteristics and exposure to conflict (in communes and villages) during 2012–2014.

USAID (2017) uses a mixed methods research design to assess the impact of *Our Children Learn to Read* (OCLR), a project conceived to enhance early grade literacy by training teachers in the Sikasso Region. Evaluators collected Early Grade Reading Assessment data twice during the project. Baseline data were collected in October 2015, and endline data in May 2017. Qualitative and cost data were also collected to answer supplemental questions. The research design for the OCLR project included two intervention groups and a comparison group to answer each of the project-specific research questions and isolate the impact of the *Stepping Stone* app on students' reading gains. Evaluators determined that 25 schools – 20 for the intervention group and five for comparison – would be sufficient to measure the impacts of the OCLR project in its pilot implementation period. Thus, 25 from the total of 36 eligible schools were randomly selected and ten schools were assigned to intervention A, ten schools to intervention B, and five schools to the comparison group. At baseline, 637 students were assessed: 232 students in intervention A, 312 students in intervention B, and 93 students in the comparison group. At endline, because of challenges related to assessing the same students from baseline, replacements were selected from students with similar profiles. Replacement

students were randomly selected from the same classroom as the students they replaced, and assessors attempted to replace students from baseline with students of the same gender at endline. In total, 540 students were assessed at endline: 372 students from baseline and 168 replacement students who were assessed at endline only. In addition, there were also 27 key informant interviews, with teachers, school directors, and pedagogical counsellors and others.

Safarha et al. (2020), USAID (2020), and Traoré et al. (2017) employ a qualitative approach to evaluate their programs, including desk review of project documents and interviews with key informants through convenience sampling. For the *Food for Education and Child Nutrition (McGovern-Dole) III* project, an initiative designed to improve the literacy rates for school-aged children, as well as health and hygiene attitudes and practices, in the regions of Mopti and Koulikoro, Safarha et al. (2020) rely on 37 interviews with relevant stakeholders (including beneficiaries), secondary analysis of quantitative data related to the performance of activities – grade-level attendance rates, student grades, level of distribution of hot meals, etc., and triangulation of qualitative and quantitative findings.

Similarly, to assess the impact of USAID/Mali's *Emergency Education Support Activity (EESA)* a project focused on making schools safer after the 2012 violent conflict outbreak in Mali, USAID (2020) relies on a survey with individuals from 94 of EESA's 250 schools (38%) in all five regions using local data collectors, who worked in their home communities due to severe security and travel-related constraints. In total, 712 interviews were conducted, including 274 students, 82 school directors, and 69 teachers. Finally, Traoré et al. 's (2017) method to evaluate the *Vocational Training Support Program*, which aimed to increase Mali's competitiveness in economic sectors through job-oriented vocational training, included five field visits and over 200 in-person and telephone interviews with key informants and beneficiaries.

All projects were said to be relevant.

Impacts

Food assistance programs on schooling

Aurino et al.'s (2019) study concludes that the educational impacts of emergency school feeding and Generalized Food Distribution (GFD) in a context of conflict, protracted fragility, and substantial food insecurity are positive. Children in households receiving school meals were 10 percentage points more likely to be enrolled in school, and they had completed on average nearly an additional half-year of education relative to children in the comparison group. Households' receipt of GFD, an unconditional and emergency food transfer, by contrast, had no significant effects on enrolment or attainment and led to reductions in school attendance (about an additional half-day of absence per week).

Literacy rates

When it comes to projects designed to increase literacy rates, both USAID (2017) and Safarha et al, (2020) show that the balanced literacy approach, a teaching method focused on shared reading, has a positive impact on increasing literacy rates.

More specifically, USAID's (2017) evaluation on the impact of *Our Children Learn to Read* (OCLR), which was designed to enhance early grade literacy by training teachers on the balanced literacy approach in the Sikasso Region, reveals that students whose teachers were trained by the OCLR project outperformed their peers whose teachers did not receive support from the project. Secondly, students in intervention groups received fewer zero scores than did those in the comparison group. Nonetheless, Early Grade Reading Assessment (EGRA) results indicate that training had been the main factor for these positive results rather than technology. Students in intervention A – those whose teachers were trained by the OCLR project and had access to tablets with the *Stepping Stone* app for supplemental learning – did not significantly outperform their peers in intervention B, whose teachers received the same training but did not have access to tablets. Evaluators highlight, however, that tablets for remote learning have high potential in the Malian context, as the lack of resources limits the ability of pedagogical counsellors to provide enough in-person support to help teachers incorporate new pedagogy into their classrooms. However, because the OCLR project did not offer substantial amounts of training content on the *Stepping Stone* app – only three videos – it is unclear if this was sufficient to provide added value to teachers and students in intervention A.

A similar conclusion on the effect of training in the balanced literacy approach is shared by Safarha et al. (2020) who evaluate the *Food for Education and Child Nutrition (McGovern-Dole) III* project, an initiative designed to improve the literacy rates for school-aged children in Mopti and Koulikoro regions. The report concludes that one year of exposure to the balanced literacy approach is associated with statistically significant improvements in alphabet knowledge, decoding ability, and reading comprehension for Grade 1 students. Specifically, Grade 1 students were able to read per minute, on average, 13.6 more letters or sounds, decode 1.8 more invented words, and correctly answer 0.2 additional reading comprehension questions compared to their performance at baseline. Positive findings in these areas were significant for both boys and girls, and the authors also found evidence that the program effect was much stronger in Koulikoro than in Mopti. Indeed, Grade 1 students in Koulikoro showed significant improvement in six out of the seven foundational reading skills examined.

School safety

USAID's (2020) evaluation of the *Emergency Education Support Activity (EESA)*, a project focused on making schools safer after the 2012 outbreak of violent conflict, found that EESA contributed to increase school enrolment over the duration of the project, logging a total of 55,073 new enrolments compared to 12,667 new enrolments at baseline in 2016. Of this final figure, 25,967 (47%) of newly registered students were female. Among the factors that made the project successful, survey respondents mentioned improvement of school infrastructure, as it increased their perception of security, and community mobilization through the use of community-based agents who served as trainers, coaches, and mobilizers and provided an incentive to send their children to school (51% of respondents). Other components cited included school construction/renovation (29%); distribution of school kits (28%); and training (13%).

Vocational training and economic competitiveness

Traoré et al.'s (2017) evaluation of the *Vocational Training Support Program*, which aimed to increase Mali's competitiveness in economic sectors through job-oriented vocational training, concluded that the project did not have any evident impact. First, the changes in the behaviour of actors involved in the program were not such that they suggested an impact attributable to it. This was due to the low involvement of the private sector in the program, which hampered the necessary responsiveness expected by public authorities and the development of skills needed in the labour market. For instance, interviews with key informants revealed that the project's partners were not satisfied with the existing decrees on vocational training and were waiting for decrees to be implemented that would ensure that transfer of competencies and resources to the decentralized communities were effective. Secondly, local governments did not significantly fund vocational training, despite its relevance and coherence with national education, and there was very weak leadership by regional elected officials, which prevented decentralized governance. Thirdly, although the program led to an income increase of at least 20% after vocational training, it did not induce a change towards an entrepreneurial spirit nor the propensity to send children to university.

Sustainability

One project that focused on increasing literacy rates in conflict situations was considered sustainable (USAID 2017). Three projects, one designed to improve schooling rates through school infrastructure (USAID 2020), one focused on literacy rates (Safarha et al. 2020), and another aimed at increasing economic competitiveness through vocational training, were evaluated as not sustainable. One project that aimed to increase school attendance through food emergency aid (Aurino et al. 2019) did not assess the project's sustainability.

USAID's (2017) evaluation on the sustainability of *Our Children Learn to Read*, a project designed to enhance early grade literacy by training teachers in the Sikasso Region, determined that the project was sustainable in Mali on several grounds. First, evaluators assessed that the project had credibility both with the Malian government, which had invested in the balanced literacy approach of the OCLR project as a key teaching strategy in its primary schools by means of consistent stakeholder engagement with the Malian government, USAID, and local representatives. Secondly, the project relied on could be utilized in internet-deprived areas due to its offline capability, meaning that this component of the project could be replicated in urban or rural areas. Lastly, given that most of the project's costs were concentrated in management rather than implementation or development costs, a scale-up of the project would not require a significant amount of investment in development, indicating that the project might be cost-effective if replicated.

In terms of threats to sustainability, the report mentioned the need for a more rigorous analysis of the impact of the project's technological components on children's reading skills before the technology was scaled. One reason for this is that there was no statistically significant difference in results between the two groups that received teacher training, where only one received tablets with the project's app. Interviews revealed that the sources available on the

app were insufficient. Secondly, the report advised that replication of this project outside Mali should be done with caution. It is unclear if a different organization, in Mali or elsewhere, could easily adopt and implement the model without support from technical experts in the pedagogical approach, knowledge of the *Stepping Stone* app, or strong relationships with the local ministry of education. Thus, potential adopters would need to invest significant time and financial resources to replicate and test the project in a new language or country context.

Although the *Emergency Education Support Activity* project was successful in improving schooling rates in conflict-affected areas, USAID (2020) reported that the project lacked a viable exit plan for sustained employment of AMCs after the activity ended. On the one hand, the report highlighted that the project had factors that enabled sustainability, such as legitimacy among the Malian authorities, as well as capacity building within the beneficiary communities. On the other hand, the evaluation did not find any evidence that emergency planning, a critical component of the project which aimed to build resiliency in case of an emergency scenario, had been tested or implemented, including by officials from the Ministry of Education. Secondly, sustainability was also affected by the lack of retention of trained staff through the transfer of teachers and principals trained by the project, and by the city mayors not communicating with the Ministry of Education.

Safarha et al. (2020) reported that the sustainability of the impact produced by the *Food for Education and Child Nutrition (McGovern-Dole) III* project, an initiative designed to improve the literacy rates for school-aged children, and health and hygiene attitudes and practices, in the regions of Mopti and Koulikoro were uncertain due to potential lack of resources. The authors stated that all stakeholders were concerned about the ability of communities to assume ownership of project activities when it required mobilization of resources. The sustainability of the project was thus uncertain and dependent on community engagement. Additionally, strikes, insecurity, climate change, and the lack of water at schools all complicated lasting effectiveness and sustained operations.

Aurino et al.'s (2019) study on the effect of food assistance on schooling did not address sustainability concerns.

Traoré et al (2017) concluded that the *Vocational Training Support Program*, which aimed to increase Mali's competitiveness in economic sectors through job-oriented vocational training, was not sustainable. Firstly, there were few indications that the effects produced by the program would continue after its conclusion. This was the result of low ownership of vocational training initiatives at the local level, since decisions, budget allocation, and planning on this theme continued to be monopolized at the national level. As a result, there was a low level of project decentralization, one of the main objectives of the program's fourth phase. In addition, vocational training benefitted most those already employed rather than youth without formal education.

Barriers

Food assistance programs on schooling

Aurino et al.'s (2019) study finds important gender differences related to the impact of food assistance on schooling in conflict situations in Mali. School feeding led to slightly larger gains in attainment among girls, while boys in households receiving generalized food distribution (GFD) – a non-conditional food transfer – exhibited larger decreases in attendance by missing about an additional day of school per week relative to their comparators. The authors explain that these results are due to differences in opportunity costs between school attendance and child labour between girls and boys. Whilst the opportunity cost of keeping girls in school is similar to their level of involvement in farm labour, for boys the scenario is different. Generalized food distribution has not been able to offset the benefits of child labour, as the opportunity costs of school attendance are higher than their involvement in farm-related activities, especially in a context of food insecurity due to ongoing conflict.

Literacy rates

USAID's (2017) evaluation on the *Our Children Learn to Read* project, which aims to increase literacy rates among children in Mali, also assessed whether there were any differences in results by gender. The evaluation concluded that no statistically significant differences were found between genders in each group and time (baseline or endline). However, their analysis also suggests that students who had greater exposure to Bamanankan, the local language taught at school, at both home and at school tended to have higher gains on the letter-sound identification, regardless of the intervention.

School safety

USAID's (2020) evaluation of Mali's *Emergency Education Support Activity* (EESA) project highlights two main barriers for project implementation: violence and lack of infrastructure. First, the lack of infrastructure was frequently cited by multiple stakeholders interviewed in all regions as a disincentive to school enrolment and attendance. For example, the lack of walled enclosures around the area of the schools caused great concern and fear among parents, students, and teachers. Without enclosures, students feel vulnerable to theft and bullying by outsiders. Violence not only affected beneficiaries, but also evaluators, who were unable to carry electronic devices due to robbery and therefore had to hand-write all survey responses. Respondents also reported that school property was vulnerable to vandalism and theft without enclosures. Secondly, the lack of potable water at schools was also reported to have an impact on school attendance. While the EESA program tracked the existence of water sources on school grounds, it did not test or track if these water sources provided clean, potable water. Whilst they facilities have been provided by EESA, at the time of the evaluation the school of Dogofry Missira in Niono School District had neither latrines nor water, leading parents to search for water sources from the village to supply the schools. Lastly, although school feeding was not included as one of the EESA outputs, many beneficiaries reported that it is a great incentive for school attendance from the beneficiaries' perspective.

Vocational training and economic competitiveness

Traoré et al.'s (2017) evaluation of the *Vocational Training Support Program*, which aimed to increase Mali's competitiveness in economic sectors through job-oriented vocational training, concluded that the main barriers to project implementation were the lack of resources and competencies for vocational training as these were not transferred to local authorities by the central authorities, and the low involvement of the private sector in the management of the program. This happened because regions wanted to replicate what was done at the national level by controlling the financing of the program, which prevented the establishment of an effective public-private partnership.

Summary

It is evident that violent conflict is detrimental to child protection and education. The case of Mali is no different: since the violent insurrection that devastated the northern regions, the government has struggled to provide basic services from water to health to education. This scenario has particularly affected school attendance and child development, resulting in the need for external aid to promote initiatives that help educational institutions provide services, to increase incentives for schooling, and to adapt learning processes to emergency situations.

In general, the education initiatives analyzed in this report were promising and have shown positive results. As Aurino et al. (2019) explain, food assistance, especially conditional food transfers, has the effect of increasing schooling by lowering the opportunity costs of receiving school meals and attending school compared to sending boys and girls to outside household chores. Future programs should take this finding into account, especially when they are designed to increase schooling of girls, since school feeding programs also show that conditional food transfers have a greater effect on school attendance among girls than boys owing to the higher opportunity costs of boys' involvement in farm-related activities, especially in a context of food insecurity.

