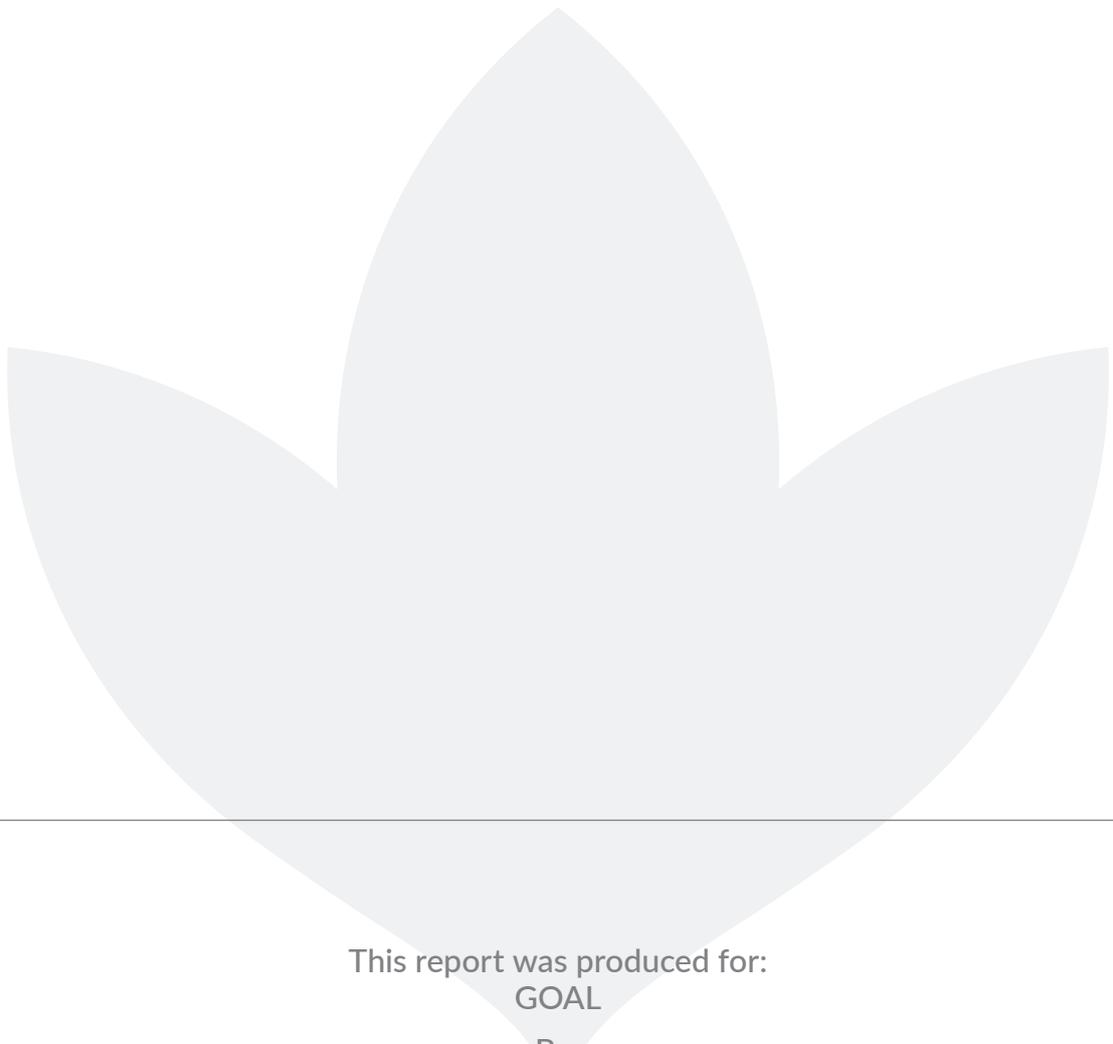


NIPP EVALUATION REPORT

SUDAN





This report was produced for:
GOAL

By:
Action Against Hunger UK's Monitoring, Evaluation and Learning Services

Author:
Joel Woolfenden

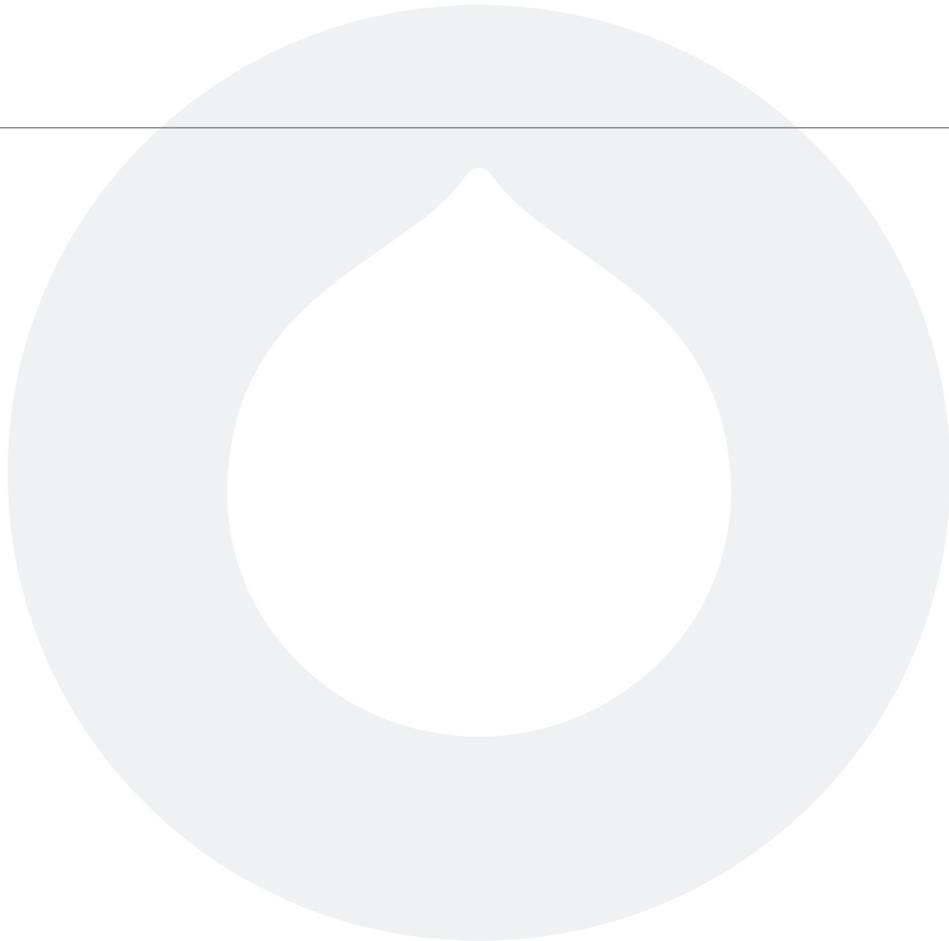


TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ACRONYMS	ii
LIST OF TABLES AND FIGURES	iii
EXECUTIVE SUMMARY	iv
INTRODUCTION	1
RESEARCH METHODOLOGY	2
PURPOSE AND SCOPE OF THIS EVALUATION	2
APPROACH AND DESIGN	2
DATA ANALYSIS	4
LIMITATIONS	5
FINDINGS	5
EFFECTIVENESS	6
TREATMENT OF MAM	6
CARE PRACTISES	8
FEEDING PRACTISES	12
MICRO-GARDEN AND LIVELIHOODS	16
HYGIENE AND SANITATION	20
HIV	23
PREVENTION OF MAM	25
MOTIVATORS	30
CHALLENGES	31
COST EFFICIENCY	33
CONCLUSIONS	36
RECOMMENDATIONS	38
ANNEX 1: CONSOLIDATED PREDICTOR MODEL	43
ANNEX 2: DESCRIPTION OF VARIABLES	44
ANNEX 3: RESEARCH OUTLINE	46
ANNEX 4: THE NIPP APPROACH DIAGRAM	50

