

Public Works and Welfare: A Randomized Control Trial of the Comoros Social Safety Net Project *



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Executive Summary

The Comoros Social Safety Net Project (SSNP) was initiated by the Government of Comoros and the World Bank in 2015. The main component of the project provided cash-for-work (CFW) opportunities to selected poor households. From 2016 to 2018, beneficiary households received an average of 60 days of work per year at the daily wage rate of KMF 1,000 (approximately US\$2.3). To measure and help to improve the effectiveness of the project, the implementing agency FADC (Fonds d'Appui au Développement Communautaire), and later ANACEP (Agence National de Conception et d'Execution des Projets), partnered with the World Bank's Development Impact Evaluation (DIME) unit to carry out an impact evaluation.

The objectives of the impact evaluation were to test the effects of the CFW activities on socio-economic outcomes and welfare of selected households. Specifically, it aimed to address the following questions: (1) What were the direct effects of CFW activities on social and economic outcomes of selected poor households? (2) What were the externalities of the CFW program on non-beneficiaries? (3) Did the effect of the CFW vary according to the gender of the recipient?

The evaluation was implemented as a randomized control trial. The randomization occurred at three levels: (1) At the household level to assess the direct impact of the program (question 1); (2) At the community level to measure externalities (question 2); (3) Within the household to measure differential effects according to beneficiaries' gender (question 3). As part of this research, baseline and endline quantitative data have been collected on 1321 beneficiary households and 860 non-beneficiary households, as well as qualitative data on 60 beneficiaries, 20 non-beneficiaries, and 8 project staff.

The perceptions from workers and non-workers from villages targeted by the project are positive. They indicate satisfaction with public works projects implemented and with the process through which workers were selected. These positive perceptions are validated by qualitative interviews carried out with workers, non-workers, and project staff. While some respondents aired a few grievances, such as the low daily wage rate and some delays between the end of work and payments, these may be seen more as areas for improvement for future versions of the project rather than indications of dissatisfaction with the project.

The project reached the targeted population and produced substantial positive effects on labor market outcomes (employment and income). The results indicate that employment opportunities were offered to the intended beneficiaries with significant take-up. At the time of the follow-up survey, households assigned to treatment were 263% more likely

to participate in cash-for-work activities than the control group. This provides reassurance on the implementation of the program and impact evaluation design. During the 30 days preceding the follow-up survey, beneficiaries worked on average 5.6 days more than non-beneficiaries including days spent on cash-for-work activities. They also worked 0.6 days more than non-beneficiaries excluding days spent on cash-for-work activities. This means that the project does not seem to have had crowding out effects on other sources of employment. Overall, the program can thus be considered as a positive income shock for treated households.

Qualitative evidence suggests that beneficiaries spent most of the cash on consumption, and occasionally on assets or livestock. However, the quantitative evidence points that these impacts were not large enough to be statistically significant. Quantitative results consistently show non-significant impacts on food security, food consumption, non-food expenditures, investments in assets, livestock, dwelling, and savings. These results are in line with Beegle et al. (2017) who find no effects on food security of a similar cash-for-work program in Malawi. In Comoros, the absence of statistically significant effects on consumption and investment indicators are not explained by substitution or spillover effects.

The qualitative evidence helps to shed light on the reasons for the lack of measurable effects on consumption in the quantitative analysis. During qualitative interviews, beneficiaries reported increased consumption, especially soon after receiving the payments. However, the follow-up quantitative survey was implemented a few months after payments occurred and the typical recall periods used in the survey questionnaire are likely too short to capture short-run effects on consumption. In addition, participants faced important delays between the work and payments. As a consequence, they often borrowed money to finance daily life before payments were made. While this helped them to smooth their consumption, this also implies that consumption might have increased long before the payments were actually received by beneficiaries, and that part of the payments was used to reimburse debts.

Qualitative interviews highlight that few households have been using part of the cash to make investments. Those who did invested in a wide variety of items, including in migration, assets, dwelling and livestock. In addition, these investments were often mutually exclusive. It is therefore not surprising that the quantitative analysis fails to detect any significant effect on assets. Similarly, there is little evidence to suggest that participation in CFW activities had significant effects non-material effects. Beneficiaries seem to have increased their participation in village associations and reported less anti-social behaviors. However, the results does not show significant effects on overall indices related to social cohesion, political participation, psychological well-being, and exposure to conflict, crime,

and violence.

The program appears to have had a sizable and positive impact on in vestments in migration to Mayotte – the neighboring and richer French Island. Migration patterns are salient in the Comoro archipelago. A mix of geographic proximity and economic disparities causes many Comorians to migrate to Mayotte. While Mayotte is located about 70 kilometers to the South-East of Comoros, its GDP per capita is more than 10 times that of Comoros, and it has much better public infrastructures. The increased CFW revenue does not seem to have reduced the need for migration. In fact, the migration rate of beneficiary households is about 36% higher (3 percentage points) than the migration rate of non-beneficiary households.

The program increased the probability that women had an income generating activity. Labor market participation of female residing in beneficiary households increased by 35 percentage points (equivalent to a 82% increase relative to the control group). This is consistent with the qualitative evidence and the fact that most of the participants in CFW activities were women. However, results from the quantitative analysis suggest that this increase in access to income generating activities did not improve female bargaining power and did not reduce their exposure to violence.

Finally, there is no compelling evidence that the effects of the program varied according to the gender of the recipients, or that the program had sizable indirect effects. There is some qualitative evidence that beneficiaries shared the cash received with their relatives and extended network, but the quantitative evidence does not detect such effects, suggesting they are small. Similarly, there is no evidence that the effects of the program were different depending on the gender of the recipient. However, this could also reflect an issue of the evaluation: compliance with the gender treatment was very low (CFW daily wage was not attractive for most men), implying that the statistical power of the gender randomization may be too low to detect statistically significant effects.

1 Background

1.1 Context

The Union of Comoros is an insular State of 3 islands (Grande Comore or Ngazidja in local language, Anjouan or Ndzwani, and Mohéli or Mwali) with a population of 760 000. A fourth island, Mayotte, remained part of France after independence in 1975. As other small Island nations, Comoros is characterized by geographical isolation, high exposure to natural disasters, limited resources, a small domestic market, a narrow export base of niche-market cash crops (vanilla, ylang ylang, clove) and a high dependence on food imports, international aid and remittances.

Since independence, Comoros has experienced recurring political crises and conflict between the islands. Comoros low GNI per capita (770 current US\$ in 2014) is stagnating because of low GNI growth rates (between 2 and 3.5%) and high population growth (2.4%). Poverty and inequality are high, with 48 percent of the population living with incomes below US\$1.25 per day, and one-third of all children under 5 years of age suffered from chronic malnutrition. Unemployment was estimated to affect 24% of the population, but 54% of the youth between 15 and 24. The Union of Comoros is ranked 159 in 181 countries in the Doing Business ranking of 2015. Because of the weak socioeconomic and unstable political situation in the country, many Comorians have migrated in France and in Mayotte. According to United Nations statistics, in 2012 there were 108,986 Comorians living abroad. The matrilineal and age systems and the related traditional norms, especially salient in Grande Comore, play an important role in the structuration of the Comorian society and in the provision of an informal safety net.

Despite high needs, Comoros has not developed a formal social protection system capable of addressing these challenges. Political instability, poverty and skilled migration have indeed impaired government's ability to invest in infrastructure and deliver quality basic services. The Bank's recent assessment of social protection policies and systems found that social protection programs cover only a small part of the population despite the high rates of poverty and vulnerability in the country. Effective social protection policies and programs including nutrition interventions have been designated as crucial for the country's development. Against this backdrop, the Government of Comoros and the World Bank initiated the Comoros Social Safety Net Project (SSNP) in 2015. The implementing agency has been FADC (Fonds d'Appui au Développement Communautaire), and later ANACEP (Agence National de Conception et d'Execution des Projets).

1.2 The Social Safety Net Project

The SSNP sought to improve poor communities' access to safety net and nutrition services. It had a number of key components, including (i) the establishment of a productive safety net providing selected poor households with cash-for-work opportunities; (ii) in communities affected by disasters, the provision of emergency cash-for-work programs and rehabilitation of damaged community infrastructure; (iii) the delivering of package of nutrition-specific interventions for children under 5 years of age and promotion of better nutrition and productive health for mothers; and (iv) the strengthening of institutional capacities for safety net management, coordination, and monitoring and evaluation.

Component 1: Establishing a Productive and Disaster Responsive Safety Net (US\$4 million)

Component 1.1: Establishing a Productive Safety Net (US\$3.2 million). This component provides cash to targeted poor families in exchange for their participation in cash-for-work activities. The focus on activities such as reforestation, water management, and terracing is expected to increase the productive capacity of households', communities' and country's resilience to natural and climatic events. Specifically, the productive safety net modality offers periodic cash-for-work opportunities to the poorest families and to labor-constrained households in selected communities over a three-year period with the aim of smoothing their consumption and supporting them in developing productive activities. A sub-component also finances small community infrastructure sub-projects to complement the cash-for-work activities with the aim of increasing the community's productive resources. These are more complex and capital-intensive than the cash-for-work activities and require more skilled labor and more materials.

Component 1.2: Ensuring an Early Recovery Response to Natural Disasters (US\$0.8 million).

This component finances activities to support communities and households in the immediate aftermath of natural disasters but have not been implemented yet since, fortunately, there have not been any major natural disasters in Comoros lately. It finances post-disaster cash-for-work activities, which may vary depending on the impact of the disaster but mostly focus on restoring village services and productive capacity, including clearing debris, removing sand, and clearing roads. It also finances the rehabilitation and reconstruction of small village infrastructure damaged by natural disasters and emergency cash-for-work activities for clean-up and repair.

Component 2: Improving the Nutrition of Young Children and Mothers from Poor Communities (US\$1 million). Complementary to the safety net activities, this component provides preventive nutrition services in the same poor communities to help households to break the inter-

generational transmission of poverty. Its focus is on creating demand for and delivering a minimum package of nutrition-specific interventions for children under 5 years of age, with particular focus on the “first thousand days” window of opportunity (from pregnancy to 2 years of age). It also promotes better nutrition and productive health for mothers. The centerpiece of the community nutrition program is the delivery and use of a minimum package of preventive nutritional and reproductive health services focused on young children and women.

Component 3: Strengthening Safety Net Management, Coordination, and Monitoring and Evaluation (US\$1 million). This component aims to support the development of key elements of a safety net system. Specifically, it supports the establishment of an effective management information system (MIS) including a beneficiary registry based on geographical and community targeting, aiming to be a repository of accurate data on beneficiaries and program implementation at all times. The component also helps to establish payment systems to transfer cash to the safety net beneficiaries through micro-finance institutions.

1.3 The Impact Evaluation

To measure and help improve the effectiveness of the SSNP project, FADC partnered with the World Bank’s Development Impact Evaluation (DIME) to carry out an impact evaluation of the cash-for-work (CFW) component of the SSNP (Component 1). As mentioned above, this component entails the provision of periodic cash-for-work opportunities to more than 4000 poor and labor-constrained households in selected communities over a three-year period with the aim of smoothing their consumption and supporting them in developing productive activities.

The impact evaluation has been designed based on outcomes of a workshop organized in October 2015 by DIME team and FADC. The impact evaluation objective is to test the effects the cash-for-work component of the SSNP on socio-economic outcomes and welfare of households. Specifically, it aims to address the following research questions:

1. What are the direct effects of temporary employment cash-for-work program on social and economic outcomes of poor households?
2. What are the externalities of the cash-for-work program on non-beneficiaries, and through which channels are the latter affected?
3. Does the effect of the program vary according to the gender of the recipient?

To answer these questions in a rigorous way, the cash-for-work component of the SSNP

project is carried out as a randomized control trial. The randomization is implemented at three levels: at the household level to assess the direct impact of the program (question 1), at the community level to measure externalities (question 2), and within the household to measure differential effects according to beneficiaries' gender (question 3).

In each village, a public works project was chosen in conjunction with the villages' population to identify those that are the most valued by the community. The chosen public works projects were chosen to have a positive environmental impact as well as increase resilience to natural and climatic events (e.g. reforestation, water management, terracing etc.). At least 75% of the value of the public works projects account for cash transfers to the beneficiary households. Households have been provided with an average 60 days of work per year from June 2016 to December 2018 at the wage rate of KMF 1,000 for 4 hours of work per day (approximately US\$2.3).²

A total of 69 villages were selected by FADC to receive the intervention based on poverty incidence and to conform to the repartition rule that has been agreed between the island governments for the national budget. According to the distribution formula, Grande Comore should receive 45 percent of the safety net funds, while Anjouan should receive 42 percent and Mohéli 12 percent. Based on these percentages, FADC selected localities using the poverty map drawn up by the Comorian national institute of statistics (known as IN-SEED) in 2003/2004 using data from the 2003 General Census (Recensement Général de la Population or RGPH) and the 2004 EIM. In Table 1, we see that selected villages are much poorer than nonselected villages, with an overall poverty rate of 88.2% against 42.1%.

Table 1: Poverty rates in treated villages

	Non-CFW villages		CFW villages	
	Pop (hh)	Poverty rate	Pop (hh)	Poverty rate
Grande Comore	42,744	41.3%	5,435	80.6%
Anjouan	38,152	41.5%	4,778	95.6%
Moheli	4,987	55.0%	1,097	94.8%
Total	85,883	42.1%	11,310	88.2%

Notes: Author's calculations based on the 2003/04 poverty mapping.

Beneficiary households were selected through a mix of self-selection, community targeting, Proxy Means Testing (poverty scorecard) and randomization tools. Because the wage rate (\$2.3 for 4 hours of work per day) is relatively low compared to the average income in Comoros (3400 KMF per day on average according to data collected during the baseline survey), self-targeting was expected to occur. Beneficiary households were also targeted at the community level by village committees working in collaboration with the project staff. Specific selection criteria were applied based on household survey analysis, and a form has

²This wage rate is well below the average daily income from other activities measured at the baseline survey (3400 KMF or US\$7.8).

been created to facilitate and guide the targeting process. There were 4 criteria and each could give one point to the household: (i) the household head attended primary school at most; (ii) the household has at least 4 children below 15 years of age; (iii) the household has children aged between 6 and 14 not enrolled in school; (iv) the household has no agricultural field. Then, households were ranked based on their overall score (between 0 and 4) and community committee members pre-selected the poorest 60 percent of households within each selected village (those with the highest scores). As it was expected that there would be more preselected households than community jobs, the selection of beneficiaries lastly relied on a public lottery from which beneficiary households are registered. In each selected village, 1/3 or 2/3 of the preselected households were assigned to treatment. This means that in each selected village 20% or 40% of households were selected.

The last level of randomization is within households in order to measure heterogeneous effects according to beneficiaries' gender. Households with both male and female potential workers chose one individual of each gender to be the potential beneficiary of the program. Then for these households, the gender of the main worker was randomly selected. In practice, however, the rule that the main worker should participate to the works was never enforced: households had eventually lots of flexibility to send the person of their choice, as they could replace the primary worker on their own. Ultimately, most households sent a female worker as the daily wage rate was mostly attractive for them (see Table A3). For this reason, the analysis of the gender randomization is mostly inconclusive.

1.4 Evidence From Prior Evaluations

Public Work Programs (PWPs) are diverse in their objectives, design and the way they are implemented, and this makes it difficult to establish a common benchmark against which to evaluate their success (McCord, 2012). Evaluations of PWPs also vary widely (e.g. on research design, outcome variables chosen) and this too makes it challenging to compare the success of different PWPs (Hartwig, 2013). Because the impact evaluation seeks to investigate the direct and spillover effects of PWPs on socio-economic welfare and psychological outcomes in developing countries, we largely limit this review to empirical work that focuses on these outcomes. For recent more comprehensive overviews of the literature see Subbarao et al. (2012); McCord and Slater (2009); Hagen-Zanker and Himmelstine (2013); Alderman et al. (2012); Independent Evaluation Group (2011).

There are numerous non-experimental studies that evaluated long-running PWPs in India, including the Maharashtra Employment Guarantee Scheme (MEGS) and the Mahatma

Gandhi National Rural Employment Guarantee Scheme (MGNREGS), for example (Ravi and Engler, 2009). Using propensity score matching and difference-in-difference techniques, they analyze the effect of NREGS on food security, savings and health outcomes and find positive impacts on all three indicators.³ Along similar lines, Datt and Ravallion (2002) find evidence of displacement from leisure/domestic work into productive public works, particularly for males, and large net income gains to participants.

In other contexts, evaluations also find positive impacts of PWPs but on different outcomes. In Argentina, Galasso and Ravallion (2004) evaluate the country's 'Jefes y Jefes Plan', an income transfer program with a work requirement, which was designed to mitigate the 2002 economic crisis. They find that although there is only a small reduction in poverty levels, the program reduced unemployment and insured against dramatic drops in income. In Rwanda, Hartwig (2013) use a mixed method approach to evaluate the public works component of the government's flagship anti-poverty and social protection program (Vision 2020 Umurenge Programme (VUP)) and find positive effects on food consumption, formation of durable household assets and livestock holdings. In Ethiopia, observational evaluations found positive effects of the Productive Safety Net Program (PSNP) on household food security, consumption and poverty (Gilligan et al., 2009; Nega et al., 2010; Holden et al., 2006; Bishop and Hilhorst, 2010). Regarding assets, two different evaluations find mixed program effects. Using matching methods on survey data from three regions, Gilligan et al. (2009) find that the program had positive effects on livestock holdings. Using panel data from one of the regions, Anderson et al. (2011) find no effects on livestock holdings.

Overall, observational studies suggest that PWPs have positive effects on the consumption and food security of beneficiary households. However, these effects could be driven by selection bias taking place at two levels. First, selected villages are likely to differ from non-selected villages as most PWPs use geographic targeting to identify the poorest villages. Second, the self-targeting features of most PWPs are likely to induce systematic differences between households that do and do not participate in the program (Beegle et al., 2015).

The evidence from recent experimental studies on PWPs is limited (Zimmermann, 2014) and decidedly mixed, with a number of studies pointing to positive impact, at least in the short-run, while other studies show no impact. Studies showing positive impacts include Christian et al. (2015) who conducted a randomized control trial of a PWP in Yemen, which combined short-term employment relief with long-term investment in community infrastructure. The authors find that the program increased average wages, household asset own-

³Deininger and Liu (2013) also examine NREGS, finding that the program increases nutritional intake in the short run and stimulates asset creation in the medium term, while Klöner and Oldiges (2012) employ a regression discontinuity design and find that the NREGS program reduces poverty during the agricultural off-season, without any significant impact during the peak season.

ership, food security and expenditure on other basic needs like medical care. They also find that the program led to shifts in the structure of the workforce from lower- to higher-paid sectors.

In a similar vein, Rosas and Sabarwal (2016), examines the short-term impacts of a PWP in Sierra Leone, using a community-level RCT approach. The study finds that the cash for work activities successfully provided temporary employment to youth characterized by low educational attainment and opened avenues for investment in the productive capacity of poor households, with the view to securing future earnings. Specifically, the earned income among program participants increased by nearly three times relative to the control counterparts, and treatment households experienced a 29 percent rise in monthly income and treated individuals were more likely to raised spending on food, medicines, and assets as well as to participate in informal savings groups and to invest in their homes and existing businesses. Treated households were also four times more likely to set up new businesses and to participate in informal savings groups and their investments in their homes and existing businesses. A twin study of PWPs by Claudia et al. (2018) and De Hoop et al. (2017) in Egypt and Tunisia, respectively, also show positive impacts of PWPs on employment, earnings, consumption and savings, among other outcomes.

However, a few other RCT studies of PWPs found mixed results or no effect. For instance, in their study of a PWP in Cote d'Ivoire, Bertrand et al. (2017) find that the program showed limited contemporaneous impacts, but it had an impact on the shift in the composition of employment towards the better-paid public works wage jobs. Furthermore, the study finds no evidence of lasting impacts on the level or composition of employment, although positive impacts are observed on earnings through higher productivity in non-agricultural self-employment. Yet the program also displayed a great deal of heterogeneity, with women and participants with low reservation wage gaining the most from it, particularly during the program.

Likewise, Beegle et al. (2015) use village-level and household-level randomization strategies to examine the direct and spillover effects of a large-scale public works program in Malawi on labor allocation and food security. The authors find no evidence of displacement of casual labor as the result of an offer to work. They find no effect of the program on food security. Similarly, Eger et al. (2018) investigate a PWP in the context of post-Jasmine revolution Egypt and find virtually null effects on key labor-market and economic welfare outcomes.