In terms of increasing literacy rates, the balanced literacy approach, which promoted shared reading activities, was also positive. In both projects (Safarha et al. 2020; USAID 2017), children exposed to this new method outperformed their peers who did not have access to the same methodology. Should technology-based applications that allow for offline training be enhanced, making it able to be used in rural areas, this literacy method shows potential to be scaled up and replicated in other locations.

Finally, school infrastructure projects are crucial for providing a sense of security in school settings for children and their parents but, unfortunately, these projects face the greatest obstacles in their implementation. In a scenario where violence is widespread, robbery and theft of school inventory is not uncommon, preventing schools from remaining operational and hence students from attending school and community events from taking place. Even when schools are not directly affected by violence, the fear of potential violence has psychological effects on the community. As a result, projects such as the EESA evaluated by USAID (2020) should

include psychological support to tackle perceptions and fears that may harm the students and their parents' motivation to send them to school.

As for vocational training, it is clear that the Malian economy needs a holistic approach between skills development and labour market needs if it is to be competitive. However, the monopolization of professional development initiatives by central government and the lack of involvement of the private sector in program development and management, has prevented the development of a sustainable public-private partnership able to upskill the youth with the labour-market oriented knowledge and skills. Future programs focused on vocational training should promote the pooling of resources from training organizations, the private sector, and the government to ensure efficiency and responsiveness of public authorities. Vocational training has a great potential to improve the living conditions of the disadvantaged and those excluded from school, as the increase in income for those who participated in the program has shown, but coordination is essential to guarantee impact and sustainability.

Despite some positive results, it should also be noted that the sustainability of most education projects remains questionable. The *Emergency Education Support Activity* (EESA) project was successful in improving schooling rates in conflict-affected areas, but the project lacked a viable exit plan. Lack of resources threatened the sustainability of a project aimed at improving the literacy rates for school-aged children, as well as health and hygiene attitudes and practices (Safarha et al. 2020). Unfortunately, the *Vocational Training Support Program* was not only ineffective, but also not sustainable (Traoré et al. 2017).

Stabilization

The Evidence Base

Rigorous Impact Evaluations

None

Good Enough Evaluations

Aldrich, D.P. 2014. First steps towards hearts and minds? USAID's "Countering Violent Extremism Policies in Africa". *Terrorism and Political Violence*, 26, 523–546. Available at <https://www.tandfonline.com/doi/abs/10.1080/09546553.2012.738263>

Grünewald, F. & Baché, J.(2019). *Évaluation du projet "Peers for Peace Building, Social Cohesion in Mopti and Segou regions"*. IRF 217. Available at <https://www.wfp.org/publications/mali-evaluation-joint-project-peers-peace-building-social-cohesion-mopti-and-segou>

United Nations Institute for Training and Research (UNITAR). 2019. Independent evaluation of the *Sustaining Peace in Mali and the Sahel Region through Strengthening Peacekeeping Training Capacities Project* (Phase II). Available at:

<https://unitar.org/results-evidence-learning/evaluation/independent-evaluation-sustaining-peace-mali-and-sahel-region-through-strengthening-peacekeeping>

United States Agency International Development (USAID). 2016. *Transition initiative: Final evaluation*. USAID/OTI PDQIII. Task Order #10, Activity #3, Mali

Four studies were included.

One report evaluates a program designed to address four key areas: electoral processes, peace process, social cohesion, and countering violent extremism (CVE) in Mali (USAID 2016). Named the *Mali Transition Initiative* (MTI), the project is a continuation of a pre-existing program, *Mali Regional Option* (MRO), that lasted from January 2013 to July 2013 and supported broad-based inclusion and participation in the democratic process and access to reliable information on the transition. Over the years, given both feasibility concerns and US legislation that limited the scope of foreign aid to non-democratic countries, the MTI gradually incorporated other objectives as Mali transitioned to a democratic regime after the elections in July 2013.

Table 1: The Evolution of MTI Objectives (USAID 2016)

	Objectives
Jan 2013 – Sept 2013	<ul style="list-style-type: none"> • To support broad-based inclusion and participation in the democratic process • To promote improved access to reliable information on the transition
Sept 2013 – Sept 2014	<ul style="list-style-type: none"> • To increase citizen confidence in and information about the democratic process and governance • To promote reconciliation and social cohesion aimed at addressing drivers of conflict
Sept 2014 – Mar 2016	<ul style="list-style-type: none"> • To increase the supply and demand for a peaceful resolution to the conflict • To restore a sense of normalcy in strategic areas in the North • To counter violent extremism through inclusion of marginalized communities

To achieve such goals, MTI’s main activities were grouped by clusters.

- With regards to increasing voter education and participation in the electoral process, MTI promoted a two-minute video on the National Democratic Institute’s (NDI) Code of Good Conduct, which was aired 49 times on the Office of Radio and Television of Mali (ORTM), the Malian government’s national broadcast channel, before the presidential polls. The project also distributed over 20,000 of the International Republican Institute’s illustrated posters on how to vote. Hundreds of volunteers in 27 towns across Mali were also deployed for door-to-door grassroots Get-Out-To-Vote efforts.

- Regarding the objective of restoring peace, MTI's activities included translation of the Algiers Peace Agreement to other languages, the promotion of public debates on peace, such as the Public Debates for Women on the Peace Process and the Youth Public Debates on the Peace Agreement, and the streaming of a series of sketches broadcast on the peace agreement in five languages on national TV and local radio stations.
- Concerning social cohesion, also called normalcy, the project's outputs involved social activities, such as music, dance, poetry, and sports events; conflict mediation training; the promotion of informal and formal peace agreements; the rehabilitation of community centres, schools, and public plazas; and income generation activities as a way to encourage community members to work together and mend tensions from the past.
- Regarding Countering Violent Extremism (CVE), MTI's activities included addressing urgent community needs through collaboration with the communal mayor's office and village leaders to identify the two most critical neighbourhoods where improved access to clean water was needed. MTI also aimed to strengthen connections within and between communities by hosting a commune-wide soccer tournament; develop a network of community leaders to resolve inter-village issues; provide cash for work schemes with individuals from different villages; promote a theatre competition for young women; and address extreme ideas and promote critical thought through reading and book clubs and initiatives with women from the ultra-conservative region of Darsalam.

The Mali Transition Initiative was implemented by AECOM International Development. USAID's (2016) evaluation covers the period from the project launch in January 2013 to 2016, when the evaluation was released.

Another report (UNITAR 2019) evaluates the *Sustaining Peace in Mali and the Sahel Region through Strengthening Peacekeeping Training Capacities* project, which aimed to increase stabilization in Mali by strengthening the capacities of the African Formed Police Units (FPUs) prior to deployment to the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA). This project was implemented by the UNITAR Peacekeeping Training Program Unit in partnership with the École de maintien de la Paix "Alioune Blondin Beye" (EMPABB), and the total cost of Phase II was 1,694,396 euros, fully funded by the Federal Government of Germany. The evaluation covers the project's second phase, from September 2017 to July 2018. A third phase followed. Prior to phase II, an eight-month pilot phase was implemented from August 2016 to April 2017. Most of the project's activities included trainings, such as training of FPU trainers on UN peace operations before their deployment to MINUSMA, training of FPUs by the FPU trainers under the supervision of UNITAR coaches, and training sessions for Protection of Civilians / Human Rights (POC/HR) focal points from Police Contributing Countries (PCCs).

A third report (Aldrich 2014) evaluates the *Trans-Sahara Counter-Terrorism Partnership* (TSCTP) in Mali, a project which sought to increase civic participation, reduce inter-group tension and violence, and strengthen the resistance of vulnerable groups, such as young men, to recruitment by violent extremist organizations. The TSCTP was fully funded by the U.S. government, and the program was based on delivering strategic communications, such as

messages broadcast through radio programming, to make young Malian men less vulnerable to recruitment by violent extremist organizations and more likely to remain embedded in positive, mainstream social and religious institutions in two towns: Tombouctou and Diré.

USAID's budget for TSCTP in the fiscal year 2005 was roughly US\$ 5 million, increasing to US\$ 9 million by the fiscal year 2009, with US\$ 16 million in the fiscal year 2012. The evaluation (Aldrich 2014) covers the project's impact from 2005–2010. The project was implemented by numerous partners, such as Management Systems International (MSI) which worked on governance issues; International Executive Service Corps (IESC) and GeekCorps, which worked with radio programming; and the Education Development Centre of the *Programme Harmonisé d'Appui au Renforcement de l'Éducation* (Program to Standardize and Strengthen Education, PHRARE) which worked on educational programming. Additionally, several organizations, including Trickle Up, Abt Associates, and Mali Pro Nord ran economic programs in the area.

The final report (Grünwald & Baché 2019) evaluates *Peers for Peace Building, Social Cohesion in Mopti and Segou regions*, a project designed to foster social cohesion and mitigate inter and intra-community conflicts by restoring conflict management mechanisms in Mali. It is believed that if community structures for conflict prevention are strengthened and local livelihoods are improved, then communities will be more resilient to violent conflicts and that social cohesion will be enhanced. To achieve this goal, the project developed a series of activities, such as the establishment of Dimitra clubs³ in each of the intervention villages, the promotion of savings and credit activities through village associations, and the rehabilitation/construction of community infrastructure, such as sources of water, dams, market gardens, and community radio stations. The program commenced in 2018 with a total expected duration of 18 months. It covered 20 communities in six communes in Mopti and Ségou regions and was financed by a Peace Building Fund⁴ with a total budget of US\$ 2.5 million. The project was implemented by the World Food Program, the Food and Agricultural Organization, and the UN Refugee Agency, as well as NGO partners.

Methods

One report adopts a quantitative methodology (Aldrich 2016) whilst the other three reports adopt a qualitative strategy (Grünwald & Baché 2019; UNITAR 2016; USAID 2016).

Aldrich's (2016) article employs a quasi-experimental method to evaluate the impact of the *Trans-Sahara Counter-Terrorism Partnership* (TSCTP) from 2005–2010 in Mali. To determine whether several years of U.S. government-funded programs altered the cognition and behaviour

³ Dimitra clubs are groups of women, men, and young people – mixed or not – who organize themselves on a voluntary basis to bring about changes in their communities and resolve problems using their own resources, without relying on external support. Members of the clubs discuss and try to find and implement solutions to development problems affecting the community.

⁴ The Peace Building Fund was created in 2005 in accordance with resolution A/60/180 from the United National general Assembly and resolution 1645 of the UN Security Council. It aims to support those countries under conflict and in which it is estimated that there is an imminent risk of conflict.

of Malians in countering violent extremism, the author undertook a paired-comparison study in the towns of Tombouctou and Diré. A 14-question survey in the local languages was administered to 200 respondents in these towns. Tombouctou and Diré were paired because although they share many characteristics in terms of demography, civic participation, Islam, and gender balance, Diré was not a TSCTP beneficiary. Should the TSCTP-based programs in Tombouctou prove effective, residents there should demonstrate these behaviours more than their counterparts in Diré. The core outcomes (dependent variables) of interest in this study are accessing peace and tolerance programs on local radio channels, participation in community-level decision making, perspectives on al Qaeda's use of violence in the name of Islam, and beliefs in whether or not the U.S. is fighting Islam (or terrorism). The study controls for demographic factors, such as age, sex, and ethnicity, and socio-economic and political conditions. These include respondents' beliefs in political freedom, satisfaction with services in their communities and with political representatives; and cultural drivers of behaviour and attitudes, including towards the United States and support for the implementation of Sharia.

Grünewald & Baché (2019), UNITAR (2016), and USAID (2016) employ a qualitative approach to evaluate their programs. USAID's (2016) evaluation of the *Mali Transition Initiative*, a project aimed at improving electoral processes, the peace process, and social cohesion in Mali, as well as countering violent extremism, included a literature review, 26 key informant interviews, seven phone interviews, four focus group discussions (FGD), and four field observations in three cities Bamako, Tombouctou, and Gao. UNITAR's (2019) evaluation on the *Sustaining Peace in Mali and the Sahel Region through Strengthening Peacekeeping Training Capacities* project also included a desk review of documents provided in the project's terms of reference, 29 in-person and skype/phone interviews, including of beneficiaries, based on purposive sampling from a list of stakeholders provided by the project management team, a field visit to Mali and an FGD with Malian police officers and survey of 149 officers. Grünewald & Baché's (2019) assessment of the *Peers for Peace Building, Social Cohesion in Mopti and Ségou Regions*, a project designed to foster social cohesion and mitigate inter and intra-community conflicts by restoring conflict management mechanisms in Mali, included semi-structured interviews with key informants, 18 interviews with village councils, 106 FGDs with beneficiaries, and interviews with residents of two villages (Monimpebougou and Djipoule-Ouro-Amney) which had not benefitted from the project. These control villages were chosen due to their similar characteristics to the target villages.

Impacts

USAID's (2016) report on the *Mali Transition Initiative* (MTI), a project designed to improve the electoral processes, the peace process, and social cohesion, as well as countering violent extremism, stated that the program achieved its intended impacts on elections and social cohesion. However, there was insufficient evidence to determine whether the MTI achieved its goals on the peace process and countering violent extremism.

- In the elections' stream, the evaluation determined that the MTI increased voter access to information. Evidence for this includes steady participation in the MTI-sponsored

hotline for the presidential election, in which 6,000 calls were received compared to the 1,500 expected. Nonetheless, it is unclear whether the initiative increased voter turnout.

- With regards to social cohesion, it is unclear whether the project had an impact on restoring “normalcy” in the targeted locations. This is due to a number of methodological failures through the conception and implementation processes, such as the lack of definition of what normalcy means, the failure to develop indicators for normalcy, the expansion of targeted areas over the years to the detriment of a more-geographically-focused approach, given the limitation of resources and the absence of a systematic scale-up plan.
- Regarding the peace process, the MTI contributed to low- or medium-level effects, such as access to information on the peace agreements. This was evidenced by the beneficiaries in phone interviews and an increase in the online and media presence of the Ministry of National Reconciliation. However, there was a lack of evidence on the impact of the MTI in sustaining peace and ensuring that leaders would remain faithful to the peace accords. Had the MTI implementers conducted micro-surveys to monitor changes in public knowledge about the peace process, there would have been higher chances of measuring the project’s impact in this regard.
- Concerning the countering of violent extremism (CVE), defined as involvement in the creation of ideologically-motivated violence and support for such an act, the report could not find any evidence with which to argue that the MTI Project had any impact. This was mainly due to methodological failures in data collection by the project. A social network analysis was conducted to gather community information on whether the MTI activities reduced the involvement in CVE activities, but the evaluators found that the socio-demographic indicators were not realistic. Instead, they argue, a micro-survey would have been more appropriate.

