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Local economy-wide  
impact evaluation of  
**Lesotho's Child Grants  
Programme** and  
Sustainable Poverty  
Reduction through  
Income, Nutrition and  
Access to Government  
Services Project

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# Local economy-wide impact evaluation of Lesotho's Child Grants Programme and Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services Project

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## Abbreviations and acronyms

CBA	Cost-Benefit Analysis
CCFLS	Community-led Complementary Feeding and Learning Sessions
CI	Confidence Interval
CGP	Child Grants Programme
CRS	Catholic Relief Services
FAO	Food and Agriculture Organization of the United Nations
ICWHR	Improving Child Wellbeing and Household Resiliency
KHG	Keyhole Gardens
LEWIE	Local Economy Wide Impact Evaluation
LFSSP	Linking Food Security to Social Protection Programme
LSL	Lesotho Loti
MoSD	Ministry of Social Development
NISSA	National Information System for Social Assistance
SILC	Savings and Internal Lending Communities
SiQ	Spatial Intelligence
SPRINGS	Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services
UNICEF	United Nations Children’s Fund



## Executive summary

### Background and objectives of the study

This report presents findings from a study of the local-economy impacts of one of Lesotho's largest social programmes, the Child Grants Programme (CGP), and a rural development intervention, the Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) programme. The CGP provides cash transfers to eligible poor households, while SPRINGS was a multi-faceted productive intervention targeting areas reached by the CGP, that provided support in the form of: a) Community-based savings and lending groups, with financial education, known as Savings and Internal Lending Communities (SILC); b) Homestead gardening, including support to keyhole gardens and vegetable seeds distribution; c) Nutrition training through Community-led Complementary Feeding and Learning Sessions (CCFLS); d) Market clubs for training on market access; e) One Stop Shop/Citizen Services Outreach Days. The objective of the analysis presented in this report is twofold:

1. To design a Local Economy Wide Impact Evaluation (LEWIE) model and carry out simulations to reveal the direct and indirect impacts of CGP and SPRINGS;
2. To assess the cost effectiveness of these programmes, alone and in combination, taking into account the income and production spillovers they create.

### Methodology

By treating eligible households, the combined CGP and SPRINGS “treat” the local economies of which these households are part, via income and production spillovers. Market interactions shift impacts from beneficiary to non-beneficiary households. For example, beneficiaries of the CGP spend a large part of their cash on goods or services supplied by local farms and businesses, while SPRINGS aims to increase their production as local demand increases. As local production expands to meet the new demand, incomes in the households connected with these farms and businesses rise, together with the demand for labour and other inputs. This generates additional rounds of spending and income growth in the local economy. As impacts swirl through the local economy, the programmes benefit non-beneficiaries, including local business owners, traders, farmers, livestock producers, and others. If the local supply of goods and services is not responsive, that is, if it is inelastic, increases in local demand may create inflationary pressures that reduce programme benefits by raising consumption costs. SPRINGS may alleviate inflationary pressures by making beneficiaries more productive and thus better able to satisfy local demand.

Quasi-experimental methods revealed positive impacts of some specific components of SPRINGS on beneficiary households that received both CGP transfers and SPRINGS. Data are not available to estimate spillover effects on non-beneficiaries using experimental methods. LEWIE makes it possible to quantify local income and production spillovers using simulations. For this analysis, we defined the local economy as the CGP and CGP+SPRINGS treated village plus neighbouring villages and the nearest town.

We used econometric methods to estimate the model parameters from these micro-data. The model shows how trade links households within the treated villages, and how regional trade links villages to each other, to regional commercial centres, and to the rest of the country. Trade within villages creates income and production spillovers in local economies. Trade with the rest of the country transmits programme benefits to other parts of Lesotho.

## Main findings

Four broad findings emerge from our LEWIE simulations:

1. Lesotho's CGP creates both nominal and real income multipliers, that is, benefits that significantly exceed programme costs. Each Lesotho loti (LSL) transferred to poor households raises nominal or "cash" income in local economies by LSL 3.11. Cash transfers stimulate local demand, which in turn stimulates production and puts upward pressure on local prices. The real or inflation-adjusted multiplier is 1.67, with a simulated confidence interval (CI) of [1.45, 1.93]. This real income multiplier is consistent with CGP real income multipliers from other studies involving both simulations and experiments.
2. Combining CGP with KHG and SILC, individually or in combination, leads to higher real income multipliers. However, in all cases the 90 percent CIs for real income multipliers in these simulations slightly overlap the CI for CGP without SPRINGS. Thus, while there is some evidence that KHG and/or SILC strengthen real-income multipliers, we cannot say that the difference from CGP multipliers is statistically significant, based on our simulations.
3. Connecting local economies with outside markets through market clubs significantly increases the real income impacts of CGP and CGP+SPRINGS if this results in higher crop prices for local producers. The positive impact of higher crop prices on farm profits outweighs the negative impact on consumers. Nevertheless, if outside markets transmit lower crop prices into the local economy, this will seriously reduce real income multipliers, and in some cases drive them to zero. This finding highlights the importance of market integration for the welfare of CGP beneficiaries and other households in local economies, but also the implications of negative price shocks on local economies.
4. LEWIE benefit-cost analyses reveal that the CGP, alone and with all combinations of SPRINGS components, generates total discounted benefits that exceed discounted programme costs. Real-income benefit-cost ratios, counting the income spillovers created in local economies, range from 1.49 (CGP+SILC) to 2.31 (CGP+Market Clubs). The benefit-cost ratio from combining CGP with the full array of SPRINGS components (2.22) easily exceeds that from CGP alone (1.63). Considering local-economy spillovers is essential in order for a cash transfer programme like CGP to pass a benefit-cost test, and it also substantially increases the estimated benefit-cost ratios for productive intervention.

## 1. Introduction

Social protection and production programmes can create production and income spillovers in rural economies. Social protection programmes do this by providing cash to poor households, which spend this cash on goods and services supplied by others in the local economy. In this way, cash transfers stimulate economic growth. Production programmes create spillovers by stimulating income growth in producer households as well as in households that supply producers with labour and other inputs. Existing research suggests that the indirect impacts of social and productive interventions, including on poor households, are significant (e.g., Thome, Filipski, *et al.* 2013; Kagin, *et al.* 2014; Taylor and Filipski 2014). Because of production and income spillovers, the full impact of social and productive programmes on rural economies may substantially exceed the direct impacts on beneficiaries.

Lesotho is no exception. A local economy wide impact evaluation (LEWIE) model revealed that the Child Grants Programme (CGP), one of the largest social protection programmes in the country, created positive production and income spillovers to households that did not receive cash transfers (Taylor *et al.*, 2014; Filipski *et al.* 2015). Simulations indicated that total income impacts significantly exceeded the amounts transferred under the programme: each maloti transferred stimulated local nominal income gains of up to 2.23 maloti. By stimulating demand for locally supplied goods and services, cash transfers had productive impacts, mostly in households that did not receive the transfer. These simulation results were validated by a randomized control trial study, which found even larger income gains for both beneficiary and non-beneficiary households in CGP-treated village clusters (Gupta *et al.*, 2018).

The CGP is at the centre of social protection in Lesotho, one of the key priority sectors of the National Strategic Development Plan 2012–2017 and of the National Policy on Social Development approved in 2014 (Government of Lesotho, 2015). The LEWIE analysis carried out by Taylor *et al.* (2014) was part of the first impact evaluation of the CGP (phase 2A). That evaluation found positive impacts on a range of social outcomes and on productive activities in beneficiary households (Pellerano *et al.*, 2014; Daidone *et al.*, 2014). However, evaluations also found areas where impacts did not occur, such as very limited effects on the accumulation of assets, no impact on savings and borrowing behaviour, and no significant impact on standard poverty measures.

Since the first impact evaluations in 2014 there have been some modifications to the CGP. The Government and development partners realized that cash transfers alone could not address the major developmental challenges confronting beneficiary households. Cash transfers cannot sustain economic self-reliance unless accompanied by more structural efforts to transform livelihoods and increase productivity. For this reason, there have been several attempts to complement the CGP with other interventions, to create synergies and linkages in the area of nutrition and rural development, including a better articulation with emergency response programmes.

The first example of a more holistic approach was the “Linking Food Security to Social Protection Programme (LFSSP)”, a one year pilot initiative led by the Lesotho country office of the Food and Agriculture Organization of the United Nations (FAO), which started in July 2013. Its objective was to

improve food security by providing vegetable seeds and training on homestead gardening to poor and vulnerable households eligible for the CGP. The theory of change behind this new programme was that social and productive programmes in combination would have resulted in stronger impacts on the food security of beneficiary households than either programme in isolation. FAO Lesotho implemented LFSSP in partnership with Catholic Relief Services (CRS) and Rural Self Help Development Association. The LFSSP impact evaluation carried out by FAO found positive effects of the combined programmes on home gardening and productive agricultural activities in beneficiary households (Dewbre *et al.*, 2015; Daidone *et al.*, 2017).

The CGP and LFSSP experience encouraged UNICEF, the Ministry of Social Development (MoSD) and CRS, with European Union funding, to implement a pilot project aimed at reducing vulnerabilities and increasing resilience in poor rural communities. The first phase of this project, known as Improving Child Wellbeing and Household Resiliency (ICWHR), was implemented in three community councils where the MoSD provided CGP transfers: Likila (district of Butha-Buthe), Menkhoaneng (Leribe), and Makhoarane (Maseru). The second phase, known as the Sustainable Poverty Reduction through Income, Nutrition and access to Government Services (SPRINGS), was launched in community councils under ICWHR plus two additional community councils: Tebe-Tebe (Berea) and Tenesolo (Thaba-Tseka). The community development package consisted of:

- a. Community based savings and internal lending groups, also known as Savings and Internal Lending Communities (SILC), which also offer financial education;
- b. Market clubs;
- c. Homestead gardening: keyhole gardens (KHG), vegetable seeds distribution and food preservation;
- d. Nutrition training via Community-led Complementary Feeding and Learning Sessions (CCFLS);
- e. One Stop Shop / Citizen Services Outreach Days.

The impacts of these programmes were evaluated by a micro-econometric study (FAO UNICEF, 2019), a qualitative study (Nesbitt-Ahmed and Pozarny, 2018), and a laboratory experiment in the field (Pace and Daidone, 2019). The objective of the analysis presented in this report is twofold:

1. To design a LEWIE model and carry out simulations to reveal the direct and indirect impacts of CGP and SPRINGS;
2. To assess the cost effectiveness of these programmes, alone and in combination, taking into account the income and production spillovers they create.

## 2. Methodology

We design and carry out a local economy wide impact evaluation (LEWIE) to uncover the direct and indirect impacts of the the Child Grants Programme (CGP) and , the Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS). Simulations using the LEWIE model provide estimates of impacts on the activities and incomes of target groups, as well as the indirect (spillover) effects on groups not targeted by these programmes. By treating eligible households, social protection and agriculture programmes “treat” the local economies of which these households are part, via these income and production spillovers. Market interactions shift impacts from beneficiary to non-beneficiary households. For example, beneficiaries of the CGP spend a large part of their cash on goods or services supplied by local farms and businesses. As local production expands to meet the new demand, incomes in the households connected with these farms and businesses rise, together with the demand for labour and other inputs. This generates additional rounds of spending and income growth in the local economy. As impacts swirl through the local economy, the programme is likely to benefit non-beneficiaries, including local business owners, traders, farmers, livestock producers, and others. However, if the local supply of goods and services is not responsive or elastic, there may also be inflationary pressures that create costs for local consumers and cause real income gains to diverge from nominal ones.

It is difficult and costly to estimate spillover effects of social and production programmes using experimental approaches. This is because spillovers, like ripples in a pond, dissipate as they move through local economies. In most cases, the indirect impacts on a single non-beneficiary household tend to be small, even though the sum of impacts on all non-beneficiaries may be quite large – even larger than the sum of direct impacts on targeted households. Because of this, identifying spillovers requires surveying large numbers of ineligible households. Almost all impact evaluations seek to identify average treatment effects by comparing outcomes in eligible households at treated and control sites. They almost never survey households that are not eligible for programmes. Trying to evaluate spillovers from multiple programmes, like CGP and SPRINGS, requires even larger and more costly surveys of ineligible as well as eligible households.

### 2.1 What a Local economy-wide impact evaluation (LEWIE) model looks like

There is a rich tradition in economics of using micro survey data to construct models of agricultural households that are both producers and consumers of food (Singh *et al.*, 1986). LEWIE begins by estimating household-farm models for programme eligible and ineligible household groups, then “nests” these models within a general-equilibrium model of a region of interest. The household models describe each group’s productive activities, income sources, and consumption expenditure patterns. In a typical model, households participate in activities such as crop and livestock production, retail, and other business activities, as well as in the labour market. Productive activities combine various factors (e.g., hired labour, family labour, land, capital) and intermediate inputs (fertilizer, seed, and a variety of purchased inputs) to produce an output (corn, prepared meals, a service), which may be consumed by the household or sold to others. Production functions for each activity are the recipes that turn inputs into outputs. We estimate production functions for each

activity and household group econometrically, using microdata (here, from the same surveys used for the experimental analyses of programme impacts).

Household groups can purchase goods and services locally or outside the region. Beneficiaries create spillovers to non-beneficiaries by spending cash on the goods and services non-beneficiaries provide. Non-beneficiaries create spillovers to both beneficiaries and other non-beneficiaries by spending their income on goods and services other households provide. We used survey data to estimate econometrically how changes in income affect expenditures by both beneficiary and non-beneficiary households.