Taken together, this review of previous empirical studies suggests a mixed picture. On one hand, some studies show. On one hand, some studies show positive impact

of PWPs on participants' labor market and economic welfare outcomes. Even then, impacts are not uniform across contexts, and more research is needed to understand why. On the other hand, several other studies show limited to no impacts of PWPs. Given the diversity of PWPs and the settings in which they are implemented, further empirical studies are warranted. Furthermore, much of the focus of these studies has been on the effects of PWPs on economic welfare with social and psychological effects receiving scant attention. In particular, there is lack of evidence about the impact PWP employment has on individual investment in productive assets, despite this being a key reason that policymakers prefer PWPs to alternatives (McCord, 2012). This impact evaluation aimed at filling these empirical gaps. This study contributes to the nascent but growing empirical evidence on PWPs from a different context: the Comoros Island, a small and lower income country in Sub-Saharan Africa.

2 Theory of Change and Effects to be Identified

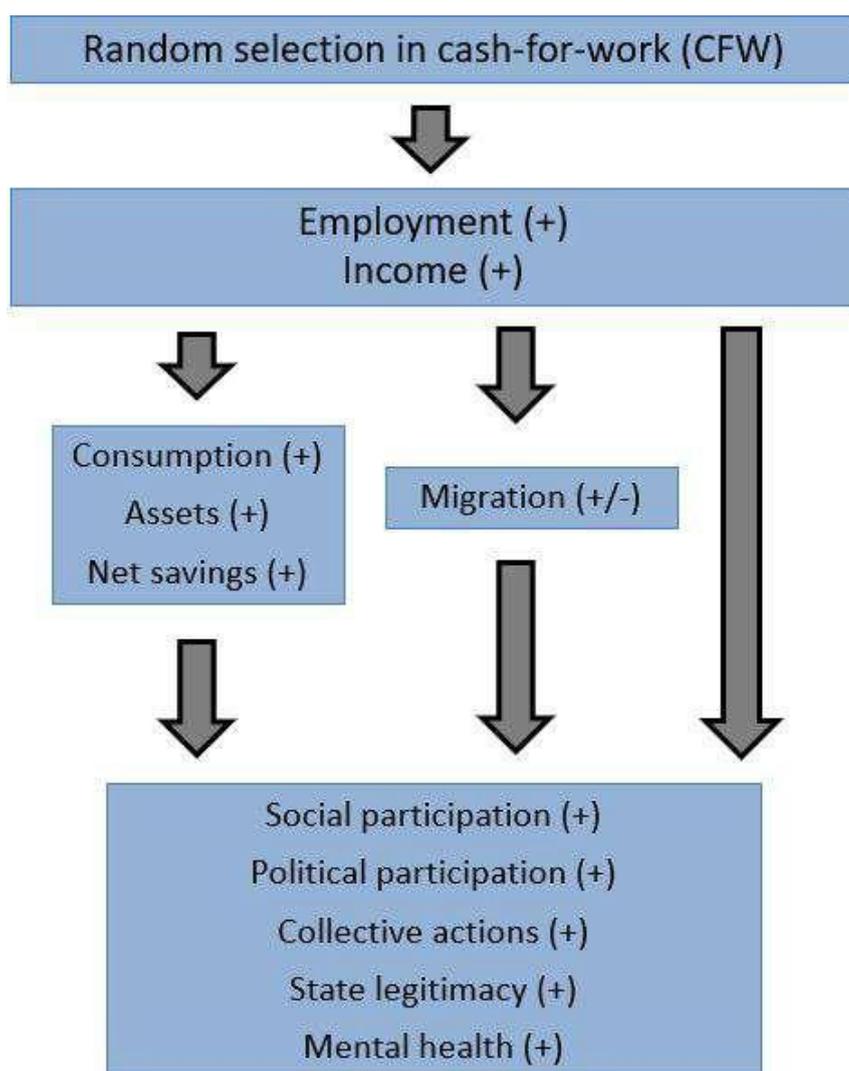
2.1 Direct effects

The theory of change for direct effects is outlined in Figure 1. CFW activities may impact four distinct family of outcomes:⁴

- **Labor market outcomes.** The CFW aims to provide temporary employment and income to poor households. We assess whether CFW indeed increase employment and income of beneficiaries.
- **Economic welfare outcomes.** If CFW increase employment and income, a natural question is how people spend the additional money. We leverage the vast literature on the impacts of cash transfers and consider variables on consumption, food security, investments in assets, savings and debts. The theory of change for these outcomes is well-established and we expect CFW impacts to be positive.
- **Migration outcomes.** Given the salience of migration patterns in Comoros, we focus specifically on CFW impacts on illegal migrations to Mayotte (the neighbouring and richer French Island). This relates to a separate, much more limited strand of the

⁴In Appendix A.2 we provide a more detailed listing of the outcomes and indices that we consider in the analysis.

Figure 1: Theory of Change of the Comoros SSNP program



Source: Authors' elaboration

literature on cash transfers and migration. The expected impact is ambiguous: while employment increases the opportunity cost of migration, it also provides the necessary means to finance travel costs.

- **Non-material outcomes.** Finally, we assess CFW non-material impacts on participants which may operate through increased income or inclusion in the community project. We look at CFW impacts on a broad range of outcomes including social participation, political participation, collective actions, state legitimacy, security, and mental health. Conventional wisdom in the social protection literature is that such programs should have positive impacts on these outcomes, though there are competing theories on why and how this might be the case and supporting empirical evidence is scant.

2.2 Indirect effects

A number of recent studies (e.g., Beegle et al. (2017), Angelucci and De Giorgi (2009)) have highlighted the importance to estimate not just direct effects of anti-poverty programs, but also their indirect effects.⁵

CFW programs such as the Comoros SSNP can affect households in multiple indirect ways. First, infrastructure created can affect the local economy as community infrastructures are themselves productive assets, which can generate higher returns to households with productive assets, or community-wide spillover effects. Second, non-beneficiaries can be positively affected by the program through inter-household redistribution and informal insurance networks. Finally, the program can generate externalities on non-beneficiaries within communities through local markets effects. The increased demand for goods generated by new income streams may affect prices, and therefore affect the real income of buyers and sellers on local markets. The CFW may also affect wages by diminishing labor supply.

Unfortunately, we are not able to assess the impact of each channel in isolation due to practical constraints faced by the implementing agency. However, Section 3.1 presents an empirical strategy to assess the sign and magnitude of these effects. The average indirect effect of the program on the outcomes outlined in Figure 1 is an empirical question.

2.3 Conditional effects

The recent literature on cash transfers shows that males and females may use differently money windfalls, in contradiction with the unitary model of the household. Given that Comorian males and females have different levels of labor market participation and preferences, we expect that gender influenced the outcomes presented in Figure 1. Females are less likely to work outside the household and therefore the substitution effect of participating in CFW should be lower for them. They may also use the additional income stream from CFW differently than their male counterparts. For example, Castilla and Walker (2013) find that public windfalls increase investment in assets and social capital when husbands win the prize, but not when wives win it. Using a regression discontinuity design, Duflo (2003) finds that a cash transfer directed to elderly women has positive effects on the anthropometric status of their granddaughters, but the author finds little effect on that of boys, and little effect when the cash transfer is directed to elderly men. Robinson (2012) finds that men

⁵The literature often makes a distinction between indirect and spillover effects. Our evaluation design does not allow us to make such a distinction, however, we present evidence on the sum of indirect and spillover effects (called indirect effects as a shortcut).

increase private consumption when they benefit from a small income shock, but he finds no effect when their wives do benefit from the same windfall. In contrast, Benhassine et al. (2015) find a strong positive effect of a cash transfer intervention on school attendance, but the impact of the intervention does not seem to vary with the gender of the recipient. In Section 3.1 we present our strategy to estimate gender conditional effects.

3 Evaluation Design

3.1 Identification strategy

To assess the impact of the SSNP on both beneficiary and non-beneficiary households, this impact evaluation is designed as a multi-level randomized control trial.

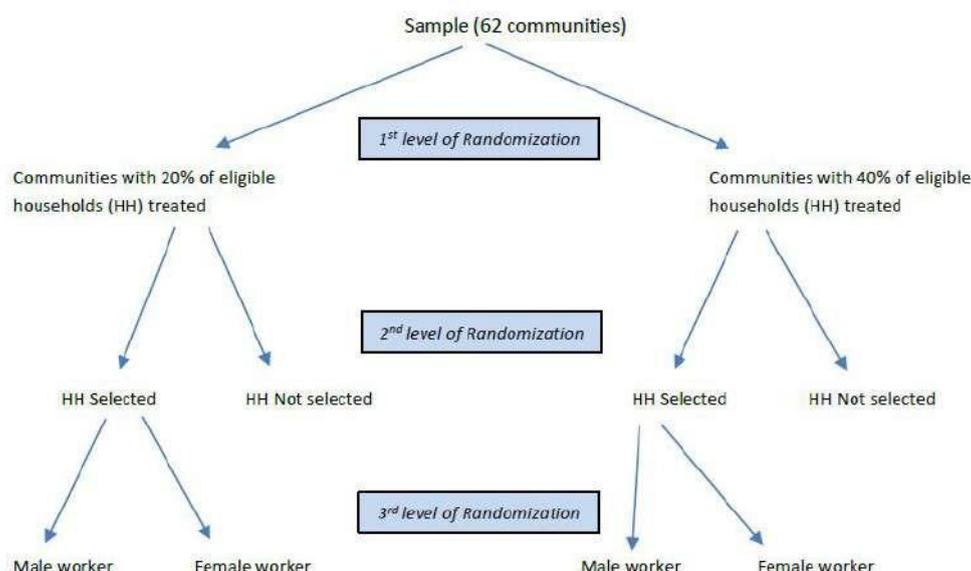
At the household level, short-term employment opportunities were randomly assigned across preselected households in order to assess the direct impact of the program on social and economic outcomes by simply taking the difference between the mean outcomes of beneficiary and non-beneficiary households from the follow-up survey.

However, given the social and economic interactions between households within villages in Comoros, it is very likely that there are spillover effects, as well as indirect effects due to infrastructures or general equilibrium effects for instance. Therefore, we also performed a randomization at the community level with the proportion of beneficiary households being randomly drawn for each of the study villages in order to measure externalities of the intervention. Given the limited number of villages in this intervention and some specific constraints imposed by FADC, it has been decided that 20% or 40% of eligible households would be assigned to treatment within each village.⁶ In order to improve precision, we first formed groups of two villages from the same island with comparable populations, and then, we randomly assigned villages to one of the two thresholds of intervention within each of the obtained strata.

Our last level of randomization is within households in order to measure heterogeneous effects according to beneficiaries' gender. Households with both male and female potential workers chose one individual of each gender to be the potential beneficiary of the program.

⁶The thresholds take into account the following constraints (some from FADC, some from the IE team): (i) the lowest threshold should be high enough so as not to increase frustrations and prevent the fulfillment of community works; (ii) the highest threshold should not be too high due to organizational reasons; (iii) the gap between the two thresholds should be high enough in order to measure precisely the scope of spillovers resulting from the program; (iv) the number of thresholds should not be too high in order to avoid statistical power issues; (v) on average, around 30% of the eligible households should benefit from the program.

Figure 2: Randomization Design



Source: Authors' elaboration

Then for these households, the gender of the beneficiary was randomly selected.

Figure 2 below depicts our design and randomization procedures. It should be noted that for seven villages, the 20% or 40% thresholds were rejected by FADC because these villages were too small. In these villages 100% of the households participated in the CFW activities. Hence, we had to exclude these villages from the randomization and we are left with 62 villages.

3.2 Sample

The sample is composed of the villages benefiting from the SSNP, with each village considered as statistical domains. It includes 43 villages from Ngazidja, 17 villages from Ndzwani and 9 villages from Mwali.

Power calculation exercises have been carried out to determine the optimal number of households to include in the sample to measure both the impacts of CFW activities and minimize survey budget.⁷ The results of these exercises imply that in each village we sampled 25 beneficiary households, 15 pre-selected but non-beneficiary households.

We obtained the list of beneficiaries, pre-selected and ineligible households from FADC's monitoring and evaluation team. The listing of households who didn't enrol to benefit from CFW activities was more challenging. The last Census is from 2003 and we had no updated lists of households per villages. We relied on village committees to make a list of these

⁷Power calculations are presented in Appendix A.1.

Figure 3: Timeline diagram



Source: Author's elaboration

households. Specifically, we have been visiting each community with a list of households enrolled in the program and asked each of them which households were not included in our list. The sampling was done using the statistical software *Stata*.

3.3 Data

Baseline and follow-up survey Both surveys were conducted by INSEED, the national institute of statistics, under the supervision of the authors. The baseline survey was conducted after randomization at the household level and before the start of CFW activities. It took place in two phases (first in 23 villages and then in the remaining 46 villages):⁸ (i) from July to August 2016 and (ii) from December 2016 to May 2017. The follow-up survey took place from June to September 2018, while beneficiaries had received while treated households had received between 3 and 7 rounds of CFW activities (equivalent to between US\$140-320).⁹ Surveys were administered on tablets, and data were automatically uploaded to an online server. Household attrition between baseline and follow-up was low (about 4 percent of the baseline sample) and balanced across treatment and control groups, as shown in Table A6.

⁸The sampling frame described above required the completion of the targeting process, which was implemented by FADC in two phases due to capacity constraints.

⁹To put this in perspective, the annual consumption per capita at baseline was US\$375

Qualitative survey While the quantitative survey can provide rigorous evidence of impact, it is limited in its explanatory power to determine the mechanisms through which that impact occurred. The qualitative component helps to shed light on the various channels through which CFW activities might affect socio-economic outcomes for the poor. Qualitative research is also useful to study perceptions, norms, and narratives, which are complex and difficult to quantify. About 110 qualitative interviews have been conducted by research assistants under the supervision of the authors. The sample included a broad range of actors, including (i) participants and non-participants in project activities, (ii) government officials and local community leaders, and (iii) NGOs and local firms in charge of the execution of CFW activities. The sample included 10 villages (4 in Grande Comore, 4 in Anjouan and 2 in Moheli), with 6 beneficiaries (2 males, 2 females, and 2 persons belonging to migrant households), 2 non-beneficiaries, 1 community leader, 1 NGO, 1 ANACEP staff in each villages.

3.4 Evaluation limitations

Impact evaluations often face implementation challenges and this evaluation was no exception.

First, compliance with the gender treatment was very low, implying that the statistical power of the gender randomization is likely too small to detect statistically significant effects. Households had lots of flexibility to send the person of their choice to public works, and ultimately, most households sent a female worker, as they were more willing to accept the low daily wage (see Table A3). For this reason, the analysis of the gender randomization is mostly inconclusive.

Second, because of the progressive and uneven roll-out of the program, communities participated to a different number of waves of CFW activities when the follow-up survey was conducted. As mentioned above, the project rolled-out in two phases due to operational constraints: first in 23 villages, and then in the remaining 46 villages. At the time of the follow-up survey, beneficiaries had received between 3 and 7 rounds of CFW activities (equivalent to between US\$140-320). The results may vary depending on the number of waves received. For this reason, heterogeneities in treatment effects with respect to the number of waves received will be considered in the analysis.

Third, the follow-up survey was implemented a few months after payments occurred, meaning that short-term increases in food consumption and frequent expenditures would be missed by the typical recall periods (7 days for food consumption; 30 days for frequent expenditures). Rigorous analysis of the dynamic effects of CFW programs on consumption

(e.g. during public works, immediately after payments, and few months after payments) could be an interesting area for future research (though particularly costly). The quantitative results from this impact evaluation highlight the effects of cash-for-work a few months after the program. Quantitative results are therefore not informative on dynamic effects and program effects during public works or immediately after payments.

Fourth, it is likely that the program may work differently for different socioeconomic groups, which is why the evaluation also studies heterogeneous effects with respect to several dimensions measured at baseline, including consumption per adult equivalent, education level of the household head, number of working-age adults, and willingness to migrate to Mayotte. These baseline characteristics were of course not randomly allocated across households; the analysis of heterogeneous effects should therefore be considered as exploratory, and results should not be interpreted as causal.

4 Empirical Framework

4.1 Econometric specifications

The empirical strategy is based on the different levels of random assignment to the treatment. Because of the random assignment, households and communities with different treatment conditions are similar (in expectation) in every respect except for their treatment. Any difference in outcome between treatment groups can thus be attributed to the difference in treatment. As mentioned above, we are mostly concerned with estimating three types of effects: (i) the direct effects of the program on social and economic outcomes of poor households; (ii) the indirect effects on both beneficiary and non-beneficiary households; (iii) the effects of the program conditional on the gender of the beneficiary. The study also looks at the heterogeneous effects on several dimensions.

We estimate intention-to-treat (ITT) estimators so as to take into account imperfect compliance or drop-outs. Direct effects are assessed by comparing mean outcomes across different randomly assigned groups.¹⁰ We also use basic interaction models to estimate indirect effects and determine whether conditional effects occur.

¹⁰This research evaluates impacts on the sample, implying that sampling weights are not accounted for. Our research design is not designed nor powered to draw conclusions that extend to the general population of Comoros.

4.1.1 Direct effects

Specifically, for (i), we estimate a regression equation of the following form:

$$y_{iv} = \beta_0 + \beta_1 CFW_{iv} + \beta_2 X_{iv} + \varepsilon_{iv} \quad (1)$$

Where y_{iv} is the outcome of interest for household i in village v ; CFW_{iv} is a dummy indicating whether an individual from household i in village v was employed in infrastructure project or not; X_{iv} is a vector of cluster- and individual-level imbalanced covariates at baseline; and ε_{iv} is the disturbance term for the regression. The direct effects of the program on the outcomes of beneficiaries are given by the coefficient β_1 . Following McKenzie (2012), where possible, we include baseline level of the outcome and use ANCOVA to improve statistical power.

4.1.2 Indirect effects

Indirect average treatment effects (ITEs) of the program are typically ascertained for non-poor households by comparing the key outcomes of interest between ineligible households in treatment and control villages. We do not have a pure control group in this study. However, this impact evaluation is designed in such a way that we can get an idea of indirect effects both on beneficiary and non-beneficiary households. For (ii), we estimate an equation of the following form:

$$y_{iv} = \beta_0 + \beta_1 CFW_{iv} + \beta_2 P_{40v} + \beta_3 CFW_{iv} * P_{40v} + \beta_4 X_{iv} + \varepsilon_{iv} \quad (2)$$

Where y_{iv} is the outcome of interest for household i in village v ; CFW_{iv} is a dummy indicating whether an individual from household i in village v was employed in infrastructure project or not; P_{40v} is a dummy variable at the village level indicating an assignment rate of 40% in village v ; $CFW_{iv} * P_{40v}$ is thus a dummy for being assigned to treatment in a village with a rate of 40% assignment; X_{iv} is a vector of cluster- and individual-level imbalanced covariates at baseline; and ε_{iv} is the disturbance term. This equation provides an estimation of spillover effects both on beneficiary and non-beneficiary household. Spillover effects among non-beneficiary households are estimated by the parameter β_2 , that is the effect of being assigned to the control group in a village where 40% of the eligible population was assigned to treatment, compared to being assigned to the control group in a village where only 20% of the eligible population was assigned to treatment. As for spillover effects among benefi-

ciary households, this is given by $\beta_2 + \beta_3$, that is the effect of being assigned to treatment in a village where 40% of the eligible population was assigned to treatment, compared to being assigned to treatment in a village where only 20% of the eligible population was assigned to treatment.

4.1.3 Conditional effects

Finally, our design allows us to estimate effects of the program conditional on the gender of the beneficiary. For (iii), we estimate an equation of the following form:

$$y_{iv} = \beta_0 + \beta_1 CFW_{iv} + \beta_2 FEMALE_{iv} + \beta_3 CFW_{iv} * FEMALE_{iv} + \beta_4 X_{iv} + \varepsilon_{iv} \quad (3)$$

Where y_{iv} is the outcome of interest for household i in village v ; CFW_{iv} is a dummy indicating whether an individual from household i in village v was employed in infrastructure project or not; $FEMALE_{iv}$ is a dummy variable indicating whether an individual from household i in village v is female; $CFW_{iv} * FEMALE_{iv}$ is thus a dummy for being a woman assigned to treatment; X_{iv} is a vector of cluster- and individual-level imbalanced covariates at baseline; and ε_{iv} is the disturbance term. This equation tests whether the effects of the program is conditional on the gender of beneficiaries. Coefficient β_1 measures the effect of the program on men, while $\beta_1 + \beta_3$ measures the effect of the program on females.