UNITAR’s (2019) evaluation on the *Sustaining Peace in Mali and the Sahel Region through Strengthening Peacekeeping Training Capacities* project reports that the qualitative indicators presented in the project’s logframe were not sufficient to measure mid-term or longer-term impact: “While short-term results were observed during the phase, according to the numerical quotas of trained FPU’s or trainers, the contribution to longer-term objectives could not be measured” (UNITAR 2019).

Aldrich’s (2016) evaluation of the *Trans-Sahara Counter-Terrorism Partnership* (TSCTP) from 2005–2010 in Mali, a project focused on countering violent extremism among the youth, concludes that it was difficult to make a causal claim that exposure to U.S. programming led to reducing violent extremism. On the one hand, there was a positive correlation between exposure to U.S. programs on CVE and civic engagement and listening to peace radio programs, even when controlling for confounding factors, and after robustness tests such as propensity-score matching⁵. On the other hand, being in the treatment or control group showed

⁵ Propensity-score matching takes an existing dataset and processes it, removing unlike observations to make the treatment and control groups as balanced and similar as possible.

no significant correlation with justifying al Qaeda's behaviour under Islam or on the question of whether the U.S. was fighting terrorism or Islam.

Grünewald & Baché's (2019) report does not provide any significant evidence on the impact of the *Peers for Peace Building, Social Cohesion in Mopti and Ségou Regions*, a project designed to foster social cohesion and mitigate inter- and intra-community conflicts by restoring conflict management mechanisms in Mali. Although there were some positive indications, such as that peace peers and village councils generally thought that an improvement of livelihoods led to reduction in community tensions, the small number of people surveyed and the nature of the survey (an individual perception survey without a baseline and not representative of the population) made these conclusions fragile. Additionally, many targeted communities were under the protection of Malian armed forces, which may also have contributed to mitigating existing inter- and intra-community conflicts.

Sustainability

UNITAR (2019) reports that the sustainability of the *Sustaining Peace in Mali and the Sahel Region through the Strengthening Peacekeeping Training Capacities* project was critical. First, it is said that this type of training needed to be ongoing in order to see progress and impact, given the rotation of the Formed Police Units and because learning was achieved through repetition and practice. However, the project's activities were unable to continue without Germany's funding, given the project was solely funded by this country, putting the project at risk. Secondly, there was insufficient consultation with Malian officials to determine their country's interests and needs. As a result, the project's work plan and budget were designed based on other countries (Nigeria, and Egypt, for instance), undermining the project's sustainability.

Grünewald & Baché (2019) conclude that the *Peers for Peace Building, Social Cohesion in Mopti and Segou Regions* project designed to foster social cohesion and mitigate inter- and intra-community conflicts by restoring conflict management mechanisms in Mali, was not sustainable. This was due to the lack of ownership among community members concerning the conflict management committees (Dimitra clubs). The short duration of the program (18 months) did not help as it resulted in a feeling of frustration among the implementing partners who believed the project was finished when it started to gain traction. Therefore, it was unlikely that project activities would continue without external support.

Neither USAID's (2016) study on the *Mali Transition Initiative* nor Aldrich's (2016) report on the *Trans-Sahara Counter-Terrorism Partnership* in Mali address sustainability concerns.

Barriers

UNITAR (2019) reports that barriers related to logistical and planning challenges that can occur in West Africa due to inefficient flight connections or communication did not prevent the delivery of the planned training to the African Formed Police Units (FPU) in Mali. Under the umbrella of the *Sustaining Peace in Mali and the Sahel Region through Strengthening Peacekeeping*

Training Capacities project, UNITAR was able to deliver training to a total of 616 FPU, 38 trainers at the École de maintien de la Paix "Alioune Blondin Beye" (EMPABB), and 26 focal points of police Contributing Countries (PCC).

Grünwald & Baché (2019) report that lack of security was the main barrier to the implementation of *Peers for Peace Building, Social Cohesion in Mopti and Ségou Regions*, a project designed to foster social cohesion and mitigate inter- and intra-community conflicts by restoring conflict management mechanisms. Given that the project was implemented in high-risk areas, both in Mopti and Ségou, implementers faced restrictions on their movement that delayed project delivery and led to an exodus of beneficiaries from certain areas (Koro and Bankass villages). Some planned activities had to be adapted to the volatile circumstances, including not providing cash transfers and relocation of activities to neighbouring towns.

Neither USAID's (2016) study on the *Mali Transition Initiative* nor Aldrich's (2016) report on the *Trans-Sahara Counter-Terrorism Partnership* address barriers or modifiers.

Summary

We identified four evaluations referring to stabilization. The main stabilization activities which these programs promoted were: communication via mass media for supporting peace and countering extremism; support for grassroots-level discussion clubs intended to improve social cohesion; restoring access to basic services with the aim of mitigating intercommunal conflicts and preventing extremism; and support for international policing.

One report (USAID 2016) evaluated a multi-dimensional program designed to address four key areas important for stabilization: support for electoral processes via communication through mass media, support for the peace process by disseminating information about the peace agreement, promoting social cohesion through community work, and countering violent extremism by addressing basic needs in communities.

A second report (UNITAR 2019) evaluated a project aimed at strengthening the capacities of the African Formed Police Units (FPU) prior to deployment to the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA).

A third report (Aldrich 2016) evaluated a project which sought to strengthen the resistance of vulnerable groups—such as young men—to recruitment by violent extremist organizations by broadcasting through radio.

A fourth report (Grünwald & Baché 2019) evaluated a project designed to mitigate inter- and intra-community conflicts by restoring conflict management mechanisms through the establishment of discussion clubs, the promotion of savings and credit activities, and the rehabilitation/construction of community infrastructure.

Unfortunately, these four evaluation reports provide little robust evidence for a stabilization effect. At the output level, it seems that strategic communication in the mass media increased access to information about the electoral process and the peace agreement, but the reports

provide no evidence about further outcomes or impacts, with information confined to the output level.

The reports do not provide evidence about the impacts of communal work, such as music, dance, poetry, and sports events; conflict mediation training; rehabilitation of community centres, schools, and public plazas; and income generation activities as a way for community members to work together. It is unclear whether such activities had an impact on social cohesion in communities, and whether this would have had an impact of stability.

It is also not apparent whether restored access to basic service had an impact on combating extremism. The evaluations were not set up to measure possible impacts. Similarly, it is unclear whether training for former police units had an impact on stability since the evaluation was methodologically not set up to investigate this.

Finally, delivering strategic communications through radio programming to make young Malian men less vulnerable to recruitment by violent extremist organizations had no effect. The addressees of such messaging showed little change in terms of their beliefs concerning whether the U.S. was fighting terrorism or Islam, or of Islamic justification for al Qaeda's activities, compared to non-beneficiaries.

The inconclusiveness of these results is mainly due to inappropriate methods. The evaluation reports were methodologically not set up to assess impacts. Key problems were a lack of conceptual clarity for what was measured, and a lack of solid data. That said, we think that it is unlikely that stronger methods would have discovered positive effects on stability. There is no clear and convincing theory of change which would link these interventions to greater stability, and the existing academic literature suggests that political communication and restoration of basic services usually has no impact on conflict mitigation.

Good Governance

The Evidence Base

Rigorous Impact Evaluations

None

Good Enough Evaluations

Kaboré, R.B. & Kampo, I. 2017. *Évaluation finale du « Projet d'appui au processus électoral du Mali (PAPEM) »*.

Wennink, B., Keita, A. & Fomba, B. 2020. *Evaluation finale du « Programme gouvernance locale redevable au Mali »*. Royal Tropical Institute (KIT), Amsterdam.

Lanoue, É. & Barro, D. 2013. « *Partenariats pour l'exercice d'une gouvernance appropriée* »: *Revue externe du programme*. Bureau de la coopération suisse au Mali.

Gouzou, J. & Traoré, K. 2021. *L'Évaluation du « Programme de gouvernance locale démocratique », 2018–2020, Mali*. Sida decentralized evaluation. Available at: https://cdn.sida.se/app/uploads/2021/06/24132738/DE2021_23_62413fr.pdf

Four studies were included.

Improving electoral governance

One report (Kaboré & Kampo 2017) evaluate a project designed to strengthen the electoral process in Mali. Called « *Projet d'appui au processus électoral du Mali* » (PAPEM) (Support Project for the Electoral Process of Mali), this project was implemented from January 2012 to December 2016 by UNDP and the Malian Ministry of Territorial Administration with the technical and financial support of 12 partners⁶. It is believed that this project was crucial for Mali's electoral governance, especially after the 2012 coup d'état which interrupted elections that year. To strengthen the capacities of national institutions in charge of organizing elections, PAPEM's main activities were the establishment of technical committees that provided support to electoral institutions; creation of civic education materials for communities (materials containing the fundamental principles of democracy and the importance of local elections for the country's political stability); and training courses to political parties on human rights and to media professionals on ethics in election coverage. The project covered the whole country and had a total budget of US\$ 57,577,775.

Increasing civil governance

Wennink et al. (2020) assess the « *Programme de gouvernance locale redevable au Mali* » (Local Governance Accountability Program), which aimed to strengthen the relationship between citizens and public authorities in Mali, with a focus on youth-led participation. It was believed that a larger role for citizen participation in the management of public affairs was needed to increase social cohesion and institutional legitimacy and to avoid a similar security crisis as that Mali had witnessed in 2012. Interventions were based on local youth as a social force to demand greater accountability from local public institutions so as to improve the performance and quality of basic social services in a country culturally dominated by the elders. The project's activities relied on three pillars: a good understanding of decentralization by citizens and local authorities; the creation of income-generating activities in sports, culture, and other innovative sectors for the youth; and the prevention and resolution of natural resources-based conflicts. As a result, the main project activities were the establishment of spaces for public debate; training modules on municipal budgets, the exercise of citizenship, and the management of basic social services; traditional cultural events; and radio broadcasts. The

⁶ Several partners provided a common fund for this project, namely, the European Union, USAID, Belgium, Sweden, Norway, Switzerland, Canada, Denmark, Netherlands, Luxembourg, African Union, UNDP, and the Government of Mali.

project was funded by the Netherlands Embassy in Bamako (EKN Bamako) and implemented by a consortium composed of SNV (lead partner), ICCO, and OXFAM-NOVIB from 2014 to 2020, which is the period covered by this final evaluation. The project targeted 180 municipalities in four regions (Ségou, Mopti, Tombouctou, and Gao) with a total budget of Euro 17,521,530.

Lanoué & Barro (2013) evaluated the « *Partenariats pour l'exercice d'une gouvernance appropriée* » (Partnerships for the Exercise of Appropriate Governance) program, which aimed to promote democratic and transparent governance in Mali by strengthening civil society participation in local authority decision making. The program's main activities involved capacity-building of decentralization actors, such as networks, communal associations, students, and local authorities through training courses (including to promote women's entrepreneurship, to manage projects, to promote local leadership and participatory budgeting, to improve socio-economic data collection, and to follow a procedures manual), and the establishment of committees to discuss economic and social issues relevant for the community. The report assesses the third phase of this program, from 2009 to 2013, and is focused on four regions: Bamako, Sikasso, Koutiala, and Bulonba, although the program covered the whole country. The program was funded by the Swiss Cooperation Bureau, with a total budget of US\$ 5 million.

Increasing democratic governance of natural resources

Gouzou & Traoré (2021) evaluate the « *Programme de gouvernance locale démocratique* » (Democratic Local Governance Program, which aimed to strengthen local mechanisms for land management and citizen control of natural resources management for sustainable and equitable development. It is believed that both the Tuareg rebellion (2006–2008) and the coup d'état in 2012 were the result of a combination of internal and external factors, including weakness of the state, insufficient attention to the needs of the population, international terrorism, destabilization of Libya, with the governance deficit as the central element. To overcome this issue, the project provided a series of activities that aimed to improve democratic governance overall, and, more specifically, to increase beneficiaries' income, reduce community and familial tensions, and promote peaceful access to and sustainable use of natural resources. These activities included support of income-generating activities in agriculture, market gardening, and small-scale trade; provision of a working capital fund in the form of a credit union; the establishment of land commissions and citizen's watch committees as instances of community discussion; conflict resolution; and knowledge transfer, for example on herd management and land rights. The program was implemented by a consortium of four international non-governmental organizations (Diakonia, Helvetas Swiss Inter-cooperation, SNV, and Norwegian Church Aid) from 2005 to 2016. It targeted 40 municipalities in nine regions in Mali and was funded by Sida with a total budget of 215 million Swedish krona. The evaluation covers the third phase of this project, from 2018 to 2020.

Methods

Kaboré & Kampo (2017) adopted a qualitative approach to evaluate the impact of the Support Project for the Electoral Process of Mali (PAPEM), a project designed to strengthen the electoral

process in Mali. The method consisted of a desk review of project documents, e.g., reports to measure project progress, 22 interviews with key informants (ten with technical and financial partners, and 12 with contributors to the project's basket fund), and field visits.

Wennink et al. (2020) employed a qualitative approach to assess the impact of the Local Governance Accountability Program, which aimed to strengthen the relationship between citizens and public authorities in Mali, with a focus on youth-led participation. The method consisted of a desk review of project documents, including semi-annual activity reports; 11 interviews with key informants, including officials from the Embassy of the Netherlands in Bamako, staff from the NGO members of the project' consortium, and elected official; and focus-group discussions (FGD) with over 800 young leaders, city hall staff, and local association members who were upskilled by the program. Interviews and FGDs were conducted in 32 communes: five communes in the Ségou region; 12 communes in the Mopti region; and five communes in the Gao region.

Lanoué & Barro (2013) used a qualitative approach to evaluate the impact of the Partnerships for the Exercise of an Appropriate Governance Program, which aimed to promote democratic and transparent governance in Mali by strengthening civil society participation in local authority decisions. The method consisted of a desk review of project documents, field visits to four regions covered by the project (Bamako, Sikasso, Koutiala, and Bulonba), and 39 semi-structured interviews with key informants from the Malian government, NGOs, and community associations.