Local trade links households within a village, and regional trade links villages to each other and to regional commercial centres. The whole region also interacts with the rest of the country, importing and exporting goods and possibly selling labour. The surveys for this project included questions about where households and businesses bought and sold goods, factors (like labour), and intermediate inputs (like seeds and the merchandise on shop shelves). We used this information to separate out local trade (within the village or with neighbouring villages) from trade with the rest of the region or outside the region. For each good and factor, the total quantities demanded and supplied in the local economy must equal one other. Otherwise, either prices must adjust to ensure a local market equilibrium, or trade, purchases or sales outside the local economy, must adjust to resolve an excess demand or an excess supply, respectively.

Equations in the LEWIE model ensure that prices adjust to clear markets for goods and services not traded with outside markets (non-tradables), and that trade adjusts to clear the markets for goods traded with outside markets (tradables). Non-tradables in rural Lesotho include labour, because workers cannot easily move long distances for daily work; services like prepared meals, haircuts, construction, butchers; bulky, costly-to-transport goods, and perishable goods. Tradables include most of the items that line the shelves of small stores, bought outside the local economy or from traders. Examples include cooking oil, salt, soap, paper products, and non-perishable foods.

Survey data play two main roles in the construction of LEWIE models. They provide initial values for all variables in the model (inputs and outputs of each production activity, household expenditures on each good and service). We also use them to econometrically estimate model parameters for each household group and sector, together with standard errors on these estimates. The initial values and parameter estimates are organized into a data input spreadsheet designed to interface with GAMS (Generalized Algebraic Modeling System) software, which we used to programme the LEWIE model.

Validation is always a concern in General Equilibrium modelling. Econometrics provides a way to validate the model's parameters: significance tests provide a means to establish confidence in the estimated parameters and in the production and expenditure functions used in the simulation model. If the structural relationships in the simulation model are properly specified and precisely estimated, this should build faith in our simulation results. Econometrically-estimated model parameters have standard errors, which can be used with Monte Carlo methods to perform significance tests and construct confidence intervals around project impact-simulation results, as shown by Taylor and Filipinski (2014). The LEWIE also takes into account nonlinearities and local price effects. Simulations require making judgements, based on the survey data, about where and how

prices are determined (that is, market closure, which usually is not known with certainty). Sensitivity analysis, combined with the Monte Carlo method described above, allows us to test the robustness of simulated impacts to market-closure assumptions.<sup>1</sup>

Table 1 presents a theory of change table, which describes how the CGP and SPRINGS programmes can create local economy impacts. Figure 1 summarizes the LEWIE model and the channels through which these policies could affect beneficiary and non-beneficiary households. It is important to note that spillovers accrue to non-beneficiaries as well as to beneficiaries; they can add to the direct effects on beneficiaries. Spillover effects on beneficiaries and non-beneficiaries are estimated simultaneously in the LEWIE model; they, together with direct effects on beneficiaries, constitute the total local economy-wide impact of the programme.

The policy option transmits impacts in a variety of ways, depending on the specific policy. For example, SILC groups can help farmers overcome liquidity constraints and increase their investment in new agricultural and non-agricultural activities (1). Impacts of the CGP operate through an increase in exogenous income, whereas the homestead gardening component of SPRINGS affects input use for vegetable production through subsidies (2). Production and consumption linkages transmit impacts to other beneficiary households and to non-beneficiary households (3). Non-beneficiary households then transmit impacts through production and consumption linkages to the other household groups (4). In subsequent rounds of spending, households continue to transmit to each other; however, leakages, in the form of expenditure on consumption and production outside the rural economy (5), reduce the effect of subsequent cycles on local incomes and production. Although leakages reduce local economy impacts, they transmit benefits to other parts of Lesotho.

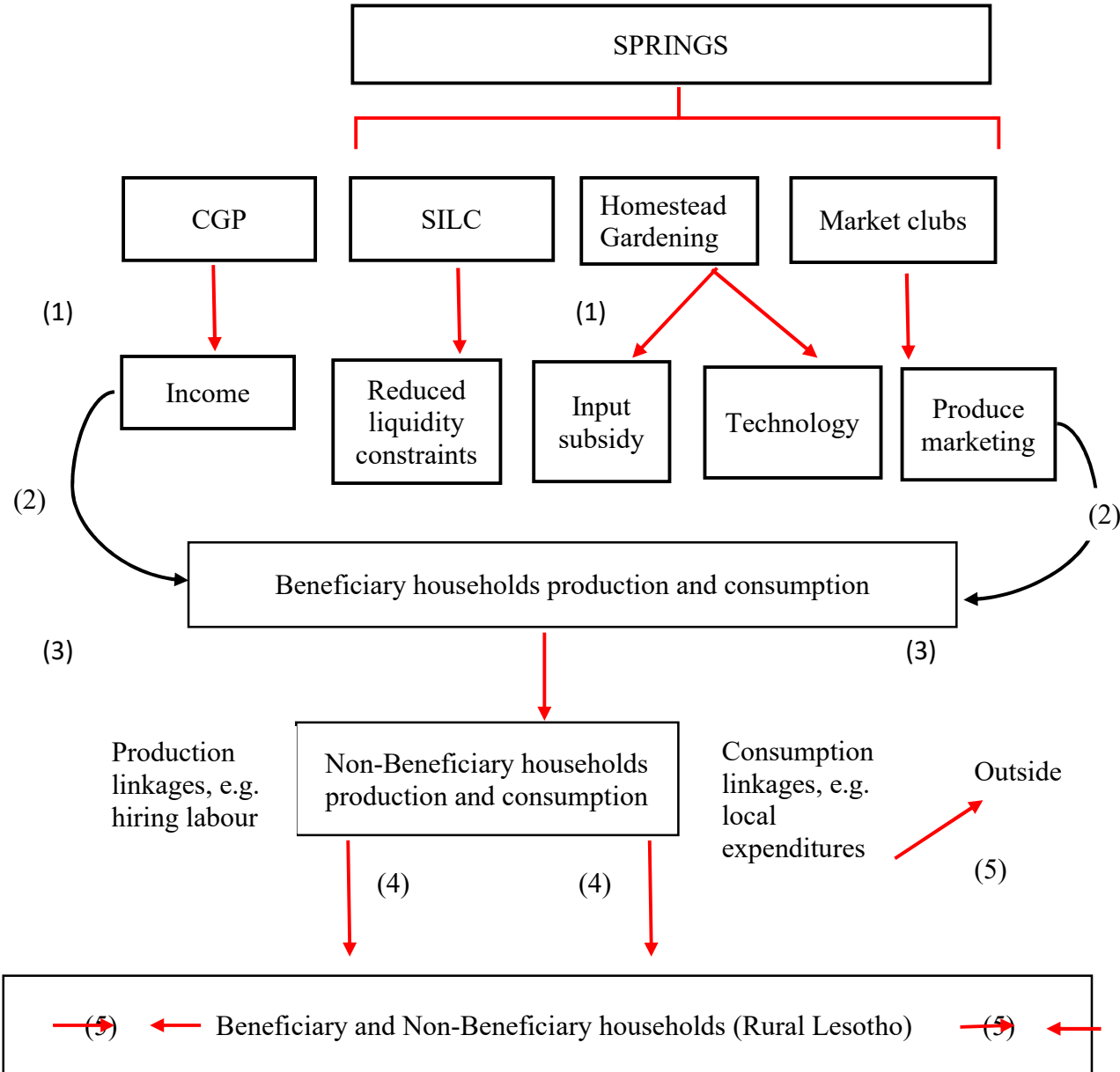
**Table 1: Theory of Change - Summary of Child Grants Programme (CGP) and Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) impacts on beneficiary and non-beneficiary households**

<b>Programme and its components</b>	<b>Channel of impact on beneficiaries</b>	<b>Spillovers to non-beneficiaries</b>
CGP: Cash transfer to vulnerable households with children	Increase in exogenous income for poor beneficiaries	Spending on goods from local farms and businesses Production expands to meet increased demand If production does not expand, inflationary impacts occur
SILC groups: - Access to saving and lending services - Financial education	Reduced liquidity constraints	
	Investment in income generating activities	
Homestead gardening: - Keyhole/trench gardens construction and management - Vegetable seeds - Training on food preservation techniques	Increase in vegetable production, due to improved seeds use, and productivity, due to new information	
Market Clubs: - Training on market engagement and business development	Access to higher prices / lower costs of selling in outside markets	

Note: SILC: Saving and Internal Lending Communities.

<sup>1</sup> For more on LEWIE see Taylor and Filipksi (2014).

**Figure 1: Summary of programmes' transmission mechanisms for rural Lesotho**



Note: (1) The policy option transmits impacts in a variety of ways depending on the specific policy e.g. market clubs can help farmers improve their business skills and find the markets for their produce. (2) Transmission mechanisms have heterogeneous impacts on beneficiary households e.g. the CGP operates through an increase in exogenous income whereas subsidies from the homestead gardening component of SPRINGS will affect improved seeds use for crop production. (3) Production and consumption linkages transmit impacts to other beneficiary households and to non-beneficiary households. (4) Non-beneficiary households then transmit impacts through production and consumption linkages to the other household groups. (5) In subsequent rounds households continue to transmit to each other, however, leakages, in the form of expenditures on consumption and production outside the rural economy, reduce the effect of subsequent cycles. CGP: Childhood Grants Programme, SILC: Saving and Internal Lending Communities.



### 3. Data

The impact evaluation design of the Lesotho CGP+SPRINGS programmes consists of a post-intervention only non-equivalent control group study. This method is based on the National Information System for Social Assistance (NISSA) registry, matching households with and without CGP based on their socio-demographic characteristics. To alleviate issues of “contamination” through possible spillovers from beneficiary households, the potential comparison group was selected from households in villages without CGP or CGP+SPRINGS beneficiaries. CGP+SPRINGS beneficiaries were identified by matching Catholic Relief Services (CRS) lists of programme participants with the lists of households in NISSA. Households with the most similar predicted probability of receiving the CGP were included in the potential sampling lists, including a set of “replacement” households, in case households were impossible to locate during the fieldwork or did not agree to be interviewed. All details of the study design are available in the NISSA data study (Daidone and Prifti, 2017) and in the impact evaluation report (FAO UNICEF, 2018).

Data collection was conducted between end of November 2017 and mid-January 2018 by Spatial Intelligence (SiQ). It comprises household, community and business surveys. For more information on the survey implementation, see SiQ (2018).

SiQ surveyed a total of 2 014 households, of which 1 550 (8 212 individuals) were eligible for the CGP and 464 (2 106 individuals) were not eligible. The full set of 2 014 households will be used for the LEWIE simulations and CBA. The sample of eligible households is divided in the following treatment arms:

- a) Comparison group: 650 households (3 289 individuals)
- b) CGP only group: 459 households (2 413 individuals)
- c) CGP+SPRINGS group: 441 households (2 510 individuals)

The household survey provides the information needed to estimate most of the LEWIE model parameters, including household- and commodity-specific expenditure functions and production functions for household activities, including crop, livestock, retail, and non-retail businesses.

The characteristics of the household sample used in this study are unlikely to fully represent the characteristics of the rural population of Lesotho. CGP+SPRINGS households and comparison eligible households were intentionally oversampled to ensure the CGP+SPRINGS evaluation had enough statistical power to detect impacts of the programmes in isolation and jointly. Other groups have different response propensities, leading to their unintentional underrepresentation. In order to mitigate the potential bias due to differences between sample and population characteristics and make the LEWIE study more representative of the surveyed population, we adjust our estimates by using post-stratification weights (Little, 1993), which allows us to account for underrepresented groups in the population.

We select two post-stratification weighting factors, the study group and the community council of residence, to partition the population within each post stratum, so that weights sum to the population sizes. We retrieve population totals from the NISSA database and calculate weights following a simple general procedure. We divide the sample into  $K$  post-strata. For each household  $h$ , belonging to post-stratum  $k$ , we compute a post-stratification weight:  $w_{hk} = N_k/n_{hk}$ , where  $n_{hk}$  and  $N_{hk}$  are the number of survey respondents and the population size in post-stratum  $h$ , respectively.

The business enterprise survey provides information on costs and revenues from a selection of businesses operating in the programme districts. Randomly selected samples of different types of businesses in the area (retail and non-retail) were then drawn. SiQ surveyed a sample of each business type sufficient to ensure an accurate representation of the technology used. In total there were 222 businesses surveyed – 66 percent retail and 33 percent non-retail (SiQ, 2018). We use this survey to estimate the intermediate demand shares for goods and services supplied as inputs from other businesses inside or outside the programme area. Not all sizes/types of businesses are picked up by the household survey, so the business survey allows us to get at the technology from these critical entities in the local economy. The business enterprise survey provides the critical complement to household survey for estimating production functions for each non-agricultural activity in the model, especially in consideration that only 5.5 percent of households included in the household survey reported running a non-farm business. Business income gathered from the household survey is part of beneficiary and non-beneficiary households' income and expenditures.

## 4. Household taxonomy and summary statistics

The LEWIE analysis requires a practical household taxonomy to carry out simulations and compare outcomes across beneficiary and non-beneficiary household groups. In this LEWIE study, the household clustering is based on eligibility for the CGP and SPRINGS benefits and includes the following:

1. Eligible households in comparison areas without CGP or CGP+SPRINGS
2. CGP-only group
3. CGP + SILC group
4. CGP + Homestead Gardening (KHG) group
5. CGP + SILC + KHG group
6. Ineligible households from CGP+SPRINGS villages
7. Ineligible households from comparison villages (CGP ineligible households not benefitting from either SILC or KHG).