ABBREVIATIONS AND ACRONYMS

CNV	Community Nutrition Volunteer
FES	Fuel-Efficient Stoves
FGD	Focus Group Discussion
HE porridge	High-Energy porridge
HIV	Human Immunodeficiency Virus
IGA	Income-Generating Activity
KII	Key Informant Interviews
MAM	Moderate Acute Malnutrition
MUAC	Mid Upper-Arm Circumference
NGO	Non-Governmental Organisation
NIPP	Nutrition Impact and Positive Practise
OLS	Ordinary Least Squares
OTP	Out Patient Therapeutic Program
PLW	Pregnant and Lactating Women
SAM	Severe Acute Malnutrition

ACKNOWLEDGEMENTS

The Action Against Hunger team would like to extend their gratitude to GOAL staff for their time and invaluable insights. In particular we would like to thank the team for their commitment to completing the primary data collection in challenging circumstances.

A big thanks also to Hamid Mohyeldin H. Idrees and his team for their work conducting interviews and focus group discussions in Kutum locality, North Darfur, Sudan.

We would also like to extend our appreciation to the Sudanese Federal Ministry of Health for supporting this evaluation and the NIPP programme in Sudan, as well as the Humanitarian Affairs Commission of Sudan for facilitating access to Kutum for data collection.

Finally, a special thanks to the numerous people who were willing to participate in interviews and focus group discussion to share their perspectives of the NIPP programme. In particular, thanks to all the community members who gave up their time to share their experiences during and after participating in the NIPP programme.

LIST OF TABLES AND FIGURES

TABLES

TABLE 1	Care practise positive practise rates at baseline and graduation
TABLE 2	Feeding positive practise rates at baseline and graduation
TABLE 3	Micro-garden and livelihoods positive practise rates at baseline and graduation
TABLE 4	Use of micro-garden produce at baseline and graduation
TABLE 5	Hygiene and sanitation positive practise rates at baseline and graduation
TABLE 6	HIV positive practise rates at baseline and graduation
TABLE 7	MUAC improvements in children post-graduation
TABLE 8	Care practise behavioural practise adoption post-graduation
TABLE 9	Feeding practises behavioural practise adoption post-graduation
TABLE 10	Micro-garden and livelihoods behavioural practise adoption post-graduation
TABLE 11	Hygiene and sanitation behavioural practise adoption post-graduation
TABLE 12	Total expenses of NIPP implementation
TABLE 13	Expenses per output
TABLE 14	Cost to cure for various households
TABLE 15	Expenses by activity

FIGURES

FIGURE 1	Ordinary Least Squares (OLS) model, the relationship between MUAC growth and weight-for-height growth
FIGURE 2	Distribution of child MUAC at baseline and graduation
FIGURE 3	Distribution of PLW MUAC at baseline and graduation
FIGURE 4	OLS model, baseline care practise behaviour and change in nutrition indicators from baseline to graduation
FIGURE 5	OLS model, baseline feeding practise behaviour and nutrition improvement
FIGURE 6	OLS model, baseline micro-garden and livelihoods behaviour and nutrition improvement
FIGURE 7	OLS model, baseline hygiene and sanitation behaviour and nutrition improvement
FIGURE 8	OLS model, baseline HIV behaviour and nutrition improvement
FIGURE 9	Calculations of inflation rates applied to cost data
FIGURE 9	Calculations of inflation rates applied to cost data

EXECUTIVE SUMMARY

GOAL Sudan has been operating in Kutum locality, North Darfur state to deliver assistance to in-need communities. Nutrition and health programmes have been carried out since 2004 with a focus to tackling a prevalence of acute and severe malnutrition in the region. Some 2.4 million children suffer from malnutrition in Sudan, with close to 700,000 of those experiencing the most severe form¹.

GOAL developed the Nutrition Impact and Positive Practise (NIPP) approach in 2012 and has been implementing this programme in Sudan since 2013. The approach has reached over 7,200 direct beneficiaries and an estimated 30,205 immediate indirect beneficiaries in Sudan. The NIPP approach is a behavioural change programme that engages both male and female caregivers on a wide range of knowledge and behaviours that are identified as contributing to malnutrition in order to instil positive practises in beneficiary's management of their health and hygiene.

The purpose of this evaluation is to assess the impact of the NIPP approach on beneficiaries in North Darfur. The Evaluation will address the following two objectives:

OBJECTIVE 1: Evaluation of the NIPP approach's contribution to moderate acute malnutrition treatment and prevention.

- 1.1** To assess the NIPP programmes effect in treating moderate acute malnutrition (MAM)².
- 1.2** To assess the NIPP programmes effect in preventing moderate acute malnutrition³.
- 1.3** To generate learnings on good practices around NIPP approach implementation, including the motivators and challenges affecting the adoption of positive behaviours and practices among NIPP participants.

OBJECTIVE 2: To conduct a cost efficiency analysis of the NIPP approach.

ANALYTICAL FRAMEWORK

Treatment of MAM – This section explores the behavioural change and improvement in nutrition in children and Pregnant and Lactating Women (PLW) from baseline to graduation. A number of behaviour and knowledge indicators were selected and divided into five categories: care practises, feeding practises, micro-garden & livelihood practises, hygiene & sanitation and HIV/AIDS. For each category, three tests were carried out for each indicator:

- 1.** The change in percentage of beneficiaries adopting positive practises at baseline with graduation.
- 2.** The predictors of improved nutrition. Specifically, which behavioural practises adopted at baseline are associated with greater improvement in nutrition over the course of the programme. This will be assessed both through category specific statistical models and a consolidated model including all observed indicators.
- 3.** A comparison of the improvement in nutrition of three groups. Those adopting a given positive practise at baseline and graduation (constantly positive), those adopting a given positive practise at graduation but not baseline

1 <https://www.unicef.org/stories/beating-malnutrition-sudan>

2 Treating in this case means reducing the MAM rates in beneficiaries through instilling positive behavioural change.

3 Prevention in this case means reducing the cases of MAM re-occurring in the long-term by instilling sustained positive behavioural change.

(improvement) and those not adopting a given positive practises at baseline or graduation (constantly negative).