4.2 Validity of the experimental set-up

The design assumes that experimental groups are balanced on a set of important pre-intervention covariates. If the experimental groups are not well balanced, we also analyze the data including the unbalanced covariates. Specifically, in Appendix A.3, we checked for imbalance on key covariates in the baseline data, and include any variables that are statistically significant at the 90 percent confidence level in the model. Table A4 shows that there is only one variable not balanced between the treatment and control groups: a dummy variable indicating whether the household head attended primary school.

We assess the severity of attrition using three approaches. First, we estimate whether the magnitude of attrition is different for treatment and control households. Second, we assess whether attrition households are different in terms of a comprehensive range of baseline characteristics. And third, we measure whether the baseline characteristics of attrition households in the treatment group are significantly different from those in the control group.

To account for multiple inference, first, we define summary indices and study whether

these indices are affected by treatment. Second, if the main indices are significant, we adjust the p-values of our coefficients of interest for multiple statistical inference using a family-wise p-value adjustment following (Anderson, 2008). The magnitude of adjustments needed crucially depends on the judgments a study wants to make (Lakens, 2016; Samii, 2017). In our case, we are interested in the effects of CFW on four distinct family of outcomes (see Figure 1 above) and so we adjust p-values within each family of outcomes but not across.

The analysis have to account for two issues related to program implementation. First, problems of compliance with the gender treatment have been somewhat bigger than expected and so the power of our ITT estimates may be limited. Second, because communities received uneven number of waves of CFW activities, we consider heterogeneity in treatment effects with respect to the number of waves received (see Section A.2.5).

5 Results

This section discusses the impacts of the program on (1) perceptions and implementation, (2) labor market outcomes, (3) material well-being (e.g. consumption and assets), (4) migration, (5) non-material welfare (e.g. social participation, the prevalence of conflicts, crime and violence, and psychological outcomes). Additionally, we explore (6) gender specific outcomes and (7) heterogeneous effects.

5.1 Perceptions of the SSNP

How was the project received on the ground? How did the population view the selection process and the infrastructures upgraded by the project? How did the beneficiaries perceive the daily wage rate and payments? To get an overall assessment, we look at responses in the quantitative and qualitative surveys for (i) beneficiaries, (ii) non-beneficiaries, (iii) village committees, and (iv) FADC/ANACEP staff.

The program as a whole was well-received. More than 70% of respondents felt satisfied with the way participants were selected and with the infrastructures being upgraded. However, a majority of beneficiaries complained about the daily wage rate and payment delays. In the qualitative survey, respondents displayed high levels of satisfactions with the program overall, but suggested three areas for improvement. First, they called for an increase in the daily wage rate, which apparently was not enough to guarantee an adequate standard of living.¹¹ Second, they suggested an improvement of the payment process, because they reported suffering from important delays between the end of work and payments

¹¹The wage rate for CFW activities is 1000 KMF—well below the average daily income across all activities measured at baseline (3400 KMF).

Figure 4: Satisfaction with the selection process

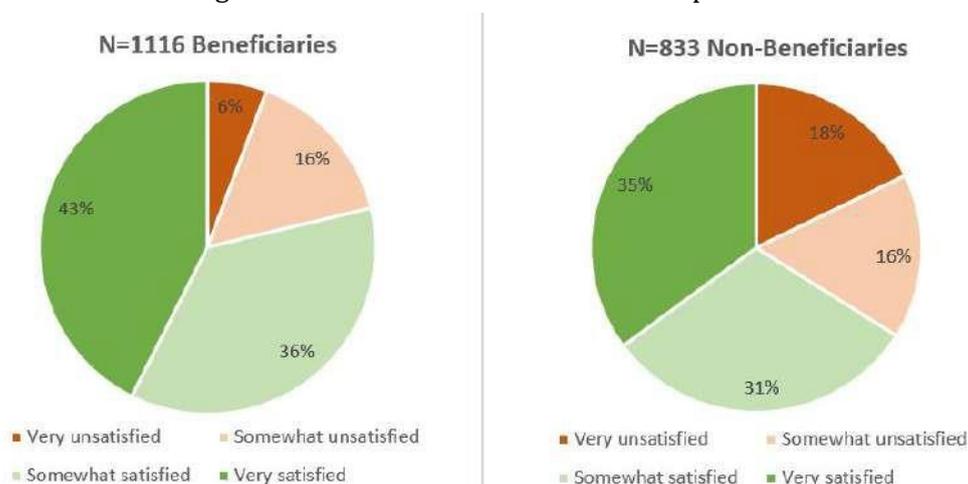
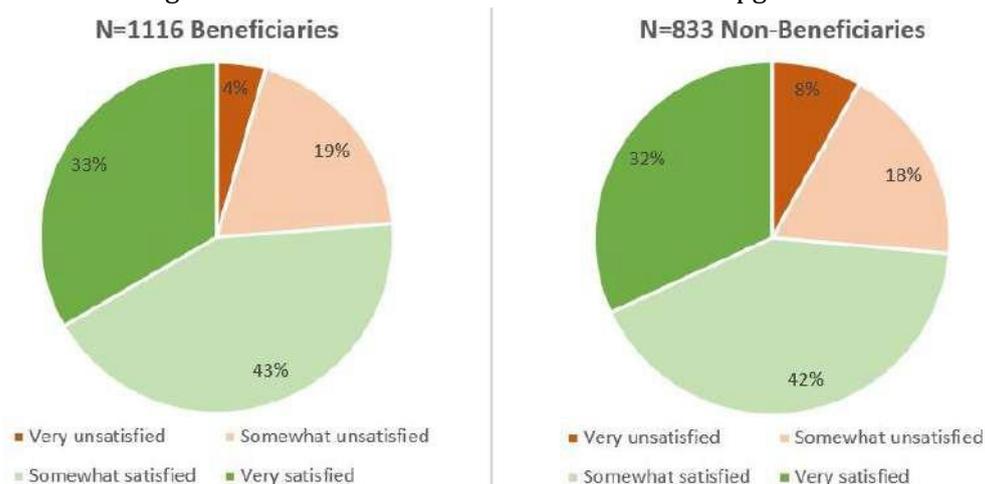


Figure 5: Satisfaction with the infrastructures upgraded



(often several months). Finally, they revealed some concerns regarding the continuity and sustainability of the infrastructures built and expressed the need to be supported after the project.

Overall, the selection process of beneficiaries, which was lottery-based, was overall well received by the population. 79% of beneficiaries and 66% of non-beneficiaries declared being satisfied (Figure 4). The fact that non-beneficiaries felt satisfied with the process at a relatively high level provides some reassurance regarding the fairness of the selection process. Below are some illustrative views:

We established the list of beneficiaries through public lotteries. Some non-beneficiaries were not satisfied. They were telling everywhere that I selected my friends, that I was partial... But the majority was happy with the way we proceeded.

President of a village committee

I would have liked to participate. I registered on the list but unfortunately, during the draw, I was not selected. I would have helped my husband in the daily consumption of our children (food). I would have been very happy. I would have also paid for the health of my children. Then, I would have bought goat.

Non-beneficiary in Grande Comore

Furthermore, most communities were also satisfied by the infrastructures on which participants worked. 76% of beneficiaries and 74% of non-beneficiaries declared being satisfied (Figure 5). This is confirmed by the qualitative interviews, even though respondents also mentioned concerns regarding the next steps to guarantee both the finalization and the continuity of improved infrastructures. In particular, it seems unclear how maintenance operations will be conducted and by who, as illustrated by the quotes below:

I'm very satisfied with the work done by this program. I found it very useful for the village because this work made it possible to develop quite a lot of fields that were uncultivable.

Beneficiary in Anjouan

I'm satisfied with the public works that have been done. We did a good job. We started by fencing the land. Then, it was arranged (cut the trees, pick up the stones, ...). We ended up fertilizing the soil. This will be useful once we will start planting. It is from there that people will really see the importance of the work. FADC promised us seeds. But we are waiting while the weeds have already grown.

Beneficiary in Grande Comore

The public works that were realized in this program really satisfied me because we will have all the profits together during harvest. The cleaning that has been done will also allow us to breathe fresh air. The negative point however is that they will not follow these activities. Once the work is finished they will give up without helping with the maintenance.

Beneficiary in Moheli

The program had positive impacts for me: the fact that my field was selected for planting trees. However, it's too bad they didn't choose the right time to plant these trees, because now there is none that has survived. There was too much sun during that time.

Non-beneficiary in Grande Comore

If there had not been not so much sun, our fields would have become true dense forests. But unfortunately most plants died because of the heat. This remains a problem without solutions for our crops. As you can see, everything is burnt, it seems as if there is fire in the ground that burns the crops.

Non-beneficiary in Anjouan

The program is well designed. What is unfortunate for me is the fact that there is no monitoring. FADC comes with several projects at the same time, such as tree planting, but it does not even know if they have survived, and the next year it starts a new plantation without considering what has been done.

Village committee member

What has been done by this program is necessary and useful, we are satisfied. However, it was not enough because we thought this program would be continuous. We would be very satisfied if all that has been done is preserved, but there is a good chance that the villagers will not take care of it.

ANACEP staff

The program helped the villages by creating income-generating activities, but the question we keep asking ourselves is whether the community can sustain what has been done without support.

ANACEP staff

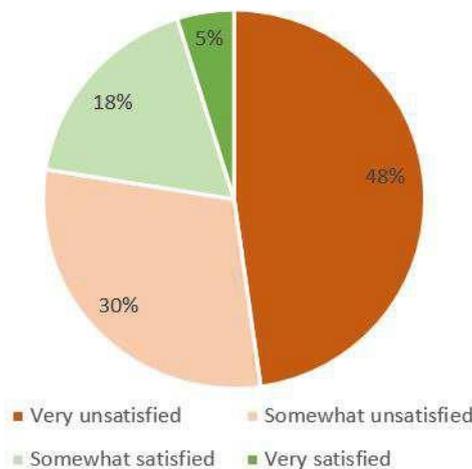
Two aspects on which beneficiaries seemed less satisfied are the daily wage of cash- for-work activities and the payment process. Only 23% of the beneficiaries declared being satisfied by the daily wage rate (Figure 6). Similarly, only 31% of the beneficiaries felt satisfied with the payment periods (Figure 7). They reported that they often had to wait several months after the end of work to get paid. Below are some illustrative views:

Workers rebelled from time to time. They demanded an increase in wages. I notified their grievances three times but ANACEP didn't react to my requests. In addition to that, we had late payments. MECK delayed paying the workers.

President of a village committee

Figure 6: Satisfaction with the daily wage rate

N=1116 Beneficiaries



Overall, I'm satisfied with the program. The bad thing I noticed is that they took too much time to pay us. Also, the salary was little compared to the daily obligations of life. With this delay and small salary, it happened that after receiving the money we spent it exclusively to discharge the debts.

Beneficiary in Anjouan

A negative point is the late payment. Also, the salary was very minimal. But what really bothered was the late payment.

Beneficiary in Grande Comore

Despite these grievances, all the respondents in the qualitative survey declared being satisfied or very satisfied by the project overall:

I'm so glad I took part and I want to say that if this program comes back I would like to be first on the list. I was really happy because it helped me too much and it gave me hope to live.

Beneficiary in Anjouan

I'm completely satisfied with the program as it has really helped in my household. I also learned a lot in this work because I didn't know how to plant a tree, how to move a large rock without much effort, how to make hedges with pebbles, how to superimpose pebbles and how to make nurseries. But now I can assure you that I know how to do all this, it's positive for me. The only thing that bothered me too much was the salary. Not only that it was really small compared to work but also the payment took too much time.

Beneficiary in Anjouan

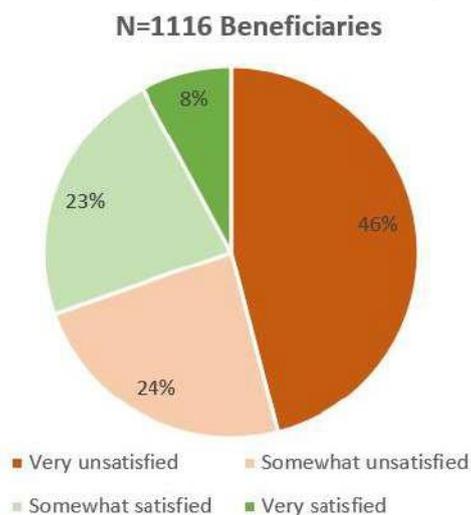
I'm very happy to have participated in the program. Thanks to the program I had hopes to receive some money at the end of the month to pay off my debts. Actually, I'm happier than before. Before I didn't have a house, I lived at the mercy of everyone in the village. I didn't have a stable life, I gave the world my four children in the homes of others. Now we have our house, we have debts, but I'm very happy to finally have a roof. We will start a new life and forget about the past.

Beneficiary in Grande Comore

I was happy to work, to occupy my time. I was very happy to be able to help my husband in the household's financial expenses.

Beneficiary in Grande Comore

Figure 7: Satisfaction with the payment periods



There are a lot of positives in this program. I learned a lot, I had some access to the shops, I had a job with a salary, which I had never thought possible. In the opposite direction, the work was really difficult, we moved large stones at a great distance, we dug big holes, we made very long hedges. There are even people who have had diseases on this program because there were some very hard activities not suited for women. But despite everything, we are very satisfied to have participated in this work.

Beneficiary in Anjouan

We are happy to have participated in the program. The work went well. We got along well between ourselves. I managed to repay almost all of my debts thanks to the money from the program. On top of that, I'm waiting for my turn in the Tontine. I'm going to have a big amount of money in one go. I will be able to buy something. So I'm probably more happy than before.

Beneficiary in Grande Comore

I would really like the program to continue because I have no other job and it will still help my household. If we are paid normally and receive the money on time, I will save little by little and at the end I will buy a goat or a calf or some other household item.

Beneficiary in Anjouan

Some concerns about the future were often expressed by village committee members, and in addition, ANACEP staff seemed discouraged by the project's end, as illustrated by the quotes below:

Our village has benefited a lot from the FADC projects. We have roads, cisterns, a school... The central government has decided to change and assign the skills of FADC to ANACEP. We really fear that things become as before.

Village committee member

Thanks to FADC we have sanitation, schools and fruit trees planted; that is why fear is instilled and multiple questions arise. In particular, will the ANACEP resume as it should?

Village committee member

Since this was a new project, we had a lot of difficulties at the beginning. But as a result of the efforts made and thanks to the training, we finally got used to it. What is disappointing is that they waited until we understood and mastered the process of the project to tell us to stop. It is not fair. We suffered because at first we didn't even understand the principle of this program. With time and the support from the World Bank we got able to overcome the difficulties and understand the principles of the program. It had become easy for us lately. For example, there was work that took us three to four days at the beginning, but at the end we could do it in a day or half a day.

Overall, the perceptions from workers and non-workers from villages targeted by the project are positive. They indicate satisfaction with infrastructure projects implemented and more importantly satisfaction with the process through which workers were ultimately selected. These positive perceptions are validated by qualitative interviews carried out with a small sample of workers, non-workers and project staff. While some respondents aired a few grievances, these should be seen more as areas for improvement for future versions of the project rather than indications of with the project per se.

5.2 Impacts on labor market outcomes

We first assess whether the intervention was delivered to the intended beneficiaries by studying self-reported labor market outcomes. In Tables 2 and 3, we check whether households assigned to treatment were indeed more likely to perform CFW activities, and whether they saw an improvement of their overall levels of employment and income. On one hand, access to CFW opportunities should directly increase employment and income of beneficiaries, at least contemporaneous or shortly after the program. On the other hand, foregone income and substitution effects could undermine these direct effects (e.g. if beneficiaries give up on other profitable activities because of the labor requirement of the program).

Employment and incomes were measured for all individuals and then aggregated at the household level. A 30 days recall period has been used in order to limit the scope for measurement errors. Note however that CFW income was derived from CFW employment as no payments occurred in the 30 days preceding the interviews (it should therefore be seen as expected or deferred income).

The SSNP appears to have reached the targeted population. The results indicate that employment opportunities were offered to the intended beneficiaries and that there was significant take-up. At the time the follow-up survey was carried out, households assigned to treatment were 263% more likely to participate in cash-for-work activities ($p < 0.01$). This provides some reassurance on the implementation of both the program and the randomization.

The control group seems to have been slightly contaminated since control households reported an average of 1.88 days in public works (Table 2). The main explanation for the contamination of the control group is related to the formal and informal replacements of beneficiaries dropping out, as illustrated in the following quote:

It was me who appeared in the draw. After a month, receiving the 40 euro, I went back to my own

Table 2: Employment

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Total days worked (excluding CFW)	51.924	0.569 (1.617)	2.134 (3.439)	3.174 (3.820)	2.706 (2.662)	2181
Total days worked (including CFW)	53.795	5.576*** (1.663)	0.923 (3.779)	3.626 (3.825)	2.420 (2.764)	2181
Engaged in agriculture (d)	0.871	-0.008 (0.015)	0.001 (0.023)	-0.030 (0.027)	0.023 (0.021)	2181
Days worked in agriculture (30 days)	19.691	0.005 (0.839)	0.846 (1.771)	1.602 (1.887)	0.371 (1.452)	2173
Engaged in livestock (d)	0.573	-0.028 (0.022)	0.030 (0.046)	-0.002 (0.049)	0.046 (0.036)	2181
Days worked in livestock (30 days)	19.305	-0.824 (0.854)	1.856 (1.899)	-0.253 (2.217)	2.467* (1.376)	2178
Engaged in fishing (d)	0.091	0.011 (0.013)	0.064** (0.032)	0.069** (0.032)	-0.020 (0.024)	2181
Days worked in fishing (30 days)	0.674	-0.174 (0.156)	0.237 (0.249)	0.695** (0.321)	0.128 (0.194)	2178
Engaged in other IGA (d)	0.597	0.035 (0.021)	-0.039 (0.056)	-0.006 (0.058)	-0.020 (0.035)	2181
Days worked in other IGA (30 days)	12.392	1.496* (0.776)	-0.719 (1.592)	0.974 (1.525)	-0.083 (1.363)	2181
Engaged in CFW activities (d)	0.119	0.314*** (0.018)	-0.071 (0.065)	0.026 (0.037)	-0.033 (0.037)	2181
Days worked in CFW activities (30 days)	1.875	5.055*** (0.320)	-1.249 (1.263)	0.465 (0.604)	-0.359 (0.695)	2169

Notes: This table reports OLS/LPM estimates of treatment effects. Outcome variables are listed on the left. For each outcome variable, we report the coefficients of interest and their standard errors in parentheses. Column (1) reports the mean of the outcome in the control group. Column (2) reports the treatment effect. Columns (3) and (4) report the indirect treatment effects on treated and control households respectively. Column (5) reports conditional effects.

farming which is more profitable. My wife also didn't want to go. Then another person took our place. I saw that the program was not going to help me on much.

Beneficiary in Grande Comore

There were also a few cases where two different household members registered the same household during the targeting (either inadvertently or in an attempt to increase the probability of the household to get selected).¹² Finally, contamination could also be due to measurement error, or to a different definition of households in the survey relative to the definition used during project targeting. As mentioned in Section 4.1, we use ITT estimates in order to limit problems.¹³

The program did not seem to crowd out other sources of employment. Beneficiary households were still able to work the same number of days in their regular activities (farming and other income-generating activities) despite the labor requirement of the program. However, the data suggest the presence of substitution effects for income (Table 3). Excluding income derived from CFW activities, treated households earned a lower total income than their control counterparts. However, the total treatment effect on employment and income is substantial and positive, so that overall the program can be considered as a positive income

¹²We do not have any evidence of other CFW programs by organizations other than the FADC.

¹³In Table A9, we replicate our main analysis using the treatment assignment as an IV for treatment actually observed (from the survey). Significance does not appear to be affected though LATE coefficients are bigger.