Table 2 reports sample sizes and shows that comparison and eligible households are over-represented in the survey, making up 32 percent of the sample, though they represent only 2 percent of the total number of households available in NISSA. On the other hand, ineligible households in comparison villages are just 5 percent of the sample, but they are supposed to represent 46 percent of all NISSA units. Households benefitting from SPRINGS, independently of whether they receive SILC, KHG or both, are almost one quarter of the sample, but they represent only 6 percent of the NISSA households. This is not surprising, as the first phase of SPRINGS targeted only three community councils.

Table 3 presents summary statistics on each of these household groups. In general, CGP-SPRINGS eligible households are larger than ineligible households, with more male and female members. They are also slightly younger, with household head ages ranging from 53 to 56 years, compared to 56 to 61 in ineligible households; they have more children 17 or younger, higher dependency ratios, and slightly larger labour constraints. They are much more likely to have an orphan living in the household. Household head education levels are similar between eligible and ineligible households, ranging from 4.3 to 5.1 years of schooling.

Figure 2 depicts graphically pecuniary summary statistics. Average harvest values are lower in eligible households, ranging from LSL 670 to 1 039, compared to LSL 1 210 to 1 825 in ineligible households. The value of livestock owned is much lower in eligible households: LSL 5 586 to 9 114 compared with LSL 14 242 to 21 146 in ineligible households. Ineligible households have higher average profits from household businesses and total higher gross income. The range of average annual food expenditures, including the value of home-grown crops, is LSL 7 225 to 12 296 for eligible households and LSL 9 794 to 10 932 for ineligible households – lower at the bottom but similar at the top.

Means for comparison households tend to be slightly lower than means for CGP and CGP+SPRINGS beneficiaries in terms of several socio-demographic variables including household size, age, orphan members and education. However, they are within the eligible-household range for harvest value, livestock, profits from home businesses, gross income, and food expenditures. There are some

differences in means for ineligible households in CGP+SPRINGS villages compared with ineligible households in comparison villages, with the former being slightly larger, younger, and better educated. Ineligible households in CGP+SPRINGS villages have lower average harvest value, livestock holdings, household business profits, and gross income but slightly higher food expenditures.

**Table 2: Household taxonomy and sample sizes**

<b>LEWIE Household Group</b>	<b>Definition</b>	<b>Survey Number of HHs</b>	<b>Survey Percentage (%) of HHs</b>	<b>Number of HHs Represented</b>	<b>Percent (%) of all HHs Represented</b>
A	Comparison Households	650	32	1 193	2
B	CGP only beneficiaries	459	23	7 526	10
C	CGP+SILC	57	3	456	1
D	CGP+KHG	260	13	2 294	3
E	CGP+SILC+KHG	168	8	1 233	2
F	Ineligible households in treatment villages	311	15	25 864	36
G	Ineligible households in comparison villages	109	5	33 469	46
<b>Total</b>		<b>2 014</b>	<b>100</b>	<b>72 035</b>	<b>100</b>

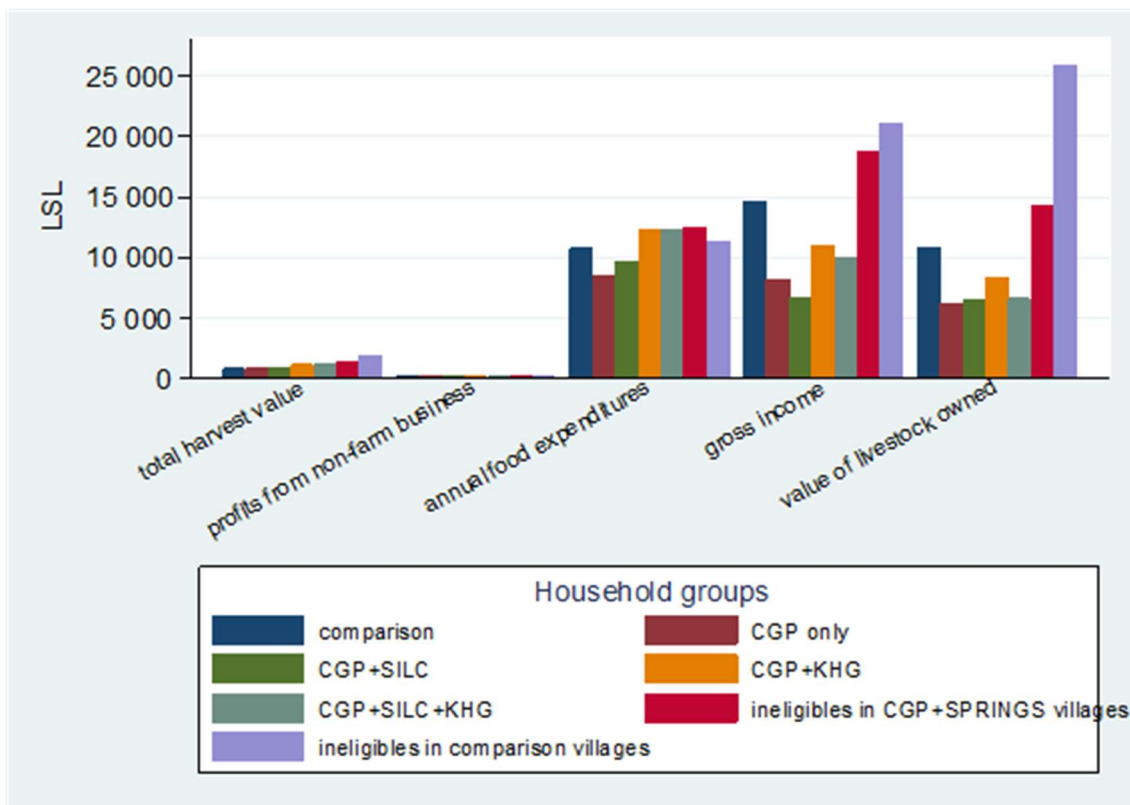
Note: CGP: Child Grants Programme, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities. Percentages retrieved by combining survey data with the National Information System for Social Assistance dataset.

**Table 3: Household summary statistics**

	Household group						
	Comparison	CGP only	CGP+SILC	CGP+KHG	CGP+SILC+KHG	Ineligibles from CGP + SPRINGS villages	Ineligibles from comparison villages
# members in the HH	5.18	5.31	5.28	5.79	5.72	4.64	4.08
# males in the HH	2.62	2.54	2.52	2.78	2.69	2.27	1.93
# females in the HH	2.57	2.77	2.75	3.02	3.03	2.37	2.16
female headed HH	0.35	0.48	0.53	0.52	0.44	0.35	0.33
head of HH age	53.18	53.75	56.03	55.91	55.34	56.56	60.66
single head of HH	0.44	0.53	0.58	0.55	0.47	0.43	0.45
head of HH married	0.56	0.47	0.42	0.44	0.53	0.57	0.55
head of HH widow	0.35	0.41	0.46	0.48	0.43	0.35	0.39
head of HH is >64 years old	0.38	0.39	0.44	0.47	0.43	0.47	0.54
head of HH is <15 years old	0.00	0.00	0.00	0.00	0.00	0.01	0.00
# HH members <=17 years old (children)	2.20	2.42	2.23	2.58	2.60	1.56	0.95
# HH members >=60 years old (elderly)	0.48	0.51	0.51	0.56	0.53	0.60	0.82
no children in HH	0.11	0.07	0.09	0.02	0.05	0.26	0.50
# disabled HH members	0.22	0.10	0.19	0.33	0.20	0.18	0.28
elderly in HH	0.40	0.41	0.46	0.48	0.43	0.49	0.59
HH with only elderly and/or children	0.09	0.06	0.03	0.06	0.06	0.13	0.16
dependency ratio	1.50	1.65	1.73	1.73	1.66	1.27	1.11
HH is labour constrained	0.32	0.30	0.28	0.37	0.34	0.37	0.48
share of dependents in HH	0.53	0.55	0.53	0.55	0.54	0.50	0.47
orphan living in HH	0.28	0.36	0.31	0.34	0.34	0.21	0.11
head of HH years of education	4.35	4.79	4.52	5.02	5.01	5.05	4.39
highest years of education in HH	8.31	8.49	9.24	9.09	9.39	9.32	8.44
head of HH completed primary school	0.30	0.34	0.30	0.30	0.30	0.36	0.28
total value of harvest, LSL	781	670	740	1 039	1 014	1 210	1 825
value of livestock owned, LSL	8 995	5 586	7 506	9 114	6 279	14 242	21 146
Profits from HH business, LSL	156	113	-67	292	223	373	671
HH monthly food expenditures, LSL	821	700	795	1 012	1 032	1 039	941
gross income, LSL	12 122	8 067	5 801	12 731	9 222	18 786	21 072
# Observations	650	459	57	260	168	311	109

Note: our elaboration from survey data. CGP: Child Grants Programme, HH: household, KHG: homestead gardening, LSL: Loti, the currency of Lesotho, SILC: Savings and Internal Lending Communities.

**Figure 2:** Household summary statistics – monetary variables



Note: our elaboration from survey data. CGP: Child Grants Programme, KHG: homestead gardening, LSL: Loti, the currency of Lesotho, SILC: Savings and Internal Lending Communities.

## 5. Estimation of model parameters

We estimated the model parameters econometrically, using microdata from the household and business surveys. Econometric estimation always requires making some assumptions about functional forms. Cobb-Douglas production functions are by far the most widely used in economics to represent technological relationships between inputs and outputs. They allow for nonlinearities, including diminishing marginal returns to inputs, and they can be estimated with the data from our household and business surveys.

Table 4 reports the production function estimates. The panels in this table present production function estimates for crops, livestock, and household non-farm businesses (separately for non-retail and retail activities). The parameter on each factor represents the elasticity of output with respect to the factor. Assuming constant returns to scale, this elasticity is also the factor's share in the activity's total value-added. Standard errors appear in parentheses underneath each parameter estimate. Asterisks (\*, \*\*, and \*\*\*) indicate that an estimated parameter is different from zero at the .10, .05, and .01 significance level, respectively.<sup>2</sup>

Crop production is land and labour intensive. Land accounts for the largest value-added share in crop production – 0.57. Labour value-added shares or elasticities in crop production are 0.27 for family labour and 0.06 for hired labour. Output elasticities are 0.09 for purchased inputs and 0.02 for capital. The largest value-added shares for livestock production are livestock capital (0.47) and land (0.40). Livestock value-added shares are 0.01 for family labour and 0.06 for both hired labour and purchased inputs. Non-farm businesses have capital (including inventory) elasticities of 0.44 and 0.39 for non-retail and retail, respectively. Both non-farm activities are labour intensive, with family labour shares of 0.35 and 0.47 and hired labour shares of 0.20 and 0.14, respectively.

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<sup>2</sup> The surveys did not provide sufficient time-use information to reliably estimate the output elasticity of family labour, so the latter was obtained as a residual, assuming constant returns to scale in crop production.

**Table 4: Cobb-Douglas production function estimates by activity**

Crop Production		Livestock Production		Business Production		
	Value of Crop Output		Value of Current Livestock Output		Non-retail profits	Retail profits
Amount of land owned (log, acres)	0.568*** (0.000)	Amount of land owned (log, acres)	0.392*** (0.033)	Value of business assets (log, LSL)	0.442*** (0.000)	0.387*** (0.002)
Family labour (assuming constant returns to scale)	0.271	Family labour (log, hours)	0.013*** (0.006)	Family labour (log, hours)	0.353*** (0.000)	0.468*** (0.000)
Hired labour expenditures (log, LSL)	0.055*** (0.003)	Hired labour expenditures (log, LSL)	0.065*** (0.013)	Hired labour expenditures (log, LSL)	0.205*** (0.001)	0.144** (0.013)
Total cost of purchased inputs (seed, fertilizer, and pesticides, log LSL)	0.091*** (0.007)	Livestock input expenditures (purchased + value of owned), (log, LSL)	0.064*** (0.012)			
Value of crop assets (tractor, cultivator, etc) in the last 12 months (log LSL)	0.015 (0.419)	Value of livestock last 12 months + livestock purchases (log, LSL)	0.467*** (0.043)			
Constant	6.734*** (0.000)	Constant	4.671*** (0.381)	Constant	2.689*** (0.000)	3.301*** (0.000)
Number of observations	711	Number of observations	1 120	Number of observations	101	129

Notes: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. LSL: Loti, the currency of Lesotho. All regressions use inverse propensity score weights from FAO UNICEF (2018) and robust standard errors. Livestock and business production functions are run as constrained regressions where its Cobb-Douglas factor coefficients are constrained to equal 1. Crop production factors are assumed to sum to 1 with family labour as the residual estimate.





The linkages created by production activities depend on the production functions as well as on intermediate inputs purchased locally or in outside markets. In this regard, non-farm production has much larger leakages, via the purchase of intermediate inputs from outside markets, than crop or livestock production. Of every LSL of total retail sales, village stores spend 0.55 to purchase merchandise outside the local economy. The share for other non-farm production is 0.33. In contrast, crop production activities spend only 0.08 per LSL of output value on intermediate inputs from outside markets (e.g., fertilizer and chemicals), and the share for livestock production is 0.06 per LSL of output value.

On the consumption side, we assume linear expenditure functions without subsistence minima,<sup>3</sup> implying Cobb-Douglas utility. We estimated a separate system of demand equations for each household group, yielding the group-specific marginal budget shares shown in Table 5. Standard errors appear in parentheses underneath the estimated budget shares.