Prevention of MAM – This section analyses the nutrition status of children in the 12 months following graduation. It also analyses the behaviour of caregivers at 2-months, 6-months and 12-months after graduation in order to generate conclusions on whether positive behavioural practises and knowledge around nutrition are sustained after the programme.

Motivators and challenges – Primarily focusing on focus group and interview responses, this section will discuss the key motivators and challenges of NIPP session participation as well as uptake of behavioural practises by beneficiaries.

Cost efficiency – This section will compare the direct expenses of the NIPP programme with the outputs of the NIPP programme (number of circles run and number of participants).

KEY FINDINGS

Treatment of MAM

MAM rates in children under 5 decreased from 87% at baseline to 4% at graduation. MAM rates in PLWs decreased from 93% at baseline to 37% at graduation. This corresponded to a 95% cure rate on children and a 78% cure rate in PLW.

All 19 behavioural practises analysed in the study had improved positive practise rates at graduation compared with baseline. Of these increases, only the increase in breastfeeding practises was negligible. Practises related to hygiene and sanitation had the smallest growth in the percentage of beneficiaries adopting positive practises. This was in part due to large numbers of beneficiaries already adopting these practises at baseline.

There was a clear association between caregivers who were already adopting positive practise at baseline and greater improvements in respective household nutrition from baseline to graduation. This was true for the following behavioural practises: knowing two causes of malnutrition, knowing two malnutrition prevention methods, knowing how to make high-energy porridge, children being breastfed, a larger no. of meals eaten daily by the child, having an established micro-garden, knowing two food storage methods, having an established FES, having an established latrine, having an established hand-washing facility and knowing two methods of HIV prevention. At baseline, these behaviours are all predictors of which households will benefit most from the programme. A caregiver adopting none of these practises at baseline is likely to experience less improvement in themselves and their family's nutrition as a result of participating in the NIPP programme.

In the consolidated model, the relationship between nutrition improvements and some of the above variables was no longer apparent. The presence of a micro-garden at baseline was the standout predictor of higher growth in Mid Upper-Arm Circumference (MUAC) and weight-for-height of children and MUAC of PLW from baseline to graduation. Micro-gardens, knowing the causes of malnutrition, knowing how to make High-Energy (HE) porridge, no. of meals and the presence of an Fuel-Efficient Stove (FES) at baseline were all significantly linked to higher growth in MUAC and weight-for-height in children.

For the majority of observed care and knowledge practises (8 out of 14), households exhibiting an improvement in positive practise from baseline to graduation were associated with a greater improvement in nutrition over the course of the programme than those who were consistently negative. These eight

practises consisted of six out of seven knowledge-related indicators included in the study. In the case of five of the remaining six practises there was no evidence of a statistically significant divergence in nutrition growth between these two groups.

For two indicators (micro-gardens and latrines) those who were consistently negative experienced a greater improvement in nutrition indicators than those who had improved, although this was only significant for micro-gardens. It could be that behavioural change that involves an investment in time and financial resources such as micro-gardens and latrines diverts resources away from other, more short-term, positive practises. It may also reflect the challenges faced by beneficiaries (as identified in subsequent sections) in setting up micro-gardens. More research could be considered to explore this.

Beneficiaries exhibiting positive behaviour at baseline and graduation were consistently associated with the largest improvement in nutrition indicators. Those who had improvements in their practise were associated with a lower growth in nutrition indicators than this group. This indicates that the programme is particularly successful, in the short-term, in improving the effectiveness of positive practises that beneficiaries are already adopting going in to the programme.

Prevention of MAM

MAM rates in children continued to decline up to 12 months after graduation. Of the 167 children for which data was collected 12-months after graduation, none were malnourished. From graduation to 12-months post-graduation, the MUAC improved in 93% of children. This is a success for the programme, indicating that even where the intervention is ended, the vast majority of households are still seeing improvements up to 12 months after the programme has ended.

There was a larger percentage of children whose MUAC declined between graduation and the 2-month follow-up compared with the percentage from baseline to graduation (11% compared with 1% from baseline to graduation). This trend continued from 6-months to 12-months post-graduation. This indicates that after the NIPP cycle has ended, children are more prone to seeing their nutrition indicators decline than during it. There is therefore some evidence that relapse is occurring, although to a small extent. In total, six (1.5%) children became malnourished between graduation and the two-month follow-up. Overall, though, the programme appears robust in its 12-month impact, with the vast majority of children having improved MUAC over this period.

The majority of positive behaviours/knowledge was sustained up to 12 months after the programme ended. The percentage of beneficiaries adopting a positive practise/behaviour reduced for only three variables from graduation to 12-month follow-up: micro-gardens, FES and vitamin A supplements. The remaining practises saw a sustained or even an increase in the percentage of beneficiaries exhibiting positive practise.

There appeared to be a sustained improvement in the number of meals and food groups consumed by children after graduation. The percentage of children up to date on their vaccinations also increased, this is more likely since children cannot be 'un-vaccinated'.

Post-graduation findings for the five knowledge-focused measurements of positive practise (causes, prevention, HE porridge, storage and preservation) indicate that beneficiaries do retain knowledge at least over the 12-month follow-up period. There appeared to be a slight decrease in the knowledge of storage and preservation methods but this was insignificant.

The most noteworthy decline in positive practise was observed for micro-gardens. Focus Group Discussions (FGD) participants also referenced micro-

gardens as the practise that the community struggle most to maintain. Given the consistency of association between having a micro-garden and improvement in nutrition-related indicators this is a finding that should feed in to future planning for NIPP programmes.

Motivators & challenges

The observation of other community members enacting positive practise is a clear motivator for NIPP participants. There appears to exist a competition dynamic whereby community members want to maintain or exceed the standards set by their neighbours. **NIPP participants are also encouraged by the idea that they are acting as models for the wider community, generating high standards for others to follow.**

The simple act of learning is the biggest motivator for NIPP participants, in particular where this learning is able to improve the practises that they operate within their households. There is clear buy-in from beneficiaries with regards to this, in particular in the areas of hygiene & sanitation and food demonstrations.

An avenue of motivation mentioned by beneficiaries that GOAL could look to further capitalise on are financial benefits. Primarily, this could mean utilising the skills learned through NIPP sessions to establish Income-Generating Activities IGAs. Additionally, highlighting the money saved through, for example, households producing their own food rather than having to purchase it at markets.

Unexpected family events (including child birth, illness, or death in the family) are the key reasons for missing NIPP sessions. Additional, having to care for children is a key challenge for women attending sessions.

Financial challenges such as the purchase of tools/materials needed for behavioural change and commitments to working were also widely reported by beneficiaries. Again, a lack of financial support appeared to be a gap highlighted by beneficiaries in the programme and the need to provide in the short term for their family sometime takes precedence.

The standout behaviour that beneficiaries are facing challenges with implementing is the establishment and maintenance of micro-gardens. This was mentioned in nearly all focus group discussions/interviews and corroborated with the findings from the database, where the percentage of households with a micro-garden fell from 80% at graduation to 36% 12-months later. FGD participants indicated a number of challenges related to insufficient land, a lack of water, a lack of tools/seeds and insects.