Table 3: Income

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Total income (excluding CFW)	9.138	-0.657*	-0.722	-0.200	0.010	2181
		(0.380)	(0.882)	(0.974)	(0.632)	
Total income (including CFW)	10.329	2.494***	-1.409	0.016	-0.244	2181
		(0.427)	(1.164)	(1.078)	(0.742)	
Income from agriculture (30 days)	3.598	-0.218	-0.495	-0.612	-0.291	2166
		(0.215)	(0.457)	(0.551)	(0.360)	
Income from livestock (30 days)	0.784	-0.059	-0.281	-0.054	0.146	2175
		(0.122)	(0.183)	(0.207)	(0.211)	
Income from fisheries (30 days)	0.453	-0.071	0.186	0.323	-0.127	2177
		(0.090)	(0.182)	(0.198)	(0.143)	
Income from other IGA (30 days)	4.318	-0.289	-0.143	0.152	0.292	2181
		(0.237)	(0.520)	(0.602)	(0.397)	
Expected income from CFW activities	1.191	3.152***	-0.686	0.216	-0.254	2181
		(0.179)	(0.663)	(0.377)	(0.376)	

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to all income variables.

shock for treated households. The magnitude of this income effect is pretty large (somewhere south of one-quarter).

The fact that we find evidence of substitution effects for income but not for employment seems a bit puzzling. The qualitative interviews tend to confirm that CFW opportunities had substitution effects on participants. Many respondents reported that they had to reduce their productive activities due to the labor requirement of the program. Perhaps our survey instruments were not designed to capture these slight changes for employment because they inquired about the number of days. It is perfectly possible that participants worked the same number of days in their regular productive activities but reduced the number of hours worked each days. Another possible explanation is that beneficiaries might have shifted some time toward activities that represent an investment (e.g. fixing nets, building fences). Future impact evaluations of cash-for-work programs should consider number of hours worked in regular activities and decompose by type of activities to be able to investigate potential substitution effects in more details.

My wife had to reduce her activity (skewered meat and chicken) to participate in this program, but as the program ended she resumed her activity.

Beneficiary in Moheli

I don't know a household that had to stop working to participate in the program. But almost everyone had to reduce their activities. For example, sometimes my husband brought food to his goats only once a day. Another time, he was busy, I had to replace him instead of going fishing.

Beneficiary in Grande Comore

I personally reduced my activities such as sewing to participate in the program.

Beneficiary in Grande Comore

I don't know of any household that had to stop or reduce their work to participate in the program. It was well planned in a way that some went into their personal work before work, while others came in the program first. After, the farmers could take care of their goats and cows. Same thing for the fishermen.

Village committee member

I didn't reduce my activities because I didn't have any activities other than housework. I was only preparing meals and cleaning the house. So I did the job of the FADC without difficulty.

Beneficiary in Moheli

5.3 Impacts on economic welfare

Qualitative evidence suggests that beneficiaries spent most of the cash on consumption, and occasionally on assets or livestock. However, the quantitative evidence points that these impacts were not large enough to be statistically significant. Tables 4 to 10 consistently show non-significant treatment effects on food security, food consumption, non-food consumption/expenditures, investments in the dwelling, assets, livestock, and savings. These results are consistent with Beegle et al. (2017) who find no effects of a similar cash-for-work program in Malawi on food security. In what follows, we focus on potential explanations for these null results.

The quantitative data allows to test for two potential explanations for these null effects:

(i) substitution effects; (ii) positive indirect effects on control households. First, the modest substitution effects highlighted in the previous section are not sufficient to explain the lack of impact. The total treatment effects on employment and income have been shown to be substantial and positive, so that overall the program caused a positive income shock for treated households. Second, indirect effects could bias the estimates if they affect treated and control households in a different manner. For instance, control households could benefit indirectly from the program through solidarity or redistribution norms. This would bias ITT estimates in Tables 4 to 10 downward. Columns 3 and 4 report the sign and magnitude of indirect effects for both treated and control households. We see no evidence of significant indirect treatment effects. If anything, these effects are likely to be small and similar across treatment and control groups.¹⁴

While the quantitative evidence provides rigorous estimates of impacts at one point in time, it is limited in its ability to explain potential mechanisms through which null effects may have occurred. Qualitative data is helpful to understand the absence of measurable effects on traditional indicators of economic well-being.

During qualitative interviews, SSNP Beneficiaries reported slight increases in consumption. The ability to detect these effects using quantitative analysis depends on the extent of consumption smoothing and the extent of investments in productive assets or activities. If consumption smoothing was important and investments were scarce or unproductive, the effects on consumption levels at the time of the survey would likely be too low to be identifiable with quantitative analysis. If households consumed most of their allowance in the short run, the effects on consumption would be short lived. The timing of the follow-

¹⁴Significant estimates of ITE on fishing may be due to the fact that the intra-cluster-correlation is much higher (most households engage in fishing if the village is on the seaside) which increases the chances to find significant ITE effects at random.

up survey may have limited our ability to capture such short-run effects using quantitative analysis. The survey was implemented a few months after payments were made. The recall periods used for data on food consumption (7 days) and frequent non-food expenditures (30 days) were most likely too short to capture short-run effects on consumption. This is reinforced by the fact that program participants reported that the program increased their ability to borrow money to finance daily life expenditures before payments were actually made. Borrowing allowed beneficiaries to increase consumption before payments were made, and therefore mitigate the negative substitution effects on income during CFW activities identified in Section 5.2. However, borrowing also implies that effects on consumption might have occurred long before the payments were actually made. Also, a non-negligible part of the payments was therefore used to reimburse debts. In conclusion, the only case in which we would be able to measure large and statistically significant effects on consumption is if beneficiaries invested the money of the SSNP in productive assets or activities, which in turn led to a long-lasting increase in income and consumption.

With most of the cash spent on consumption and debt repayment, beneficiaries reported having a very limited amount at their disposal for investments in dwelling, assets or livestock. The qualitative interviews suggest that few households have been able to use the cash to make such investments. When they did, it is striking to see the wide variety of items cited. In the quotes, we can see some respondents who mentioned using the money for construction (house, cistern, small improvements), buying a bed, a TV, cooking pots, a goat... However, these types of investments were rare, of various forms, not necessarily productive, and generally mutually exclusive (i.e. they could buy one of these items but not all of them). Thus, it is not surprising that the quantitative analysis fail to detect any significant effect on consumption and on assets. If anything, these effects are small.

In what follows, we present the quantitative results and qualitative evidence in more details, focusing on (1) food security and consumption (including food security, food expenditures, non-food expenditures, etc.); (2) Assets accumulation (including households assets; dwelling; livestock, etc.) and (3) savings and debts.

5.3.1 Impacts on food security and consumption

Tables 4 and 5 report the impact of the SSN program of food security and consumption. For food security, we inquired about the usual number of meals for adults and children, how many meals have been skipped in the last 7 days, a self-declared indicator of food security, whether the household relied on help from others for food. For food consumption,

Table 4: Food security

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Food security index	0.000	-0.014	0.012	-0.015	-0.008	2181
		(0.021)	(0.052)	(0.051)	(0.036)	
Self-declared food security (d)	0.707	0.010	0.030	-0.016	0.036	2181
		(0.019)	(0.032)	(0.040)	(0.032)	
Relied on help from others for food (d)	0.406	-0.017	-0.005	-0.018	-0.008	2181
		(0.021)	(0.039)	(0.038)	(0.036)	
Meals per day: children (N)	1.695	-0.009	-0.022	-0.018	0.128**	2181
		(0.041)	(0.073)	(0.067)	(0.062)	
Meals skipped per week: children (N)	1.410	-0.028	-0.251**	-0.188	0.208*	2181
		(0.070)	(0.118)	(0.124)	(0.116)	
Meals per day: adults (N)	1.845	-0.069**	-0.008	-0.079	0.030	2181
		(0.028)	(0.074)	(0.081)	(0.047)	
Meals skipped per week: adults (N)	1.885	-0.037	0.016	0.025	0.045	2181
		(0.074)	(0.128)	(0.142)	(0.119)	
Days with meat or fish per week (N)	4.371	-0.073	0.026	-0.059	0.359**	2181
		(0.096)	(0.272)	(0.251)	(0.163)	

Notes: See notes to Table 2. All estimates control for baseline level of the outcome.

we inquired how much the household of the respondent spent on various food and beverage items in the last 7 days, such as rice, fruits, legumes, vegetables, meat, fish, eggs, oil, etc... We also asked about own consumption (valued at the market price) because this was widespread in our context. We created a composite index of food security and food consumption, calculated by acquiring the standardized mean across these variables for each observation. Expenditure variables have been converted using the inverse hyperbolic sine transformation.

We do not find significant direct or indirect effects of the program on food security and food consumption. The program had no significant on the food security index, total food expenditures, and total non food expenditures.

There is mixed evidence that the food security of households with a female assigned to treatment improved slightly. Children with female beneficiaries had more meals per day on average (but also missed more meals) and their households had on average more 0.36 days per week with meat or fish (significant at the 5% level). However, there is no significant effect for the food security index.

While the quantitative results on impacts on food security and consumption are statistically insignificant, many respondents to the qualitative survey reported higher levels of consumption and food security due to the program, as illustrated by the quotes below.

The work lasted 9 months spread over 3 years. Each month we earned 20,000 KMF (40 euros). So it was 180,000 KMF (360 euros) in total. I didn't make anything productive of this money. I only bought food for the household because we had a big problem with the payment. Imagine, we worked for 20 days per month but instead of paying us directly they took several months. During this time we were taking debts, and when we finally received the money, we had to repay all the debts and could not even buy anything. That said, I'm very satisfied with the way I spent the money I received because in my household we ate a little better than before.

Beneficiary in Anjouan

Table 5: Food consumption

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Total food expenditures	38.037	-0.471	0.604	0.767	0.838	2181
Rice expenditures	9.807	0.042	0.308	-0.068	0.547	2181
Fruits and legumes/vegetables exp	10.608	-0.052	0.386	0.716**	0.142	2181
Meat and fish expenditures	8.044	-0.223*	-0.107	-0.042	0.395*	2181
Other food exp (eggs, oil, beverages,etc.)	9.578	-0.204	0.293	0.647	-0.174	2181
Value of food own consumption	7.532	-0.214	0.109	0.008	0.233	2181
		(0.167)	(0.326)	(0.326)	(0.277)	

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to all outcomes. All estimates control for baseline level of the outcome.

This money had increased the consumption of the house a little.

Beneficiary in Anjouan

We ate well because I had enough to spend on food.

Beneficiary in Anjouan

Table 6: Non-food expenditures

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Total non food expenditures	82.732	-0.218	-1.848	-1.504	1.244	2181
		(0.887)	(1.671)	(2.032)	(1.370)	
Frequent non-fond expenditures						
Cosmetics	10.076	-0.017	0.022	-0.215	-0.010	2181
		(0.094)	(0.174)	(0.202)	(0.150)	
Energy	8.674	-0.164	-0.549	-0.003	0.055	2181
		(0.220)	(0.439)	(0.456)	(0.361)	
Communication	8.355	-0.118	-0.167	-0.240	0.299	2181
		(0.200)	(0.380)	(0.365)	(0.328)	
Transportation	8.770	0.012	-0.436	-0.554	0.442	2181
		(0.210)	(0.418)	(0.485)	(0.345)	
Non-frequent non-fond expenditures						
Education	9.280	0.059	-0.445**	0.015	0.194	2104
		(0.165)	(0.215)	(0.279)	(0.257)	
Health	9.642	0.010	-0.335	0.052	0.173	2130
		(0.179)	(0.284)	(0.345)	(0.293)	
Clothing	10.136	0.123	-0.204	-0.188	0.260	2127
		(0.133)	(0.242)	(0.261)	(0.180)	
Housing	3.277	0.237	0.220	-0.087	-0.214	2145
		(0.222)	(0.421)	(0.507)	(0.377)	
Equipments	3.911	-0.079	0.156	-0.491	-0.650*	2152
		(0.223)	(0.499)	(0.564)	(0.375)	
Taxes	0.342	-0.054	0.139	0.032	-0.019	2163
		(0.078)	(0.118)	(0.135)	(0.141)	
Ceremonies	10.832	-0.134	0.077	0.291	-0.127	2181
		(0.133)	(0.209)	(0.222)	(0.232)	

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to all outcomes. All estimates control for baseline level of the outcome.

In Table 6, we report the effects of the program on non-food items, such as expenditures on education, health, clothing or transportation. We also include an expenditure index, in order to ascertain whether there has been an effect on this family of outcomes in general. We do not find a significant direct or indirect effects of the program on food security and food

consumption. Some households mentioned using the money of the program on education or health expenditures. This was however pretty rare and it is thus not surprising that the results are not statistically significant in the quantitative survey.

My daughter was sick, she was hospitalized, I had to spend 40,000 KMF, the salary for two months.

Beneficiary in Grande Comore

The money I got through this program, I spent it in the education of my children and for food. So, for now, I have nothing left of this money.

Beneficiary in Anjouan

We agreed, me and my husband, to invest the money in the education of our children and to repay debts. Yes, I'm satisfied. Because 75% of the money is invested in the education of our children, it is our hope.

Beneficiary in Grande Comore

5.3.2 Impacts on assets accumulation

The survey also inquired about assets accumulation and investments. The survey included a list of questions on whether the household owns a series of assets (e.g. mattress, bed, chair, table, fridge, TV, phone) and, if yes, how many of these they own.

Table 6 shows the results at the extensive margin (i.e. on the quantity). The overall asset index is not statistically significant. Results on the intensive margin are reported in Table A5. The results consistently show that the program had a non-significant impact on assets. The results on dwelling and livestock are similar (see Tables 8 and 9). There are no significant impacts on the overall indices (the livestock index corresponds to the quantity of livestock expressed using the tropical livestock unit - TLU), and for individual variables, only a few coefficients appear significant. For example, households assigned to the treatment had 0.049 less sheep than households assigned to the control group (significant at the 10% level).

The qualitative evidence helps to understand why there is no significant effects on investments in assets, dwelling and livestock. Most of the respondents reported that they were unable to invest the money on beyond consumption and debt repayment. Beneficiaries reported that in practice, they had a very limited amount at their disposal for investments in dwelling, assets, or livestock.

This money I used it just for consumption, nothing else than that. I could not save or bought any property because this money was very little, with a big delay of the payment. So with the bigger part of this money, we repaid the loans we made on the shops, with the other part we bought food.

Beneficiary in Moheli

We paid off debts, we made stock (rice, salt, sugar, ...). Other than that, we didn't buy anything.

Table 7: Assets (extensive margin)

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Asset index	0.000	0.001	0.005	0.046	0.026	2181
		(0.015)	(0.027)	(0.033)	(0.028)	
Mattress	0.883	0.009	-0.032	-0.009	-0.017	2181
		(0.014)	(0.032)	(0.039)	(0.023)	
Bed	0.977	-0.003	-0.001	0.022*	0.002	2181
		(0.007)	(0.010)	(0.011)	(0.011)	
Chair	0.650	0.023	-0.020	-0.050	-0.020	2181
		(0.018)	(0.033)	(0.037)	(0.029)	
Armchair	0.137	-0.012	0.005	0.027	-0.011	2181
		(0.013)	(0.023)	(0.029)	(0.023)	
Table	0.697	0.001	0.004	-0.003	-0.027	2181
		(0.018)	(0.030)	(0.033)	(0.029)	
Gas fireplace	0.038	-0.004	-0.013	0.017	0.027**	2181
		(0.007)	(0.010)	(0.015)	(0.013)	
Oil fireplace	0.351	0.017	0.027	0.035	0.009	2181
		(0.020)	(0.040)	(0.042)	(0.033)	
Iron	0.148	0.014	0.002	0.001	0.002	2181
		(0.014)	(0.024)	(0.025)	(0.025)	
Fridge	0.156	-0.002	-0.018	0.021	-0.003	2181
		(0.014)	(0.025)	(0.030)	(0.025)	
Fan	0.016	0.006	0.010	-0.010	0.001	2181
		(0.006)	(0.010)	(0.009)	(0.012)	
TV	0.360	-0.033*	-0.013	-0.034	0.005	2181
		(0.019)	(0.033)	(0.040)	(0.031)	
Phone	0.765	-0.018	-0.001	0.001	0.013	2181
		(0.018)	(0.034)	(0.033)	(0.030)	
Computer	0.057	0.005	0.010	0.055***	-0.004	2181
		(0.010)	(0.016)	(0.016)	(0.016)	
Wheelbarrow	0.049	0.002	0.028*	0.028	0.014	2181
		(0.010)	(0.016)	(0.018)	(0.016)	
Bike	0.010	0.005	-0.006	-0.001	0.012	2181
		(0.005)	(0.006)	(0.006)	(0.008)	
Motorbike	0.030	-0.003	0.007	0.011	0.008	2181
		(0.007)	(0.009)	(0.015)	(0.012)	
Car	0.047	-0.007	0.002	0.023*	0.014	2181
		(0.008)	(0.012)	(0.013)	(0.014)	
Satellite dish	0.091	-0.016	-0.009	0.020	-0.021	2181
		(0.012)	(0.014)	(0.023)	(0.019)	
Other	0.044	0.002	-0.026	-0.018	0.003	2181
		(0.009)	(0.017)	(0.019)	(0.016)	

Notes: See notes to Table 2. All estimates control for baseline level of the outcome. Results on the intensive margin are similar (see Table A5).

Table 8: Dwelling

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Dwelling index	0.000	-0.003	-0.015	-0.016	-0.005	2181
		(0.014)	(0.033)	(0.032)	(0.024)	
House owned (d)	0.933	-0.009	-0.019	-0.018	-0.019	2181
		(0.011)	(0.018)	(0.016)	(0.019)	
Number of rooms	3.052	0.036	-0.071	-0.048	-0.066	2181
		(0.049)	(0.129)	(0.123)	(0.086)	
House has non-mud floor	0.778	0.007	-0.016	-0.046*	-0.010	2181
		(0.012)	(0.025)	(0.026)	(0.018)	
House has cement roof	0.203	-0.010	-0.011	0.013	0.019	2181
		(0.011)	(0.020)	(0.017)	(0.018)	
House has non-mud walls	0.943	-0.008	-0.008	-0.006	0.014	2181
		(0.009)	(0.018)	(0.016)	(0.014)	
House has private source of electricity	0.476	0.016	0.061	0.097**	0.058**	2181
		(0.018)	(0.042)	(0.048)	(0.029)	
House has private drinking water source	0.699	-0.019	0.017	-0.009	-0.031	2181
		(0.013)	(0.043)	(0.040)	(0.022)	

Notes: See notes to Table 2. All estimates control for baseline level of the outcome.

Table 9: Livestock (extensive and intensive margins)

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
TLU (N)	0.451	-0.057	-0.024	0.068	0.021	2181
		(0.036)	(0.058)	(0.076)	(0.051)	
Cow (d)	0.227	-0.023	-0.006	0.006	0.014	2181
		(0.016)	(0.032)	(0.034)	(0.029)	
Cow (N)	0.473	-0.077	-0.042	0.078	0.031	2181
		(0.048)	(0.078)	(0.102)	(0.066)	
Goat (d)	0.347	0.005	0.006	-0.009	0.043	2181
		(0.020)	(0.026)	(0.039)	(0.033)	
Goat (N)	0.899	0.026	0.022	0.107	0.044	2181
		(0.067)	(0.094)	(0.127)	(0.122)	
Sheep (d)	0.070	-0.020*	0.016	-0.007	-0.013	2181
		(0.010)	(0.018)	(0.025)	(0.016)	
Sheep (N)	0.163	-0.049*	0.027	-0.056	-0.020	2181
		(0.028)	(0.044)	(0.062)	(0.045)	
Chicken (d)	0.283	-0.010	0.034	0.025	0.037	2181
		(0.019)	(0.033)	(0.040)	(0.032)	
Chicken (N)	1.452	-0.087	0.013	0.226	0.120	2181
		(0.139)	(0.220)	(0.268)	(0.220)	
Other (d)	0.019	-0.010*	-0.001	-0.003	0.006	2181
		(0.005)	(0.006)	(0.011)	(0.006)	
Other (N)	0.128	-0.055	0.054	0.056	0.007	2181
		(0.055)	(0.074)	(0.071)	(0.012)	

See notes to Table 2. All estimates control for baseline level of the outcome.

Beneficiary in Anjouan

All the money from the program was invested in household consumption and my husband's health, as I said. We didn't buy assets.

Beneficiary in Grande Comore

I used the money received for household food and to repay debts (also made for household food). I couldn't do something else. Looking for something to eat for my home was the most urgent. The money received was insufficient to make a program other than the household's food. I swear I didn't buy anything else.

Beneficiary in Anjouan

I could not buy anything with this money. There were also important things to do, for example, to pay for the schooling of children, in fact it was little for all that.