Most household groups make the largest share of their expenditures – between one-fourth and one-third or more – in the town closest to their village ('Zone of Influence' row in Table 5). These expenditures represent a leakage for the village but can generate income multipliers within the Zone of Influence that includes the nearest town. Purchases outside the Zone of Influence account for up to 26 percent of total expenditures, although on average these are lower for eligible than ineligible households. The outside shares for eligible households range from 0.04 to 0.26, with most around 0.10 to 0.15. These outside shares represent leakages from the local economy, though they may

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<sup>3</sup> Simply stated, subsistence minima are the minimum amounts (e.g., of food) that households must consume in order to survive.

stimulate income growth in other parts of the country. Expenditure shares are also large for local retail and other nonfarm activities that, in turn, purchase inputs outside the local economy. Local crops constitute between 0.16 and 0.28 of every LSL spent by eligible households, but smaller shares – 0.05 to 0.16 – of expenditures by ineligible households. Livestock accounts for a small share of household expenditures.

**Table 5: Estimated household expenditure shares, by group**

Expenditure Shares by Household Group							
Expenditure Item	Comparison	CGP only	CGP + SILC	CGP + KHG	CGP + SILC + KHG	Ineligibles in CGP + SPRINGS villages	Ineligibles in comparison villages
<b>Local Crops</b>	0.157 (0.0106)	0.2 (0.0197)	0.279 (0.0584)	0.257 (0.0141)	0.157 (0.0106)	0.0463 (0.0166)	0.157 (0.0106)
<b>Local Livestock and Livestock Byproducts</b>	0.0132 (0.00263)	0.00789 (0.00661)	0.0132 (0.00263)	0.00983 (0.00321)	0.0106 (0.00386)	0.00251 (0.00386)	0.0132 (0.00263)
<b>Local Retail</b>	0.103 (0.0113)	0.0834 (0.0203)	0.0886 (0.056)	0.262 (0.0216)	0.246 (0.0264)	0.0901 (0.0128)	0.103 (0.0113)
<b>Local Non-Retail</b>	0.183 (0.00821)	0.183 (0.00821)	0.208 (0.0236)	0.228 (0.010005)	0.217 (0.02)	0.101 (0.0123)	0.1204 (0.01607)
<b>Zone of Influence</b>	0.268 (0.0134)	0.379 (0.0252)	0.268 (0.0134)	0.0852 (0.02708)	0.268 (0.0134)	0.337 (0.0164)	0.268 (0.0134)
<b>Savings in SILC</b>	0.000573 (0.000352)	0.000573 (0.000352)	0.000573 (0.000352)	0.000573 (0.000352)	0.000573 (0.000352)	0.000573 (0.000352)	0.000573 (0.000352)
<b>Other Savings</b>	0.0248 (0.00519)	0.0248 (0.00519)	0.0248 (0.00519)	0.00922 (0.00833)	0.0248 (0.00519)	0.158 (0.008)	0.146 (0.017)
<b>Local transfers received</b>	3.15e-05 (0.000169)	3.15e-05 (0.000169)	3.15e-05 (0.000169)	3.15e-05 (0.000169)	3.15e-05 (0.000169)	3.15e-05 (0.000169)	3.15e-05 (0.000169)
<b>Local transfers given</b>	0.0001 (0.00000551)	0.0001 (0.00000551)	0.0004 (0.00000551)	0.0001 (0.00000551)	0.0008 (0.0000551)	0.0001 (0.0000551)	0.0001 (0.0000551)
<b>Outside Goods</b>	0.257 (0.0114)	0.04205 (0.0348)	0.133 (0.0399)	0.155 (0.0163)	0.113 (0.0198)	0.257 (0.0114)	0.257 (0.0114)
<b>Observations</b>	1 853	1 853	1 853	1 853	1 853	1 853	1 853

Notes: Standard errors in parentheses. Seemingly unrelated regression (SUR) estimates using inverse probability weights from FAO UNICEF (2018). Interaction term from pooled SUR are collected here, so standard errors are also calculated. Local expenditures refer to expenditures in the village or nearby village. Zone of influence expenditures refer to expenditures occurring in the closest town. CGP: Child Grants Programme, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

Estimating income spillovers is a key objective of this LEWIE analysis. Income spillovers depend on several considerations, including:

1. How we define the local economy. How far out from the beneficiary households we “cast our net” will determine what constitutes a local purchase and what constitutes a leakage, thereby affecting the multiplier. In general, the farther out one casts one’s net, the larger the income multiplier. The definition of “local economy” is inherently arbitrary and reflects, to an important degree, the interests of researchers and policy makers. For our analysis, the local economy includes the beneficiary’s village, neighbouring villages, and the closest town.
2. The share of income that households—both eligible and ineligible—spend within this local economy. The larger the expenditure share outside the local economy, the larger the leakage and smaller the potential income multiplier.
3. Which goods and services supplied by local farms and businesses households spend their income on, as well as where these activities, in turn, obtain intermediate inputs. If households spend a large part of their income in local shops, which in turn procure their merchandise in outside markets, the potential income multiplier is smaller than if households demand local crops, which use few inputs from outside the local economy.

Real income multipliers also depend on the local supply response to increases in demand, which influences prices and thus the purchasing power of households’ cash. The more elastic the local supply response, the larger the real-income impact, and the smaller the inflationary impact. If households’ budget share on goods and services from a given activity – say, retail – is large, but the activity spends a large share of its revenue on inputs obtained from outside markets, the impact on local income might be limited, but so is the potential inflationary impact. On the other hand, if households spend a large share of their income on goods produced locally, the result may be a large real-income multiplier, if the local supply response is elastic, or a small real-income multiplier (and inflation) if the local supply response is inelastic.

Supply elasticities depend, in part, on the elasticity of factor input supplies. Labour is an important input for all activities. Very few reliable estimates of labour supply elasticities exist in the development economics literature, and these elasticities are not estimable from cross-section data. We assume an elastic labour supply. We believe this assumption is justified because the unemployment rate in Lesotho is high – about 27 percent in 2017 – and both unemployment and underemployment are widespread in rural areas. This implies that additional workers can readily be induced to supply their labour as the labour demand expands.

Land and capital inputs in our model are fixed – a standard short-run assumption in agricultural household and LEWIE models. If households have access to underutilized land and capital that they can bring into production as local demand increases, our simulations will tend to underestimate local income multipliers in the long term and possibly also in the short term. In that case, one might consider the production and income impacts from our simulations as conservative.



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## 6. Simulations and results

### 6.1 Simulations

We used the LEWIE model to perform the following simulations:

#### 6.1.1 Child Grants Programme (CGP) only

We estimate the local economy effects of the CGP transfers on eligible and ineligible households in CGP only areas. Table 6 reports the actual transfers we simulate in this experiment.

**Table 6: Transfers in Child Grants Programme (CGP) simulation, by household group**

	CGP Transfers			
	CGP only	CGP+SILC	CGP+KHG	CGP+SILC+K HG
Number of HHs	7 526	456	2 294	1 233
Percentage (%) of total households in local economy	10	1	3	2
Percentage (%) with 1–2 children	52	56	51	51
Percentage (%) with 3–4 children	38	41	42	38
Percentage (%) with 5+ children	10	4	8	11
Amount per year for 1–2 children	1 440	1 440	1 440	1 440
Amount per year for 3–4 children	2 400	2 400	2 400	2 400
Amount per year for 5+ children	3 000	3 000	3 000	3 000
<b>Total Yearly Transfer to HH Group (LSL)</b>	<b>14 720 856</b>	<b>861 304</b>	<b>4 491 468</b>	<b>2 431 930</b>

Notes: CGP: Child Grants Programme, HH: households, KHG: homestead gardening, LSL: Loti, the currency of Lesotho, SILC: Savings and Internal Lending Communities. Amount of LSL per household depends on the household size; numbers come from FAO UNICEF (2018).

#### 6.1.2 Child Grants Programme (CGP)+ Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) Home gardening

We simulated the local-economy effects of CGP combined with the home gardening component of SPRINGS. To simulate the home gardening component of SPRINGS, we increased the shift parameter in the crop production function of CGP households by an amount equal to the estimated impact of SPRINGS on crop production. The quasi experimental analysis did not estimate this impact explicitly; however, it did estimate the average impact of CGP + SPRINGS on the number of keyhole gardens the treated households cultivated – 2.65, or a 195 percent increase from the base (comparison) average of 1.39 keyhole gardens. For this experiment, we had to assume constant returns to scale in keyhole fruit and vegetable production, i.e., output from keyhole fruit and vegetable production is similar, on average, across keyhole gardens, and doubling the number of

keyhole gardens doubles keyhole output. We also assumed that all fruit and vegetable production is from keyhole gardens. On average, the data show that fruit and vegetable production constitutes 5 percent of total crop production in comparison (eligible) households. Thus, we simulated a  $1.95 \times 5$  percent = 9.5 percent increase in crop production in all CGP-eligible households that were also part of the homestead gardening component of SPRINGS for this experiment.



### 6.1.3 Child Grants Programme (CGP) + Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) Financial inclusion

The goal of the financial inclusion component of SPRINGS is to connect households with credit markets, making it possible to borrow funds to overcome liquidity constraints. The impact of financial inclusion on outcomes in the CGP+SPRINGS Financial Inclusion group depends on the amount borrowed as well as how households use the borrowed funds. Investments of borrowed funds creates the possibility of future production and income growth. Both investment and consumption uses of borrowed funds create the possibility of growth-inducing income linkages within local economies. Table 7 shows borrowing activity among the household groups.

**Table 7: Borrowing by beneficiary household groups**

Borrowing Outcomes	Household Group			
	CGP only	CGP+SILC	CGP+KHG	CGP+SILC+KHG
Number of HHs	7 526	456	2 294	1 233
Percentage (%) of total households in local economy	10	1	3	2
Total Yearly Borrowing Income to HH Group (LSL)	850 438	51 528	259 222	139 329

Notes: CGP: Child Grants Programme, HH: households, KHG: homestead gardening, LSL: Loti, the currency of Lesotho, SILC: Savings and Internal Lending Communities. An additional LSL 113 (Table 14 in FAO UNICEF 2018) per household was the impact of being part of CGP+SPRINGS.

We used the model to simulate impacts of borrowing for consumption as well as investment. For this simulation, we econometrically estimated differences in marginal propensities to consume between borrowed money and other income. These differences turned out to be quantitatively small, with a slight increase in expenditure shares on goods purchased outside the local economy and saving in SILC, and slight decreases in consumption expenditure shares for livestock and other savings. We also estimated the impact of borrowing on investment in different kinds of capital, simulated by a corresponding increase in the capital factor in activity production functions. Most of the capital investment – 8.3 percent – is in increased use of tractor services, but a portion is also in increasing land productivity through an increase in purchased inputs (FAO UNICEF, 2018, p. 28)<sup>4</sup>. We simulated the joint impacts of adding the amount borrowed to the household group’s total budget together with changes in marginal propensities to consume and capital inputs in production activities.

#### 6.1.4 Child Grants Programme (CGP) + Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) Market clubs: integrating local markets for home garden fruits and vegetables with outside markets

The goal of this component of SPRINGS is to connect CGP beneficiaries with outside markets for their produce. In theory, increased market integration can benefit agricultural households by allowing them access to higher prices for their output. However, higher food prices also raise food costs for consumers. Moreover, integration with outside markets exposes farm households to the ups and downs of market prices. On the other hand, without integration, local food prices are endogenous and will vary with changes in local supply and demand.

Market clubs were only implemented in a few villages. Probably because of this, the quasi-experimental analysis was unable to isolate impacts of SILC from other SPRINGS interventions. Nevertheless, a LEWIE simulation can be used to perform a ‘what if’

<sup>4</sup> We simulated an increase in the fixed capital and land for crop production of 8.3 percent.



experiment on the likely impacts of market clubs. For this simulation, we explore whether the impacts of CGP and CGP+SPRINGS differ when local producers and consumers are price takers in outside markets instead of price makers within the local economy. We do not know whether crop prices will be higher or lower with market integration or how crop prices in outside markets may vary in the future. Because of this, we conduct two simulations of CGE impacts: one in which integration with outside markets raises the crop price by 10 percent, and one in which it decreases the crop price by 10 percent. We repeat these simulations to study impacts of CGP+SPRINGS. We compare the results of these simulations with market integration with the previously-reported simulations in which there is no access to an external price, and thus changes in local crop supply and demand impact the local endogenous crop price.

#### 6.1.5 Combined programmes

In this final set of experiments, we simulate impacts of CGP+KHG+SILC, both without market integration and with market integration, leading to higher or lower crop prices.

The findings from these simulations follow.

## 6.2 Results

### 6.2.1 Child Grants Programme (CGP) Cash transfers

**Erreur ! Source du renvoi introuvable.** presents the results of our first simulation, CGP cash transfers in the absence of other programme components. The first data column in this table presents CGP multipliers, or impacts on outcomes (rows) per LSL transferred to eligible households. We calculated these multipliers by dividing the change in the outcome (row) value by the total cost of CGP transfers. The second data column reports the total percentage change in each row variable caused by the CGP transfers to eligible households.

The simulations show that each LSL transferred to a CGP-eligible household increases total nominal (cash) income in the local economy by LSL 3.11 and LSL 1.67 in real (inflation-adjusted) terms. These are the total income multipliers from CGP transfers; that is, the change in total local income, including spillovers, from an LSL 1 change in the transfers. These multiplier estimates compare favourably with previous estimates of CGP income multipliers from LEWIE simulations (Filipski *et al.* 2015) and ex-post experimental estimates (Gupta *et al.* 2018). The nominal income multiplier is higher than the previous estimates, which were 2.21 from the LEWIE simulations and 2.47 from the ex-post experimental analysis, which might reflect changes in the structure of local economies as households and markets adjusted to the CGP. However, the real income multiplier falls in between the two (1.53 and 1.94, respectively).