There is no evidence of tensions between men and women in the household over female participation in the programme. GOAL staff and volunteers indicated that while there was some scepticism from men at the start, it has now become a big motivator for them to see their spouses engaged in the programme and improving the household situation.

Volunteers are highly motivated to run and engage in the programme but a number of sources suggested that GOAL should look into providing financial incentives to enhance retention.

Cost efficiency

Over the course of three project periods (May 2016–June 2017, July 2017–May 2018 and June 2018–May 2019) direct programme expenses amounted to €115,885; accounting for the very high inflation rates in Sudan, around €171,023 in 2019 money. It should be reiterated that this takes into account only direct project expenses, there are additional support and societal costs that would apply to the total cost of programme implementation.

The outputs of these three project periods were the running of 296 NIPP circles

(for 12 weeks each) consisting of a total of 4,199 participants. **Based on these figures, in Sudan, direct expenses for the running of one NIPP circle for the full 12 week period costs GOAL €580.** On average, the NIPP programme costs €40.70 per participant over 12 weeks.

Training of NIPP staff, community nutrition volunteers and partner staff accounted for nearly a quarter (23.7%) of project expenses. This was the activity that accounted for the largest proportion of project expenses followed by the cost of seeds (23.5%) and surveillance & screening (21.5%).

RECOMMENDATIONS

Programmatic

Incorporate IGA-related sessions – Consider a fourth ‘part’ to every other session with a focus on IGAs. This would include basic financial/business training as well as establishing market linkages relevant to the items produced through other NIPP activities. This would become a core element of MAM prevention and a good advocacy tool for the NIPP as a sustainability building tool.

Revise the approach to micro-garden sessions – There is substantial evidence that beneficiaries are struggling to sustain their micro-gardens after graduation, for a range of reasons. Areas to consider are: how to sustain a micro-garden through the dry season, how to acquire a sufficient supply of seeds, how to cultivate land, how to manage insects etc. Further support beyond the 12-week cycle may be a consideration in order to help beneficiaries sustain the use of micro-gardens.

Water-integrated approach – There is a lack of water in targeted communities particularly during the dry season, limiting the effectiveness of particular behavioural changes in targeted communities. The programme should explore an integrated approach with water-related activities. GOAL should look to anticipate the need for water in different climates/seasons so that a measureable response can be made. GOAL should also explore other technologies/rural practises that are drought resistant.

Dry season – The NIPP implementation guidelines factor in the challenges with rainy season and harvesting season, but do not explicitly consider the dry season. During this time it is evidently more challenging for beneficiaries to establish micro-gardens, purchase food etc. The programme should consider these challenges during the dry season, either adjusting sessions during this time or advising programme teams not to run cycles during it.

Model-mother approach – NIPP participants are enthusiastic about supporting others to establish positive change. Identify NIPP participants who display leadership skills and buy-in to positive behavioural change and include additional sessions to instil some responsibilities within them. Post-graduation, these individuals could make house visits, provide support to other community members, pass on feedback to GOAL etc. There is clear appetite for this kind of community lead approach post-graduation and GOAL should capitalise on this.

Establish predictor system – The findings above can be used to predict which households will see the largest improvement in nutrition indicators based on positive practises already adopted at baseline. Consider putting greater focus of support to those who are predicted to see smaller improvements (generally speaking, these are households exhibiting poor behaviours/knowledge at baseline).

Focused support – There is some evidence that caregivers who are constructing/ establishing micro-gardens or latrines during the programme are associated with the lowest improvement in nutrition indicators up to graduation. GOAL should

identify those establishing these facilities and commit to household visits to assess the challenges they are facing around resource distribution.

Baby friendly spaces – Set up baby friendly spaces, with toys provided, such that mothers do not have to prioritise caring for their child over participation in NIPP sessions. A cost efficient approach to this would be to, if possible, organise NIPP circles to be conducted in places where baby-friendly spaces are already in place in the community.

Catch-up sessions – There are a number of reasons identified for participants having to miss sessions. Consider a process by which participants can have catch-up sessions in cases where they can justify their absence.

Additional motivators – Small motivators can generate a widely enhanced uptake of positive practises. This is something GOAL could be doing more of, in addition to the achievement day. Examples could be a certificate upon successful completion of the NIPP cycle, setting up weekly, un-regulated coffee meetings for groups to discuss the changes they have made, visiting identified households to take pictures of changes made to the household to be presented at the achievement day. All these could feed in to the above mentioned competition dynamic that beneficiaries repeatedly spoke of, further enhancing the uptake of positive practises.

Data capture

Measurements (child length, weight-for-height) - There was some evidence that the weight-for-height measurements of children were more accurate than for MUAC. However, weight-for-height was available at baseline and graduation for around 1/3 of the children where MUAC was available. The programme should look to make weight-for-height measurements common practise, with a focus on how to systematically collect 'length' data which was missing in many cases.

Increase follow-up data cases – The current targeted sample size is on the basis of calculating the mean difference in one indicator across two points in time. In order to build more complex predictor models to find associations between positive practises and nutrition measurements, a greater sample size will be needed. Additionally, the target should factor in missing cases (for which there are many after 12-months) – calculate a buffer that factors in expected missing responses for each indicator.

Capture incentives, motivations and belief systems – The current databases captures behaviours and knowledge. GOAL could consider building in indicators around incentives, motivators and beliefs such that they can be linked to behavioural practises. For example, is an increased willingness to learn, rather than the learning itself, causing improved nutrition in participants.

Consider more complex testing – Graduation is contingent on participants completing the post-test. The current test is passed by 99% of respondents at graduation. This would suggest that it is not a good indicator of knowledge gained from the programme. Consider a more complex post-test to isolate those who have acquired in-depth knowledge. Additionally, build a similar compiled indicator around behavioural quality (ask respondents to perform tasks related to food preparation, hygiene, breastfeeding etc.)

Incorporate knowledge use into database – Knowledge indicators do not capture the actual implementation of knowledge. Consider capturing more data around the uptake of behavioural knowledge (e.g. food storage/prevention methods).

Quality indicators – Current hygiene and sanitation indicators, in particular whether a household has an observed latrine or hand washing facility, do not capture significant change, particularly given that these facilities are widely in use already at baseline. Consider indicators on the quality of facilities factoring in

the amount of degradation, accessibility, usage etc. Quality indicators should be considered for other behavioural areas too.

IGA related indicators – Following the programmatic recommendation for an increased focus on IGA establishment, build IGA-related indicators into the database (income, no. of IGAs etc.).

Further research

Resource allocation – The findings in this study indicated that those who established a micro-garden during the NIPP programme experienced less improvement in nutrition than those who had no garden at baseline or graduation. Generally, those establishing facilities were not seeing greater improvements than those who weren't. This could indicate that establishing household facilities diverts resources away from the short-term nutrition needs of participants. Further research could be considered to explore this and the future implications for the NIPP programme. More detailed post-graduation data could explore whether this reduced nutrition improvement in those improving their care-practise is short-term or long-term.

INTRODUCTION

GOAL Sudan have been operating in Kutum locality, North Darfur state to deliver assistance to in-need communities. Nutrition and health programmes have been carried out since 2004 with a focus to tackling a prevalence of acute and severe malnutrition in the region. Some 2.4 million children suffer from malnutrition in Sudan, with close to 700,000 of those experiencing the most severe form⁴.