Beneficiary in Moheli

Almost all the money has been invested in household consumption. It is me and my husband who decided on the allocation of the money. To tell the truth, I'm not very satisfied. With such an amount, we should have invested in something sustainable. But we had debts in the shops, after the payments we had to pay back.

Beneficiary in Grande Comore

A few households were able to use the cash to make investments. The wide variety of investments made is however striking. In the quotes below, we can see some respondents who mentioned using the money for construction (house, cistern, small improvements), buying a bed, a TV, cooking pots, a goat... However, these types of investments were rare, of various forms, not necessarily productive, and generally mutually exclusive (i.e. they could buy one of these items but not all of them). Thus, it is not surprising that the quantitative analysis fail to detect any significant effect on individual variables. If anything, these effects are small.

This money allowed me to buy a bed. I have it until now. I bought it because I didn't have one before.

Beneficiary in Anjouan

I bought a TV. My children were going to the neighbors' house to watch TV but I saw them being rejected every day and it made me feel uncomfortable and ashamed to see my children like that. So I decided to buy the TV so that they stay at home.

Beneficiary in Grande Comore

I used this money to repair my house which was in bad shape. My husband decided on the allowance. I'm very satisfied with the way the money was spent.

Beneficiary in Anjouan

In fact, we didn't have a house before. We slept with friends of my husband and neighbors. So, we invested the program money in the tontine. This allowed us to start building this house until this point. We hope to finish everything and arrange by next month. I can say that this is the good that we got from the program money.

Beneficiary in Grande Comore

Apart from the household consumption, I bought a pot of 10 liters. I just wanted to keep a souvenir of the program and bought the pot.

Beneficiary in Grande Comore

In addition to household consumption, I bought a goat. It's economically profitable. She will give children. We can sell them and make money. In addition, I wanted to keep a memory of the program.

Beneficiary in Moheli

5.3.3 Savings and debts

Finally, the results on debts and savings are reported in Table 10. The overall financial index is not significantly different between the treatment and control groups. The impact on debts is theoretically ambiguous. On the one hand, the program could have a negative effect on debts if beneficiaries use the cash to repay their debts. On the other hand, the capacity of beneficiaries to borrow could also be increased as future income streams can be used as a collateral. Overall, the quantitative results do not show significant impacts on debt, which suggest that the effects are of a similar magnitude. The qualitative evidence suggests that both mechanisms are at play.

The fact of participating in the program has completely changed our status in this village because if for example we want to make debts in a shop, there was no doubt because the owner still had the hope that we have work so we will have the means to pay this debt. But the other people who didn't have the chance to participate in the work it was difficult for them to make a debt somewhere.

Beneficiary in Anjouan

Participating in this program have slightly changed our status in the village because people like us, who worked in the program, we were given loans in the shops. This was already a good thing.

Table 10: Debts and savings

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Financial index	0.000	-0.009	-0.023	-0.019	0.025	2181
		(0.018)	(0.030)	(0.038)	(0.030)	
Has debts (d)	0.673	0.009	-0.073*	-0.042	0.014	2181
		(0.020)	(0.040)	(0.039)	(0.033)	
Total amount of the debts	8.143	-0.008	-0.958*	-0.726	0.245	2181
		(0.259)	(0.494)	(0.510)	(0.424)	
Reimbursed debts (d)	0.234	-0.006	-0.005	-0.054	0.040	2181
		(0.018)	(0.027)	(0.033)	(0.031)	
Has a bank account (d)	0.303	-0.021	-0.033	-0.005	0.001	2181
		(0.020)	(0.039)	(0.047)	(0.033)	
Savings (d)	0.066	0.009	-0.007	0.018	0.005	2181
		(0.011)	(0.017)	(0.020)	(0.019)	

See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to the amount of the debts.

Beneficiary in Moheli

I used this money to repay debts because there was late payment.

Beneficiary in Anjouan

I used this money by paying debts because they took time to pay us. To live I got into debt. I'm not at all satisfied with the way this money was spent.

Beneficiary in Anjouan

We do not find significant impacts on savings either. This may be due to the difficulty to capture savings in a context where 70% of households do not have a bank account. Saving money is rare and takes various forms (e.g. bank account, assets, jewels, ROSCAs and other informal institutions), as illustrated in the following quotes.

I didn't save because as soon as I received the money there was a problem to solve.

Beneficiary in Grande Comore

I saved everything for the construction of the house.

Beneficiary in Moheli

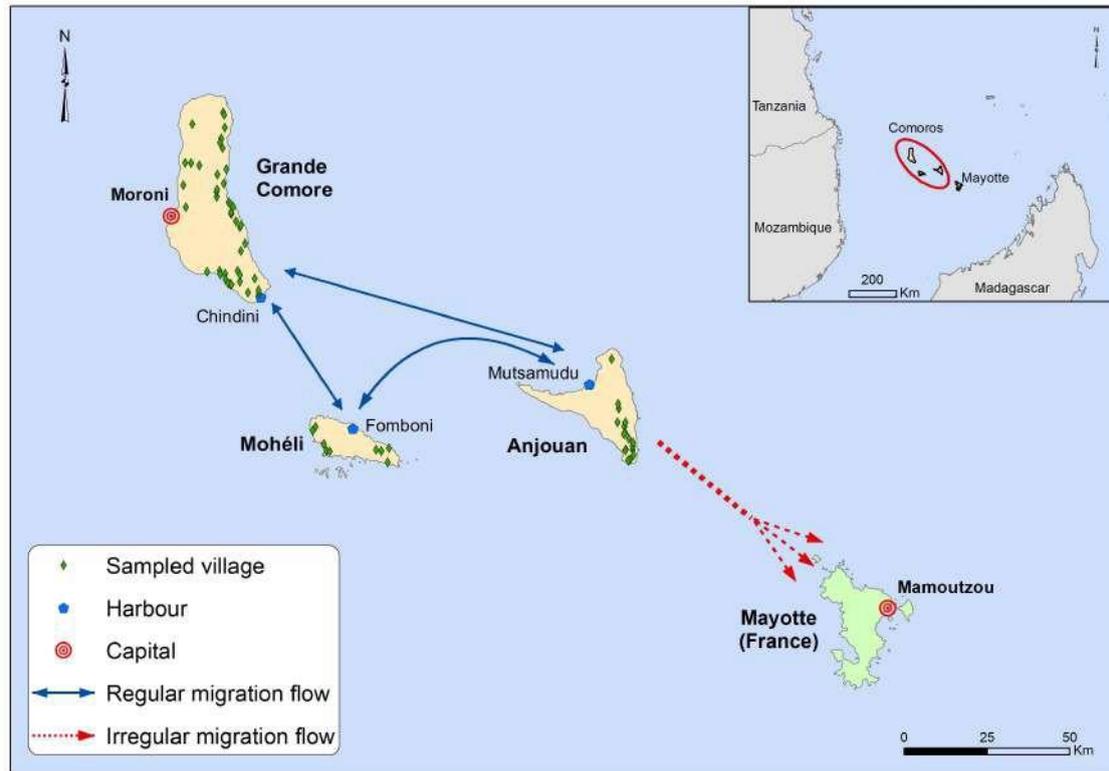
Yes, I have almost all of my salary. I saved it in my bank account to build a cistern. I know it's not enough but it's still a start.

Beneficiary in Grande Comore

As I said before, I spent my money in the following way. I invested in the tontines, I paid off debts, and I contributed in the consumption of the household. Other than that, we didn't buy anything. I'm waiting for the tontine to come to me. I will earn more than 500,000 KMF. At that moment, I will buy some jewels that I will keep at home. It is a wealth for us Comorians. There will come a time when we will need a lot of money. It can be sold or deposited in banks to make a loan. Otherwise we can also use it at weddings of our children.

Beneficiary in Grande Comore

Figure 8: Migration route to Mayotte



Source: Authors' elaboration

5.4 Impacts on migration

The program may have affected migration patterns to Mayotte – the neighboring and richer French Island. As mentioned in section 2.1, the expected impact is ambiguous: the increased revenue could reduce the need for migration but it may also provide the necessary means to finance migration costs. The results show that the program increased investments in migration to Mayotte. This result seems to be driven by individuals migrating for health and family reasons.

Migration patterns are salient in the Comoro archipelago. A mix of geographic proximity and economic disparities causes many Comorians to migrate to Mayotte. While Mayotte is located about 70 kilometers to the South-East of Comoros, the GDP per capita in Mayotte is more than 10 times that of Comoros, and Mayotte has much better public infrastructures.

In 1995, in order to control migration of Comorians to Mayotte, France issued strict visa requirements. As a result, illegal sea routes and people smuggling emerged. The routes used by migrants are depicted in Figure 8. Migrants converge to the south east of Anjouan and then use *kwassa-kwassa* (small fishing boats) to reach Mayotte. Despite high migration costs (a trip costs about US\$500) and police controls, the flow of Comorians has never stopped.¹⁵

¹⁵According to official statistics from the French administration, each year, about 20,000 illegal migrants (i.e.

It is estimated that 61 percent of Mayotte’s population has a connection to Comoros with 42 percent born in Comoros and an additional 19 percent having a Comorian mother (Marie et al., 2017). The journey is both risky and costly. The cost of a trip is currently about US\$500.¹⁶ An average of 1,000 Comorians are estimated to die trying to reach Mayotte each year (Senat, 2008). The qualitative survey provides sobering evidence on these migrations flows.

People don’t want to migrate to Mayotte. In general, there are only two reasons why people do it. A miserable life: some people think that in Mayotte they can find a better life compared to Comoros and work to help their loved ones. A disease: there are people who don’t want to go to Mayotte but because of diseases they will be forced to go because there they can find better care compared to Comoros. It’s not easy at all to go to Mayotte. This is the most dangerous path in the world. I took it three times. I know it by heart. But now I decided to never put my foot in Mayotte again, because the life there does not interest me.

Beneficiary in Anjouan

There is only one way to go to Mayotte, it is to take a Kwassa-kwassa (small fishing boat). Only people who have a normal situation can travel by plane or boat. The journey is so difficult and risky... I know so many people who have lost their lives in this sea... I can tell you that here there are many orphans who have lost their families because of Mayotte. The number of people in this village who died in the sea is uncountable.

Beneficiary in Anjouan

Table 11: Migration to Mayotte

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Migration to Mayotte (HH level)	0.078	0.028** (0.012)	-0.008 (0.024)	-0.005 (0.022)	0.019 (0.021)	2181
Reasons for Mayotte migration (indiv level)						
Economic reasons	0.006	0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	14288
Health reasons	0.007	0.005*** (0.002)	-0.006* (0.003)	-0.003 (0.003)	0.001 (0.003)	14288
Family reasons	0.005	0.003* (0.001)	0.005** (0.002)	0.000 (0.002)	0.003 (0.002)	14288
Studies	0.001	0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	14288
Tourism	0.001	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.002** (0.001)	14288
Other	0.000	0.000 (0.054)	0.000 (0.073)	-0.001 (0.074)	0.000 (0.000)	14288
Remittances						
Migrant sent remittances (d)	0.183	0.027 (0.054)	0.177** (0.073)	-0.023 (0.074)	0.096 (0.080)	260
Amount received (12 months)	11.292	0.097 (0.339)	0.375 (0.381)	-0.309 (0.496)	-0.597 (0.722)	51

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to the amount of the remittances received.

While it was deemed important to assess the effects of the program on migration flows, one concern was the sensitivity of the topic. Migration of Comorians to Mayotte is usually illegal, especially for the study population which is poorer than the average Comorian and about 8 percent of Mayotte’s population) are deported to Comoros (Senat, 2008).

¹⁶As a comparison, the median annual consumption per capita in our sample is US\$460.

has thus a tiny probability of getting visas. In addition, many people have died in the last few decades trying to reach Mayotte and development agencies are increasingly concerned by the phenomenon. In terms of identification, experimenter demand effects and socially desirable answers could induce beneficiary households to be more reluctant to reveal they sent migrants to Mayotte, which would bias the treatment effects downward. In order to avoid respondents discomfort and biased responses, the survey instruments collected information as indirectly as possible, by leveraging data on household composition collected at baseline. In particular, the main measure of migration relies on questions asking whether each baseline household member is still residing in the household at follow-up, and if not, where he is currently residing with Mayotte as one of the choices. Because it did not make salient that the purpose of the questions is to assess migration to Mayotte, the risks of respondents unease and biased responses were limited.

The impact of the program on migration to Mayotte are presented in Table 11. Consistent with the existence of binding liquidity constraints, cash windfalls had a sizable and positive impact on migration to Mayotte. The migration rate of beneficiary households increased by about 36 percent. The results seem to be driven by individuals migrating for health and family reasons. However, Table A7 shows that economic migrants are not the only one to send remittances to their household of origin. People migrating for health and family reasons also remit. This suggests that the different migration reasons are not mutually exclusive, even though the survey instruments inquired respondents to select only one type of migration. In addition, people migrating for economic opportunities might state health or family motives because they believe these motives could be seen as more legitimate.

When respondents reported a migrant, we further inquired about the month and year of migration. This retrospective data allows us to explore temporal dynamics in the treatment effect. Figure 9 shows the evolution of the treatment effect over time. For each quarter between July 2016 and September 2018, we report the treatment effect and the migration rate in the control group.¹⁷ Consistent with the presence of liquidity and credit constraints, the treatment effect increases over time. We see some signals of positive effect during the second quarter of 2017, and then regular increases until the second quarter of 2018. Figure 9 also represents the timing of cash transfers (measured using administrative data). The correlation with treatment effects seems rather strong: increases in treatment effect follow closely the disbursement of cash transfers.

During qualitative surveys, a few respondents mentioned that they used part of the

¹⁷Some respondents only recalled the year. In such cases, we generate a random month in order to avoid power losses. However, the dynamic of the treatment effect is the same if we exclude households with missing migration month data.

money to finance the migration of a relative to Mayotte.

With this money, I remember giving a little to my friend just to help him to finance the crossing to Mayotte.

Beneficiary in Anjouan

I used this money and savings to finance a trip to Mayotte, the one of my mother, to send her to the hospital, because she suffered from swelling of her feet. We tried a lot of hospitals in Anjouan but it didn't work.

Beneficiary in Anjouan

I gave 40,000 KMF to my son for his trip to Mayotte. Life is hard. We had no one to ask for help. My son decided alone to leave in the hope of helping us. I didn't have much. But to encourage him, I gave this small amount.

Beneficiary in Grande Comore

I didn't use the money I received to finance such a trip. I didn't work to think of such a goal. You know, if there was a job that allowed us to earn enough to survive, we would not think about crossing the sea to Mayotte, which killed the majority of the Comorians in the sea.

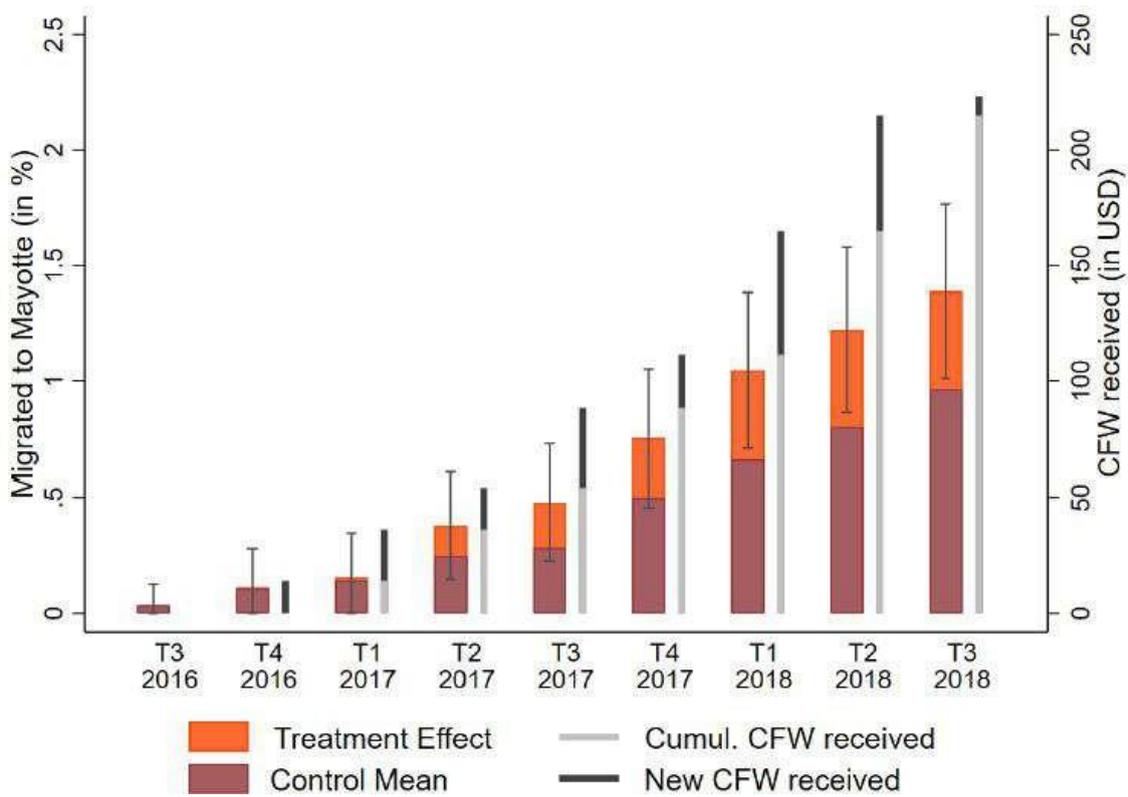
Beneficiary in Anjouan

I gave 50,000 KMF to my sister whose child was sick. I had to help them to go to Mayotte. They got along well thank God.

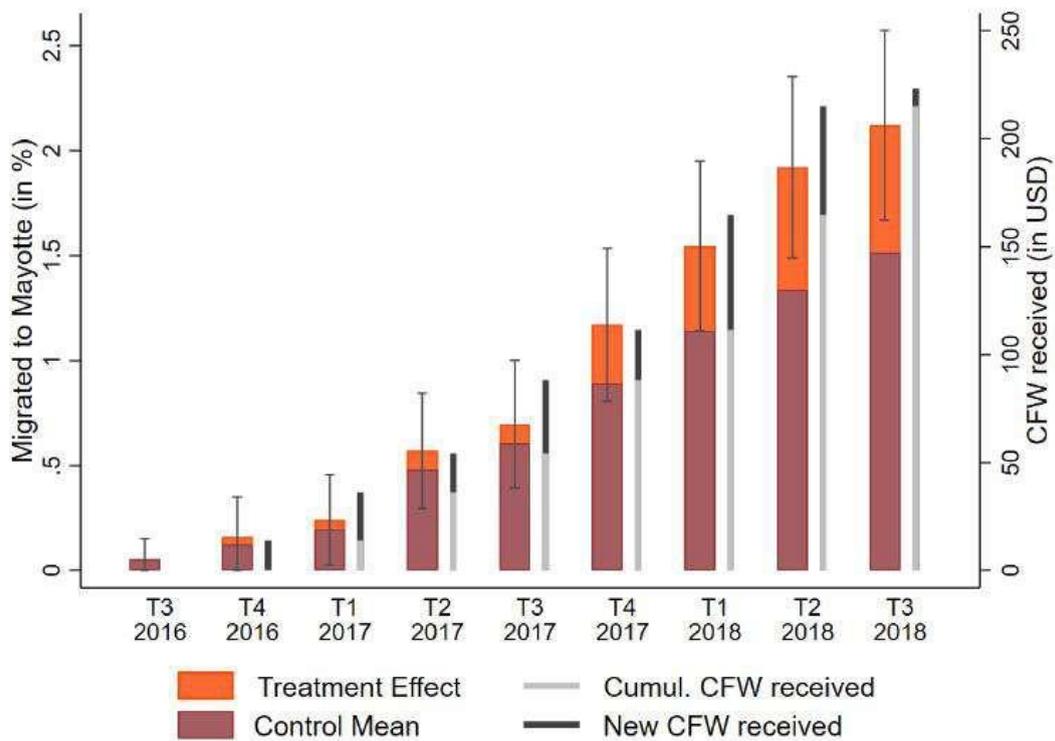
Beneficiary in Grande Comore

It may seem a bit surprising at first that the results show an impact on migration but not on consumption, as there is evidence from other contexts that migration improves the consumption of those left behind. This can be explained by at least two things: (i) the 38% increase in migration corresponds to an additional 65 households sending someone in Mayotte, and while this increase is statistically significant because of the relatively low level of migration in the control group (migration rate = 7,8%), it is probably not sufficient to have second order effects on other outcomes such as consumption, and (ii) migration investments may take time to become profitable and provide benefits on those left behind, especially in the case of Comorian migrants which are mostly illegal in Mayotte (for example, only 20% of the new migrants sent remittances to household members left behind; in Table A10 we explore migration effects on main outcomes).