Gouzou & Traoré (2021) employed a mixed methods approach to evaluate the Democratic Local Governance Program (during 2018–2020), which aimed to strengthen local mechanisms for land management and citizen control of natural resourced management for sustainable and equitable development. The method consisted of a desk review of project documents, 40 interviews with key informants, 39 focus group discussions, and a survey of 1,120 respondents in a sample of communes.

Impacts

Improving electoral governance

Kaboré and Kampo's (2017) study on PAPEM, a project designed to strengthen the electoral process in Mali, did not provide substantive evidence to measure the project's medium- or long-term impact. Although the project showed some positive results, such as a higher rate of electoral participation (in 2013, a 51.54% voter turnout was achieved compared to 38.31% in 2002 and there was a higher proportion of female voters, candidates, and elected officials), the lack of a clear baseline and endline for this project made any conclusions regarding impact fragile. There are no data presented on how peaceful past elections had been, for example, nor did the study provide any information on why the year of comparison was 2002.

Increasing civil governance

Wennink et al. (2020) concluded that it was difficult to assess the impact of the Local Governance Accountability Program, which aimed to strengthen the relationship between citizens and public authorities in Mali through a focus on youth-led participation. According to the evaluators, this was due to methodological failure of the project because the sample of young people used to evaluate trust in local authorities changed every year. Furthermore, although the report stated that some interviewees had noticed that the youth had been more active in public forums, it is unclear to what extent this led to greater transparency in the management of local public affairs.

Lanoué & Barro's (2013) study on the Partnerships for the Exercise of an Appropriate Governance program, which aimed to promote democratic and transparent governance in Mali by strengthening civil society participation in local authority decisions, did not provide enough evidence to evaluate the program's impact. Although it is clear that some community associations could not be established without the funding provided by the program, the evaluation lacks any measures to assess to what extent political decentralization advanced in Mali or citizens participated in local decision making through capacity-building initiatives for public management.

Increasing democratic governance of natural resources

Gouzou & Traoré (2021) concluded that there was not enough evidence to assess the impact of the Democratic Local Governance Program during the period 2018–2020 with respect to strengthening local mechanisms for land management and citizen control of natural resource management for sustainable and equitable development. On the one hand, the study's key informant interviews and beneficiary survey showed a positive perception about the program, attributing to it an improvement in natural resources management in Mali: for instance, 93% of respondents agreed that the program improved natural resources management and 80% agreed that the program had a positive impact on existing conflicts by reducing tensions. On the other hand, the lack of measurement beyond individuals' perceptions makes these results fragile to assess the project's impact.

Sustainability

Improving electoral governance

Kaboré & Kampo (2017) concluded that PAPEM, a project designed to strengthen the electoral process in Mali, was sustainable. The report stated that the credibility of the electoral process, the peaceful conduct of elections, the acceptance of the results of the polls, and the adoption of the code of good conduct were achievements that could continue after the end of the project. This was an overly optimistic assessment, given that the 2020 parliamentary elections were marred by violence and had a 35% lower turnout than the 2013 and 2002 elections.

Increasing civil governance

Wennink et al. (2020) concluded that the Local Governance Accountability Program, which aimed to strengthen the relationship between citizens and public authorities in Mali, with a focus on youth-led participation, was sustainable. The project's sustainability goal was to create a perennial youth movement in targeted areas. Surveys with 1,539 beneficiaries and interviews with key informants revealed that there was increased youth participation in the management of public affairs and election to positions in decision-making bodies, such as communal councils and public service management organizations. For instance, in 2019, 82% of respondents participated in public service management organizations, 10% in conflict management commissions, and 8% in communal councils, which represents 120% of the final target. There is, however, a need to retain the youth in these locations due to high unemployment and persistent violence which leads to rural exodus.

Lanoué & Barro's (2013) study on the Partnerships for the Exercise of an Appropriate Governance program, which aimed to promote democratic and transparent governance in Mali by strengthening civil society participation in local authority decision making, did not address sustainability concerns.

Increasing democratic governance of natural resources

Gouzou & Traoré (2021) concluded that the Democratic Local Governance Program, which aimed to strengthen local mechanisms for land management and citizen control of natural resources management for sustainable and equitable development, was not sustainable. One of the main goals of the current and final phase of this project was ensuring broader knowledge dissemination and scale up. The study reported that there was little or no evidence of dissemination of achievements beyond the implementation area. Secondly, the maintenance of the project's activities, institutions, and infrastructure were fragile due to the limited financial resources available and the lack of inclusion of operating costs of village land commissions in municipal budgets. There is no strong evidence of self-reliance of the actors and structures supported by the program.

Barriers

Kaboré & Kampo (2017) asserted that lack of security was the main barrier to the implementation of PAPEM, a project designed to strengthen the electoral process in Mali. Firstly, the administrative census for civil status purposes (RAVEC), which consisted of registering Malians both within and outside the country in order to build a biometric database and assign each of them a national identification number (NINA number), could not be carried out because of the prevailing insecurity in the Kidal region as well as in the communes of Gao, Tombouctou, and Mopti. This situation had negative effects on the population of these regions as they were not included in Mali's national civil register or the electoral roll. Secondly, insecurity, especially in the north of the country, prevented the delivery of electoral materials in several localities, undermining the project's activities on civic education.

Lanoué & Barro (2013) stated that the implementation of the Partnerships for the Exercise of an Appropriate Governance program, which aimed to promote democratic and transparent governance by strengthening civil society participation in local authority decision making, was interrupted after the coup d'état in 2012. Interviewees reported that rebels ransacked their offices and destroyed strategic documents, preventing continuation of project activities. Similarly, the political crisis led the Swiss Cooperation Bureau in Mali to cease operations, only resuming activities several months later.

Neither Gouzou & Traoré (2021) on the Democratic Local Governance Program nor Wennink et al. (2020) on the Local Governance Accountability Program addressed barriers to project implementation.

Summary

For over a decade, Mali experienced political crisis and turmoil, from the 2012 Tuareg rebellion to the 2020 coup d'état. At the heart of these crises were a combination of internal and external factors – weakness of the state, insufficient attention to the needs of the population, international terrorism, and the destabilization of Libya, with the governance deficit as the central element. To overcome this issue, donors financed projects to build a decentralized government system in which Malians could play an important role at the local level.

We identified four evaluations referring to good governance. The main good governance activities which these programs promoted were support for capacity-building through the establishment of spaces for public debate (electoral technical committees, land commissions, and community associations), the delivery of training modules and civic education materials on a variety of topics (municipal budget, exercise of citizenship, management of basic social services, local leadership, and participatory budgeting), and support for income-generating activities (market gardening, small-scale trade, and village associations).

One report (Kaboré & Kampo 2017) focused on electoral governance and evaluated a project designed to improve the electoral process in Mali by strengthening the capacities of national institutions in charge of organizing elections and increasing civic awareness on electoral rights and ethics. Two more studies shed light on civil governance. Wennink et al. (2020) assessed a program designed to strengthen citizen participation and trust between citizens and public authorities in Mali, with a focus on youth-led participation, by providing training, income-generating activities and social events, and spaces for public discussion of community affairs. Lanoué & Barro (2013) evaluated a project conceived to promote democratic and transparent governance in Mali by strengthening civil society participation in national and local authority decision-making. A fourth report (Gouzou & Traoré 2021) focused on the democratic governance of natural resources and evaluated a project designed to strengthen local mechanisms for land management and citizen control of natural resources management for sustainable and equitable development by establishing land committees and providing capital and technical support for income-generating activities.

Unfortunately, the four evaluations of good governance projects included in this report failed to provide evidence for impacts. This is mainly the result of methodological flaws, insufficient data collection, and the lack of strategic planning to elaborate key variables that would have been able to capture impacts.

Nonetheless, the reports show some intermediate outputs (results). In terms of improving electoral governance, the strengthening of local capacity contributed to the holding of two rounds of presidential elections and legislative elections in 2013, and communal elections in 2016 (Kaboré & Kampo 2017). Although the project cannot provide robust evidence, it is feasible to believe that it improved the democratic processes in Mali, given that the elections were peaceful and the results were accepted by both the winning and losing parties. To some extent, this can be attributed to the project's awareness campaigns, the training of more than 125,000 electoral agents, the modernization of the civil registry, the opportunity of Malian refugees and expatriates to vote from abroad, and the consensual adoption of an electoral code of conduct by candidates and the electorate. However, the sustainability of the project's intermediate effects was weak since the elections held in 2020 were marred by violence and led to a coup d'état.

As for strengthening civil governance, one of the two reports on this theme (Wennink et al. 2020) showed that programs focused on the youth have the potential to create new leaders and encourage youth participation in local fora of decision making. Over time, the number of functional communal youth centres, of citizens aware and active in local governance, and of positions held by young people in communal councils and communal public services all increased significantly after the project. This shows that is reasonable to believe that there has been a growing confidence in the youth about their capacity to seek social change in local institutions.

However, the second report on civil governance (Lanoue & Barro 2013) revealed a different scenario where no impact could be attained. As previously mentioned, the project aimed to increase civil governance across multiple levels (national authorities, regional councils, and communities), with the strengthening of civil society's (particularly NGOs') agency in public affairs. Nonetheless, the project outputs showed that there was a lack of a strategic view and monitoring and evaluation mechanisms throughout the program. The program focused on a myriad of partnerships and covered many areas beyond its initial scope, which made both the partnerships and project activities ineffective. Further projects should limit their scope to specific areas and identify strategic partners for quick wins⁷.

With regard to the governance of natural resources, the evaluation of Gouzou & Traoré (2021) showed some intermediate outputs, such as the perception among beneficiaries (almost 80%) that the project had increased social cohesion in the communities and led to a behavioural change against exploitative environmental practices. Although the evaluation could not prove

⁷ A quick win is a change that is visible and will have immediate impacts. Solutions are defined as quick wins if they are easy, fast and economical to implement, and able to be easily reversed. Government of New Zealand. Cf. https://aci.health.nsw.gov.au/_data/assets/pdf_file/0008/486782/Solutions_QUICK-WINS.pdf

causality, it is possible to believe that the project’s market gardening activities did actually result in a decrease in the non-sustainable exploitation of wood from forests and an increase in livelihoods, especially during the dry season. Secondly, the adoption of a judicial framework for the entire country – the Agricultural Land Law – to which the project contributed, and the establishment of a register of customary holdings and a communal register of land transactions, which allowed for the archiving of land transactions, may have increased land security, as sustained by the majority of survey respondents.

Also noteworthy is the current state of decentralization, an important component of the 2013 peace agreement, which is still elusive. One of the reports (Lanoué & Barro 2013) states that there are many obstacles in the process of transferring competencies and resources from the State to communities and most of the sectors are still monopolized by the central government. Another report (Wennink et al. 2020) asserts that, although the peace agreement was signed in 2015, its full implementation is still delayed and decentralization and good governance have not significantly changed.

Health

A total of 25 studies were included, of which 23 were rigorous.

The following table summarizes the evidence base.

Sector	Rigorous	Good Enough
Malaria (6)	Ponsar et al. 2011; Mangam et al. 2016; Clarke et al. 2017; Diawara et al. 2017; Druetz 2018; Kayentao et al. 2018	
WASH (6)	Allegranzi et al. 2010; Trinies et al. 2015; Koita et al. 2016; Trinies et al. 2016; Chard et al. 2018; Kone et al. 2019	
Open Defecation (3)	Pickering et al. 2015; Alzúa et al. 2020	Rotondo et al. 2009
Child Mortality (9)	Perez et al. 2009; Trevant 2009; Simonyan et al. 2013; Bagayoko et al. 2017; Ravit, et al. 2018; Whidden et al. 2018; Adubra et al. 2019; Le Port et al. 2019	Guèye & Nikièma 2018
HIV status management (1)	Bernier et al. 2018	

Nine evaluations investigated the impacts of various interventions on child mortality. Six studies focused on WASH interventions and their effects on children in school and on mother/child health. Six studies focused on interventions aimed at curbing the spread and mitigating the effects of malaria. Three studies assessed the impacts of interventions for curbing open defecation. One study investigated the effects of a psycho-social intervention on HIV status management for HIV positive women.

Malaria

The Evidence Base

Rigorous Impact Evaluations

Clarke, S.E, Rouhani, S., Diarra, S., Saye, R., Bamadio, M., Jones, R., Traoré, D. et al. 2017. Impact of a malaria intervention package in schools on plasmodium infection, anaemia, and cognitive function in schoolchildren in Mali: A pragmatic cluster-randomized trial." *British Medical Journal, Global Health*, 2(2), e000182–e000182. Available at: <https://doi.org/10.1136/bmjgh-2016-000182>

Diawara, F. Steinhardt, L.C., Mahamar, A., Traore, T., Kone, D.T et al. 2017. Measuring the impact of seasonal malaria chemoprevention as part of routine malaria control in Kita, Mali. *Malaria Journal*, 16(1), 325–325. Available at: <https://doi.org/10.1186/s12936-017-1974-x>

Druetz, T. 2018. Evaluation of direct and indirect effects of seasonal malaria chemoprevention in Mali. *Scientific Reports*, 8(1), 8104–9. Available at: <https://doi.org/10.1038/s41598-018-26474-6>

Kayentao, K., Florey, L.S., Mihigo, J., Doumbia, A., Diallo, A., Koné, D., Doumbo, O. & Eckert, E. 2018. Impact evaluation of malaria control interventions on morbidity and all-cause child mortality in Mali, 2000–2012. *Malaria Journal*, 17(1), 424–424. Available at: <https://doi.org/10.1186/s12936-018-2573-1>

Mangam, K., Fiekowsky, E., Bagayoko, M., Norris, L., Belemvire, A., Longhany, R., Fornadel, C. & George, K. 2016. Feasibility and effectiveness of health for mobilizing households for indoor residual spraying to prevent malaria: A case study in Mali. *Global Health Science and Practice*, 4(2), 222–37. Available at: <https://doi.org/10.9745/GHSP-D-15-00381>

Ponsar, F., Van Herp, M., Zachariah, R., Gerard, S., Philips, M. & Jouquet, G. 2011. Abolishing user fees for children and pregnant women tripled uptake of malaria-related

interventions in Kangaba, Mali. *Health Policy and Planning*, 26 (Suppl 2), ii72–ii83.
Available at: <https://doi.org/10.1093/heapol/czr068>

Malaria remains a grave health concern for Sub-Saharan Africa. 90% of the world's malaria deaths occur in this region.