GOAL Sudan developed the Nutrition Impact and Positive Practise (NIPP) approach in 2012 and has been implementing this programme in Sudan since 2013. The approach has reached over 7,200 direct beneficiaries and an estimated 30,205 immediate indirect beneficiaries in Sudan. The NIPP approach is a behaviour change programme that engages both male and female caregivers on a wide range of knowledge and behaviours that are identified as contributing to malnutrition, in order to instil positive practises in beneficiary's management of their health and hygiene.

The programme targets households where MAM is identified, either in children under 5 or in Pregnant and Lactating Women (PLW). Male and female caregivers of malnourished children, and malnourished PLW, are invited to participate in the programme. The core component of the NIPP approach is the design and facilitation of NIPP circles. Selected beneficiaries make up the circle and trained community volunteers conduct workshops and trainings on a variety of nutrition/health related practises. These sessions consist of food demonstrations, establishing/maintenance of micro-gardens as well as general guidance and information on positive practises to improve nutrition rates in household members.

This report will explore some of the behavioural changes seen in NIPP participants over the course of the NIPP cycle as well as measuring the change in key nutrition indicators in relation to behavioural change. Additionally, the report will outline the motivators and challenges of NIPP participation and conclude with an assessment of the cost-efficiency of NIPP implementation.

4 <https://www.unicef.org/stories/beating-malnutrition-sudan>

RESEARCH METHODOLOGY

PURPOSE AND SCOPE OF THIS EVALUATION

The purpose of this evaluation is to assess the impact of the NIPP approach on beneficiaries in North Darfur. The Evaluation will address the following two objectives:

OBJECTIVE 1: Evaluation of the NIPP approach's contribution to moderate acute malnutrition treatment and prevention.

- 1.1** To assess the NIPP programmes effect in treating moderate acute malnutrition (MAM)⁵.
- 1.2** To assess the NIPP programmes effect in preventing moderate acute malnutrition⁶.
- 1.3** To generate learnings on good practices around NIPP approach implementation, including the motivators and challenges affecting the adoption of positive behaviours and practices among NIPP participants.

OBJECTIVE 2: To conduct a cost efficiency analysis of the NIPP approach.

The findings and conclusions generated through this evaluation will inform a series of recommendations to improve future NIPP programming.

The evaluation will be shared with a number of stakeholders including donors and the Ministry of Health in Sudan. It is also written to be used by nutrition stakeholders in Sudan, including Federal Ministry of Health, Nutrition Sector, Donors, NIPP implementers to inform the strategy for further iterations of the approach in Sudan.

APPROACH AND DESIGN

OBJECTIVE 1

The evaluation of the NIPP's contribution to treatment and prevention consisted of a desk review, an analysis of GOAL Sudan's existing database and an analysis of primary data collected in Sudan.

Desk review

The desk review was undertaken by the evaluators. It included a review of the NIPP approach as well as an analysis of context and programme-specific reports. A detailed inspection of the NIPP implementation guidelines was conducted to inform a thorough understanding of the NIPP methodology and objectives. This analysis fed into the design of the tools for primary data collection.

Database

An analysis of GOAL Sudan's existing internal NIPP monitoring database was conducted. This database contains information for 5,017 data points, representing children of the respective NIPP participants and participants themselves. Of the 5,017 participants, 3,816 represented children and the remainder were caregivers.

5 Treating in this case means reducing the MAM rates in beneficiaries through instilling positive behavioural change.

6 Prevention in this case means reducing the cases of MAM re-occurring in the long-term by instilling sustained positive behavioural change.

For each data point there exists baseline and graduation data which this evaluation used as an indication of the change in the MAM status of beneficiaries. The database also documents a number of behavioural practises of beneficiaries at both baseline and graduation. This informed an analysis of the behavioural predictors of improved MAM and was used to identify the most significant changes in behaviour of NIPP participants.

In addition to baseline and graduation data, the database also provides follow-up data at 2, 6 and 12 months after the programme has ended for any given participant. This informed the extent to which the NIPP approach has a long-lasting impact on behaviour change and the MAM status of beneficiaries. In particular, this data was used to assess the degree to which the NIPP programme is successful in preventing MAM.

Primary data collection

The quantitative analysis of GOAL's existing database was triangulated by primary qualitative data collected in the field. This data sought to explain the motivations and challenges for participants of NIPP circles. Data was collected from 15th to 23rd July. The following tools were developed for this evaluation and were carried out in the field.

- Focus group discussions (FGDs): FGDs were conducted with beneficiaries. They sought to facilitate a reflection for beneficiaries on the NIPP approach, with a particular focus on the effectiveness of the approach and challenges faced by beneficiaries both in terms of attending sessions and adopting positive practises. This FGD referenced some of the key, explanatory behavioural practises highlighted by a preliminary analysis of the database.
- Key informant interviews (KIIs): There were two KII tools used for this evaluation in Sudan in order to obtain different perspectives on the NIPP approach. The first were for GOAL staff and the second were for community volunteers who had been trained to facilitate NIPP circles.

OBJECTIVE 2

To estimate the expenses incurred per case (beneficiary reached) of the NIPP project in Sudan through quantitative method focusing on the analysis of NIPP project expenses data.

Approach

The cost efficiency component of the evaluation looked at GOAL's existing expenses data for three project periods: May 2016 – June 2017, July 2017 – May 2018 and June 2018 – May 2019. The number of NIPP circles and number of participants of those NIPP circles were analysed along with the expenses data. The analyses looked to identify the expenses related to the running of NIPP programmes as well as the average cost to treat MAM⁷.

7 Not all cost data was captured in this report due to unavailability and the resources required to collect additional data (societal, support costs etc.) This analysis will take in to account the direct project expenses and compare them with the outputs of the NIPP programme.

DATA ANALYSIS

The analytical framework is as follows:

1. Treatment of MAM

This was sub-divided into practise category, as structured in the NIPP database. The categories are as follows: Care practises, feeding practises, micro garden and livelihood practises, hygiene & sanitation and HIV. For each category, a selection of variables included in the NIPP database were selected and built into regression models both to identify the baseline predictors of successful Moderate Acute Malnutrition (MAM) treatment and the change in behaviour practises that can be statistically linked to improved nutrition status from baseline to graduation⁸.

For each practise area, qualitative data from FGDs and KIIs was used to triangulate quantitative findings. This qualitative data further informed both the impact of NIPP circles on behaviour change and the impact of behaviour change on nutrition/health status of respondents. Also included in this section is positive and negative feedback from respondents on specific practise areas.

2. Prevention of MAM

This was sub-divided into practise category (care practises, feeding practises, micro garden and livelihood practises, hygiene and sanitation and HIV). This section looked at the same variables analysed in section one, primarily assessing the degree to which positive practises are continued after graduation. Due to limited data points, regression models were not used to analyse follow-up data, a descriptive analysis was used.