Figure 9: Treatment effect over time



(a) Excluding returnees



(b) Including returnees

5.5 Impacts on non-material welfare

In addition to economic welfare, the study was interested to uncover the effects of the SSNP on various sets of non-material outcomes that reflect the context in which the inhabitants of Comoros live and expected to be influenced by the project. These outcomes include information on social cohesion, political participation, psychological well-being, and exposure to conflict, crime, and violence.

The detailed results are presented in Tables 12 to 14. We present first the results on social and political participation, civic engagement, and then the results on psychological well-being.

5.5.1 Social and political participation

To measure social cohesion, we gathered information on participation in community associations and in collective action, on migration, and we asked questions that reflected incidences of crime and violence. With regard to civic engagement, we asked questions on instances of participation or civic initiatives undertaken by individuals, on political information sources and liberal attitudes, and on political isolation. The results, presented in Tables 12, show a slight increase in the social and political participation index, though the coefficient is not significant. However, there is evidence that the program had effects on some individual variables. In particular, beneficiaries seem to have increased their participation in village associations by 13% (significant at the 1% level).

In addition, this research was part of a broader research on fragility, conflict and violence economies and it was therefore deemed interesting to assess CFW impacts on a broad range of outcomes exposure and participation to conflict, crime and violence. The results are presented in Table 13. The results suggest a slight decrease in anti-social behaviors, of about 2.5 percent (significant at the 10% level). Other outcomes are nonetheless statistically non-significant. The qualitative evidence suggests that the targeting of the program may have created some resentment from non-beneficiaries, as illustrated in the quotes below.

I would say the program created jealousy towards others. Non-beneficiary were jealous. They said we are very lucky, we work, we get paid, but not them.

Beneficiary in Grande Comore

Participating in the program improved the image that others had of us. In the village everyone was talking about us. That we are lucky, that we have found a job. It's true that some people were jealous. But for the most part they envied us positively.

Beneficiary in Grande Comore

Table 12: Social and political outcomes

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Social and political index	0.000	0.013 (0.010)	-0.009 (0.022)	-0.010 (0.023)	0.008 (0.016)	2181
Village associations membership (N)	1.088	0.141*** (0.046)	-0.057 (0.143)	-0.071 (0.144)	0.033 (0.050)	2181
Civic engagement index	0.000	0.009 (0.017)	-0.024 (0.036)	-0.024 (0.038)	0.012 (0.050)	2181
Voluntary contribution game						
Intra-village project: willing to contribute (d)	0.799	0.029* (0.017)	0.018 (0.027)	-0.014 (0.035)	0.005 (0.018)	2181
Inter-village project: willing to contribute (d)	0.162	-0.027* (0.016)	-0.019 (0.023)	0.017 (0.032)	-0.008 (0.017)	2181
Intra-village project: contribution (in KMF)	206.808	1.744 (8.409)	15.707 (13.242)	-18.324 (18.025)	1.264 (8.793)	2181
Inter-village project: contribution (in KMF)	43.227	-12.257** (4.926)	-7.466 (6.795)	7.977 (10.124)	-3.533 (5.030)	2181
Perception of chief's power index	0.000	0.018 (0.030)	0.016 (0.076)	-0.007 (0.078)	0.041 (0.032)	2181
Relationships with village chief index	0.000	0.041** (0.018)	-0.001 (0.032)	0.024 (0.037)	0.007 (0.017)	2181
Political participation and attitudes index	0.000	-0.034* (0.019)	0.001 (0.038)	-0.014 (0.045)	-0.021 (0.020)	2181
Tax game						
Willing to contribute (d)	0.786	-0.015 (0.018)	-0.008 (0.050)	0.036 (0.045)	0.001 (0.019)	2181
Contribution (in KMF)	114.948	-5.949 (5.280)	-1.113 (8.656)	13.148 (10.130)	8.635 (5.802)	2181

Notes: See notes to Table 2.

Table 13: Conflict, crime and violence

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Conflict index	0.000	0.006 (0.010)	0.014 (0.034)	0.001 (0.026)	0.023 (0.020)	2181
Exposure to rebel or criminal organizations index	0.000	0.006 (0.012)	-0.012 (0.041)	-0.008 (0.033)	0.019 (0.014)	2181
Exposure to random and inter-personal violence index	0.000	0.037 (0.032)	0.096 (0.112)	0.014 (0.044)	-0.010 (0.037)	2181
Conflicts and violence within the community index	0.000	0.021 (0.014)	-0.005 (0.039)	-0.012 (0.032)	-0.010 (0.037)	2181
Anti-social behaviours index	0.000	-0.025* (0.014)	0.026 (0.022)	0.015 (0.040)	-0.010 (0.037)	2181

Notes: See notes to Table 2.

5.5.2 Psychological well-being

Results for psychological well-being are presented in Table 14. The table reports estimates on the few outcomes that convey the psychological state of the respondents. We asked questions that reflect the mental-health and self-esteem of the respondent, the quality of the relationships in their family and the perception of the household in the community. The estimates show small and non-significant effects. The overall psychological index is not statistically different between the treatment and control groups.

This contrasts with the qualitative evidence, which seems to suggest that the program had positive effects on psychological well-being and happiness, as illustrated in the quotes below:

Table 14: Psychological well-being

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Psychological index	0.000	-0.005 (0.015)	0.011 (0.035)	-0.004 (0.036)	0.000 (0.025)	2181
Pearlin index	3.733	-0.047 (0.076)	-0.055 (0.173)	0.005 (0.197)	-0.069 (0.079)	2181
Pearlin components						
<i>Do you feel...</i>						
...you can solve problems by yourself	0.501	-0.008 (0.022)	0.016 (0.043)	-0.020 (0.045)	-0.026 (0.023)	2181
...you can deal with the problems in your life	0.766	0.008 (0.018)	-0.001 (0.032)	0.022 (0.036)	0.035* (0.019)	2181
...you're not taking control of your life	0.499	0.014 (0.022)	-0.020 (0.044)	0.002 (0.047)	-0.028 (0.024)	2181
...you have control over what happens in your life	0.698	0.011 (0.020)	0.032 (0.045)	0.036 (0.044)	-0.001 (0.021)	2181
...you can achieve anything if you are dedicated	0.689	-0.014 (0.020)	-0.034 (0.031)	0.028 (0.044)	-0.003 (0.022)	2181
...your future depends mainly on you	0.545	0.007 (0.021)	-0.068* (0.039)	0.005 (0.041)	0.006 (0.023)	2181
...you can do little to influence important events in your life	0.660	-0.018 (0.020)	-0.003 (0.035)	-0.002 (0.040)	-0.022 (0.022)	2181
Depression and anxiety index	4.109	0.017 (0.072)	-0.134 (0.138)	-0.021 (0.156)	0.012 (0.077)	2181
Depression and anxiety index components						
Afraid of losing control of yourself or "going crazy"	0.495	-0.005 (0.022)	-0.062 (0.046)	-0.028 (0.050)	-0.019 (0.023)	2181
Feel exploited or cheated by others	0.477	0.015 (0.022)	-0.041 (0.039)	0.010 (0.046)	0.029 (0.023)	2181
Often feel sad or depressed	0.685	-0.020 (0.020)	-0.048 (0.047)	0.019 (0.050)	-0.001 (0.022)	2181
Lost interest in activities	0.710	0.029 (0.020)	0.013 (0.030)	0.019 (0.034)	0.008 (0.021)	2181
Often feel irritable	0.506	-0.015 (0.022)	-0.008 (0.039)	-0.040 (0.039)	-0.033 (0.023)	2181
Often lose your appetite	0.787	0.001 (0.018)	-0.007 (0.027)	0.027 (0.030)	0.006 (0.019)	2181
Feel like important to others	0.512	0.026 (0.021)	0.029 (0.038)	-0.008 (0.044)	0.034 (0.022)	2181
Quality of family relationships	2.420	-0.009 (0.025)	0.018 (0.040)	0.002 (0.044)	-0.034 (0.027)	2181
Perception of household acceptance in community	2.520	0.027 (0.031)	-0.007 (0.056)	-0.028 (0.062)	0.003 (0.032)	2181
Perception of individual acceptance in family	2.730	-0.015 (0.023)	-0.005 (0.048)	-0.009 (0.049)	0.005 (0.025)	2181

Notes: See notes to Table 2. All estimates control for baseline level of the outcome.

Thanks to the program I was hoping to receive some money at the end of the month to pay off my debts. I'm happier than before. Before I didn't have a house, I lived at the mercy of everyone in the

village. I didn't have a stable life. I gave birth to my four children in the homes of others. Now we have our house. We have debts, but I'm very happy to finally have a roof. We will start a new life and forget the past.

Beneficiary in Grande Comore

We are happy to have participated in the program. The work went well. We got along well with each other. I managed to repay almost all of my debts thanks to the money from the program. On top of that, I'm waiting for my turn in the tontine. I'm going to have a big amount of money in one go. I will be able to buy something. So I'm probably happier than before.

Beneficiary in Grande Comore

I'm very happy to have participated in the program. I was happy to work, to occupy my time. I was very happy to be able to help my husband with the household's financial expenses.

Beneficiary in Grande Comore

Of course we are very happy to have participated in the program! Thanks to him, we have our own house. We received help from nobody. I had some of the money I had when I participated in a census project. Plus the money from the program we could build the house. We are proud and happier than before.

Beneficiary in Grande Comore

5.6 Impacts on female empowerment and gender-based violence

Given that most workers were female, the program may have impacted female empowerment and attitudes towards gender-based violence. With this final category of outcomes, we complete the investigation of the effect of the program on economic welfare, on social outcomes and on psychological outcomes, with an exploration of the state of women's decision making and of violence against women. We study the effect of the program on women's earnings, employment, decision-making, attitudes, and experiences of physical, emotional, or economic violence within their household.

The results are presented in Table 15. The program increased the probability that women had an income generating activity (. Labor market participation of female residing in beneficiary households increased by 35 percentage points (equivalent to a 82% increase relative to the control group, significant at the 1% level). This is consistent with the qualitative evidence and the fact that most of the participants in CFW activities were women. Despite this increase in access to income generating activities, and qualitative evidence suggesting that participating lead at least some woman to feel more empowered (see the quotes below), there is no evidence that the program had any effect (positive or negative) on variables related to women bargaining power, the perception and exposure to gender-based

violence. These results are consistent with other findings found in the literature. In particular, it has been shown that improvements in economic conditions of female are not enough to empower females (Duflo, 2012). Overall, this suggests that investing in public works programs, which may be desirable for other reasons, should not be expected to achieve strong improvements in female-bargaining power.

Table 15: Intra-household bargaining and gender-based violence

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Woman empowerment index	0.000	0.026 (0.018)	0.024 (0.034)	0.050 (0.035)	0.007 (0.029)	1761
Women has an income generating activity (d) (incl. CFW)	0.427	0.349*** (0.023)	-0.047 (0.030)	0.014 (0.055)	0.255*** (0.022)	1761
Women has an income generating activity (d) (excl. CFW)	0.309	0.053** (0.023)	-0.057 (0.051)	-0.021 (0.052)	0.019 (0.025)	1761
Women decides how to use the money (d)	0.557	0.007 (0.024)	0.029 (0.052)	0.010 (0.059)	0.039 (0.026)	1761
Perception of gender-based violence						
<i>(State that husband is justified in hitting or beating his wife in the following situations)</i>						
If she goes out without telling him	0.186	0.017 (0.019)	-0.026 (0.031)	-0.043 (0.043)	0.023 (0.021)	1761
If she refuses to have sex with him	0.173	0.000 (0.018)	-0.028 (0.031)	-0.048 (0.042)	-0.001 (0.019)	1761
If she neglects the children	0.221	0.008 (0.020)	-0.006 (0.035)	-0.055 (0.037)	0.010 (0.022)	1761
If she burns the food	0.078	-0.001 (0.013)	-0.002 (0.020)	-0.049** (0.019)	0.006 (0.014)	1761
If she argues with him	0.070	0.001 (0.012)	0.000 (0.020)	-0.011 (0.027)	0.003 (0.013)	1761
If she is unfaithful	0.282	0.035 (0.022)	-0.100*** (0.036)	-0.043 (0.048)	0.020 (0.024)	1761
If she requires the use of contraceptives	0.136	-0.002 (0.017)	-0.052* (0.027)	-0.008 (0.029)	-0.022 (0.017)	1761
If she drinks alcohol	0.322	0.052** (0.023)	-0.052 (0.034)	0.006 (0.046)	0.053** (0.025)	1761
Exposure to gender-based violence						
Physical violence	0.149	0.000 (0.017)	0.035 (0.028)	-0.024 (0.032)	0.034* (0.019)	1761
Sexual violence	0.012	0.005 (0.006)	0.010 (0.008)	0.007 (0.009)	-0.003 (0.006)	1761
Emotional violence	0.006	-0.001 (0.004)	-0.004 (0.004)	0.000 (0.005)	-0.003 (0.003)	1761
Economic violence	0.016	0.005 (0.007)	0.015 (0.012)	-0.001 (0.011)	-0.001 (0.007)	1761

Notes: See notes to Table 2. The sample is restricted to co-residing couples for the woman empowerment index.

The fact that I was participating in the program improved the image that others had of me. I got noticed by my strength and my courage to work. Which meant that most of the time I was working while others were exhausted. In the end, I was appointed worker delegate.

Beneficiary in Grande Comore

It was my husband who decided on the allocation of the money. And yes, we are satisfied.

Beneficiary in Grande Comore

Yes, the fact of participating in the program has somehow changed my image in the village. Before I was the woman nailed home without work or anything. People thought I was incapable of doing physical work. Now everyone congratulates me, they found me active and courageous. I made friends.

Beneficiary in Grande Comore

Now our husbands respect us, find us useful.

Beneficiary in Grande Comore

Conditional effects on gender, which were one of the three main dimensions that this impact evaluation sought to study, are presented in column (5) of Tables 2 to 15 above. There is some evidence suggesting that the food security of households with a female assigned to treatment improved slightly. Children in households where female were assigned to the treatment had 0.13 more meals per day on average (significant at the 5% level). In addition, their households had on average 0.36 more days per week with meat or fish (also significant at the 5% level). More generally, the program seems to have a higher impact on overall indices when the female was treated, but the differences are not statistically significant. In sum, there is no systematic evidence to suggest the effects of the program varied according to the gender of the recipients. However, this could also reflect an issue of the evaluation. Compliance with the gender treatment was very low, implying that the statistical power of the gender randomization may be too low to detect statistically significant effects.¹⁸

¹⁸As mentioned above, CFW daily wage was not attractive for most men. 78% of the workers were female (Table A3).

Table 16: Heterogeneous effects

	Days worked (1)	Income (2)	Food exp (3)	Non-food exp (4)	Food security (5)	Asset index (6)	Financial index (7)	Migration (8)	Social/Pol index (9)	Conflict index (10)	Woman empo index (11)	Psychological index (12)
Panel A. Rounds of CFW received (N)												
β_1 : Treatment	7.724*** (2.192)	-0.527 (0.516)	0.000 (0.742)	1.381 (1.300)	0.006 (0.029)	0.003 (0.028)	-0.009 (0.025)	0.009 (0.015)	0.014 (0.014)	-0.004 (0.011)	0.010 (0.026)	0.001 (0.021)
β_3 : Above-median CFW Rounds x Treatment	-4.408 (3.313)	-0.278 (0.758)	-0.872 (0.952)	-3.413** (1.718)	-0.040 (0.040)	-0.022 (0.033)	0.001 (0.035)	0.037 (0.025)	-0.002 (0.019)	0.018 (0.020)	0.033 (0.037)	-0.012 (0.030)
$\beta_1 + \beta_3$	3.316 (2.485)	-0.804 (0.556)	-0.872 (0.598)	-2.032* (1.132)	-0.033 (0.028)	-0.019 (0.017)	-0.008 (0.025)	0.046** (0.020)	0.012 (0.014)	0.014 (0.017)	0.043* (0.026)	-0.012 (0.021)
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181
Panel B. Baseline working-age adults (N)												
β_1 : Treatment	4.433** (2.225)	-0.251 (0.551)	0.199 (0.803)	-1.835 (1.388)	-0.036 (0.030)	-0.038* (0.023)	0.021 (0.024)	0.023 (0.015)	0.014 (0.014)	0.008 (0.015)	0.029 (0.029)	-0.018 (0.023)
β_3 : Above-median Working-age adults x Treatment	1.440 (3.220)	-0.765 (0.756)	-1.149 (0.990)	2.409 (1.765)	0.035 (0.040)	0.049 (0.033)	-0.054 (0.035)	0.005 (0.024)	-0.005 (0.019)	-0.004 (0.021)	-0.004 (0.037)	0.018 (0.030)
$\beta_1 + \beta_3$	5.874** (2.318)	-1.016** (0.516)	-0.950* (0.576)	0.574 (1.093)	-0.001 (0.027)	0.011 (0.023)	-0.033 (0.025)	0.028 (0.019)	0.010 (0.013)	0.004 (0.014)	0.024 (0.024)	0.000 (0.020)
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181
Panel C. Baseline consumption												
β_1 : Treatment	4.526** (2.215)	-0.948* (0.507)	-0.617 (0.688)	-0.261 (1.197)	-0.025 (0.027)	-0.025 (0.017)	0.006 (0.020)	0.023 (0.018)	0.003 (0.013)	0.008 (0.014)	0.050* (0.026)	-0.003 (0.021)
β_3 : Above-median Consumption x Treatment	2.049 (3.315)	0.558 (0.752)	0.395 (0.949)	-0.177 (1.722)	0.018 (0.040)	0.033 (0.033)	-0.032 (0.035)	0.010 (0.025)	0.019 (0.019)	-0.006 (0.021)	-0.047 (0.037)	-0.009 (0.030)
$\beta_1 + \beta_3$	6.575*** (2.470)	-0.390 (0.556)	-0.222 (0.656)	-0.438 (1.246)	-0.007 (0.030)	0.007 (0.028)	-0.026 (0.028)	0.033* (0.017)	0.022 (0.015)	0.003 (0.015)	0.003 (0.026)	-0.012 (0.021)
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181
Panel D. Baseline education of the household head												
β_1 : Treatment	4.584** (2.213)	-0.891* (0.488)	-0.983 (0.660)	0.178 (1.194)	-0.033 (0.027)	-0.012 (0.021)	-0.015 (0.021)	0.028* (0.017)	0.004 (0.012)	0.004 (0.013)	0.023 (0.024)	-0.012 (0.020)
β_3 : Above-median education x Treatment	2.362 (3.355)	0.612 (0.769)	1.376 (0.937)	-1.003 (1.677)	0.044 (0.041)	0.008 (0.034)	0.017 (0.036)	-0.001 (0.025)	0.021 (0.020)	0.004 (0.022)	0.005 (0.037)	0.011 (0.030)
$\beta_1 + \beta_3$	6.946*** (2.522)	-0.279 (0.595)	0.393 (0.668)	-0.826 (1.186)	0.011 (0.031)	-0.004 (0.027)	0.002 (0.030)	0.027 (0.019)	0.025 (0.016)	0.008 (0.018)	0.029 (0.028)	-0.001 (0.022)
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to all monetary outcomes (i.e. income, food expenditures, non food expenditures). The sample is restricted to co-residing couples for the woman empowerment index. All estimates control for unbalanced covariates at baseline. Where possible, we include baseline level of the outcome.

5.7 Heterogeneous effects

As with many interventions of this kind, it is likely that the program may work differently for different socioeconomic groups. Table 16, reports heterogeneous effects along four key dimensions specified in our pre-analysis plan:

- **Number of rounds of CFW received.** Theoretically, the program may have stronger effects on households receiving the highest number of rounds of CFW received.
- **Number of working-age adults in the household at baseline.** The more working-age adults in the household, the less binding the labor requirement of CFW opportunities, and therefore the higher the measured impact. However, the marginal effect of cash received may also be smaller in larger households because the amount of the cash received represents a smaller fraction of the total income in large households (the cash would be diluted).
- **Total consumption per adult equivalent at baseline.** The marginal effect of cash received may be the highest for households with a low consumption level at baseline.
- **Schooling of the household head at baseline.** The effect of the program may vary depending on the level of education of the household head.