Six evaluations on malaria were included, each of which assessed projects aimed at reducing transmission and improving the treatment of malaria. Four studies focused on the impact of malaria interventions on the health of children aged 6–59 months. One study assessed malaria interventions in schools. Interventions included malaria education, insecticidal net administration, and a treatment dose of artesunate plus sulfadoxine-pyrimethamine to all children regardless of malaria status. One study assessed the impact of abolishing medical fees for all children under five and for pregnant women with fever on child malaria rates. One study assessed how to prepare most efficiently households for residual malaria spray treatments.

Ponsar et al. (2011) assessed the impact of abolishing medical fees for all children under five, regardless of illness as well as for pregnant women with fever. The project was funded by Médecins sans Frontières (MSF). The intervention took place in Kangaba, in the southeast of Mali, serving a population of 66,500 people. The intervention took place between 2005 and 2008, whilst the intervention and evaluation took place between 2004 and 2008.

Kayentao et al. (2018) evaluated the impact of malaria interventions across Mali on child morbidity and mortality (ages 6–59 months) between 2000 and 2012. Interventions included insecticide net distribution, intermittent preventive treatment in pregnancy, artemisinin combination therapy on a test-to-treat model and indoor residual spraying against malaria. The project was funded by the Government of Mali, the Global Fund to Fight AIDS, Tuberculosis, and Malaria, and the US President's Malaria Initiative.

Clarke et al. (2017) assessed the impact of malaria interventions in school and their effects on plasmodium infection, anaemia, and cognitive function. The project took place in 40 southern Mali schools from grades 1–6, where teachers taught malaria prevention education alongside a school-based distribution of two long-lasting insecticidal nets per student prior to the onset of the malaria season. Furthermore, an 'intermittent parasite clearance' program was administered in school using a treatment level dose of artesunate plus sulfadoxine-pyrimethamine in all students regardless of infection status. The trial was conducted by Save the Children in partnership with the Ministry of Health and Ministry of Education, with funding from Save the Children. The analysis was undertaken by the London School of Hygiene & Tropical Medicine. The evaluation commenced in November 2010 and was completed in May 2012. Interventions occurred between April 2011 and December 2011.

Druetz (2018) assessed the effectiveness of the nationwide seasonal malaria chemoprevention program in Mali in reducing malaria and anemia prevalence in children 6–59 months. This was done using data from the 2015 nationwide malaria indicator surveys (MIS). The study aimed to show that national health surveys may provide a rich resource for natural experiments and

rigorous evaluation designs. A total of 5,960 children aged 6–59 months were included in the MIS survey. 45% of them had reported that they had received a seasonal malaria chemoprevention treatment (SMC) in 2015. SMC cards were available and checked for 1,951 children.

Diawara et al. (2017) assessed the impact of four rounds of seasonal malaria chemoprevention (SMC) with sulfadoxine and amodiaquine on parasitaemia and malaria illness. SMC was delivered through routine programs via existing community health workers. This intervention took place in the Kita region, including the district hospital, 47 community health centres, and among community health workers within a 15 km catchment. This included 516,649 inhabitants, of which 77,497 were children aged 3–59 months throughout 336 villages. A coverage survey was conducted in 1,141 children aged 3–59 months, with 15 localities selected per district. The project was funded by the U.S. President’s Malaria Initiative (PMI) and the Maternal and Child Survival Program (MCSP) of Save the Children. The project ran from July to December 2014.

Mangam et al. (2016) looked at the efficacy and cost-effectiveness of using mobile messaging / calling to prepare villagers for residual spray treatment. The U.S. President’s Malaria Initiative (PMI) and Africa Indoor Residual Spraying (AIRS) Project piloted a mobile mass-messaging service (to 673 residents) in Koulikoro District in August 2014 to determine whether voice and/or text messages received on cell phones could effectively replace door-to-door mobilization for the indoor residual spraying (IRS) campaign.” AIRS was covered by USAID initiatives.

Methods

Experimental designs

Diawara et al. (2017) assessed the impacts of seasonal malaria chemoprevention (SMC) using a non-randomized pragmatic trial with pre and post design, with one intervention district (Kita) and a comparable control district (Bafoulabé) with similar geographic and demographic characteristics, as well as similar rainfall and malaria transmission patterns. Baseline and follow-up cross-sectional household surveys were carried out to assess SMC coverage and their relation to the reduction of malaria and anemia. Difference-in-differences regression models were used to assess and compare changes in malaria and anemia in the intervention and comparison districts.

For assessing the effectiveness of seasonal malaria chemoprevention (SMC) in reducing malaria and anaemia prevalence in children, Druetz (2018) compared a treatment group of children with a control group. Households were selected using a two-stage cluster sampling approach and multiple regression modeling was used to control for confounding factors.

For assessing the impact of abolishing medical fees for all children under 5 and pregnant women with fevers, Ponsar et al. (2011) used both an intervention sample and a control sample that looked at program data to monitor health care centre utilization, as well as malaria consultations. This study also utilized cluster sampling cross-sectional surveys, to measure mortality, medical-seeking behaviours regarding child fevers, and the possession of mosquito nets between controlled and intervention areas.

To assess the impact of malaria interventions in schools, Clarke et al. (2017) used a randomized cluster trial carried out in 80 control and 80 intervention schools in Southern Mali.

Mangam et al.'s (2016) study on how to best prepare villagers for residual spray treatment (that is, to ensure that all household and food items were removed before the treatment) utilized an experimental design. Three intervention villages were compared with three control villages. Beneficiaries in the three intervention villages received text messages, while one village received voice messages in addition to text messages. Comparison villages received door-to-door mobilization.

Pre and post tests

Kayentao et al. (2018) assessed the impact of malaria interventions across Mali on child morbidity and mortality using five national, population-based household surveys conducted in 2001, 2006, 2010, 2012/13, and 2015. Standardized 'Roll Back Malaria' indicators were used to measure malaria intervention coverage, while capillary blood specimens were obtained to assess various trends regarding the prevalence of several biomarkers relating to malaria for comparison rates in children

Impacts

Diawara et al. (2017) report a reduction of clinical malaria, malaria infection, and anaemia prevalence by 80%, 65%, and 53% respectively, as a result of administering four rounds of seasonal malaria chemoprevention. Additionally, fever rates were more than halved.

Druetz (2018) found that at least one cycle of seasonal malaria chemoprevention (SMC) administration during the 2015 campaign had great efficacy in children aged 6–59 months. The risk of malaria was reduced by 44%. The study also found that SMC had no direct effect on moderate to severe anaemia, but indirectly reduced its likelihood by 18%.

Ponsar et al. (2011) found significant benefits to children under five and mothers in the intervention zone, after an uptake in health utilization and positive outcomes subsequent to user fee abolition. There was a 65% reduction in malaria infection prevalence, an 80% reduction in the prevalence of malaria illness of child mortality rates, and a greater utilization rate by pregnant women. The authors also noted that the per-capita cost of patient care actually fell due to the economies of scale that accompanied greater utilization rates and physicians being busier.

Clarke et al. (2017) found that malaria intervention practices in schools led to a 92% bed net use subsequent to net distribution and malaria prevention education (vs 62% in the control group). Moreover, the study concluded that 94.6% of pupils in the intervention group had received malaria treatment, leading to a 44% reduction in the odds of plasmodium infection. There was also evidence that the malaria medicine administered had profound effects on asymptomatic plasmodium infection, anaemia, and haemoglobin concentration. Asymptomatic parasitemia prevalence fell to 3% in the intervention arm, while remaining stable relative to baseline at 78% in the control arm, resulting in a 99% greater reduction.

Kayentao et al. (2018) found that malaria interventions across Mali between 2000–2012 led to increased household ownership of insecticide-treated nets (ITN) from 49% to 93% between 2006 and 2015. In children under five, ITN use increased from 26% to 71%. Similarly, ITN use among pregnant women increased from 28% to 78%.

Mangam (2016) reported that structure preparedness for residual spray treatment was significantly lower in households mobilized through the mobile-messaging approach compared with the door-to-door approach (49% vs. 75%, respectively). Spray coverage of targeted households was also significantly lower among the mobile-messaging villages than the door-to-door mobilization villages (86% vs. 96%, respectively). Spray coverage in pilot villages was lower compared with coverage in the villages mobilized through traditional door-to-door mobilization (85% vs. 96%, respectively).

Sustainability

Ponsar et al. (2011) noted that sustainability of the abolition of medical fees for all children under 5 for all illnesses and for pregnant women with fever would rely on continued funding (5.6 euros per child).

Efficiency

Clarke et al. (2017) found that malaria prevention education was estimated to cost US\$ 2.13 per child, with good reception by beneficiaries. Intermittent parasite clearance cost an additional \$2.72 per child, with infrequent and insignificant side effects recorded.

Druetz (2018) advocated that routine seasonal malaria chemoprevention would have profound effects on Mali's child population due to the high efficacy rate.

Mangam et al. (2016) note that the mobile-messaging approach cost an average of US \$8.62 per structure prepared for malaria spraying, which was more costly but less effective than the door-to-door approach at US\$ 1.08 per structure prepared.

Barriers

Ponsar et al. (2011) noted issues in the medication supply chain. This barrier was likely to impede the sustained success of treating patients, especially in the likely event that medication utilization would grow in the absence of user fees.

Diawara et al. (2017) noted that continuity and drug administration decreased without healthcare clinicians. They cited continual drug administration monitoring as an important key to success and suggested working towards engaging beneficiaries while increasing their mobility to ensure drug administration continuity.

Clarke et al. (2017) reported that southern Mali's peak transmission seasons were correlated with school recesses. Interventions on children's malaria prevention might therefore need to be shifted towards a community-based approach to adequately address the rainy seasons.

Mangam et al. (2016) listed several barriers while trying to inform residents of preventative malaria spraying via text and calls, including illiteracy (75% of those sampled), lack of familiarity with technology, and a distrust of text messages (as compared to face-to-face interaction). A further problem with text messaging was that mobile phones were usually owned by the men. Women often did not have mobile phones, but they were typically the ones staying at home and preparing the house for spraying. Thus, vital information was not relayed to the right addresses.

Summary

Three studies looked at the effects of medicine regimens on malaria. Two of these conducted seasonal malaria chemoprevention (SMC) interventions (Diawara et al. 2017; Druetz 2018), and one study assessed the efficacy of a treatment level dose of artesunate plus sulfadoxine-pyrimethamine in school children (Clarke et al. 2017). These interventions led to significant reduction in the prevalence of clinical malaria, malaria infection and anemia and asymptomatic parasitemia.

Abolition of medical fees for all children under 5 regardless of illness, and for pregnant women with fever, led to a 65% reduction in malaria infection prevalence, to an 80% reduction in the prevalence of malaria illness of child mortality rates, and to a greater utilization rate by pregnant women, which created beneficial economies of scale with regard to paying medical doctors (Ponsar et al. 2011).

Malaria interventions across Mali on child morbidity and mortality (ages 6–59 months) led to increased insecticide net use in children under five from 26% to 71%, and from 28% to 78% in pregnant women. The intervention of intermittent preventive treatment led to coverage of at least two doses in pregnancy increasing from 10% to 38% (Kayentao et al. 2018).

Preparedness for residual spray treatment was significantly higher in households mobilized through door-to-door approach than through mobile-messaging (49% vs. 75%, respectively) (Mangam et al. 2016).

WASH Interventions

The Evidence Base

Rigorous Impact Evaluations

Allegranzi, B., Sax, H., Bengaly, L., Richet, H., Minta, D.K., Chraïti, M.N. et al. 2010. Successful Implementation of the World Health Organization Hand Hygiene Improvement Strategy in a referral hospital in Mali, Africa. *Infection Control and Hospital Epidemiology* 31(2), 133–41. Available at: <https://doi.org/10.1086/649796>

Chard, A.N., Trinies, V., Moss, D.M., Chang, H.H., Doumbia, S., Lammie, P.J. & Freeman, M.C. 2018. The impact of school water, sanitation, and hygiene improvements

on infectious disease using serum antibody detection. *PLoS Neglected Tropical Diseases*, 12(4), e0006418–e0006418. Available at: <https://doi.org/10.1371/journal.pntd.0006418>

Koita, N., Diarra, D. & Diarra, F. 2016. Évaluation finale du projet « WASHPLUS de CARE Mali dans la région de Mopti ». Koita Consulting.

Kone, Y., Iknane, A.A. & Kaloga, M. 2019. *Final evaluation of the Project USAID/Nutrition – WASH in the regions of Koulikoro, Ségou and Mopti*.

Trinies, V., Ghulamali, S., & Freeman, M.C. 2015. *Dubai Cares WASH in Schools Initiative in Mali: Impact evaluation report, January 2013 – May 2014*. Rollins School of Public Health.

Trinies, V., Garn, J.V., Chang, H.H. & Freeman, M.C. 2016. The impact of a school-based water, sanitation, and hygiene program on absenteeism, diarrhoea, and respiratory infection: A matched-control trial in Mali. *American Journal of Tropical Medicine and Hygiene*, 94(6), 1418–25. Available at: <https://doi.org/10.4269/ajtmh.15-0757>

Because diarrhoea is a leading cause of morbidity and mortality for children in developing communities and often transmits through soils and waters, WASH interventions are important.

Six reports assessed projects aimed at improving access to water, sanitation and hygiene (WASH) practices. WASH interventions included initiatives such as rehabilitating water points and latrines, distributing WASH supplies including for handwashing, drinking water treatment and containers, soap, anal cleansing kettles, trash bins, brooms, and disinfectants.

Three studies focused on the impacts of WASH interventions in schools, including their ability to stop the spread of disease and illness. Additionally, two of these interventions also carried out hygiene promotion activities in and around the schools, trained teachers and school management committees, established and trained school hygiene clubs, and established financial WASH governance (Chard et al. 2018; Trinies et al. 2015; Trinies et al. 2016).

Two studies assessed the effects of WASH interventions on child and maternal welfare, health, and nutrition (Kone et al. 2019; Koita et al. 2016).

One study evaluated an intervention aimed at increasing the rate of hand hygiene practices among staff in a referral hospital in Mali in accordance with WHO hand hygiene guidelines (Allegranzi et al. 2010).