As for section one, for each practise area qualitative data from FGDs and KIIs were used to triangulate quantitative findings. Included in the sample of FGD participants are respondents who finalised the programme months and years ago. These respondents will be specifically asked about the challenges/successes of maintaining positive practises post-programme. Interviews with staff and volunteers also revealed similar challenges/successes of the uptake of positive practises at various intervals after the programme.

3. Motivators/challenges

This section focused on qualitative data. It identified the challenges faced by beneficiary's in both attendance of NIPP sessions and implementation of practises taught through NIPP circles in their own lives. It also detailed the challenges faced by GOAL staff and community volunteers that prevent them from effectively and efficiently implementing NIPP activities. Finally, it highlights, based on primary data, the elements of the programme that motivate beneficiaries to participate and enact behavioural change as a result.

4. Cost analysis

This section addressed objective two of the evaluation, with an analysis of the cost efficiency of the NIPP approach.

8 The variables will be selected based on the quality and quantity of respective data available.

LIMITATIONS

Follow-up data: the number of cases included in the follow-up data are considerably lower than at baseline and graduation. At the 2-month interval 445 beneficiaries were followed-up, this reduced to 201 after 12-month. This lower quantity of available data restricted the depth and type of analysis possible for post-graduation data.

Cost data: it was agreed early on that it was beyond the scope of this study to conduct a full cost-effectiveness study. Instead, GOAL organised their available and project applicable cost data for the evaluators, with no additional data collection conducted. This means that the cost data used for this report is limited as is the subsequent analysis. The cost efficiency component of the evaluation will only look at expense data and will not include analysis of support or societal costs.

FINDINGS

Mid-Upper Arm Circumference (MUAC) vs weight-for-height

Both MUAC and weight-for-height are used to identify MAM in children; the admission criteria for the NIPP programme. The WHO recommends the use of either/or method and validates the usefulness of both. Both measurements will be used in this report as dependent variables, representing the nutrition status of children, while the nutrition status of PLW will be represented by MUAC alone.

The number of data points for children where data was collected for MUAC at both baseline and graduation was 3451. **The number of cases with a weight-for-height measurement at baseline and graduation was only 1326, less than 40% of the number of cases for MUAC.** While a large number of data points recorded child weight, the reason for the lower number of cases for weight-for-height at baseline and graduation was a low number of recorded child lengths. This would suggest that there are more challenges when collecting weight-for-height measurements. It would indicate that the MUAC measurement is more useful for generating a larger number of relevant data points, which strengthens data quality and subsequent analysis.

When mapping the change in MUAC and change in weight-for-height there is a divergence in the kurtosis value⁹. **The kurtosis value for the change in weight-for-height is less than for the change in MUAC, suggesting that the change in MUAC measurements have more outliers.** There are a range of possible reasons for this, for example, weight-for-height measurements are collected digitally while MUAC measurements are recorded by hand increasing the likelihood for error. It could therefore be concluded that weight-for-height has greater accuracy, producing a more standardised distribution with fewer outliers.

Figure 1 shows a positive and statistically significant link between MUAC growth and weight-for-height growth. This indicates that both can be used as dependant variables to measure the same causal effect. However, **only 43% of the variance in MUAC growth can be explained by the variance in weight-for-height growth, highlighting that there is some divergence in these measurements of nutrition status.**

9 Kurtosis values reveal the proportion of data in the 'tails' of the distribution. The key thing to note here is that it reveals the number of outliers that do not appear to 'fit' with the rest of the data.

FIGURE 1: ORDINARY LEAST SQUARES (OLS) MODEL, THE RELATIONSHIP BETWEEN MUAC GROWTH AND WEIGHT-FOR-HEIGHT GROWTH¹⁰

	<i>Dependent variable:</i>
	MUAC
dwl	33.980*** (1.073)
Constant	0.578*** (0.029)
Observations	1,326
R ²	0.431
Adjusted R ²	0.430
Residual Std. Error	0.713 (df = 1324)
F Statistic	1,001.978*** (df = 1; 1324)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

EFFECTIVENESS

See annex 2 for a list and description of variable names included in the effectiveness section of this report. Each variable is related to a question asked during household visits to NIPP participants at different stages of the NIPP cycle.

Treatment of MAM

The key objectives of the NIPP programme are to both treat and prevent MAM. This section focuses on the treatment of MAM by comparing the nutrition status of children and PLW at baseline and graduation. As previously mentioned, nutrition status will be measured through MUAC and weight-for-height measurements.

The common threshold for children being identified as malnourished is a MUAC of less than 125mm. The threshold for Pregnant and Lactating Women (PLW) is 230mm. This evaluation will categorise the MAM status of beneficiaries using these two thresholds.

At baseline, 87% of children included in the programme were malnourished (below the 125mm threshold)¹¹. At graduation, only 4% of children included in the programme were malnourished. This corresponds to a 95% cure rate of MAM among children with caregivers participating in NIPP circles. Of children included in the programme, 98% (3385 out of 3451) saw an improvement in their MUAC from baseline to graduation. Figure 2 shows the distribution of MUAC for children at baseline (pink) and graduation (blue). The red line represents the 125mm threshold. It is clear that there is a significant, positive shift of child MUAC from baseline to graduation.

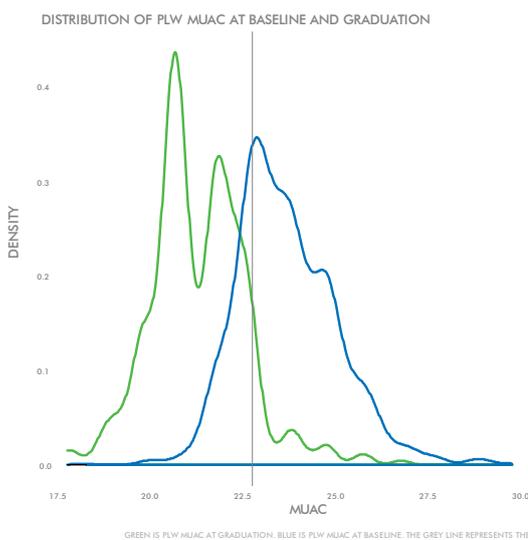
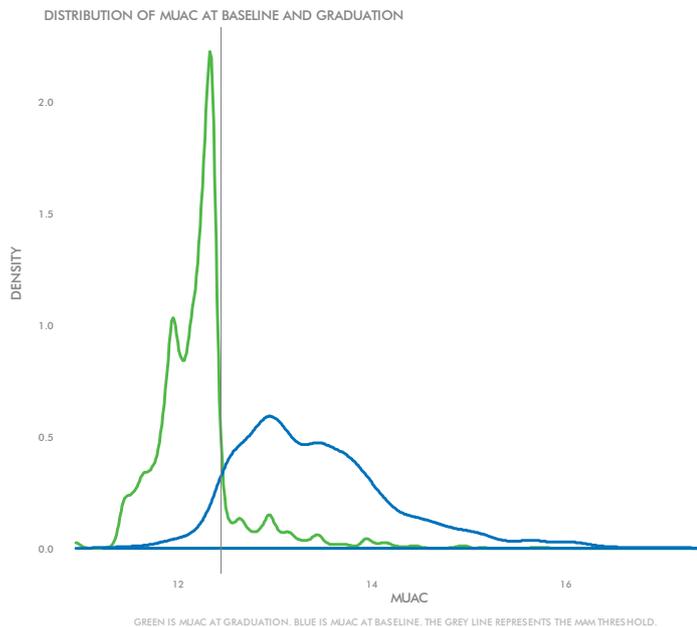
At baseline, 90% of PLWs included in the programme were malnourished (below the 230mm threshold)¹². At graduation, this fell to 20%. This corresponds to a 78% cure rate. Of PLWs included in the programme, 99% (892 out of 904) saw an improvement in their MUAC from baseline to graduation. Figure 3 shows the distribution of MUAC for PLWs at baseline (pink) and graduation (blue). The red line represents the 230mm threshold. It is clear that there is also a significant, positive shift of PLW MUAC from baseline to graduation.