To estimate these effects, we use the same specification as for conditional effects, as highlighted in section 2.3. Overall, the results does not suggest the presence of important heterogeneous effects. There are only one significant interaction terms (β_3) over a total of 48 interaction terms. Households who received the highest number CFW rounds spent slightly less on non-food expenditures (significant at the 5% level). For all the other interaction terms the results show no significant effect. Overall, this means that the results does not appear to vary along these four key dimensions.¹⁹

¹⁹In Table A8, we explore heterogeneity of treatment effects with process indicators.

6 Conclusion and Policy Implications

This report summarized the main findings from an impact evaluation (IE) of the Comoros Social Safety Net Project (SSNP), whose objectives are to provide selected poor households with CFW opportunities to smooth consumption, while also improving community infrastructures. The main component of the SSNP project provided cash-for-work (CFW) opportunities to selected poor households. From 2016 to 2018, beneficiary households received an average of 60 days of work per year at the daily wage rate of KMF 1,000 (approximately US\$2.3).

The IE, carried out by DIME in partnership with the Government of Comoros, FADC, ANACEP, and INSEED sought to test the effects of these CFW opportunities on socio-economic outcomes and welfare of households. Specifically, the study used an RCT approach to address the following questions: (1) What were the direct effects of CFW activities on social and economic outcomes of poor households? (2) What were the externalities of the CFW program on non-beneficiaries? (3) Did the effect of the CFW vary according to the gender of the recipient? The IE employs baseline and follow-up survey. The baseline survey was conducted after randomization at the household level and before the start of CFW activities. It took place in two phases (first in 23 villages and then in the remaining 46 villages): (i) from July to August 2016 and (ii) from December 2016 to May 2017. The follow-up survey took place from June to September 2018, while beneficiaries had received between 3 and 7 rounds of CFW activities (equivalent to between US\$140-320). Our empirical findings suggest the following:

The perceptions from workers and non-workers from villages targeted by the project are positive. They indicate satisfaction with infrastructure projects implemented and with the process through which workers were ultimately selected. These positive perceptions are consistent with qualitative interviews carried out with a sample of workers, non-workers and project staff. While respondents aired a few grievances on the low wage rates and payment delays, these should be seen more as possible areas for improvement for future versions of the project rather than indications of dissatisfaction with the project.

The project reached the targeted population and produced positive effects on labor market outcomes. Households assigned to treatment were 263% more likely to participate in cash-for-work activities. The project does not seem to have had important crowding out effects on other sources of employment. Overall, the program can thus be considered to have been successfully implemented and produced a positive income shock for treated households.

Using quantitative analysis, we find no evidence of significant impact of the SSNP on a wide-range of socio-economic measures such as food security, food consumption, non-food expenditures, investments in assets, livestock, dwelling, and savings. The ability to detect effects using quantitative data might have been undermined by the low wages offered by the SSNP, by low levels of investments in productive assets, by extreme patterns in consumption smoothing, and by the fact that the endline survey took place a few months after any payments were made.

Evidence from qualitative research suggests that beneficiaries spent most of the cash on consumption, and occasionally on assets or livestock. The qualitative evidence also helps explaining the lack of significant quantitative effects on household consumption and expenditures. Beneficiaries reported increased consumption soon after payments were made. Our ability to detect such short-run effect might have been limited by the fact that the endline survey took a few months long after payments were made and by the limited recall period used for consumption and expenditures questions.

In addition, participants faced important delays between the work and payments and borrowed money to finance daily life before payments. While borrowing helped them to smooth their consumption, it also implies that part of the payments were used to reimburse debts.

With most cash spent on consumption and debt repayment, beneficiaries had a limited amount at their disposal for investments in dwelling, assets, or livestock. Few households have been able to use the cash to make such investments. When they did, it was on a wide variety of items. Overall, investments in dwelling, assets and livestock appeared rare, of various forms, and often mutually exclusive. It is therefore not surprising that the quantitative analysis fails to detect any significant effects of the program on these outcomes. Similarly, there is little evidence to suggest that participation in CFW activities had significant non-material effects. Beneficiaries seem to have increased their participation in village associations and reported less anti-social behaviors. However, the results do not show significant effects on overall indices related to social cohesion, political participation, psychological well-being or exposure to crime and violence.

In contrast, the program appears to have had a sizable and positive impact on migration to Mayotte – the neighboring and richer French Island. Migration patterns are salient in the Comoros archipelago and the program seems to have enabled households willing to migrate, particularly for health care reasons, to do so when they have accumulated enough liquidity. The increased CFW revenue does not seem to have reduced the need for migration. In fact, the migration rate of beneficiary households increased by about 36% (3 percentage

points).

The program also increased the probability that women had an income generating activity. Labor market participation of female residing in beneficiary households increased by 35 percentage points (equivalent to an 82% increase relative to the control group). This is consistent with the qualitative evidence and the fact that most of the participants in CFW activities were women. However, results from the quantitative analysis suggest that this increase in access to income generating activities did not seem to have improved female bargaining power or reduced their exposure to violence.

There is no compelling evidence that the effects of the program varied according to the gender of the recipients, or that the program had sizeable indirect effects. There is some qualitative evidence that beneficiaries shared the cash received with their relatives and extended network, but the quantitative evidence does not detect such effects, suggesting they are small. Similarly, there is no evidence that the effects of the program were different depending on the gender of the recipient, though this could also reflect compliance issues with the gender treatment which was very low (CFW daily wage was not attractive for most men), implying that the statistical power of the gender randomization may be too small to detect statistically significant effects.

Taken together, this study's findings suggest several implications for future research and social protection policies. Below we outline four.

First, the payment process should be improved and streamlined. The lack of regularity in the payments seems to have been detrimental to the effectiveness of the program as many households took on debts prior to receiving the transfers. Debts are not only a financial burden: they can affect social relationships, stress, and wellbeing. Payment delays are therefore expected to reduce the effect of cash-for-work programs. It is also worth revisiting the question of whether CFW payments could be used more productively when transferred in multiple smaller (often daily) payments or in one (or few smaller) sizable lump sums. The evidence on this question is still inconclusive. While studies such as De Mel et al. (2012) in the Sri Lankan context find that one-time transfers of cash or capital have long-lasting effects on microenterprises, other such as Bastian et al. (2017) in the context of Nigeria find that quarterly transfers cost half as much as monthly transfers to administer, but there is no difference in outcomes. However, it is noteworthy that the one-time transfers seemed to yield more return in cases of micro-enterprises, suggesting perhaps that the same may be true with beneficiaries wanting to invest in self-employment.

Second, the benefit level of this cash-for-work program may be reviewed. The program has been successful to marginally increase people's income. However, many house-

holds mentioned that daily wage earned from the CFW program was very low, and our quantitative results suggest that it had no significant effects on consumption a few months after payments occurred. This means that such programs are unlikely to be transformative. A small proportion of beneficiaries invested in migration or assets, but that was more an exception than the rule. This also has implication for research. In particular, it suggests that the effects of small cash transfers programs can most often not be detected using quantitative methods.

Third, the time frame for CFW activities should be carefully considered when designing interventions. On the one hand, such programs often face delays and take time to be fully functional. Programs with longer time frames (or permanent programs) might therefore be more cost-effective. On the other hand, cash-for-work programmes typically exclude part of the communities, as infrastructure work are too small for the whole community to work on it. A fundamental question is whether the same households should benefit from such programs during the entire duration of the project, or whether the benefits should be more equally shared. Efficiency and fairness considerations should be balanced.

Fourth, incentives of non-compliers should be carefully considered when designing impact evaluations. In this research, the non-compliance rate for the gender randomization was extremely high because women were much more interested in participating in the programs than men. Such issue present serious evaluations challenges that should be carefully considered in future endeavors.

Fifth, fragility, conflict and violence (FCV) contexts should be taken seriously in future projects and evaluations. It is common knowledge that these settings often pose significant challenges to operations and research and Comoros was no exception. Specifically, there were changes in implementing agency mid-course, which led to some delays in the roll-out of project activities. It is not clear how these issues affected the project's overall effectiveness, but they clearly cannot be ignored.

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Appendix

A.1 Power Calculations

This section discusses the statistical power of the design described above to identify the minimum sample size required to detect meaningful effects of the interventions and minimize the risks of false negatives (not finding an effect when it actually exists). For the present study, we have information on some parameters, but not on others.

We are interested in the expected Minimum Detectable Effect Size (MDES). First, we assess the size of both the direct and conditional effects (gender effects) our study will be able to detect by performing power calculations for a multi-site person randomized trial. Then, we test the size of the indirect effects with power calculations for a cluster randomized trial with individual outcomes.²⁰

Figure A1 below depicts how the MDES changes as a function of power, holding others parameters constant. Solid power curves account for a relatively low level of variability of the effect size (e.g., $=.01$), while dashed lines allow for a relatively high level of variability of the effect size (e.g., $=.10$). The blue power curves represent calculations of direct effects with 30 subjects per cluster, while the power curves colored in red represent calculations of conditional effects with 20 subjects per cluster.²¹

What is the MDES we are able to detect with the conventional power of 0.80?²² As the power curves suggest, with 62 clusters and 30 subjects per cluster, we can expect to detect MDES of at least .14 standard deviations assuming a relatively low level of variability of the effect size ($=.01$) and .18 standard deviations assuming a relatively high level of variability of the effect size ($=.10$).²³ With the same set up but only 20 subjects per cluster, we can expect to detect a minimum effect size of at least .16 assuming a relatively low level of variability of the effect size ($=.01$) and .20 assuming a relatively high level of variability of the effect size

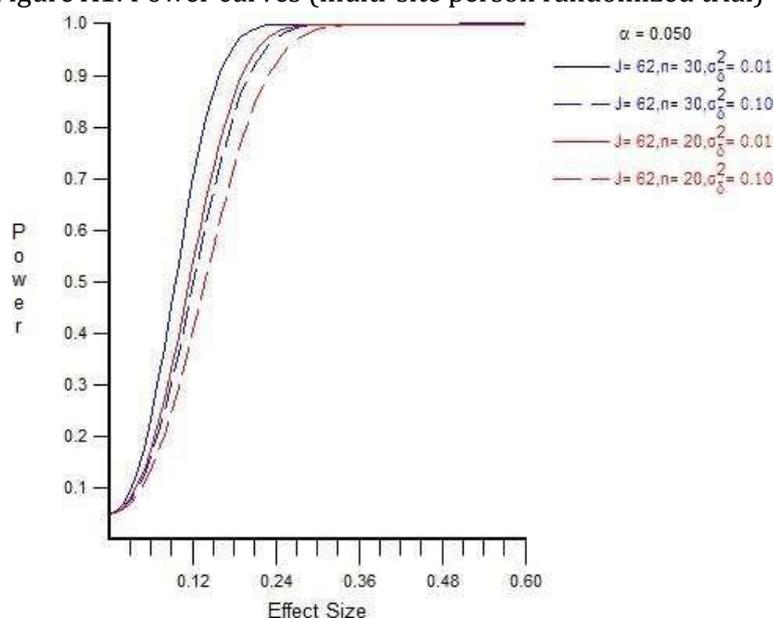
²⁰We use Optimal Design, an open source software package produced by the University of Michigan.

²¹These cluster sizes entail the sampling of at least 20 beneficiary and 15 non-beneficiary households for each community. Power calculations with alternative cluster sizes were performed. Results are not presented but available upon request.

²²A power of 0.8 means that there is an 80% chance that we avoid a “false negative”. In other words, there is an 80% chance that we do not reject “the null hypothesis that the treatment had no effect”, while in fact the program has an effect.

²³For direct and conditional effects, 62 clusters per group is a rather conservative assumption because in practice we may end up with more villages in each group. Indeed, for some of the seven villages with the 100% treatment intensity, it is likely that more households than expected will enrol, so the randomization at the household level will be possible. In addition, the gender randomization will be possible in all communities. These seven villages have been excluded from power calculations because of their very small number of subjects. However, they can be considered as an extra source of power.

Figure A1: Power curves (multi-site person randomized trial)



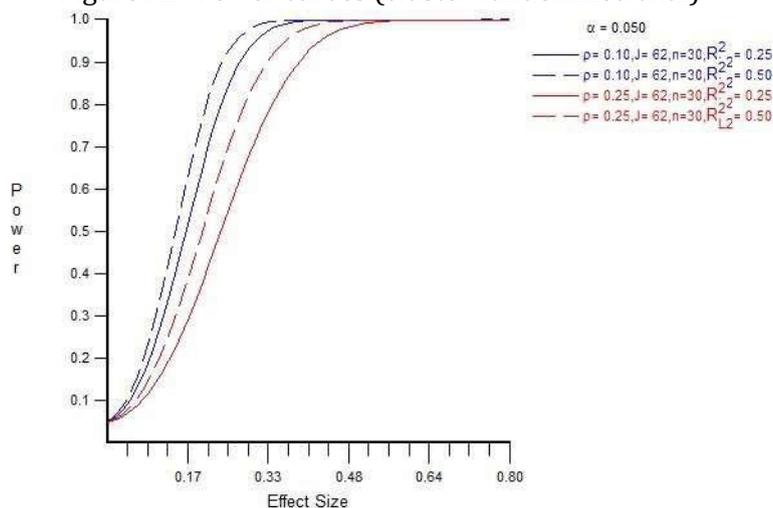
(=0.10).

As mentioned above, the gender randomization may not be implemented for all beneficiary households because some of them do not have both male and female potential workers. Unfortunately, we do not know ex-ante the proportion of households with both male and female potential workers, but we expect it to be large because households are explicitly asked by FADC to preselect both male and female potential workers when possible. However, this means we should sample substantially more beneficiary households to end up with at least 20 subjects per cluster for gender analysis.

Furthermore, imperfect compliance and attrition could alter the power of our design. Based on previous CFW programs implemented by FADC, take-up was generally high (more than 95% of initial lists of beneficiaries). In order to limit the loss of power due to imperfect compliance, a randomization will be implemented after each period of work to replace drop-outs. To minimize attrition, we plan to put in place our own tracking system after the baseline using addresses, GPS coordinates and phone numbers. This should increase our chances of finding selected households for follow up surveys. Households who drop-out or move from the location where they are found in the baseline will be tracked and interviewed to the largest possible extent. Given the small size of Comoros, we expect that it will be possible to interview these households in most cases. Illegal migration to the neighbouring French island, Mayotte, is more problematic; however, given its cost and riskiness, in most cases it should be restricted to individuals and not households.

The discussion suggests that in order to measure both direct and conditional effects we should sample relatively more beneficiary households than non-beneficiary households. With a sample of 25 beneficiary households and 15 non-beneficiary households our study

Figure A2: Power curves (cluster randomized trial)



should be powered to detect intervention direct effects above .14 or .18 standard deviations, and conditional effects above .16 or .20 standard deviations.

We now turn to the discussion of power calculations for indirect effects of the intervention. At the community level, the program has one main treatment variation, with 31 communities assigned to the 20% threshold and the remaining 31 communities to the 40% threshold. Figure A2 below depicts how the MDES changes as a function of power, with 31 clusters per treatment condition, 30 subjects per cluster and holding other parameters constant. The blue power curves represent calculations based on ICC of .10, while the power curves colored in red represent calculations based on ICC of .25. Dashed power curves account for cluster-level covariates—we assume that half of the variation in key outcomes will be explained by pre-intervention covariates. Solid lines allow for about a quarter of the variation in key outcomes to be explained by pre-intervention covariates.

As the power curves suggest, to detect the effects of one treatment relative to a control condition with 31 clusters in each condition and assuming the cluster-level covariate explains 50% of the variation in key outcomes of interest, we can expect to detect a minimum effect size of at least .20 standard deviations when we assume a relatively low level of homogeneity within clusters and (ICC=.10) or about .23 standard deviations if we assume relatively high level of homogeneity within clusters (ICC=.25). By contrast, with the same set up and assuming the cluster-level covariate explains 25% of the variation in key outcomes of interest, we can expect to detect a minimum effect size of at least .28 standard deviations with a low level of homogeneity within clusters (ICC=.10) or about .33 standard deviations if we assume relatively high level of homogeneity within clusters (ICC=.25).

But how realistic are these MDES? As noted, the key outcomes we are studying are individual-level consumption, income and behaviours. A quick survey of closely related program evaluations (e.g., Cash Transfer programs) suggests that estimated MDES of .20

Table A1: Key parameters for consumption data

	Daily mean food consumption pc	N	ICC daily consumption pc
All islands	274 KMF (sd=256)	1913	0.14
Grande Comore	386 KMF (sd=318)	704	0.07
Anjouan	159 KMF (sd=137)	791	0.07
Moheli	303 KMF (sd=215)	418	0.05

Table A2: Equivalence table

MDES in X sd	MDES in X% of daily mean food consumption pc using sd=256
0.05	4.6%
0.1	9.3%
0.2	18.6%
0.3	28%
0.4	37%
0.5	46.7%

to .30 standard deviations are not farfetched. But below, we provide more power analysis based on consumption data collected at baseline. Looking at consumption data from the baseline villages, we have the parameters in Figure A1.

The expected mean of daily food consumption per capita is 274 KMF with a standard deviation equal to 256. Given the sample size $N=1913$, we have that the standard error of the mean is equal to 2.14. Based on these descriptive statistics, we have the equivalence table depicted in FigureA2.

Hence, effect sizes of .20 to .30 standard deviations are an 18.6% to 28% increase in the daily food consumption per capita. The intervention will provide a yearly cash transfer of at least 60'000 KMF to beneficiary households, which is equivalent on average to roughly 60% of the annual food consumption of one of their member.

Finally, as noted in the previous section, clusters have been stratified by location and population. Specifically, within each island, we formed pairs of villages according to their population. Then, for each of the formed pairs, one village was assigned to the low treatment intensity and the other to the high treatment intensity. As can be seen in Figure A1, blocking clusters by islands should increase precision and reduce the ICC, thus increasing the power of our design.

A.2 Outcome variables

Below we provide a details on the four family of outcomes and indices that will be considered in the separate papers as well as the variables used to operationalize them.²⁴

²⁴As mentioned in Section 4.2, we will correct for multiple hypotheses testing of indices within each family of outcomes but not across due to limited power.

A.2.1 Labor market outcomes

There is a small but expanding literature that examines the impact of cash transfers on labor supply (Bandiera et al., 2017; Banerjee et al., 2017; Salehi-Isfahani and Mostafavi-Dehzoeei, 2018; Bertrand et al., 2017). The findings of this literature do not show a negative labor supply effect. In the context of CFW programs, beneficiaries self-select to apply for work opportunities paid below the prevailing market wage. While CFW direct effects should increase employment and income of beneficiaries, substitution and general equilibrium effects could also appear if unemployment is limited and CFW opportunities impact the composition of employment and market wages.

The main analysis will be conducted on the following indices:

- Total number of days worked (w5a, w6a, w7a, w15, cfw8)
- Total income (w8, w9, w10, w16)

We will also conduct sub-analysis on the following variables:

1. Agriculture

- (a) Household engaged in (i) agriculture (w1a), (ii) livestock (w2a) and (iii) fishing (w3a)
- (b) Days worked in (i) agriculture (w5a), (ii) livestock (w6a) and (iii) fishing (w7a)
- (c) Income from (i) agriculture (w8), (ii) livestock (w9) and (iii) fishing (w10)
- (d) Use and value of chemical fertilizers (fields6 and fields7)

2. Non-agricultural activities or business

- (a) Individual/Household has a non-agricultural activities or business (w11)
- (b) Days worked (w15)
- (c) Income (w16)

3. Looked for paid work

4. Child labor

- (a) Child labor (w22)
- (b) Missed school because of work (w24)

A.2.2 Economic outcomes

If CFW increase employment and income, a natural question is how people spend the additional money. A substantial body of research documents positive impacts of cash transfers on consumption, food security, investments in assets, savings and debts (Arnold et al., 2011; Bandiera et al., 2017; Banerjee et al., 2017; Blattman et al., 2013; Haushofer and Shapiro, 2016).