The Monte Carlo method described above permits us to construct an analogue to confidence bounds reflecting uncertainty about model parameters. The numbers in parentheses underneath the simulated total income results are 90 percent confidence intervals. They are (2.88, 3.39) for the total nominal income multiplier and (1.45, 1.93) for the real multiplier. The right-hand column in the table gives total percentage impacts. The increases in total nominal and real income due to the CGP represent 6.02 percent and 3.21 percent, respectively, of total income in the local economy. In

percentage terms, not surprisingly, the eligible household groups reap the largest income benefits from the programme. Their total income increases by 34.08 percent in nominal terms and by 25.45 percent in real terms.

A total real income multiplier of 1.67 implies that each LSL transferred to poor households creates an additional LSL 0.67 in real income spillovers. Most of these spillovers benefit households that are not eligible for CGP transfers. Eligible households' real income rises by LSL 1.08 – that is, by the LSL transferred plus an additional LSL 0.08 of spillover. Ineligible households do not receive any direct benefits from the transfer; however, their real income rises by LSL 0.59 per LSL transferred to eligible households. The middle panel of the table reports nominal and real income multipliers for all household groups in the model. These multipliers reflect the way in which CGP transfers are distributed across the four treatment groups: CGP only, CGP+KHG, CGP+SILC, and CGP+KHG+SILC. Adding these up, we get the total beneficiary income multipliers shown above in the table. The income multipliers are zero for the two control groups – eligible and ineligible – which is what one would expect in the absence of control-group contamination. They are positive for all other groups.

**Table 8: Child Grants Programme (CGP) Cash transfer simulation results**

Household	Multiplier	Percentages (%)
<b>Total Income Multiplier</b>		
Nominal (CI)	3.11 ( 2.88–3.39)	6.02 ( 5.55, 6.60)
Real (CI)	1.67 ( 1.45–1.93)	3.21 ( 2.72, 3.77)
<b>Total Beneficiary Income Multiplier</b>		
Nominal	1.45	34.08
Real	1.08	25.45
<b>Total Non-Beneficiary Income Multiplier</b>		
Nominal	1.65	3.60
Real	0.59	1.29
<b>Income Multiplier by Household Group</b>		
Comparison      Nominal	0.00	0.00
Real	0.00	0.00
CGP only      Nominal	0.90	38.24
Real	0.68	28.92
CGP+SILC      Nominal	0.06	32.34
Real	0.04	22.40
CGP+KHG      Nominal	0.32	25.21
Real	0.23	17.77
CGP+SILC+KHG      Nominal	0.17	35.06
Real	0.13	27.37
Ineligible Comparison Nominal	1.65	8.94
Real	0.59	3.20
Ineligible CGP+SPRINGS Nominal	0.00	0.00
Real	0.00	0.00
<b>Production Multipliers</b>		
Total	1.63	3.04
Beneficiary Households	0.29	8.14

**Table 8: Child Grants Programme (CGP) Cash transfer simulation results**

Non-Beneficiary	1.34	2.68
Production Multipliers by Sector		
crop	0.28	2.85
livestock	0.01	1.26
retail	0.76	3.46
non-retail	0.57	3.63
Production Multipliers by Sector Beneficiary HHs		
crop	0.10	7.49
livestock	0.00	3.31
retail	0.09	10.35
non-retail	0.09	7.86
Production Multipliers by Sector Non-Beneficiary HHs		
crop	0.18	2.40
livestock	0.01	1.12
retail	0.68	3.19
non-retail	0.48	3.28
Production Multiplier by Household Group		
Comparison	0.00	0.00
CGP only	0.15	8.05
CGP+SILC	0.01	7.77
CGP+KHG	0.09	8.36
CGP+SILC+KHG	0.04	8.11
Ineligible Comparison	1.34	7.87
Ineligible CGP+SPRINGS	0.00	0.00

Note: Percentage changes are percentage changes to initial income and production due to the simulation. CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

CGP transfers create spillovers by stimulating the demand for goods and services in the local economy. Local production expands to satisfy this demand. The table shows that the value of total production in the local economy, valued at pre-transfer prices, increases by LSL 1.63 per LSL transferred to poor households. Most of this production multiplier – 1.34 – is in households that are not eligible for CGP transfers. Those households, on average, are in a more favourable position than CGP-eligible households to increase their supply of goods and services. The bottom panel of the table shows that the largest impacts are on retail (0.76), non-farm production other than retail (0.57), and crop production (0.28). There is a minimal impact on production in the livestock sector (0.01).

### 6.2.2 Child Grants Programme (CGP)+ Keyhole Gardens (KHG)

Table 9 reports the results of our second simulation, which combines CGP cash transfers with home gardening (KHG). The first data column in this table presents multipliers when the CGP is combined with KHG; that is, impacts of the combined intervention on outcomes (rows) per LSL transferred to eligible households. We calculated these multipliers by dividing the change in the outcome (row) value by the total cost of CGP transfers. The second data column reports the total percentage change in each row variable caused by the combined CGP + KHG intervention.

CGP + KHG multipliers are higher than CGP multipliers without KHG. The KHG intervention raises the production impact in eligible households from 0.29 to 0.50. It decreases the impact on production in ineligible households, which compete with eligible households that are made more productive by the transfer. The multiplier effect of the CGP on beneficiary households' total production falls from 1.34 to 1.28. Nevertheless, the increase in the production multiplier for beneficiaries exceeds the one for non-beneficiaries, resulting in a net increase in the local production multiplier (from 1.63 to 1.79). Nearly all this gain is in the crop sector, which is what the KHG intervention targets.

The KHG intervention increases the total nominal income multiplier slightly (to 3.14); however, its biggest impact is to narrow the gap between nominal and real income impacts. By increasing the local supply response, this productive intervention dampens the impact of cash transfers on local prices. As a result, the total real income multiplier jumps to 1.86, and the CGP + KHG adds 3.55 percent to total local real income. Beneficiary households with KHG assistance more than double their share of real income spillovers, from 12 percent (LSL 0.08 of a LSL 0.67 total spillover) to 28 percent (LSL 0.24 of the LSL 0.86 spillover).

Although the expected multiplier effects of CGP + KHG are greater than those of CGP alone, the confidence intervals of the two simulations overlap: the CI for the real-income multiplier of CGP + KHG is [1.70, 2.03], which overlaps the top end of the CI for CGP alone [1.45, 1.93].

**Table 9: Child Grants Programme (CGP)+ Keyhole Gardens (KHG) simulation results**

Household	Multipliers	Percentages (%)
<b>Total Income Multiplier</b>		
Nominal	3.14	6.07
(CI)	( 2.94–3.36)	( 5.66, 6.53)
Real	1.86	3.55
(CI)	( 1.70–2.03)	( 3.16, 3.96)
<b>Total Beneficiary Income Multiplier</b>		
Nominal	1.56	36.50
Real	1.24	29.14
<b>Total Non-Beneficiary Income Multiplier</b>		
Nominal	1.58	3.44
Real	0.62	1.35
<b>Income Multiplier by Household Group</b>		
Comparison		
Nominal	0.00	0.00
Real	0.00	0.00
CGP only		
Nominal	0.97	40.94
Real	0.78	33.03
CGP+SILC		
Nominal	0.06	35.55
Real	0.05	27.28
CGP+KHG		
Nominal	0.35	27.22

**Table 9: Child Grants Programme (CGP)+ Keyhole Gardens (KHG) simulation results**

Real	0.27	20.83
CGP+SILC+KHG Nominal	0.18	36.86
Real	0.14	30.11
Ineligible Comparison Nominal	1.58	8.54
Real	0.62	3.34
Ineligible CGP+SPRINGS Nominal	0.00	0.00
Real	0.00	0.00
<b>Production Multipliers</b>		
Total	1.79	3.34
Beneficiary Households	0.50	14.32
Non-Beneficiary	1.28	2.57
<b>Production Multipliers by Sector</b>		
crop	0.43	3.48
livestock	0.01	1.28
retail	0.77	3.47
non-retail	0.58	3.68
<b>Production Multipliers by Sector Beneficiary HHs</b>		
crop	0.31	22.98
livestock	0.00	3.35
retail	0.09	10.37
non-retail	0.10	7.95
<b>Production Multipliers by Sector Non-Beneficiary HHs</b>		
crop	0.12	1.58
livestock	0.01	1.13
retail	0.68	3.19
non-retail	0.48	3.32
<b>Production Multiplier by Household Group</b>		
Comparison	0.00	0.00
CGP only	0.28	15.33
CGP+SILC	0.02	16.00
CGP+KHG	0.15	13.06
CGP+SILC+KHG	0.06	11.69
Ineligible Comparison	1.28	7.56
Ineligible CGP+SPRINGS	0.00	0.00

Note: Percentage changes are percentage changes to initial income and production due to the simulation. CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.



### 6.2.3 Child Grants Programme (CGP) + Savings and Internal Lending Communities (SILC)

Results from simulating impacts of the combined CGP + SILC intervention appear in Table 10 . The first data column in this table presents multipliers when CGP is combined with financial inclusion or impacts of the combined intervention on outcomes (rows) per LSL transferred to eligible households. We calculated these multipliers by dividing the change in the outcome (row) value by the total cost of CGP transfers. The second data column reports the total percentage change in each row variable caused by the combined CGP + SILC intervention.

The SILC intervention, as simulated here, results in a nominal total income multiplier lower than both the CGP and CGP+KHG multipliers. However, the real income multiplier is similar to that from the CGP+KHG experiment and larger than the real income multiplier from CGP alone. Thus, like CGP+KHG, CGP+SILC closes the gap between nominal and real income multipliers. Real income rises by 1.82 [CI: 1.65, 2.01] per LSL transferred to eligible households, compared to 1.86 [1.70, 2.03] in the CGP+KHG experiment. Beneficiary households capture 29 percent (0.24 of LSL 0.82) of the spillovers created by this combined intervention, while the rest accrues to households ineligible for CGP. By diverting some spending from local consumption goods to investments, SILC slightly reduces production multipliers for all sectors; total production value increases by LSL 1.40 per LSL transferred, compared with 1.62 in the CGP-only simulation.

As with KHG, the multiplier effects of CGP + SILC are greater than those of CGP alone, but the CIs of the two simulations overlap even more than the CIs for KHG and CGP. The CI for the real-income multiplier of CGP + SILC is [1.65, 2.01], and the CI for CGP alone is [1.45, 1.93].

**Table 10:** Child Grants Programme (CGP) + Savings and Internal Lending Communities (SILC) simulation results

Household	Multipliers	Percentages (%)
<b>Total Income</b>		
Nominal	2.58	5.28
(CI)	( 2.38–2.80)	( 4.84, 5.73)
Real	1.82	3.68
(CI)	( 1.65–2.01)	( 3.20, 4.20)
<b>Total Beneficiary Income</b>		
Nominal	1.37	34.09
Real	1.24	30.77
<b>Total Non-Beneficiary Income</b>		
Nominal	1.21	2.79
Real	0.58	1.35
<b>Income by Household Group</b>		
Comparison	Nominal	0.00
Real		0.00
CGP only	Nominal	0.86
Real		0.78
CGP+SILC	Nominal	0.05
Real		0.05
CGP+KHG	Nominal	0.30
Real		0.27
CGP+SILC+KHG	Nominal	0.16
Real		0.14
Ineligible Comparison	Nominal	1.21
Real		0.58
Ineligible CGP+SPRINGS	Nominal	0.00
Real		0.00
<b>Production</b>		
Total	1.40	2.77
Beneficiary Households	0.33	9.80
Non-Beneficiary	1.08	2.28
<b>Production by Sector</b>		
crop	0.29	2.70
livestock	-0.01	-0.82
retail	0.67	3.20
non-retail	0.45	3.03
<b>Production by Sector Beneficiary HHS</b>		
crop	0.18	13.76
livestock	0.00	-2.14
retail	0.08	9.53
non-retail	0.07	6.55

**Table 10:** Child Grants Programme (CGP) + Savings and Internal Lending Communities (SILC) simulation results *Cont.*

Household	Multipliers	Percentages (%)
Production by Sector Non-Beneficiary HHs		
crop	0.11	1.62
livestock	0.00	-0.73
retail	0.59	2.95
non-retail	0.38	2.74
Production by Household Group		
Comparison	0.00	0.00
CGP only	0.17	10.20
CGP+SILC	0.01	10.33
CGP+KHG	0.10	9.44
CGP+SILC+KHG	0.04	8.49
Ineligible Comparison	1.08	6.69
Ineligible CGP+SPRINGS	0.00	0.00

Note: Percentage changes are percentage changes to initial income and production due to the simulation. CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

#### 6.2.4 Child Grants Programme (CGP) + Keyhole Gardens (KHG) + Savings and Internal Lending Communities (SILC)

Combining all three interventions – CGP+KHG+SILC – closes the nominal-real income multiplier gap further and results in higher real income multipliers than CGP alone or in combination with only one other intervention. Results from simulating impacts of the combined CGP+KHG+SILC intervention appear in Table 10. The first data column in this table presents multipliers when CGP is combined with both KHG and SILC, or impacts of the combined intervention on outcomes (rows) per LSL transferred to eligible households. We calculated these multipliers by dividing the change in the outcome (row) value by the total cost of CGP transfers. The second data column reports the total percentage change in each row variable caused by the combined CGP+KHG+SILC intervention.