10 Dwl denotes weight-for-height

11 NIPP participants are selected specifically on the basis that they are MAM. Those who are SAM are enrolled in OTP and graduate to NIPP when cured of SAM.

12 As with children, PLWs are selected on the basis that they are MAM.

FIGURES 2 & 3



Behavioural category analysis

The following analysis will be disaggregated by behavioural category and identify the links between the successful treatment of MAM and a range of behavioural change indicators. These categories are care practises, feeding practises, micro-garden & livelihoods, hygiene & sanitation and HIV. For each category, selected behavioural indicators will be included in Ordinary Least-Squares (OLS) models. These indicators will be selected on the basis that the respective data is of good quantity and quality. OLS models will aim to find out two things:

- 1** Whether already adopting a particular positive practise at baseline is associated with greater improvements in household nutrition from baseline to graduation, and thus a predictor of improved nutrition.
- 2** A comparison of three groups; those who were adopting a given positive practise at baseline and graduation, those who were not adopting a

given positive practise at baseline but were at graduation and those who were not adopting a given positive practise at baseline or graduation. The results will determine how the improvement in nutrition indicators compares between these groups. The dependant variables for this second set of OLS models will be logged.

Analysis will then extend to additional behavioural indicators and compare the uptake of positive practises at baseline with graduation.

CARE PRACTISES

Behaviour indicators under care practises focused on beneficiary's knowledge of malnutrition causes and prevention methods. Additionally, there were some indicators capturing broader care practises. The behavioural indicators included in the OLS models were: pre/post-test, malnutrition causes, malnutrition prevention and methods for making HE porridge – see annex 2 for a description of included variables. Additionally this section looks at descriptive statistics on accessing micronutrients, vitamin A supplements and vaccinations.

TABLE 1: CARE PRACTISE POSITIVE PRACTISE RATES AT BASELINE AND GRADUATION

INDICATOR	BASELINE	GRADUATION	TOTAL RESPONSES ¹³
TEST	645 (15%)	4392 (99%)	4413
CAUSES	1313 (33%)	3892 (97%)	4020
PREVENT	1052 (26%)	3857 (95%)	4020
HE PORRIDGE	1521 (38%)	3876 (97%)	4011
MICRO ACCESS	271 (69%)	373 (95%)	393
VITA	705 (54%)	900 (69%)	1300
VACCINATION	749 (57%)	1000 (76%)	1312

Pre/post-test

The pre/post-test asks a series of 10 questions around practises and behaviours related to the causes and prevention of malnutrition. Over the course of the 12-week cycle, the NIPP approach aims to improve beneficiary's knowledge surrounding malnutrition measured by the increased number of beneficiaries able to pass the test at graduation compared with baseline. **Of the 4,423 beneficiaries for which pre and post-test were documented, 15% passed the test at baseline and 99% passed the test at graduation – see Table 1. Only 21 of these 4,423 beneficiaries failed the post-test.** This indicates a clear improvement in the ability for beneficiaries to answer questions related to malnutrition.

13 This is referring to the total cases where responses were provided at baseline AND graduation for each behavioural indicator. This is so that the differences can be compared.

During FGDs, beneficiaries relayed a substantial amount of knowledge around malnutrition, indicating all of this knowledge to have been acquired during NIPP sessions. In each FGD, beneficiaries described the signs of malnutrition and how to accurately measure an individual using MUAC tape. Participants were also able to describe, in depth, the causes and prevention methods taught to them by the programme. The director of nutrition at GOAL indicated that over a two month period in 2015, 1,500 children were referred to local health centres by NIPP participant themselves, having learned how to identify malnutrition through NIPP sessions.

“ONE TIME I FOUND A WOMAN WITH HER CHILD, AND HE WAS LOOKING THIN AND ILL, I TOOK A MUAC MEASUREMENT FOR HIM AND TOLD HER TO TAKE HIM TO THE HEALTH CENTRE, SHE TOOK AND NOW HE IS TREATED”
- FGD PARTICIPANT

Children whose caregiver failed the pre-test but passed the post-test were associated with 4.8% higher MUAC growth than those who failed both, this was also the case for PLW but it was not significant. However, compared with those that passed the test at baseline and graduation, PLW who failed the pre-test but passed the post-test experienced 3.9% less improvement in MUAC growth and their children were associated with 0.9% less growth.

Causes

Beneficiaries were asked to describe two causes of malnutrition at baseline and at graduation. The ability to identify causes of malnutrition improve a beneficiary's ability to mitigate the risk of these causes occurring. The project intended to increase the number of beneficiaries able to identify causes of malnutrition at graduation compared with baseline. Of the 4,030 beneficiaries who were asked about the causes of malnutrition at baseline and graduation, 33% were able to name two causes at baseline and 97% were able to name two causes at graduation. Therefore, by the end of the NIPP programme, the number of beneficiaries able to name two causes of malnutrition increased by 66 percentage points compared with baseline.

Households whose caregiver acquired knowledge on malnutrition causes over the course of the programme were associated with higher growth in child MUAC/ weight-for-height and PLW MUAC than those who did not have this knowledge at baseline or graduation (although these were not significant). Children whose caregivers had acquired this knowledge experienced 1.9% and 4.4% less MUAC growth and weight-for-height growth respectively than children whose caregivers already had this knowledge at baseline. A similar pattern was also true for PLW MUAC change; those who had acquired knowledge on causes were associated with 2% less MUAC growth than those who already had this knowledge at baseline.

Prevention

Beneficiaries were asked to describe two methods of preventing malnutrition at baseline and at graduation. The ability to identify prevention methods of malnutrition should improve a beneficiary's ability to mitigate the likelihood of malnutrition. The project intended to increase the number of beneficiaries able to explain malnutrition prevention methods at graduation compared with baseline. Of the 4,030 beneficiaries who were asked about prevention of malnutrition at baseline and graduation, 26% were able to name two methods of prevention at baseline and 95% were able to name two methods at graduation. This shows that by the end of the NIPP programme the number of beneficiaries able to name two methods for preventing malnutrition increased by 73 percentage points compared with baseline.