Chard et al. (2018) utilized antibody response from dried blood spots (DBS) to measure the impact of a school water, sanitation, and hygiene (WASH) intervention on infectious diseases among pupils. The study was part of an evaluation of the Dubai Cares WASH in Schools Initiative in Mali. This intervention occurred in 900 schools in Bamako Capital District and in the Koulikoro, Mopti, and Sikasso regions of Mali. DBS were collected from 807 primary school

students aged four to 17 attending 42 schools (21 beneficiaries, 21 comparators) between January and May 2014. The United States Centers for Disease Control and Prevention ran the DBS samples.

Trinies et al. (2016) measured the effect of a school WASH intervention on pupil absence, diarrhoea, and respiratory infections. Interventions included installing or rehabilitating water points and latrines; distributing WASH supplies, including handwashing and drinking water containers, soap, anal cleansing kettles, trash bins, brooms, and disinfectant; carrying out hygiene promotion activities in and around the schools; training teachers and school management committees, establishing and training school hygiene clubs; and establishing financial WASH governance and material management systems at the school level. The intervention was implemented by CARE Mali, Oxfam Great Britain, Save the Children U.S., UNICEF Mali and WaterAid Mali with financial support from the philanthropic foundation Dubai Cares. The program delivered a comprehensive WASH package to 916 schools in six of Mali's nine regions from 2011 to 2014.

Trinies et al. (2015) is based on the same intervention as Trinies et al. (2016). However, this study determined the success and sustainability of the program in achieving targets and promoting behavioural change. Thus, the findings measured the degree to which equipment provided by the intervention was still in place and functional, and whether the interventions led to behaviour changes and updated WASH practices by the schools.

Koita et al. (2016) assessed the impact of WASH interventions on 800 children aged one to 23 months. The main measures were provision of drinking water, improved sanitation and hygiene. Secondary objectives were exclusive breastfeeding in children under six months, minimum acceptable diets for children up to two years, hygiene and sanitation practices, perception and attitudes, as well as diarrhoea and malnutrition prevention in children under two. The intervention occurred in the Circles of Mopti, Bandiagara, and Bankass in Mopti Region. Interventions were funded by Dubai Cares. Data collection occurred between December 29th, 2015 and January 15th, 2016.

Kone et al. (2019) assessed the effect of CARE's integrated Nutrition–WASH intervention on nutritional status and hygiene practices of pregnant and lactating women, and on children under five through multiple and diverse interventions. Interventions included ODA-Free (open defecation free) certifications, clean villages competitions, and mobilization of funds for water management and sanitation shops. CARE 's Nutrition–WASH project intervention zones included the regions of Mopti, Ségou, and Koulikoro. The study took place between April 4th and 26th, 2019. The population sampled included women of childbearing age who were not pregnant, children under five, heads of households, community leaders and health workers, NGO workers, and national health officials in charge of hygiene and sanitation. The child sample included 1,041 children aged 6–59 months.

Allegranzi et al. (2010) assessed an intervention that introduced a locally produced alcohol-based hand rub to hospital staff while monitoring hand hygiene practices. The intervention also provided feedback, educated staff, posted hand hygiene reminders in the workplace, and

promoted an “institutional safety climate” according to the World Health Organization standards. This occurred from December 2006 to June 2008, with 224 healthcare workers.

Methods

Experimental designs

Chard et al. (2018) compared 21 beneficiary primary schools with 21 schools in the control group in the same education district. 20 students from grades 1 to 6 were randomly selected from a list of all pupils while accounting for sex and grade. Students selected were interviewed about their school attendance, household WASH access, and illness. Thereafter, a dried blood spot sample was collected via finger prick for IgG antibodies to detect the impact of WASH practices on disease exposure.

Trinies et al. (2015, 2016) use a matched control trial to assess the effectiveness of comprehensive school-based WASH intervention on pupil absence, diarrhoea, and respiratory infections. Data were collected from 100 beneficiaries and matched comparison schools. Enumerators visited each school every 6–8 weeks between January 2013 and May 2014. At each visit, enumerators conducted observations of WASH facilities and practices, interviewed the school director, conducted a roll call of all pupils, and conducted interviews with 40 pupils.

Koita et al. (2016) compared 800 intervention households with 800 control households. Surveys were administered in households with women who were at least 18 years old, and who were mothers or caregivers of children under 2 years old with an income of less than \$1.25 a day.

Pre and post tests

Kone et al. (2019) assessed the impact of CARE 's integrated Nutrition-WASH intervention on pregnant and lactating women, and children under five through a pre and post test. Data was collected with a two-stage cluster cross-sectional survey. Qualitative and quantitative methods were used to triangulate the information for better appreciation and explanation.

Allegranzi et al. (2010), investigating the impact of an intervention aimed to increase hand hygiene of health care workers, used pre and post intervention surveys. Furthermore, an unobtrusive observer monitored and recorded staff hand hygiene practices during the 20-minute session.

Impacts

Chard et al. (2018) found that WASH interventions in schools led to a 0.24 reduction in the latent variable mean of food/water-transmitted enteric disease, and a 0.17 reduction in the latent variable mean of person-to-person transmitted enteric disease among pupils attending beneficiary schools versus pupils attending comparison schools via a linear latent model. However, there was no difference in the evidence of vector-transmitted diseases.

Trinies et al. (2016) found that school-based WASH interventions had a positive effect on reducing rates of illness. However, there was no evidence for a reduction in absence rates, and

absence rates in the intervention schools were actually higher. However, the authors suggest that this finding was probably caused by an imbalance in unobserved confounders between study groups, rather than by the intervention itself.

Trinies et al. (2015) found that beneficiary schools met all four Dubai Cares WASH in Schools Initiative standards during 24.9% of evaluation visits, compared to 2.5% of schools at baseline. Beneficiary schools were most likely to meet the water access (81.8%) and hygiene kit (74.0%) standards, and least likely to meet the handwashing (57.9%) and sanitation (47.0%) standards. Beneficiary schools post-intervention performed better across all standards compared to both beneficiary schools at baseline and comparison schools. There was also a decline in open defecation at intervention schools and an increase in latrine cleanings. Lastly, the intervention schools saw an increase in WASH management committee convenings, WASH budgets, WASH spending, and school WASH education.

Koita et al. (2016) found that WASH interventions led to a 36% increase in exclusive breastfeeding practices of children under 6 months, a 26% increase in minimum acceptable diets for children 6-23 months, and a 74% improvement in household sanitation facilities. Additionally, household handwashing facilities went up by 35% of the community population. There was a 19% increase in household safe drinking water sources, with a 30% increase in suggested sterilization methods and a 62% increase in safe water conservation practices. Regarding excrement sanitation, there was a 32% discrepancy between the intervention zone and control zone on proper child fecal disposal.

Kone et al. (2019) found that Care's integrated Nutrition-WASH interventions increased the percentage of households with clean drinking water from 61.9% to 88.8%, and the number of households treating water daily grew by 48.2%. Households reporting proper detergents went up 45%. Functional hand washing facilities at the household level increased by 45%, and proper sanitary excretion disposal by 41.1% relative to the population. There was a 70.37% reduction in underweight children, a 21% reduction in child wasting, and a 29.27% decrease in stunting.

Allegranzi et al. (2010) found that hand hygiene compliance rose from 8% at baseline to 21.8% during the intervention. There was improvement across all levels and categories of health care workers. The exception to growth was the use of hand sanitizer after contact with patient surroundings. At follow-up, hand sanitization rubbing was by far the most prominent hand hygiene technique (93.3%). Hand hygiene knowledge improved across all professional categories after training. There was an increase in handwashing stations and soap dispensers, and the permanent availability of gloves on wards increased from 38.5% to 100%. Availability of pocket-sized hand sanitizer also grew significantly from 0% on some wards to 100%.

Sustainability

Chard et al. (2018) noted benefits of the use of capillary blood via dried blood spots (DBS). First, it was seen as feasible in a low-resource field context and acceptable by participants, and therefore serves as a viable alternative to current WASH-related disease methods such as stool collection or venipuncture that are labour, time, and cost-intensive. Such data provided valuable information on the effectiveness of mass drug administration and vaccination programs and

could identify areas where these programs were successful or should be scaled up; additional analyses examined patterns of malaria and neglected tropical disease transmission.

Kone et al. (2019) noted that survey respondents considered that gains made under the intervention would continue and expressed their motivation to sustain the positive behavioural changes. Importantly, mobilization by community health workers was expected to have an ongoing impact as they had the greatest influence on behavioural change during the intervention.

Allegranzi et al. (2010) recommended that the WHO hospital hand sanitization practices should be sustained for some time. First, hand sanitizer is cheap (US\$ 2.97 per litre), easy to produce, and can be stored for up to 24 months without any deterioration. Long-term sustainability practices included scaling up hospital-wide hand hygiene practices, organization of focus groups at the ward level, new local posters, and periodical hand hygiene compliance monitoring and feedback. Additionally, healthcare product distribution companies in Mali will procure the two ingredients of the hand rub currently provided by the University of Geneva Hospitals when a larger quantity is ordered.

Koita et al. (2016) and Trinies et al. (2015, 2016) made no mention of sustainability.

Efficiency

Chard et al. (2018) found that DBS antibody data were a cost-effective solution as they include antibody measures for diseases beyond the scope of the program, at a minimal extra cost. With a total of 36 antigens included in the assessment, the cost was US\$ 0.54 per antigen/sample, excluding labour cost.

Barriers

No barriers to better implementation were reported.

Summary

Two studies (Koita et al. 2016; Kone et al. 2019) examining the effects of WASH interventions on child health and nutrition found that WASH interventions led to better child nutrition practices, including more exclusive breastfeeding, safer drinking water / water treatment, as well as increased hygiene and handwashing practices. These studies also found a reduction in underweight children and child wasting in communities which had undergone comprehensive WASH practice interventions. Additionally, these studies found that WASH practices led to better full-body hygiene bathing practices and more appropriate child fecal disposal practices.

Three wash interventions conducted in schools (Chard et al. 2018; Trinies et al. 2015, 2016) found WASH practices were successful in reducing food/water transmitted enteric disease and person-to-person disease as well as in reducing self-reported rates of illness and diarrhoea. School WASH interventions were also positively correlated with having acceptable water sources and appropriate hygiene kits, handwashing, better sanitation practices, and a decline in open defecation practices.

An intervention aimed at improving WHO hand hygiene practices in a Malian referral hospital led to significant uptake in hand sanitizer use and education and a jump from 8% to 21% in hand hygiene compliance, but it had a negligible effect on the transmission of infections (Allegranzi et al. 2010).

Open Defecation

The Evidence Base

Rigorous Impact Evaluations

Alzúa, M.L., Djebbari, H. & Pickering, A.J. 2020. A community-based program promotes sanitation." *Economic Development and Cultural Change*, 68(2), 357–90. Available at: <https://doi.org/10.1086/701214>

Pickering, A.J, Djebbari, H., Lopez, C., Coulibaly, M. & Alzúa, M.L. 2015. Effect of a community-led sanitation intervention on child diarrhoea and child growth in rural Mali: A cluster-randomized controlled trial. *The Lancet Global Health*, 3(11), e701–e711. Available at: [https://doi.org/10.1016/S2214-109X\(15\)00144-8](https://doi.org/10.1016/S2214-109X(15)00144-8)

Good Enough evaluations

Rotondo, L.A., Ngondi, J., Rodgers, A.F., King, J.D., Kamissoko, Y. et al. 2009. Evaluation of a community intervention with pit latrines for trachoma control in Ghana, Mali, Niger, and Nigeria. *International Health*, 1(2), 154–62. Available at: <https://doi.org/10.1016/j.inhe.2009.08.001>

Three reports assess projects aimed at mitigating open defecation practices in Mali. Two of these interventions took the form of community-led total sanitation (CLTS) practices (Alzúa et al. 2020; Pickering et al. 2015). Rotondo et al. (2009) evaluated latrine uptake, construction, and usage in villages participating in latrine promotion programs supported by The Carter Center.

Alzúa et al. (2020) reviewed a community-led total sanitation (CLTS) program focused on three main activities: first, a 3-5 hour community gathering in which CLTS agents focused everyone's attention on the issue of sanitation and commitments were made; second, follow-up visits to each household to help monitor their commitments and practices; and third, the awarding of OD-free (open defecation free) status to those communities that were successful in eliminating OD. The intervention took place in 60 villages of the Koulikoro region and was implemented between September 2011 and June 2012. Funding was provided by the Melinda and Bill Gates Foundation.

Pickering et al. (2015) measured the effects of CLTS (mobilizing communities to build their own toilets and move away from open defecation) on child diarrhoea and child growth in Koulikoro,

rural Mali. One and a half years after the intervention diarrhoea was measured in children under five as the primary outcome indicator, along with appropriate height, weight, stunting, and underweight prevalence for participants' age. The CLTS included regular interventions such as the “walk of shame” to document and discuss OD areas and their potential hazards, setting a target date to cease OD, and getting verbal confirmation of the commitment from participants. Thereafter staff encouraged construction of simple latrines made from local materials and expertise. Finally, visits and monitoring occurred regularly between every 2–4 weeks. Funding was provided by the Melinda and Bill Gates Foundation. 60 villages (2,365 households) received the CLTS intervention.

Rotondo et al. (2009) evaluated latrine uptake, construction, and usage in villages participating in latrine promotion programs supported by The Carter Center in Ghana, Mali, Niger, and Nigeria where 113,457 new latrines had been built from 2002 to 2008. The sample included 293 homes from the Ségou Region in Mali. Support for the intervention was provided by the Carter Center and the Malian Lions Clubs. The intervention included health education for trachoma control, community mobilization for latrine construction, training of community leaders and health workers, training and equipping of community-based masons, and provision of technical assistance in latrine construction.

Methods

Experiential design

Pickering et al. (2015) and Alzúa et al. (2020) used an experiential design involving clustered randomized trials, with 60 control villages and 60 intervention villages.

Pre and post tests

Rotondo et al. (2009) used a pre and post test design. Data were collected via a two-stage cluster random sampling design to select villages and households for evaluation. Baseline latrine coverage was estimated from the 2001 Demographic and Health Survey.

Impacts

Alzúa et al. (2020) found that CLTS increased private latrine ownership by 28.7%, with latrine utilization following suit. There was a reported 42% reduction in at least one household member regularly practising OD when at home in intervention villages compared to control villages. Evidence suggests that the availability of cheap technical solutions was very persuasive to beneficiaries. In addition, social disapproval of OD was correlated with CLTS interventions, due to the knowledge gained of the affordability of latrines and the risks of open defecation. The program had less impact on the elderly than on children. In terms of latrine quality, there was a 34 percentage point increase in households with latrines equipped with a cover for the pit. However, CLTS alone has not been proven effective in creating significant health changes.