The main analysis will be conducted on the following indices:

- Total food expenditures (c6c)
- Total non-food expenditures (c7, c8)
- Food security index (standardized average of variables 2.a.-g.)
- Asset index (standardized average of variables 3.a.-d.)
- Financial index (standardized average of variables 4.a.i and b.i)

We will also conduct sub-analysis on the following variables:

1. Consumption and expenditures

(a) Food expenditures

- i. Rice (c6c-1)
- ii. Fruits and legumes/vegetables (c6c-2, ... , c6c-28)
- iii. Meat and fish (c6c-29 , ... , c6c-32)
- iv. Other: oil, beverages, eggs, etc. (c6c-34 , ... , c6c-40)

(b) Total value of food own consumption

(c) Frequent non-food expenditures (c6d)

- i. Cosmetics (c7d)
- ii. Energy (c7b)
- iii. Transportation (c7e)
- iv. Communication (c7c)

(d) Non-frequent non-food expenditures

- i. Housing (c8a)
- ii. Health (c8b)

-
- iii. Equipments (c8c)
 - iv. Taxes (c8d)
 - v. Ceremonies (c8e, c8f, c8g)
 - vi. Education (c8h)
 - vii. Clothing (c8i)

2. Food security

- (a) Meals per day: adults (c2a)
- (b) Meals per day: children (c3a)
- (c) Meals skipped: adults (c2b)
- (d) Meals skipped: children (c3b)
- (e) Days with meat or fish ((c2)
- (f) Self-declared food insecurity (c1a)
- (g) Relied on help or credit from others for food (c4)

3. Assets

- (a) Dwelling
 - i. House ownership (house1)
 - ii. Number of rooms (house4)
 - iii. House has non-mud floor (house8)
 - iv. House has cement floor (house8)
 - v. House has non-thatch roof (house9)
 - vi. House has cement roof (house9)
 - vii. House has non-mud walls (house10)
 - viii. House has cement/bricks walls (house10)
 - ix. House has electricity (house5)
 - x. House has private drinking water source (house6)
- (b) Furniture and electronic equipment (asset1, asset2)
- (c) Livestock (ani, ani2)
- (d) Land owned (fields1)

4. Financial variables

- (a) Savings

-
- i. Saved money in the last 3 months (savings2)
 - ii. Total amount saved for the *Grand Mariage* in the last 12 months (s-9b + s-9-wb)

(b) Debts

- i. Reimbursed debts in the last 3 months (debt2)
- ii. Total amount of current debts (debt3)

A.2.3 Migration outcomes

A separate, much more limited strand of the literature considers the effects of cash transfers on individual and household migration decisions. The expected impact is ambiguous. On the one hand, potential migrants who are entitled with CFW opportunities may decide there is no need to migrate. On the other hand, cash transfers could provide the necessary means to finance migration costs. Most of the studies in the literature come from Mexico and study whether access to Oportunidades, Mexico's flagship anti-poverty program, increases or decreases the propensity to migrate. Angelucci (2015) find that the conditional cash transfers seem to relax credit constraints for households that did not manage to migrate before receiving the transfer. We will test this hypothesis in the Comoros context where migration patterns to Mayotte, the neighboring and richer French Island, are especially salient.

The main analysis will be conducted on the following variable:

- Migration to Mayotte: individual and household level (left-where4, return-exp)

We will also conduct sub-analysis on the following variables:

1. Migration reason (left-why, return-why)
2. Migrant sent remittances (left-rem1)
3. Amount of remittances sent (left-rem2)

A.2.4 Non-material outcomes

Finally, we will assess CFW non-material impacts on participants which may operate through increased income or inclusion in the community project. We will look at CFW impacts on a broad range of outcomes including social participation, political participation, collective actions, state legitimacy, security, and mental health. CFW opportunities may displace socially disruptive activities such as crime, improve mental health, and may operate as a social stabilization tool (Bertrand et al., 2017).

The main analysis will be conducted on the following indices:

- Conflict, crime and violence index: standardized average of variables 1.a.-h.
- Social and political index: standardized average of variables 2.a.-d.
- Gender-based violence index: standardized average of variables 3.a.-g.
- Psychological index: standardized average of variables 4.a.-e.

We will also conduct sub-analysis on the following variables:

1. Social and political outcomes

- (a) Village associations membership (assoc3)
- (b) Civic engagement (project2, actes)
- (c) Intra-community and inter-community collective action: contributions in voluntary contribution game (coop-game2, coop-game3)
- (d) Perception of chief's power and authority (power1, ... , power4)
- (e) Relationships with village chief (chief-vil1, ... , chief-vil7)
- (f) Political isolation (pol1)
- (g) Political participation and attitudes (pol3, ... , pol10)
- (h) Perceptions towards state legitimacy: contributions in tax game (chief-vil1)

2. Outcomes related to conflict, crime and violence

- (a) Activities by rebel or criminal organizations (fcv1)
- (b) Exposure to random and inter-personal violence (fcv4, fcv7, fcv10)
- (c) Conflicts and violence within the community (fcv12, fcv13, fcv14)
- (d) Anti-social behaviours (fcv17a, fcv17b)

3. Intra-household bargaining and domestic violence

- (a) Women has an income generating activity (w11)
- (b) Women decides how to use the money (woman-1, male-1)
- (c) Perception of gender-based violence (fcv22)
- (d) Physical violence (fcv19a)
- (e) Sexual violence (fcv19b)

(f) Emotional violence (fcv19c)

(g) Economic violence (fcv19d)

4. Psychological outcomes

(a) Pearlin index (pear1, ... , pear7)

(b) Depression and anxiety index (psy8, ... , psy15)

(c) Quality of family relationships (psy5)

(d) Perception of household acceptance in community (psy2)

(e) Perception of individual acceptance in family (psy3)

A.2.5 Sub-group analysis for heterogeneous treatment effects

We will look at heterogeneity of treatment effects along the following variables:

1. Number of rounds of CFW received (admin. data)

2. Baseline number of working-age adults (age-bl)

3. Baseline total consumption (c6c-bl)

4. Baseline education level of the head (schoolhead-bl)

5. For analysis on frequent expenditures and food security:

(a) Number of days since last payment (admin. data)

6. For analysis on migration:

(a) Baseline willingness to migrate (mig-21-bl)

(b) Baseline predicted migration, measured using the leave-one-out endogenous stratification procedures (?)

It should be noted however that the evaluation is not powered to correct for multiple hypotheses testing for all these extra-tests. We will therefore report results on all interaction variables in the research outputs and recognize that the evidence is suggestive.

A.3 Additional Tables

Table A3: Summary statistics on project workers

	Worker=1	Worker=0
Age	39.97	29.56
Male	0.22	0.64
Education		
Did not complete primary	0.57	0.22
Primary	0.24	0.19
Secondary	0.16	0.46
Tertiary	0.02	0.12
Observations	1158	2662

Notes: The sample is restricted to adults (15-65 at baseline) in treated households.

Table A4: Household characteristics at baseline

	Control		Treatment		Diff	p-value
	Mean	SD	Mean	SD		
Household size	6.55	2.80	6.57	2.82	-0.01	0.91
Consumption (log PAE)	6.48	1.01	6.45	0.96	0.03	0.52
Has a bank account	0.28	0.45	0.27	0.45	0.01	0.64
Has an income generating activity (other than agriculture)	0.48	0.50	0.45	0.50	0.03	0.17
Owns fields	0.76	0.43	0.75	0.43	0.01	0.72
Livestock (tropical unit)	0.49	0.93	0.52	0.99	-0.03	0.48
Has electricity	0.59	0.49	0.60	0.49	-0.01	0.50
Has a private water access	0.63	0.48	0.63	0.48	0.01	0.74
Head is male	0.77	0.42	0.76	0.43	0.01	0.59
Head age	48.66	16.03	48.34	15.20	0.32	0.63
Head education						
Did not complete primary	0.56	0.50	0.58	0.49	-0.02	0.39
Primary	0.22	0.41	0.19	0.39	0.03	0.06
Secondary	0.18	0.38	0.19	0.39	-0.01	0.48
Tertiary	0.04	0.20	0.04	0.20	-0.00	0.83
Willingness to migrate to Mayotte	0.21	0.41	0.23	0.42	-0.02	0.31
Migrant network in Mayotte	0.13	0.34	0.14	0.35	-0.01	0.49
Island of residence						
Ngazidja	0.58	0.49	0.58	0.49	0.00	0.84
Ndzواني	0.27	0.44	0.28	0.45	-0.01	0.58
Mwali	0.15	0.36	0.15	0.35	0.01	0.67
F-test joint significance						0.78
Observations	900	900	1372	1372	2272	2272

Notes: This table reports subsample means with standard deviations. The last column reports the pvalue of a ttest of mean equality across subsamples. The F-test corresponds to a regression of the treatment on baseline characteristics (using the same specification as in the subsequent analysis). PAE denotes per adult equivalent.

Table A5: Assets (intensive margin)

	ITT		ITE			Observations
	(1) Control Mean	(2) Treatment	(3) Treated	(4) Control	(5) Female	
Asset index (intensive)	0.000	-0.008 (0.017)	0.007 (0.030)	0.048 (0.038)	0.047* (0.028)	2181
Mattress	2.381	-0.136 (0.130)	-0.115 (0.122)	0.458* (0.259)	-0.149 (0.091)	2181
Bed	2.530	-0.033 (0.048)	-0.089 (0.105)	0.049 (0.112)	-0.074 (0.091)	2181
Chair	3.641	0.023 (0.148)	0.086 (0.296)	-0.220 (0.336)	-0.004 (0.219)	2181
Armchair	0.491	-0.033 (0.057)	-0.057 (0.111)	0.062 (0.141)	0.031 (0.096)	2181
Table	0.856	-0.009 (0.028)	0.053 (0.048)	-0.049 (0.055)	-0.021 (0.048)	2181
Gas fireplace	0.043	-0.007 (0.008)	-0.015 (0.012)	0.026 (0.019)	0.034** (0.014)	2181
Oil fireplace	0.457	0.024 (0.028)	0.043 (0.058)	0.034 (0.063)	0.027 (0.047)	2181
Iron	0.167	0.012 (0.017)	-0.005 (0.029)	-0.004 (0.031)	0.034 (0.030)	2181
Fridge	0.177	-0.006 (0.017)	-0.027 (0.027)	0.038 (0.037)	0.000 (0.028)	2181
Fan	0.016	0.007 (0.006)	0.009 (0.011)	-0.010 (0.009)	0.004 (0.013)	2181
TV	0.390	-0.047** (0.021)	-0.012 (0.037)	-0.028 (0.047)	-0.013 (0.035)	2181
Phone	1.458	-0.030 (0.053)	0.033 (0.101)	0.097 (0.113)	0.109 (0.095)	2181
Computer	0.066	0.007 (0.012)	0.013 (0.019)	0.066*** (0.022)	-0.002 (0.020)	2181
Wheelbarrow	0.053	-0.001 (0.010)	0.030* (0.017)	0.030 (0.020)	0.015 (0.016)	2181
Bike	0.012	0.009 (0.006)	-0.003 (0.008)	-0.004 (0.007)	0.012 (0.008)	2181
Motorbike	0.034	-0.007 (0.007)	0.007 (0.009)	0.004 (0.016)	0.008 (0.012)	2181
Car	0.055	-0.001 (0.014)	-0.016 (0.027)	0.014 (0.016)	0.044 (0.036)	2181
Satellite dish	0.097	-0.023* (0.012)	-0.007 (0.014)	0.023 (0.027)	-0.019 (0.018)	2181
Other	0.051	0.001 (0.011)	-0.033 (0.020)	-0.016 (0.024)	-0.002 (0.019)	2181

Notes: See notes to Table 2.

Table A6: Differential attrition test

	Control		Treatment		Diff	p-value
	Mean	SD	Mean	SD		
Attrition rate	0.044	0.206	0.037	0.189	0.007	0.39
Observations	900	900	1372	1372	2272	2272

Notes: This table displays the difference in mean attrition between treatment and control groups.

Table A7: Remittances sent by migration reasons

	Remittances			N
	Dummy	Amount sent		
		(All)	(if D=1)	
Economic	0.40	4.58	11.53	68
Health	0.11	1.01	9.56	85
Family	0.17	1.95	11.31	81
Studies	0.00			17
Tourism	0.25	2.79	11.17	8
Other	0.00			4
Total	0.20	2.20	11.12	263

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to the amount of the remittances received.

Table A8: Heterogeneous effects (process indicators)

	Days worked (1)	Income (2)	Food exp (3)	Non-food exp (4)	Food security (5)	Asset index (6)	Financial index (7)	Migration (8)	Social/Pol index (9)	Conflict index (10)	Woman empo index (11)	Psychological index (12)
Panel A. Satisfied with the selection process												
β_1 : Treatment	8.474 (5.355)	0.224 (1.185)	-0.142 (1.416)	2.288 (2.754)	-0.052 (0.063)	-0.152*** (0.056)	0.011 (0.053)	0.048 (0.039)	0.031 (0.030)	0.002 (0.031)	0.014 (0.058)	-0.030 (0.046)
β_3 : Satisfied selection x Treatment	-0.778 (1.661)	-0.227 (0.375)	-0.078 (0.459)	-0.706 (0.882)	0.014 (0.020)	0.050*** (0.018)	-0.005 (0.017)	-0.006 (0.012)	-0.007 (0.010)	0.003 (0.010)	0.001 (0.019)	0.004 (0.015)
$\beta_1 + \beta_3$	7.696** (3.813)	-0.003 (0.839)	-0.219 (0.997)	1.582 (1.937)	-0.038 (0.044)	-0.102*** (0.040)	0.006 (0.038)	0.042 (0.028)	0.024 (0.021)	0.005 (0.022)	0.016 (0.040)	-0.026 (0.032)
N	2144	2144	2144	2144	2144	2144	2144	2144	2144	2144	1730	2144
Panel B. Satisfied with the infrastructures upgrades												
β_1 : Treatment	-3.076 (6.067)	-0.266 (1.371)	2.367 (1.720)	3.705 (3.121)	0.040 (0.072)	0.019 (0.057)	-0.068 (0.065)	0.042 (0.044)	0.062* (0.035)	0.000 (0.037)	0.024 (0.066)	0.021 (0.053)
β_3 : Satisfied infrastructures x Treatment	2.961 (1.893)	-0.064 (0.433)	-0.878 (0.548)	-1.218 (0.978)	-0.017 (0.023)	-0.009 (0.019)	0.022 (0.020)	-0.005 (0.014)	-0.016 (0.011)	0.003 (0.012)	-0.001 (0.021)	-0.011 (0.017)
$\beta_1 + \beta_3$	-0.115 (4.278)	-0.330 (0.963)	1.489 (1.204)	2.486 (2.199)	0.023 (0.050)	0.009 (0.039)	-0.046 (0.046)	0.038 (0.031)	0.046* (0.025)	0.003 (0.026)	0.023 (0.046)	0.010 (0.037)
N	2144	2144	2144	2144	2144	2144	2144	2144	2144	2144	1730	2144
Panel C. Satisfied with the daily wage rate												
β_1 : Treatment	-0.163 (7.090)	-1.043 (1.476)	0.268 (1.678)	1.522 (3.280)	0.052 (0.080)	-0.026 (0.069)	0.006 (0.065)	0.073* (0.041)	-0.004 (0.039)	0.041 (0.044)	-0.041 (0.067)	0.084 (0.059)
β_3 : Satisfied wage x Treatment	-1.638 (3.211)	-0.296 (0.741)	-0.480 (0.834)	-0.383 (1.638)	-0.025 (0.037)	0.016 (0.031)	-0.010 (0.032)	-0.024 (0.021)	-0.020 (0.019)	-0.034 (0.022)	0.037 (0.033)	-0.040 (0.028)
$\beta_1 + \beta_3$	-1.801 (4.347)	-1.339 (0.875)	-0.211 (1.014)	1.139 (1.948)	0.027 (0.049)	-0.010 (0.043)	-0.004 (0.039)	0.049* (0.025)	-0.024 (0.023)	0.007 (0.026)	-0.003 (0.039)	0.044 (0.035)
N	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1105	1348
Panel D. Satisfied with the payment period												
β_1 : Treatment	-6.214 (7.300)	-1.849 (1.421)	-2.302 (1.798)	0.628 (3.352)	-0.132* (0.077)	0.013 (0.055)	-0.010 (0.067)	0.056 (0.045)	-0.013 (0.038)	0.019 (0.043)	0.080 (0.063)	0.022 (0.056)
β_3 : Satisfied payment x Treatment	1.551 (3.198)	0.165 (0.620)	0.853 (0.840)	0.128 (1.628)	0.069** (0.034)	-0.004 (0.028)	0.001 (0.031)	-0.015 (0.019)	-0.013 (0.017)	-0.020 (0.019)	-0.029 (0.029)	-0.007 (0.023)
$\beta_1 + \beta_3$	-4.664 (4.547)	-1.684* (0.917)	-1.450 (1.099)	0.756 (1.997)	-0.063 (0.049)	0.008 (0.034)	-0.010 (0.042)	0.041 (0.029)	-0.026 (0.024)	-0.001 (0.027)	0.050 (0.040)	0.016 (0.036)
N	1348	1348	1348	1348	1348	1348	1348	1348	1348	1348	1105	1348

Notes: See notes to Table 2. An inverse hyperbolic sine (IHS) transformation is applied to all monetary outcomes (i.e. income, food expenditures, non food expenditures). The sample is restricted to co-residing couples for the woman empowerment index. All estimates control for unbalanced covariates at baseline. Where possible, we include baseline level of the outcome.

Table A9: Estimation of local average treatment effects (LATE)

	Days worked (1)	Income (2)	Food exp (3)	Non-food exp (4)	Food security (5)	Asset index (6)	Financial index (7)	Migration (8)	Social/Pol index (9)	Conflict index (10)	Woman empo index (11)	Psychological index (12)
Panel A. OLS												
ITT	5.576*** (1.663)	-0.657* (0.380)	-0.471 (0.491)	-0.218 (0.887)	-0.014 (0.021)	-0.008 (0.017)	-0.009 (0.018)	0.028** (0.012)	0.013 (0.010)	0.006 (0.010)	0.026 (0.018)	-0.005 (0.015)
Control mean	53.795	9.138	38.037	82.732	0.000	0.000	0.000	0.078	0.000	0.000	0.000	0.000
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181
Panel B. IV												
LATE	9.609*** (2.847)	-1.133* (0.656)	-0.812 (0.847)	-0.375 (1.526)	-0.024 (0.036)	-0.014 (0.029)	-0.016 (0.030)	0.048** (0.022)	0.022 (0.017)	0.010 (0.018)	0.044 (0.031)	-0.008 (0.026)
Control mean	51.277	9.478	38.290	83.272	0.014	0.011	0.008	0.064	-0.004	-0.003	-0.013	0.006
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181

Notes: See notes to Table 2. Random assignment is used as an IV for actually treated households (according to survey data). An inverse hyperbolic sine (IHS) transformation is applied to all monetary outcomes (i.e. income, food expenditures, non food expenditures). The sample is restricted to co-residing couples for the woman empowerment index. All estimates control for unbalanced covariates at baseline. Where possible, we include baseline level of the outcome.

Table A10: Estimation of impacts of migration on main outcomes

	Days worked	Income	Food exp	Non-food exp	Food security	Asset index	Financial index	Social/Pol index	Conflict index	Woman empe index	Psychological index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A. OLS											
Migration	-3.990*	-1.597***	-1.880**	-4.317***	-0.081**	-0.048*	-0.074***	0.007	-0.012	0.013	-0.026
	(2.355)	(0.563)	(0.748)	(1.476)	(0.036)	(0.025)	(0.027)	(0.016)	(0.014)	(0.030)	(0.025)
Control mean	57.419	8.852	37.876	82.443	-0.008	-0.010	-0.003	0.005	0.005	0.016	-0.005
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181
Panel B. IV											
Migration LATE	200.322*	-23.618	-16.962	-7.811	-0.513	-0.290	-0.326	0.460	0.199	1.769	-0.177
	(108.781)	(16.876)	(18.945)	(31.727)	(0.795)	(0.612)	(0.638)	(0.403)	(0.386)	(2.047)	(0.570)
Control mean	39.636	11.052	39.463	85.769	0.081	0.063	0.044	-0.021	-0.017	-0.145	0.036
N	2181	2181	2181	2181	2181	2181	2181	2181	2181	1761	2181

Notes: See notes to Table 2. Random assignment to treatment is used as an IV for migration. An inverse hyperbolic sine (IHS) transformation is applied to all monetary outcomes (i.e. income, food expenditures, non food expenditures). The sample is restricted to co-residing couples for the woman empowerment index. All estimates control for unbalanced covariates at baseline. Where possible, we include baseline level of the outcome.

A.4 Fieldwork