The real income multiplier with the three interventions jumps to 2.01 [1.86, 2.16], compared with 1.67 [1.45, 1.93] for CGP alone. The total production multiplier is 1.63 (compared with 1.40 for CGP alone and 1.79 for CGP+KHG). If the policy goal is to stimulate crop production, a crop-focused intervention like KHG appears more effective than other interventions or a combined intervention that includes KHG along with other components. If the goal is to stimulate total real income, however, the three-way combined intervention seems more effective than the other interventions examined thus far, alone or in combination. As in the other simulations, CGP-ineligible households reap most of the income spillovers from this combined intervention.

The real income effects of CGP+KHG+SILC are greater than those of CGP alone. The CIs of the two simulations overlap, but only slightly. The CI for the real-income multiplier of CGP+KHG+SILC is [1.86, 2.16], compared with [1.45, 1.93] for CGP alone.



**Table 11: Simulated impacts of combining Child Grants Programme (CGP) + Keyhole Gardens (KHG) + Savings and Internal Lending Communities (SILC)**

Household	Multipliers	Percentages (%)
Total Income		
Nominal	2.61	5.31
(CI)	( 2.41- 2.79)	( 4.87, 5.73)
Real	2.01	4.04
(CI)	( 1.86- 2.16)	( 3.63, 4.46)
Total Beneficiary Income		
Nominal	1.47	36.51
Real	1.40	34.67
Total Non-Beneficiary Income		
Nominal	1.13	2.62
Real	0.61	1.41
Income by Household Group		
Eligible Control      Nominal	0.00	0.00
Real	0.00	0.00
CGP only              Nominal	0.92	41.27
Real	0.88	39.35
CGP+SILC            Nominal	0.06	35.22
Real	0.06	34.59
CGP+KHG            Nominal	0.33	26.86
Real	0.30	25.02
CGP+SILC+KHG    Nominal	0.16	36.13
Real	0.16	34.48
Ineligible Control    Nominal	1.13	6.50
Real	0.61	3.49
Ineligible In Treated Villages    Nominal	0.00	0.00
Real	0.00	0.00
Production		
Total	1.56	3.08
Beneficiary Households	0.54	16.16
Non-Beneficiary	1.02	2.17
Production by Sector		
crop	0.44	3.37
livestock	-0.01	-0.77
retail	0.67	3.19
non-retail	0.46	3.08

Note: Percentages are percentage changes to initial income and production due to the simulation. CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

### 6.2.5 Child Grants Programme (CGP) and combined interventions with market clubs

Market clubs have the potential to create large local income multipliers if they succeed in connecting villages with higher outside prices for the food they produce. This comes at a cost of higher prices for food consumption. Nevertheless, our simulations suggest that, if market clubs result in a ten percent increase in crop prices (all crops harvested in the local economy), the income gain on the production side outweighs the loss on the consumption side. The CGP total real income multiplier rises from 1.67 to 2.48, and its CI [1.99, 3.10] lies entirely above the CI from the CGP-only simulation [1.45, 1.93]. The positive impact on the real-income multiplier can be attributed partly to the crop production stimulus it creates (the crop multiplier increases from 0.28 to 1.02). It also reflects that CGP transfers do not push up local prices when market clubs integrate the local economy with outside food markets. When we combine CGP transfers with all SPRINGS components, market clubs leading to higher crop prices create a real income multiplier of 3.05, with a CI [2.54, 3.65] that lies well above the CI for the CGP alone [1.45, 1.93] or in combination with KHG [1.70, 2.03], SILC [1.65, 2.01] or both [1.86, 2.16].

The opposite happens if market clubs connect villages with markets where crop prices are lower, or if the village suffers a negative food price shock from outside markets. The right-hand columns in Tables (Table 13 and Table 14) show that real-income multipliers fall below 1.0 when market clubs connect villages with outside markets where food prices are lower or that transmit a negative price shock to the village. With CGP alone (Table 13), the real income multiplier drops to 0.35 and the CI contains zero; we cannot conclude that CGP transfers create positive real income multipliers when they are accompanied by negative crop price shocks. The addition of the SPRINGS interventions (Table 13) keeps the real income multiplier positive (0.88), with a CI [0.34, 1.32] that lies above zero and contains 1.0. Nevertheless, the CI for CGP + SPRINGS lies entirely below the CI for CGP alone [1.45, 1.93] when CGP + SPRINGS is accompanied by a negative crop price shock. Opening to trade is key to achieving increased prosperity in economies, whether local or national. However, both positive and negative trade shocks are inevitable, and governments may need to design measures to protect economies from the latter.



**Table 12: Child Grants Programme (CGP) Multipliers with market clubs**

Household	Multipliers		
	CGP	CGP and 10% increase in the price of crops	CGP and 10% decrease in the price of crops
Total Income			
Nominal	3.11	5.79	-1.69
(CI)	( 2.88–3.39)	( 5.06–6.65)	( -2.44– -1.03)
Real	1.67	2.48	0.35
(CI)	( 1.45–1.93)	( 1.99–3.10)	( -0.17–0.78)
Total Beneficiary Income			
Nominal	1.45	1.45	0.90
Real	1.08	1.09	1.03
Total Non-Beneficiary Income			
Nominal	1.65	4.34	-2.59
Real	0.59	1.40	-0.69
Income by Household Group			
Eligible Control			
Nominal	0.00	0.04	-0.04
Real	0.00	0.01	-0.01
CGP only			
Nominal	0.90	0.90	0.59
Real	0.68	0.68	0.67
CGP+SILC			
Nominal	0.06	0.06	0.03
Real	0.04	0.04	0.04
CGP+KHG			
Nominal	0.32	0.32	0.17
Real	0.23	0.23	0.21
CGP+SILC+KHG			
Nominal	0.17	0.17	0.10
Real	0.13	0.13	0.11
Ineligible Control			
Nominal	1.65	1.65	-0.11
Real	0.59	0.59	0.03
Ineligible In Treated Villages			
Nominal	0.00	2.65	-2.44
Real	0.00	0.80	-0.70
Production			
Total	1.63	3.36	-1.66
Beneficiary Households	0.29	0.29	-0.06
Non-Beneficiary	1.34	3.07	-1.60
Production by Sector			
crop	0.28	1.02	-1.04
livestock	0.01	0.04	-0.02
retail	0.76	1.40	-0.44
non-retail	0.57	0.90	-0.16

Note: CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

**Table 13: Child Grants Programme (CGP) + Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) Multipliers with market clubs**

Household	Multipliers		
	CGP+SPRINGS	CGP+SPRINGS and 10% increase in the price of crops	CGP+SPRINGS and 10% decrease in the price of crops
Total Income			
Nominal	2.61	6.00	-1.29
(CI)	( 2.41–2.79)	( 5.24–6.90)	( -2.15– -0.62)
Real	2.01	3.05	0.88
(CI)	( 1.86–2.16)	( 2.54–3.65)	( 0.34–1.32)
Total Beneficiary Income			
Nominal	1.47	1.69	1.08
Real	1.40	1.45	1.33
Total Non-Beneficiary Income			
Nominal	1.13	4.31	-2.37
Real	0.61	1.60	-0.45
Income by Household Group			
Eligible Control			
Nominal	0.00	0.04	-0.04
Real	0.00	0.01	-0.01
CGP only			
Nominal	0.92	1.04	0.70
Real	0.88	0.90	0.85
CGP+SILC			
Nominal	0.06	0.07	0.04
Real	0.06	0.06	0.06
CGP+KHG			
Nominal	0.33	0.39	0.22
Real	0.30	0.32	0.28
CGP+SILC+KHG			
Nominal	0.16	0.19	0.12
Real	0.16	0.17	0.14
Ineligible Control			
Nominal	1.13	1.76	0.01
Real	0.61	0.83	0.25
Ineligible In Treated Villages			
Nominal	0.00	2.51	-2.34
Real	0.00	0.76	-0.69
Production			
Total	1.56	3.77	-1.14
Beneficiary Households	0.54	0.67	0.28
Non-Beneficiary	1.02	3.09	-1.42
Production by Sector			
crop	0.44	1.34	-0.67
livestock	-0.01	0.02	-0.03
retail	0.67	1.49	-0.32
non-retail	0.46	0.91	-0.11

Note: CGP: Child Grants Programme, CI: confidence interval, HH: households, KHG: homestead gardening, SILC: Savings and Internal Lending Communities.

## 7. Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis

LEWIE makes it possible to quantify impacts on the rural economy that are usually missed by other types of evaluation. These impacts can be folded into a LEWIE cost-benefit analysis of individual or combined programmes, taking into account the income spillovers the programmes create. Cost-benefit analysis entails summing up the future stream of discounted benefits from a project/programme and comparing it with the costs. The well-known formula for calculating the discounted net benefits of a project (net present value, or NPV), relative to the baseline without the project, is:

$$NPV = \sum_{t=0}^T \left( \frac{Y_i^p - Y_i^{np} - I_t}{(1+r)^t} \right) \quad (1)$$

Where  $Y_i^p$  ( $Y_i^{np}$ ) denote benefits with (without) the project,  $r$  is the discount rate, and  $I_t$  is the project cost in year  $t$ . The potential benefits of a livelihood project like SPRINGS are complex and go beyond what is normally included in a cost-benefit analysis. They encompass income gains (derived from productivity enhancement) to beneficiary households, income spillovers to non-beneficiary households, as well as other impacts to which it is difficult to assign economic values (e.g., optimism about the future and happiness). We focus only on the economic benefits, specifically, income gains. Although income is a subset of all potential benefits, the component lends itself to cost-benefit analysis.<sup>5</sup> Other possible benefits include the accumulation of productive capital, social capital, improved nutrition, and education. For some of these dimensions, FAO UNICEF (2018) have quasi-experimental estimates of the impacts of CGP and SPRINGS. This is left for future research.

A critical difference between this and conventional cost-benefit analysis (CBA) is that we incorporate the local economy-wide benefits of CGP and SPRINGS, including spillovers to non-beneficiaries of both programmes.  $Y_i^p$  is the output from the LEWIE model. We compare these local-economy benefits, appropriately discounted, to the cost of both CGP and SPRINGS. For the former we use payments data to eligible households, while for the latter we use the total amount invested in the project by CRS (i.e. USD XYZ millions). For both programmes we include the administrative cost. This local-economy CBA allows us to calculate the net present value of the CGP only and of the CGP and SPRINGS components, considering the programme's impacts on income and local economy-wide spillovers.

To sum up, the CGP+SPRINGS CBA consists of annually calculating the benefits (total income benefits to beneficiaries) over a time horizon of 10 years, discounting these benefits using low and high discount rates, adding up the discounted future stream of benefits and comparing it to the

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<sup>5</sup> It is possible that SILC, which represents the credit component of SPRINGS, have negative impacts, for example, if funds are diverted to other purposes or are not properly managed, resulting in defaults and possibly seizure of assets/collateral. This could also have negative spillover effects through loss of hired labour and loss in production. The household survey unfortunately does not gather information on this aspect. However, CRS monitoring data report very high repayment rates, which allow us to rule out these negative spillovers.

discounted stream of project costs. The discounted stream of benefits is the present value (PV) of local economy benefits from the CGP and/or SPRINGS. The discounted stream of programme costs over this period (C) is the total amount transferred in 2018 continuing over the 10-year period, plus administrative costs. We subtract C from PV to obtain the net present value of the two programmes. The net benefit ratio (PV/C) gives the economic return per US dollar invested in CGP and SPRINGS.

### 7.1. Cost-benefit analysis of the Child Grants Programme (CGP)

Table 14 presents a LEWIE CBA for the CGP, using the real income multipliers reported in Table 6. All numbers in this table are millions of 2018 LSL. The total amount of cash transferred to eligible households (16 percent of total households in the local economy) per year in the local economy simulations (assuming full coverage) is LSL 22.5 million (Column A). Column B gives the discounted value of the programme cost in each of the following ten years, including administrative costs, using a discount rate of ten percent.

The costs used above when calculating the denominators of the multipliers in the CGP multiplier results (Table 6) include only transfer costs, but for the cost-benefit analysis we also include yearly operational costs.<sup>6</sup> The indirect income spillover effects of the transfers are given in Column C. Retrieving the multiplier from Table 6, each LSL of the CGP increases total real income by LSL 1.67 – that is, by the LSL transferred plus an additional LSL 0.67 of spillover. The indirect spillover, then, is the 0.67 spillover multiplied by the total amount transferred, or LSL 22.5 million per year. This spillover is reported in Column C of Table 14.

Total discounted real-income benefits of the CGP are reported in Column D. They include the amount transferred (Column A) plus the spillovers (Column C), discounted each year at the discount rate of 10 percent. Their sum over ten years is LSL 254 million.

One can compare these discounted benefits to the total discounted cost of the transfers over ten years, which is LSL 156.1 million. The differences between discounted benefits and costs each year are given in Column E. Over the ten-year period, the CGP programme creates total discounted benefits, net of transfer and admin costs, equal to LSL 98 million. This represents a return of LSL 1.63 per LSL transferred to eligible households.

Nominal cost-benefit ratios, those based on the nominal or cash income CGP multipliers from Table 6, are higher – in the order of LSL 3.03 per LSL of programme cost. This suggests that complementary interventions targeted at raising productivity in rural areas and limiting price increases can enhance the economic returns to CGP investments. This would cause real multipliers to converge to higher nominal multipliers.

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<sup>6</sup> To calculate total administrative costs we use the CGP cost data for CGP Beneficiary Households Payments Schedule for the 2nd and 3rd Quarters (Jul–Sept and Oct–Dec 2018/19) from the Ministry of Social Development of Lesotho (MoSD). Admin costs as a percentage of transfers vary by community council from 1 to 3 percent. For the six community councils receiving mobile payments, admin costs are 1.3 percent of the total transfer. Total admin costs as a percentage of the total CGP transfers across all community councils is 2.6 percent. It is not known what percentage of this cost is spent back in the local economy, perhaps by the service workers themselves. That amount would be an additional transfer to the local economy and contribute to the multiplier; however, since it is unknown we do not assume that any amount is spent back in the local economy (even if a fraction was spent in the local economy, given the small relative size of the admin expenses this would represent only a small addition to the CGP multiplier as a whole). Additionally, the extent of start-up costs (planning for implementing the programme, training of staff, etc.) is unknown and thus we may be underestimating the true cost of the CGP.