Pickering et al. (2015) found a negligible difference in diarrhoeal prevalence among children in CLTS compared to control villages (22% vs 24%). They also found that access to private

latrines was 30% higher in intervention villages than in control villages and that OD was reduced in the intervention zone by 23.5%. In terms of child stunting and anthropomorphic measures, children in CLTS villages were found to be taller with a 0.18 increase in height-for-age when compared to the control group, and they were 6% less likely to be stunted than control group counterparts. 22% of children were underweight in CLTS villages compared with 26% in control villages.

Rotondo et al. (2009) found that latrine ownership had risen 12% during the intervention period. It is worth noting that there were no control areas for comparison, but the rapid rise was likely attributable to the intervention.

Sustainability

Alzúa et al. (2020) found that a year after the end of the intervention, no community was still OD-free, although 58 out of 60 intervention villages were certified OD-free immediately concluding the intervention. A possible explanation is that these villages were incorrectly certified OD-free when they did not meet the 100% latrine coverage requirement. Alternatively, households may have slipped back to OD. This begs the question of whether a one-shot intervention is sufficient for permanent behavioural change. Sustainability assessments may require longitudinal studies of five years or more, which may be difficult to justify or perform. The long-term success of a behavioural change intervention can be expected to depend on the persistence of newly formed habits. It may well take more than one community behavioural intervention visit to achieve permanent improvement in sanitation practices.

Rotondo et al. (2009) note that 86% of built latrines were still usable after one year, indicating that participants in sanitation promotion programs are likely to put effort and resources into the upkeep and maintenance of their own sanitation facilities. The cost of one latrine in the Ségou region was US\$ 27.80.

Barriers

None of the reports mentioned barriers to project implementation or success.

Summary

Community-led total sanitation (CLTS) interventions are likely to lead to an increase in latrine ownership and utilization, and to a reduction of open defecation (Alzúa et al. 2020; Pickering et al. 2015). However, it is important to recognize that in the long term, OD practices may be subject to regression as time after CLTS interventions pass (Alzúa et al. 2020).

Results also suggest that CLTS interventions may have negligible effects on diarrhoea prevalence in children (Pickering et al. 2015). However, CLTS is associated with better anthropomorphic measurements in children. CLTSs show inverse relationships with underweight children, and child stunting, especially amongst children whose communities become OD-free before their second birthday (Pickering et al. 2015).

The cost of latrine construction in parts of rural Mali was approximately US\$ 27.8, but only 20% of households in CLTS communities were likely to build latrines meeting all CLTS standards (Rotondo et al. 2009).

Child Mortality

The Evidence Base

Rigorous Impact Evaluations

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Le Port, A., Zongrone, A., Savy, M., Fortin, S., Kameli, Y., Sessou, E., Diatta, A.D. et al. 2019. Program impact pathway analysis reveals implementation challenges that limited the incentive value of conditional cash transfers aimed at improving maternal and child health care use in Mali. *Current Developments in Nutrition*, 3(9). Available at: <https://doi.org/10.1093/cdn/nzz084>

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Final evaluation report, 30 September 2004 – 30 September 2009. Cooperative Agreement No.: GHA-A-00-0003-00. Save the Children.

Whidden, C., Kayentao, K., Liu, J.X., Lee, S., Keita, Y., Diakit , D., Keita, A. et al. 2018. Improving community health worker performance by using a personalized feedback dashboard for supervision: A randomized controlled trial. *Journal of Global Health*, 8(2), 020418–020418. Available at: <https://doi.org/10.7189/jogh.08.020418>

Good enough evaluations

Gu ye, M. & Niki ma, A. 2008. *USAID Health Program / K n ya Ciwara: Analysis of the final evaluation survey.* USAID.

A total of nine reports assess interventions aimed at mitigating child mortality.

Three reports evaluated the impacts of Community Health Workers (CHW). Whidden et al. (2018) assessed the effects of implementing digital performance dashboards into CHW's work routine on the health of children under five. Perez et al. (2009) and Trevant (2009) looked at CHWs' ability to teach child wellness in communities and to encourage the use of health services for children under five.

Four evaluations assessed the effects of incentives for better healthcare utilization, including free caesarean sections, telehealth applications coupled with non-profit micro-insurance, and the distribution of cash or lipid-based nutrients (Ravit et al. 2018; Simonyan et al. 2013; Le Port et al. 2019; Adubra et al. 2019).

Bagayoko et al. (2017) assessed the role of telemedicine in delegating and supporting obstetric-gynaecological tasks in rural communities.

Gu ye & Niki ma (2018) assessed the outcomes of multiple USAID interventions aimed at increasing high impact health services related to child survival.

The objective of Perez et al.'s (2009) study was to assess the performance of CHWs in the promotion of basic child health services in 400 households in the district of Djenn , Mopti Region. The intervention consisted of three cost-effective community outreach intervention packages. At commencement, outreach CHWs were identified and trained for five days and equipped with a bicycle to make home visits. Thereafter they performed three cost-effective community outreaches. The first was to promote health and education to households concerning the prevention and basic management of child illness, including personal and environmental hygiene, bed nets, the importance of vaccines, etc. The second outreach was to support families in basic household health practices such as malaria care, acute respiratory infection, and diarrhoea through regular home visits. The third was to facilitate outreach and mobile care that would fall under the responsibility of local health centres. CHWs would see 245 inhabitants and visit 35 households once every month, making them a pivotal part of community

health and behavioural change. The intervention was conducted through the Ministry of Health of Mali together with UNICEF.

Trevant (2009) studied multiple interventions aimed at sustaining a reduction in under-five child mortality in Sikasso. Interventions included establishing village drug kits; fostering behavioural change by teaching the recognition of symptoms of illness and aiming to increase care-seeking behaviour, and providing in-service training and supervision for healthcare teams, both in the district and in regional health centres. The intervention put an emphasis on malaria, diarrhoea, pneumonia, and family planning. The project built on existing relationships with the Ministry of Health in the districts of Bougouni, Yanfolila, and Kolondiéba and was later expanded to include Yorosso and Sélingué. Coverage extended to 464 villages, serving a total population of 1,037,418. USAID provided US\$2.5 million, while Save the Children provided US\$833,330. Interventions occurred between October 2004 to September 2009.

Whidden et al. (2018) studied the effect of using personal performance dashboards supervising the quantity, speed, and quality of care provided by community health workers. CHWs performed proactive case detection, by conducting a day of door-to-door home visits to identify patients who need care for a minimum of two hours daily. These included doorstep evaluations, counselling, diagnostics, treatment, and referral to appropriate health facilities for children under five. All CHW care was provided without user fees, and patients referred to government primary health centres for care were also attended to without user fees. The program was launched in 2008 by the Malian Ministry of Health and Public Hygiene, with help from non-governmental organizations. Between October 2015 and June 2016, 150 CHWs were employed across the Yirimadio area near Bamako to provide health services to all its communities. All eight supervisors and 150 CHWs participated in the study. The evaluation was conducted in 2016 in Yirimadio, which had an estimated population of 163,500.

Ravit et al. (2018) examined the impact of user fee exemption policies focused on caesarean sections. The aim was to assess the impact of this policy on service utilization, as well as on neonatal outcomes. The study covered 362 women who received free caesarian sections while assessing the policy on three outcomes: caesarean delivery, facility-based delivery, and neonatal mortality. The initiative was financed by the government.

Simonyan et al. (2013) looked at the effects of Pesinet, a non-profit telehealth and micro-insurance program on health service utilization. The objective of Pesinet was to increase healthcare utilization for children in low-income countries. 91 children were recruited between November and December 2010. Children received weekly or biweekly visits from “weighing agents” who collected health measurements of the child and captured it via an app. The data were transferred to a general practitioner who flagged any abnormalities automatically. Upon flagging, children were given an emergency ticket for a same-day consultation to address health concerns.

Bagayoko et al. (2017) assessed the impact of the PACT–Denbaya project aimed at providing rural communities with access to telemedicine to improve the health of mothers and children with obstetric-gynaecological and pediatric tasks. Research took place in six community health centres in the Dioila district. Pediatric and obstetrics–gynaecology experts provided week-long

training on managing the most common problems in the field, as well as the use of "Bogou" teleconsultation and "Dudal" tele-education platforms. A total of 17 healthcare providers, including six doctors, five nurses, obstetricians, and a midwife participated in the sessions.

Le Port et al. (2019) assessed the program *Santé Nutritionnelle à assise communautaire à Kayes* (SNACK) aimed at improving child growth through interventions targeted towards mothers and children during pregnancy and up to the child's second birthday. Interventions included the distribution of cash to mothers and/or lipid-based nutrient supplements to children aged 6–23 months after attending community health centre appointments to increase their attendance and health-seeking behaviours. Twelve community health centres were selected to provide mothers with a cash incentive during visits for antenatal care, child delivery, vaccination, and/or growth monitoring. Women's enrolment was conditional on being pregnant, or having a child less than 12 months of age. Program partners included the French National Research Institute for Sustainable Development, WFP, UNICEF, and health officers of each district of Kayes. A total of 76 community health centres in the catchment areas of Bafoulabé, Diéma, and Yélimané took part. Interventions commenced in April 2014. Baseline and endline surveys took place in November 2013 (n = 5,046) and November 2016 (n = 5,098).

Guèye & Nikiéma (2018) studied the outcomes of a USAID and Kénéya led health program aimed at reducing child mortality. Interventions included immunization, prevention and treatment of malaria, diarrhoeal diseases, and acute respiratory infections, nutrition, and vitamin A distribution. The sample included 2,029 households, with 2,750 women of childbearing age and 2,787 children under five in Bamako. The program was funded by USAID and implemented by a consortium led by CARE Mali. It commenced in August 2003 and ended in July 2008.

Adubra et al. (2019) evaluated the effects of conditional cash transfers and/or provision of a lipid-based nutrient supplement as incentives for uptake of maternal and child health services.

Methods

Experimental designs

Whidden et al. (2018) conducted a randomized controlled trial with 148 community health workers (CHWs) randomly allocated to receive personal monthly supervision with or without a personal performance dashboard from January to June 2016.

Adubra et al. (2019), explored the effects of different treatments (cash transfers, lipid-based nutrient supplement distribution, and a combination of the two) on the growth of young children, using baseline and endline data and randomized samples for all treatment arms.

In assessing Pesinet's non-profit micro-insurance program, Simonyan et al. (2013) used a random sample of 600 children enrolled in Pesinet. Weighing agents visited randomly selected homes to identify eligible families with children under five years. Weighing agents tried to balance control and intervention by age, sex, and socioeconomic status. Logistic regression modeling was used to assess the effect of the Pesinet program on the utilization of health services.

Difference in difference

Ravit et al. (2018) used a difference-in-differences approach with two other western African countries that did not have fee exemption policies as the comparison group, namely Cameroon and Nigeria, to assess the effect of free caesarean sections on utilization rates and neonatal outcomes. Data were extracted from demographic and health surveys covering four periods between the 1990s and the early 2000s.

Pre and post test

For assessing the performance of CHWs in the promotion of basic child health services in 400 households in the district of Djenné, Mopti, Perez et al. (2009) utilized a community-based cross-sectional survey using multi-stage cluster sampling of wards and villages. Additionally, qualitative and quantitative information regarding child health activities of CHWs was collected amongst household caregivers with a focus on the accessibility of rural households to basic care via CHWs.

Trevant (2009) used data from surveys, operation research, community health worker logs, and monthly summary logs produced by the district advisors. Program Monitoring and Evaluation Officers entered monthly routine information into a central database. Community health workers used collection forms, notebooks, and logs with specific indicators to measure multiple outcomes, as well as indicators from the Ministry of Health.

Bagayoko et al. (2017) assessed the effects of teleconsultations on the health of mothers and children. To evaluate knowledge gains from training, participants filled in a pre and post questionnaire. To assess the effects of the intervention on improving maternal/child health, data was collected at base and endline.

Le Port et al. (2019) evaluated the effects of cash or nutritional supplements on the uptake of community health centre appointments using survey instruments.

Guèye & Nikièma (2018) relied on baseline and endline surveys to investigate the outcomes of a multifaceted health program.

Impacts

Perez et al. (2009) assessed the impacts of community health workers, compared to households without CHW visits. They found a positive influence of CHWs on family health practices, including knowledge on the management of child fever, non-utilization of antibiotics in home treatment of diarrhoea, the presence of chloroquine in the household, and presence and use of bed nets.

Trevant (2009) studied multiple interventions aimed at sustaining a reduction in under five child mortality in Sikasso Region. The interventions resulted in an increase in the number of children and pregnant women sleeping under insecticide-treated nets. At-home treatment of child diarrhoea increased from 17.5 % to 67.7%. Modern methods of family planning increased (from 5.1% to 14%). There was also an increase in utilization of village drug kits for children with rapid

breathing (from 25% to 44.7%). Village drug kits became the first source for health care in the villages, largely due to there being no transportation cost or consultation fees. Results also suggested that community healthcare workers were seen to be very knowledgeable about the treatment protocols for simple illnesses and correctly referred critical cases when needed. Lastly, mothers acquired greater knowledge of the signs of childhood illnesses and sought care more frequently.

Whidden et al. (2018) found that the use of the personal performance dashboard during monthly supervision significantly increased the average quantity of home visits undertaken by community health workers. Additionally, CHWs were more proactive in “case-finding home visits” per month. They also treated sick children under five within 24 hours of symptoms at a rate of 85% during the intervention versus 71% before. Lastly, CHWs in the intervention arm treated children under five without protocol error at a rate of 67% during the intervention compared to 50% prior to the intervention.

Ravit et al. (2018) noted that user fee exemptions for caesarean sections increased caesarean section utilization by 36% and led to a 30% reduction in neonatal mortality when compared to control countries. Those most impacted by the program were uneducated rural women.

Simonyan et al. (2013) found that a mobile phone based monitoring service for prevention, early-detection, treatment, and follow-up of illnesses in children led to an uptake in medical consultations for children. The monitoring service was combined with a simple micro-insurance plan that improved access to healthcare for families with young children.