Spillovers are the key to passing this cost-benefit test. If there were no income spillovers from CGP transfers, each LSL transferred to a poor household would raise income in the local economy by only the LSL transferred, for a cost-benefit ratio of 1.0. Programme costs would reduce this to below 1.0.

**Table 14: Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of the Child Grants Programme (CGP)**

Year	A Amount transferred to eligible households	B Discounted CGP cost, including administration	C Real income spillover	D Discounted benefits including spillovers	E Discounted net benefit
1	22.51	23.09	15.08	37.58	14.49
2	22.51	20.99	15.08	34.17	13.18
3	22.51	19.08	15.08	31.06	11.98
4	22.51	17.35	15.08	28.24	10.89
5	22.51	15.77	15.08	25.67	9.90
6	22.51	14.34	15.08	23.34	9.00
7	22.51	13.03	15.08	21.21	8.18
8	22.51	11.85	15.08	19.29	7.44
9	22.51	10.77	15.08	17.53	6.76
10	22.51	9.79	15.08	15.94	6.15
Total	225.05	156.07	150.78	254.03	97.96
Ratio of Discounted Benefits to Discounted Costs:				254.03 / 156.07:	1.63

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, 2.6 percent administrative cost, and a ten-year time horizon, with no changes in Child Grants Programme transfers (in nominal terms) over the period.

## 7.2. Cost-benefit ratios of Child Grants Programme (CGP) + Keyhole Gardens (KHG)

Table 15 presents results of a LEWIE CBA of the CGP+KHG programme of SPRINGS. This option also includes administrative costs of the CGP plus those for the keyhole gardening component of SPRINGS. CGP costs, as discussed above, amount to 2.6 percent of the total CGP transfer. For the KHG component of SPRINGS, we use the cost amounts from 2018 financial data provided by Catholic Relief Services (CRS), which administered SPRINGS. Activities included in KHG include the distribution of starter pack seeds and new tools to households, training of lead farmers on food preservation and nutrition, and facilitating lead farmers network formation. Some of these activities, e.g., training, included spending on food and other services in the local economy, which would increase the income multiplier effect of the programme. Some CRS staff salary may also have been spent in the local economy. Unfortunately, due to the reporting of the cost data, these proportions are unknown. We conservatively treat administrative costs strictly as costs; besides the multiplier effect of the programmes already reported above, we do not count any additional programme benefit that might be created by administrative costs.

Total costs of the CGP+KHG, including administrative costs, come to LSL 25.46 million (LSL 23.09 million for the CGP plus LSL 2.37 million for the KHG component of SPRINGS). The LEWIE analysis captures income spillovers from KHGs, and we consider these spillovers in the LEWIE CBA of a

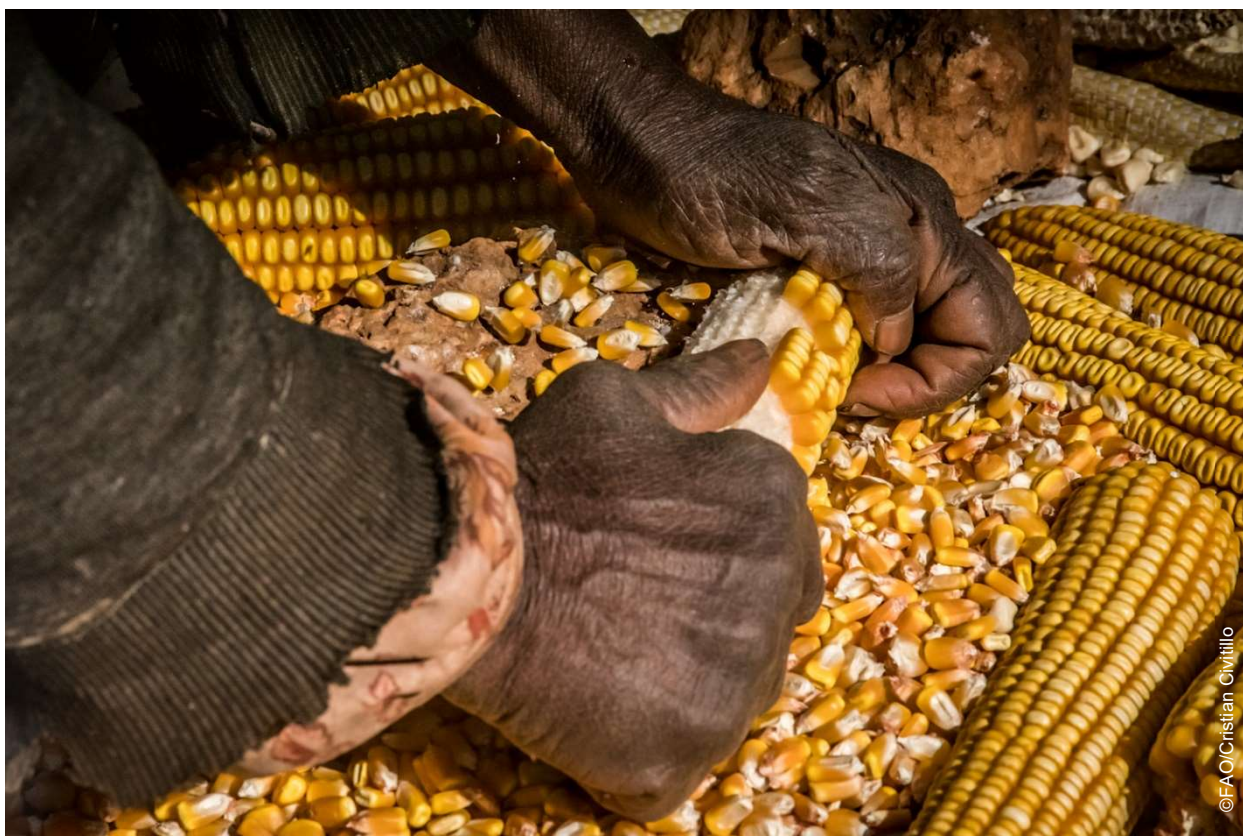
combined CGP+KHG. The real income multiplier of the CGP was 1.67; the CGP+KHG creates an additional spillover of LSL 0.19 (0.86 total) per LSL transferred. Total discounted benefits, including spillovers, equal LSL 282.9 million over the ten-year period. Dividing this by the total discounted programme costs yields a net return of 1.64 per LSL invested in CGP+KHG. The productive impacts of KHG thus slightly reinforce the positive benefit-cost assessment of the CGP.

**Table 15: Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of Child Grants Programme (CGP) + Keyhole Gardens (KHG)**

Year	A	B	C	D	E	F	G
	Amount transferred to eligible households	Estimated additional benefit of KHG	Discounted CGP cost, including admin.	Discounted KHG costs	Real income spillover	Discounted benefits including spillovers	Discounted net benefit
1	22.51		23.09	2.37	19.35	41.86	16.40
2	22.51		20.99	2.15	19.35	38.05	14.91
3	22.51		19.08	1.95	19.35	34.59	13.56
4	22.51		17.35	1.78	19.35	31.45	12.32
5	22.51		15.77	1.62	19.35	28.59	11.20
6	22.51		14.34	1.47	19.35	25.99	10.19
7	22.51		13.03	1.33	19.35	23.63	9.26
8	22.51		11.85	1.21	19.35	21.48	8.42
9	22.51		10.77	1.10	19.35	19.53	7.65
10	22.51		9.79	1.00	19.35	17.75	6.96
Total	225.05		156.07	15.99	193.54	282.93	110.88
Ratio of Discounted Benefits to Discounted Costs:					282.93 / (156.07+15.99):		1.64

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, and a ten-year time horizon, with no changes in the Child Grants Programme (CGP) or Homestead Gardening (KHG) intervention over the period.





### 7.3. Cost-benefit ratios of the Child Grants Programme (CGP)+ Savings and Internal Lending Communities (SILC)

Table 16 presents results of a LEWIE CBA of the CGP+SILC programme of SPRINGS. This analysis takes into account the administrative costs of the CGP, as well as of the saving and internal lending component of SPRINGS. CGP costs, as before, amount to 2.6 percent of the total CGP transfer. For the SILC component of SPRINGS, we again use costs from CRS 2018 financial data. Activities covered by SILC include SILC orientation and training of SILC staff, field agents and monitors, sensitization of relevant stakeholders, formation of SILC groups, and support for SILC groups to link with formal financial institutions. As in the CGP+KHG analysis, it is possible that some of these costs may represent expenditures in the local economy that contribute to the benefits of the programme. As these amounts are unknown, we do not consider them; thus, our LEWIE CBA is likely to be conservative.

Total costs of the CGP+SILC, including administrative costs, are LSL 27.55 million (LSL 23.09 million for the CGP and an additional LSL 4.46 million for the SILC component of SPRINGS). The LEWIE analysis revealed that CGP+SILC created an additional spillover of LSL 0.15 (0.82 total) per LSL transferred on top of the CGP multiplier of 1.67, for a combined multiplier of 1.82. Total discounted benefits, including spillovers, equal LSL 276.84 million over the ten-year period. Dividing this by the total discounted programme costs yields a net return of 1.49 per LSL invested in CGP+SILC. Although total discounted benefits from the combined CGP+SILC exceed those from CGP alone, the additional cost of SILC results in a slightly lower benefit-cost ratio, which nevertheless easily exceeds 1.0.

**Table 16:** Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of Child Grants Programme (CGP) + Savings and Internal Lending Communities (SILC)

Year	A	B	C	D	E	F	G
	Amount transferred to eligible households	Estimated additional benefit of SILC	Discounted CGP cost, including admin.	Discounted SILC costs	Real income spillover	Discounted benefits including spillovers	Discounted net benefit
1	22.51		23.09	4.46	18.45	40.96	13.41
2	22.51		20.99	4.06	18.45	37.24	12.19
3	22.51		19.08	3.69	18.45	33.85	11.08
4	22.51		17.35	3.35	18.45	30.77	10.07
5	22.51		15.77	3.05	18.45	27.98	9.16
6	22.51		14.34	2.77	18.45	25.43	8.32
7	22.51		13.03	2.52	18.45	23.12	7.57
8	22.51		11.85	2.29	18.45	21.02	6.88
9	22.51		10.77	2.08	18.45	19.11	6.25
10	22.51		9.79	1.89	18.45	17.37	5.69
<b>Total</b>	<b>225.05</b>		<b>156.07</b>	<b>30.17</b>	<b>184.54</b>	<b>276.84</b>	<b>90.61</b>
Ratio of Discounted Benefits to Discounted Costs:					276.84 / (156.07+30.17):		1.49

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, and a ten-year time horizon, with no changes in the Child Grants Programme (CGP) or Savings and Internal Lending Communities (SILC) intervention over the period.

#### 7.4. Cost-benefit ratios of the Child Grants Programme (CGP)+ Keyhole Gardens (KHG) + Savings and Internal Lending Communities (SILC)

Table 17 presents results of a LEWIE CBA of the combined CGP+KHG+SILC programmes of SPRINGS. This option considers administrative costs of the CGP plus those of the keyhole garden and saving and internal lending components of SPRINGS. For the KHG and SILC components of SPRINGS we again use the CRS 2018 financial data. Total costs of the CGP+KHG+SILC, including administrative costs, come to LSL 29.92 million (LSL 23.09 million for the CGP, LSL 2.37 million for the KHG programme, and an additional LSL 4.46 million for the SILC component of SPRINGS). The LEWIE analysis captures the real-income spillovers created by the combined CGP+KHG+SILC. CGP+KHG+SILC creates an additional spillover of LSL 0.34 (1.01 total) per LSL transferred, on top of the CGP multiplier of 1.67. Total discounted benefits, including spillovers, equal LSL 305.74 million over the ten-year period – substantially more than CGP alone. However, the cost of the combined programme is also higher. Dividing total discounted benefits by total discounted programme costs yields a net return of 1.51 per LSL invested in CGP+KHG+SILC.

**Table 17: Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of Child Grants Programme (CGP) + Savings and Internal Lending Communities (SILC)**

Year	A Amount transferred to eligible households	B Estimated additional benefit of KHG+SILC	C Discounted CGP cost, including admin.	D Discounted KHG+SILC costs	E Real income spillover	F Discounted benefits including spillovers	G Discounted net benefit
1	22.51		23.09	6.83	22.73	45.24	15.32
2	22.51		20.99	6.21	22.73	41.12	13.92
3	22.51		19.08	5.64	22.73	37.38	12.66
4	22.51		17.35	5.13	22.73	33.99	11.51
5	22.51		15.77	4.66	22.73	30.90	10.46
6	22.51		14.34	4.24	22.73	28.09	9.51
7	22.51		13.03	3.85	22.73	25.53	8.65
8	22.51		11.85	3.50	22.73	23.21	7.86
9	22.51		10.77	3.19	22.73	21.10	7.14
10	22.51		9.79	2.90	22.73	19.18	6.50
Total	225.05		156.07	46.16	227.30	305.74	103.52
Ratio of Discounted Benefits to Discounted Costs:					305.74 /		
					(156.07+46.16):		1.51

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, and a ten-year time horizon, with no changes in the Child Grants Programme (CGP), Homestead Gardening (KHG) or Savings and Internal Lending Communities (SILC) interventions over the period.