Bagayoko et al. (2017) reported that training provided via distance learning to community-based healthcare workers improved knowledge about case management. Participants believed that the telemedicine guidance for remote physicians improved their knowledge and that access to remote expertise was a valuable asset in their daily medical practices. When patients were asked if they had more confidence in the centres due to the new telehealth guidance services 68% agreed. Note that the study does not measure real impacts on mortality, but shows knowledge gains and that telemedicine is a possibility for mitigating child mortality.

Le Port et al. (2019) found that lipid-based nutrient supplements in addition to cash incentives to encourage caregivers to seek out health care utilization for children were more successful than cash incentives alone. The results also suggest that the nutrient supplements were perceived by mothers to be an incentive to attend growth-monitoring visits. Child health was identified as the main motivation to attend community health centres with cash described as an additional benefit. In terms of cash usage, most money was spent first by mothers, second by children, with food being the item most purchased (57%), followed by clothes (23%) and, lastly, medicine or health consultation fees (10%). The study also found that mothers had a say in the use of cash on 94% of occasions.

As a result of multifaceted health intervention, Guèye & Nikièma (2018) found increases in the use of insecticide-treated nets (ITN) by pregnant women and by children, and in the prevalence of modern contraception. Contraceptive use in the intervention zone was 9.4% versus 6.2% for the average Malian women of child-bearing age. They also found a marginal increase in

children receiving a third dose of DTCOQ, vaccination against diphtheria, tetanus, and whooping cough, and vitamin A supplementation. The number of pregnant women receiving their iron / folic acid dose also increased but not as much as the intervention team had hoped. Also important was the finding that those who participated in community events or listened to radio were significantly more likely to participate in intervention activities than those who did not.

Aubra et al. (2019) found that conditional cash transfers and/or lipid-based nutrient supplements yielded no significant positive impacts on either height-for-age Z score or stunting. The cash component alone provided no added value. Interestingly, about 40% of women with cash payments would have preferred free-of-charge health consultations to the cash, suggesting they valued the access to healthcare.

Sustainability

Not surprisingly, the evaluations suggest that the biggest threat to sustainability of health care interventions was continued financing.

Trevant (2009) suggests that village drug kits were recognized as essential to increasing access to care in the most disenfranchised communities. The study recommends that drug kit managers need to work on options to restock the kits in a more timely fashion in order to make this intervention sustainable. Additionally, Trevant (2009) suggested that the Mali Ministry of Health (MOH) should recognize the critical role community health workers play as health educators, community mobilizers, and as the first line of treatment for common and less complex childhood illnesses. It is further recommended that the MOH should formalize the position of CHWs.

Ravi et al. (2018) noted that the sustainability of free caesarean sections depended on the willingness of the Government of Mali to continue financing this policy.

Finally, the positive effects of non-profit micro-insurance and free healthcare for children were noted to depend on continued financing (Simonyan et al. 2013).

Efficiency

None of the studies explicitly compared the cost of the evaluated interventions (the costs per achieved outcome) with the costs of alternative interventions. In our view, this is an important gap, and more cost effectiveness studies in sectors such as health, nutrition and humanitarian aid would be useful.

Nevertheless, the included studies provide interesting details about the costs of some of the interventions. For example, we learn that community health workers were compensated with a monthly salary of approximately US\$ 70 a month. A home health kit costs about US\$ 2.18, but only 4% of households were ready to spend this amount (Perez et al. 2009). Ravi et al. (2018) reported that caesarean sections cost on average US\$ 50. Le Port et al. (2019) reported that cash incentives during visits for antenatal care, child delivery, vaccination, and/or growth monitoring cost an average of \$3–\$12, depending on the nature of the visit. This estimate covered the cost of transportation, consultation fees, cost for delivery, and or lipids.

Barriers

Perez et al. (2009) noted that only 40% of those supposed to see a community healthcare worker in the community had done so. Low levels of engagement from CHWs is likely a result of being underpaid or unpaid.

When trying to mobilize community members to utilize health services for children, Trevant (2009) found that barriers included household decision makers not agreeing to care seeking for the child, the high cost of transportation, and competing household demands on mothers' time.

The cost of sulfadoxine-pyrimethamine was reported to be a barrier for pregnant women, and their adherence to preventative treatment.

Bagayoko et al (2017) noted that lack of an internet connection may prevent the widespread use of telehealth communication practices for the time being.

Le Port et al. (2019) found remoteness and inaccessibility often reduced the value of a cash transfer aimed at increasing health service utilization by mothers and young children. Moreover, because of irregularities in cash delivery, there was often a significant time burden for beneficiaries to receive their cash, detracting from its appeal.

Summary

All interventions for reducing child mortality were successful in most capacities. Digital personal performance dashboards led to community health workers (CHW) seeing an additional 39.9 homes per month. CHWs were also associated with increased knowledge on family health practices, including effectively dispelling common maladaptive local practices (Whidden et al. 2018). Additionally, CHWs led to an increase in proper medication regimens for simple and common child illnesses at home (Perez et al. 2009), especially through use of community health kits due to the decreased cost from not having to travel (Trevant 2009). Furthermore, health service utilization saw significant leaps in malaria, diarrhoea, and modern contraceptive use/demand (Trevant 2009). It is reasonable to believe that permanent paid CHW positions would be an effective tool in substantially decreasing under 5 child mortality. Also, subsidizing community or personal home health kits (at \$2.18 each) could also play a major role in effectively curbing under 5 child mortality (Perez et al. 2009).

Three interventions on healthcare utilization incentives were successful. The first (Ravit et al. 2018) focused on free caesarean sections which reduced neonatal mortality by 30% when compared to control countries, at a cost of US\$ 50 for non-complicated and US\$ 70 for complex cases. Simonyan et al. (2013) found that a non-profit telehealth and microinsurance program increased healthcare utilization. Le Port et al. (2019) found that the provision of lipid-based supplements for children in tandem with cash incentives resulted in an uptake of healthcare utilization.

Adubra et al. (2018) reported that the provision of lipid-based nutrient supplement and/or cash incentives had a positive impact on attendance at child growth-monitoring sessions. However, there was little evidence of an improvement in chronic undernutrition, stunting, or child feeding

practices. 40% of the women receiving cash would have instead preferred free access to healthcare.

Guèye & Nikièma (2018) found that multifaceted interventions succeeded in increasing the use of insecticide-treated nets by pregnant women and by children under five, as well as modern contraception use.

Lastly, Bagayoko et al. (2017) found that telehealth training for community health workers in rural Mali led to an 81% increase in on-site care or referral for selective malnutrition and led to greater confidence in the health centres.

HIV Status Management

The Evidence Base

Rigorous Impact Evaluations

Bernier, A., Yattassaye, A., Beaulieu-Prévost, D., Otis, J., Henry, E., Flores-Aranda, J. et al. 2018. Empowering Malian women living with HIV regarding serostatus disclosure management: Short-term effects of a community-based intervention. *Patient Education and Counseling*, 101(2), 248–55. Available at: <https://doi.org/10.1016/j.pec.2017.07.030>

Bernier et al. (2018) assessed the effects of a program aimed at empowering Malian women living with HIV with regard to their status disclosure management. There is a crucial need for empowerment programs when considering the potentially negative consequences of serostatus disclosure. This is particularly true for women in resource-limited settings. The intervention was implemented by ARCAD-SIDA, a Malian community-based organization. It took place in seven sites across Mali and consisted of one individual meeting, followed by nine weekly group meetings with other HIV-positive women. There were three main objectives: assessing personal serostatus disclosure, discussing and finding strategies to disclose the status with contingency plans, and discussing coping strategies in the case of keeping one's serostatus a secret.

Methods

Pre and post test, regression model

Bernier et al. (2018), investigating the effects of a psycho-social intervention on HIV positive women, used pre and post tests. Effects of the intervention were estimated with a linear regression model.

Impacts

Bernier et al. (2018) found that their psycho-social intervention considerably increased the ability of women living with HIV to freely choose whether to disclose their HIV states, or to willingly conceal it. It also reduced the “burden of secrecy” and led to better perceived psychological health.

Sustainability

The sustainability of the intervention was not discussed.

Barriers

No barriers to better implementation were reported.

Summary

Bernier et al.'s (2018) study on interventions supporting HIV disclosure or concealment for women had great efficacy and helped women to manage their HIV diagnosis. The psycho-social intervention was successful in creating courses of action for participants to live with their HIV diagnosis covertly, or to disclose their status. This led to a stronger perceived self-efficacy among participants that they were now better equipped to disclose their status or care for their diagnosis in a covert manner.

Summary of Health Interventions

Malaria

Malaria constitutes the largest cause of mortality and morbidity in Malian children under five.

Seasonal malaria chemoprevention offers promising outcomes. It was found greatly to reduce rates of malaria and anaemia among children (Diawara et al. 2017; Druetz 2018).

The abolition of medical fees for children under five and mothers with fever led to significant uptake and healthcare utilization, and a reduction in malaria prevalence and illness in children (Ponsar et al. 2011).

Malaria interventions in schools provided an opportunity for malaria education, leading to a significant uptake in the utilization of insecticide treated bednets (Clarke et al. 2017). Moreover, schools offered a good opportunity for conducting intermittent parasite clearance practices, which led to a substantial reduction in malaria, asymptomatic malaria, and general plasmodium infections.

The sustainability of these practices relies on continued funding. Sustaining the abolition of medical fees for all children under five and pregnant women with fever would be at a cost of

5.6 euros per child (Ponsar et al. 2011). Malaria interventions in schools appear sustainable, with malaria education estimated to cost US\$ 2.13 per child, while intermittent parasite clearance costs an additional US\$ 2.72.

Preparedness for residual spray treatment can be achieved cost-effectively by door-to-door mobilization (Mangam 2016).

WASH

Because diarrhoea remains a leading cause of morbidity and mortality for children, WASH interventions are key.

Chard et al. (2018) found that WASH interventions in schools led to a reduction in food and water-transmitted enteric disease and in person-to-person transmitted enteric disease among students.

Trinies et al. (2016) found that a WASH intervention had a positive effect in reducing rates of illness. In their 2015 study, Trinies et al. found that WASH beneficiary schools were about ten times more likely to meet Dubai Cares WASH in Schools standards.

In the broader community, Koita et al. (2016) found that WASH interventions led to a substantial improvement in nutrition in children 6–23 months, along with improved home sanitation facilities, handwashing practices and facilities, and safe drinking water. This was reinforced by Kone et al. (2019) who found an uptick in clean drinking water and safe water storage practices for communities after WASH interventions. Kone et al. (2019) also found WASH interventions in the community to be associated with appropriate household detergents, functional handwashing facilities, proper sanitary excrement disposal, and a decrease in child wasting and stunting.

Allegranzi et al. (2010) found that an intervention in hospitals increased hand hygiene compliance across all levels and categories of health care workers.

In terms of sustainability, there are reasons to believe that WASH interventions are largely sustainable.

Open defecation

Open defecation, which is common in Mali, can lead to health complications and sicknesses. Community-led total sanitation (CLTS) projects were found to increase private latrine ownership with latrine utilization following suit. Consequently, CLTS projects led to a significant drop in open defecation, especially among children (Pickering et al. 2015; Alzúa et al. 2020). Evidence suggests that cheap technical solutions are important in converting people to latrine use (Alzúa et al. 2020).

CLTS practices had only a marginal impact on diarrhoeal prevalence among children. However, CLTS may have an effect in reducing child stunting (Pickering et al. 2015).

Child mortality

Community Health Workers (CHWs) appear to be effective in reducing child mortality.

CHWs were found to be effective in the promotion of basic child health services, and dispelling maladaptive at-home practices for common childhood illnesses. CHWs were able to recognize many inappropriate practices in childcare and to teach caregivers proper medicine and care regimens for malaria, acute respiratory infection, and diarrhoea. They were also effective in dissuading parents from using potential harmful medicines and administrations and towards more appropriate measures such as chloroquine for malaria treatments (Perez et al. 2009).

CHWs were also effective in mobilizing populations to change their care-seeking behaviours by teaching the recognition of symptoms of illness and helping communities increase their responsibility for health care activities. CHWs' mobilization of community members for health seeking also led to increased insecticide-treated bednet use, at-home treatment of children's diarrhoea, modern methods of family planning, and utilization of village drug kits (Trevant 2009). CHWs may be very effective in mobilizing health seeking behaviours. The provision of community health care kits appeared to be effective, especially in conjunction with the deployment of CHWs.

The effectiveness and efficiency of CHWs was increased by introducing a personal performance dashboard for monitoring and supervising the work of CHWs. The dashboard led to more home visits per month, more proactive "case-finding home visits", more treatments of sick children under five, and fewer protocol errors (Whidden et al. 2018). While the work of CHWs depends on continued financing and is, *per se*, not sustainable, it appears that CHWs can offer effective and efficient healthcare for communities.

Another effective tool for combating child mortality was providing financial or other incentives for utilizing health services. Ravit et al. (2018) found that user fee exemptions for caesarean sections increased utilization by over a third, leading to a one third reduction in neonatal mortality. Sustainability depends on funding, at a cost of approximately US\$ 50 per intervention.

Simonyan et al. (2013) reported that a non-profit micro-insurance program combined with a digital monitoring app of the health status of children, which alerted doctors in cases of abnormalities, led to more frequent use of health services.

Le Port et al. (2019) found that handing out lipid-based nutrient supplements for children served as an incentive for mothers to attend growth-monitoring visits at regional health centres. Handing out additional cash as incentive did not increase attendance. The same study found that 40% of mothers who received cash payments would have preferred free-of-charge health consultations to the cash, reminding us that user fees can be an impediment for the utilization of health services (Le Port et al. 2019).

Bagayoko et al. (2017) showed that telemedicine training for health workers and teleconsulting can be effectively used to improve the health of mothers and children. Obstetric–gynaecological and pediatric tasks were supported via teleconsultations. Participants believed that telemedicine

guidance improved the knowledge of local healthcare workers. A majority of patients said that they had more confidence in local health centres due to the new telehealth guidance services.

Guèye & Nikièma (2018) found that multifaceted interventions increased the use of insecticide-treated nets by children and pregnant women, and increased the prevalence of modern contraception.

HIV status management

Bernier et al.'s (2018) study on interventions supporting HIV disclosure or concealment for women was effective at helping women to manage their HIV diagnosis. The psycho-social intervention was successful in creating courses of action for participants to live with their HIV diagnosis covertly or if they chose to disclose their status.