### 7.5. Cost-benefit ratios of the Child Grants Programme (CGP) +Market Clubs and Child Grants Programme (CGP) + Keyhole Gardens (KHG) + Savings and Internal Lending Communities (SILC) + Market Clubs

Table 18 presents results of a LEWIE CBA of the combined CGP+Market Club programme of SPRINGS, assuming an increase of 10 percent in the price of agricultural crops from market integration. This option considers administrative costs of the CGP plus implementation of market clubs, taken from the CRS 2018 financial data. Market club activities entail costs of conducting a participatory Market Opportunity Identification study, forming market clubs, training CRS staff, and educating market clubs on “Marketing Basics and the Seven Steps of Marketing.”

Total costs of the CGP+Marketing Clubs, including administrative costs, come to LSL 24.15 million (LSL 23.09 million for the CGP, LSL 1.06 million for the market clubs component of SPRINGS). The LEWIE analysis captures the income spillovers created by the combined CGP+Market Clubs, which add LSL 0.81 (1.48 total) per LSL transferred to the CGP real-income multiplier. Total discounted benefits, including spillovers, equal LSL 377.24 million over the ten-year period. Dividing this by the total discounted programme costs yields a net return of 2.31 per LSL invested in CGP+Market Clubs – appreciably higher than the per-LSL return from CGP alone.

**Table 18:** Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of Child Grants Programme (CGP) +Market Clubs

Year	A	B	C	D	E	F	G
	Amount transferred to eligible households	Estimated additional benefit of Market Clubs	Discounted CGP cost, including admin.	Discounted Market Clubs costs	Real income spillover	Discounted benefits including spillovers	Discounted net benefit
1	22.51		23.09	1.06	33.31	55.81	31.66
2	22.51		20.99	0.96	33.31	50.74	28.78
3	22.51		19.08	0.88	33.31	46.13	26.17
4	22.51		17.35	0.80	33.31	41.93	23.79
5	22.51		15.77	0.72	33.31	38.12	21.63
6	22.51		14.34	0.66	33.31	34.66	19.66
7	22.51		13.03	0.60	33.31	31.50	17.87
8	22.51		11.85	0.54	33.31	28.64	16.25
9	22.51		10.77	0.49	33.31	26.04	14.77
10	22.51		9.79	0.45	33.31	23.67	13.43
Total	225.05		156.07	7.16	333.07	377.24	214.01
Ratio of Discounted Benefits to Discounted Costs:					377.24 /		
					(156.07+7.16):		2.31

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, and a ten-year time horizon, with no changes in the Child Grants Programme (CGP) or Market Clubs programme over the period.

Table 19 adds the other components of SPRINGS (KHG+SILC) to estimate the benefit-cost ratio of all the programmes combined: CGP+SPRINGS, including market clubs. We again assume integration of markets and a 10 percent price increase in agricultural crops. In this case, while the real (as well as nominal) income multiplier is higher due to the inclusion of KHG+SILC, the additional administrative costs push down the benefit-ratio slightly, from 2.31 to 2.22.

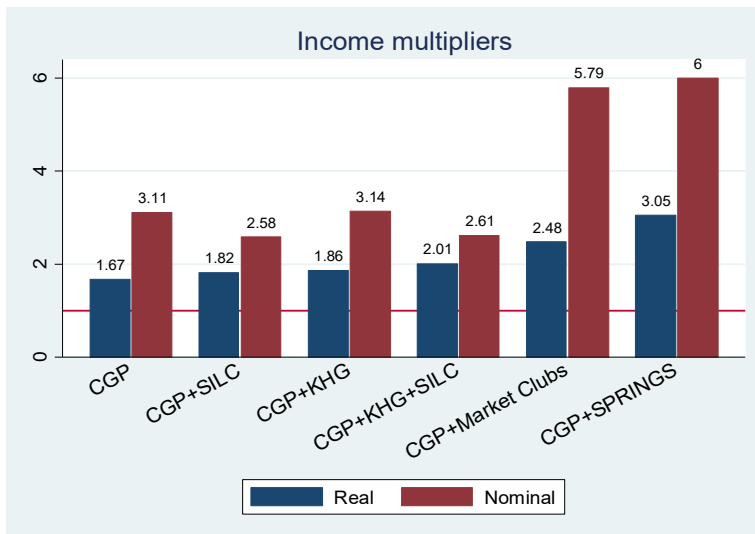
**Table 19: Local economy-wide impact evaluation (LEWIE) Cost-benefit analysis of CGP+SPRINGS (including Market Clubs)**

Year	A	B	C	D	E	F	G
	Amount transferred to eligible households	Estimated additional benefit of SPRINGS	Discounted CGP cost, including admin.	Discounted SPRINGS costs	Real income spillover	Discounted benefits including spillovers	Discounted net benefit
1	22.51		23.09	7.89	46.14	68.64	37.66
2	22.51		20.99	7.17	46.14	62.40	34.24
3	22.51		19.08	6.52	46.14	56.73	31.12
4	22.51		17.35	5.93	46.14	51.57	28.30
5	22.51		15.77	5.39	46.14	46.88	25.72
6	22.51		14.34	4.90	46.14	42.62	23.38
7	22.51		13.03	4.45	46.14	38.75	21.26
8	22.51		11.85	4.05	46.14	35.22	19.33
9	22.51		10.77	3.68	46.14	32.02	17.57
10	22.51		9.79	3.35	46.14	29.11	15.97
<b>Total</b>	<b>225.05</b>		<b>156.07</b>	<b>53.32</b>	<b>461.35</b>	<b>463.94</b>	<b>254.55</b>
Ratio of Discounted Benefits to Discounted Costs:					463.94 / (156.07+53.32):		2.22

Notes: All figures are in millions of 2018 Lesotho Loti. This analysis assumes an annual discount rate of 10 percent, and a ten-year time horizon, with no changes in the Child Grants Programme (CGP) or SPRINGS programmes over the period.

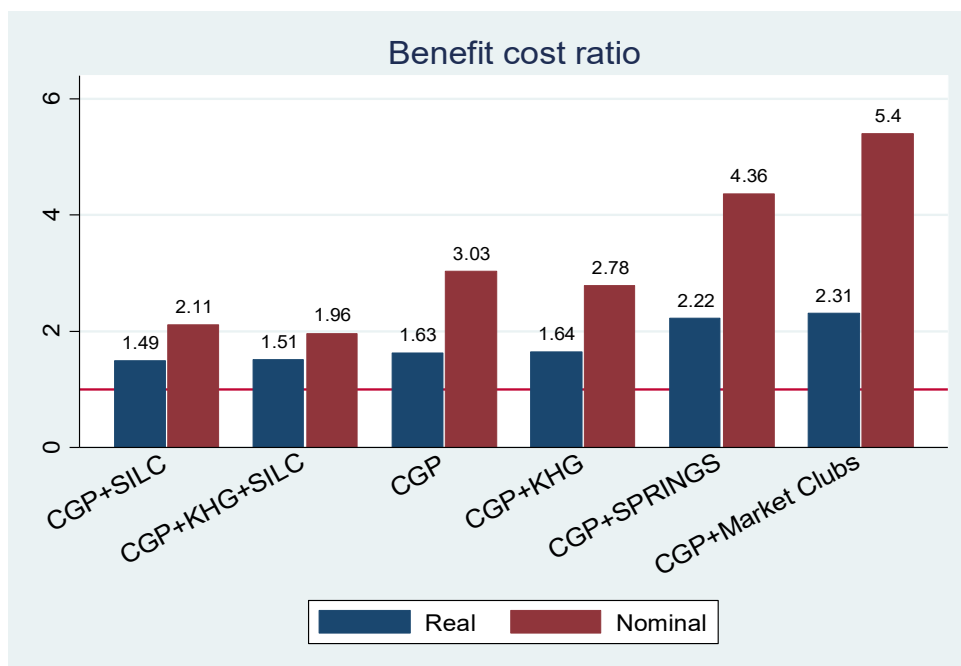
Figure 2 and Figure 3 compare the real and nominal-income multipliers and the real and nominal LEWIE cost-benefit ratios respectively, of the CGP alone and in combination with the SPRINGS components. Real-income cost-benefit ratios take into account possible inflationary impacts and therefore are likely to be more conservative than nominal-income cost-benefit ratios. Because of this, they are our preferred approach to evaluate the cost effectiveness of these programmes. All the real-income cost-benefit ratios are greater than 1.0. They range from 1.49 (CGP+SILC) to 2.31 (CGP+Market Clubs).

**Figure 2: Local economy-wide impact evaluation (LEWIE) real and nominal income multipliers summary**



Note: CGP+SPRINGS comprises all components of SPRINGS, including market clubs.

**Figure 3: Local economy-wide impact evaluation (LEWIE) real and nominal benefit cost ratios summary**



Note: CGP+SPRINGS comprises all components of SPRINGS, including market clubs.

## 8. Conclusions and recommendations

This paper used a local economy wide impact evaluation (LEWIE) model to simulate income and production spillovers from Lesotho's Child Grants Programme (CGP), alone and in combination with a multi-faceted productive intervention called Sustainable Poverty Reduction through Income, Nutrition and access to Government Services (SPRINGS). Quasi-experimental methods revealed positive impacts of some specific components of SPRINGS on beneficiary households that received both CGP transfers and SPRINGS. Data are not available to estimate spillovers from these interventions experimentally. We used experimental findings as inputs into a LEWIE model designed to simulate income and production spillovers. In cases where the experimental evaluation was not able to isolate impacts of specific programme components on beneficiaries, we used hypothetical impacts on beneficiaries as the inputs for our simulations. The simulations generate total and spillover effects of these programmes on the local economy, including impacts on households that are not eligible for CGP or SPRINGS. For this analysis, we defined the local economy as the CGP and CGP+SPRINGS treated village plus neighbouring villages and the nearest town.

Four broad findings emerge from our LEWIE simulations:

- 1. Lesotho's CGP creates both nominal and real income multipliers that significantly exceed 1.0.** Each LSL transferred to poor households raises nominal or "cash" income in local economies by LSL 3.11. Cash transfers stimulate local demand, which in turn stimulates production and puts upward pressure on local prices. The real or inflation-adjusted multiplier is 1.67, with a simulated confident interval (CI) of [1.45, 1.93]. This real income multiplier is consistent with CGP real income multipliers from other studies involving both simulations and experiments.
- 2. Combining CGP with KHG and SILC, individually or in combination, leads to higher real income multipliers.** However, in all cases the 90 percent CIs for real income multipliers in these simulations slightly overlap the CI for CGP without SPRINGS. Thus, while there is some evidence that KHG and/or SILC strengthen real-income multipliers, we cannot say that the difference from CGP multipliers is statistically significant, based on Monte Carlo simulations.
- 3. Connecting local economies with outside markets through market clubs or other means significantly increases the real income impacts of CGP and CGP+SPRINGS if the result is higher crop prices for local producers.** The positive impact of higher crop prices on farm profits outweighs the negative impact on consumers, resulting in real income multipliers that are significant, in the sense that their 90 percent CIs lie well above those without market integration. Nevertheless, if outside markets transmit lower crop prices into the local economy, this will seriously reduce real income multipliers, and in some cases drive them to zero. This finding highlights the importance of market integration for the welfare of CGP beneficiaries and other households in local economies, but also the implications of negative price shocks on local economies.
- 4. LEWIE cost-benefit analyses reveal that the CGP, alone and with all combinations of SPRINGS components, generates total discounted benefits that exceed discounted programme costs.** Real-income cost-benefit ratios, counting the income spillovers created in local economies, range from 1.49 (CGP+SILC) to 2.31 (CGP+Market Clubs). The cost-benefit ratio from combining CGP with the full array of SPRINGS components (2.22) easily exceeds that from CGP alone (1.63).

Considering local-economy spillovers is essential in order for a cash transfer programme like CGP to pass a cost-benefit test, and it also substantially increases the estimated cost-benefit ratios for productive interventions.

We draw several recommendations based on the findings of this study:

1. **Strengthen smallholder farmers' engagement in increased farm production and productivity, going beyond small-scale vegetable production, to significantly enhance livelihoods and incomes.** While homestead gardening interventions contribute to household members dietary diversity and food security, it is unlikely they can generate substantial income gains. The multiplier analysis from LEWIE simulations clearly shows that, while positive, the added monetary benefits of the key-hole gardens over and above the receipt of the cash transfers are marginal.
2. **Connect smallholders with outside markets for their produce, to cash in on the potential benefits of commercialization.** Barriers to market participation are often high, making participation in commercial agriculture a huge challenge. While cash transfers can overcome barriers to trade by mitigating transaction costs, farmers living further away from markets or lacking telecommunication technology face more binding transaction costs. This highlights the need for policy makers to provide interventions aimed at improving market infrastructure, for instance by designing markets that meet a community's needs, choosing a suitable site for a new market, guaranteeing adequate connections and the rapid dissemination of information on prices. The results of the simulations show that by better integrating with outside markets and consequently raising the crop price by ten percent, it is possible to attain substantial cost-effective income gains for the local economy.
3. **Consolidate community-based micro-finance groups, such as SILC, strengthening the message that loans should be used primarily for investment purposes rather than consumption.** While the latter can still have an effect on the local economy, "pure" investments in fixed factors of land and capital have larger impacts. Further, spending on health and education contributes to long-term human capital accumulation, which was not accounted for in the multiplier analysis.



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FAO, together with its partners, is generating evidence on the impacts of coordinated agricultural and social protection interventions and is using this to provide related policy, programming and capacity development support to governments and other actors.

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