Households whose caregiver acquired knowledge on malnutrition prevention over the course of the programme were associated with 5.4% more PLW MUAC

growth and 5.3% more child weight-for-height growth than those who did not have this knowledge at baseline or graduation (although these were not significant). Children whose caregiver had acquired this knowledge experienced 1.8% less MUAC growth and 5.5% lower weight-for-height growth than children whose caregivers already had this knowledge at baseline.

HE Porridge

Beneficiaries were asked to describe how to make High-Energy (HE) porridge using local ingredients. The NIPP programme attempts to educate beneficiaries on the techniques they can adopt in order to create this highly nutritious and easy to make substance. **Of the 4,021 beneficiaries asked about making HE porridge at baseline and graduation, 38% were able to describe the method at baseline while 97% were able to describe the method at graduation.** Therefore by the end of the NIPP programme the number of beneficiaries able to describe the method for making HE porridge increased by 59 percentage points compared with baseline.

Households whose caregiver acquired knowledge on making HE porridge over the course of the programme were associated with higher growth in child MUAC/weight-for-height and PLW MUAC than those who did not have this knowledge at baseline or graduation (this was statistically significant for PLW MUAC who experienced 10.4% higher growth). However, children whose caregivers acquired this knowledge were associated with 0.8% lower MUAC growth and 2.2% lower weight-for-height growth from baseline to graduation than caregivers who could already describe this at baseline.

Additional variables

Beneficiaries were asked about whether they had access to micronutrients. The NIPP programme includes guidance on how to access such micronutrients from local health facilities and hopes to increase the number of children who are taking them. **Of the 393 beneficiaries who were asked about their access to micronutrients, 69% had access at baseline increasing to 95% at graduation.**

Beneficiaries were also asked about whether their children were up to date on their vitamin A supplementation in accordance with the national guideline. **Of the 1,300 caregivers who were asked about vitamin A supplementation, 54% were up to date at baseline increasing to 69% at graduation.** Compared with other care practise behaviours/knowledge changes this was a relatively low rate of change.

Caregivers were asked whether their children were up to date with their vaccinations. Providing children with vaccinations is a vitally important practise for caregivers since certain diseases can lead to significant weight and health loss. **Of the 1,312 caregivers asked about providing children with vaccination, 57% were up to date at baseline increasing to 76% at graduation.**

Finally, a key change in behaviour resulting from improved knowledge around health is the change in practises such as tooth extraction or skin cutting. The majority of FGDs discussed these behaviours as long-standing traditions in an attempt to mend sick children. GOAL staff and volunteers also identified this harmful practise and the reduction of its use in the community after participating in the programme. The programme has given the community viable alternatives that are not harmful to children.

Care practises as predictors

In the care practise predictor model, there was evidence that knowing causes at baseline, knowing prevention methods at baseline and knowing the method for producing HE porridge at baseline were all predictors of larger improvements in nutrition from baseline to graduation – see figure 4. In particular, causes had strong explanatory power over nutrition improvements with a significant relationship on all three dependent variables, meaning households where caregivers could name two causes at baseline were associated with higher MUAC and weight-for-height growth in children and higher MUAC growth in PLW from baseline to graduation.

When included in the consolidated model, knowing causes of malnutrition held its significance with child MUAC and weight-for-height growth – see annex 1¹⁴. Surprisingly, children whose caregivers passed the test at baseline saw lower growth in MUAC and weight-for-height than those whose caregivers failed the test.

FIGURE 4: OLS MODEL, BASELINE CARE PRACTISE BEHAVIOUR AND CHANGE IN NUTRITION INDICATORS FROM BASELINE TO GRADUATION

	<i>Dependent variable:</i>		
	Δ MUAC child (1)	Δ MUAC PLW (2)	Δ dwl (3)
test_baseline	-0.072 (0.049)	0.221 (0.155)	-0.005*** (0.001)
causes_baseline	0.152*** (0.041)	0.291** (0.129)	0.003** (0.001)
prevention_baseline	0.108** (0.043)	-0.042 (0.139)	0.005*** (0.001)
HEporridge_baseline	0.021 (0.034)	-0.017 (0.109)	0.003*** (0.001)
Constant	1.124*** (0.020)	2.235*** (0.063)	0.017*** (0.001)
Observations	2,931	849	1,303
R ²	0.015	0.016	0.038
Adjusted R ²	0.013	0.011	0.036
Residual Std. Error	0.807 (df = 2926)	1.344 (df = 844)	0.018 (df = 1298)
F Statistic	10.954*** (df = 4; 2926)	3.435*** (df = 4; 844)	12.992*** (df = 4; 1298)

*p<0.1; **p<0.05; ***p<0.01

Note: The independent variables denote care practises at baseline. The dependent variables denote the change in (child MUAC, PLW MUAC & child weight-for-height) from baseline to graduation.

Care practises – Summary

- For all seven observed care practise variables, the percentage of beneficiaries exhibiting positive practise/behaviour increased from baseline to graduation. The findings for all four knowledge-related care practise variables (pre/post-test, causes of malnutrition, prevention of malnutrition and HE porridge) all indicated a sharp increase in knowledge of beneficiaries. At least 95% of caregivers were able to exhibit a positive standard of knowledge for each of these variables.
- There is evidence of a relationship between caregivers knowing two causes of malnutrition, two prevention methods of malnutrition and how to make HE porridge at baseline and a larger improvement in household nutrition from baseline to graduation within the household. This would indicate that greater knowledge of malnutrition at baseline is a predictor of

greater benefit over the course of the programme.

- There is consistent evidence that households whose caregiver acquired knowledge (could not describe the respective methods at baseline but could at graduation) experienced greater improvements in nutrition from baseline to graduation than those who did not acquire the knowledge. This was true for the acquisition of knowledge on prevention, causes and high-energy porridge as well as with regards to the pre and post-test.
- Additionally, for each of these variables there is clear evidence that caregivers who already had each type of knowledge at baseline were associated with the greatest improvement in nutrition for themselves and their children during the NIPP cycle.

FEEDING PRACTISES

Behaviour indicators under feeding practises focused on the food intake of caregiver's children as well as cooking methods and facilities. The behavioural indicators included in the OLS models were: breastfeeding, liquid intake, number of meals and number of food groups - see annex 2 for a description of included variables.. Additionally, this section looks at descriptive statistics on the use of fats and oils in cooking.

TABLE 2: FEEDING POSITIVE PRACTISE RATES AT BASELINE AND GRADUATION

	BASELINE	GRADUATION	TOTAL RESPONSES
BREASTFEEDING	1,656 (56%)	1,704 (58%)	2,926
MEALS (0-1)	88 (3%)	78 (3%)	2,968
MEALS (2-3)	2,045 (69%)	864 (29%)	2,968
MEALS (4-5)	803 (27%)	1865 (63%)	2,968
MEALS (6+)	32 (1%)	161 (5%)	2,968
GROUPS (0-1)	104 (4%)	61 (2%)	2,960
GROUPS (2-3)	2347 (79%)	610 (21%)	2,960
GROUPS (4-5)	494 (17%)	2211 (75%)	2,960
GROUPS (6-7)	15 (1%)	78 (3%)	2,960

Breastfeeding

Beneficiaries were asked whether their child was currently being breastfed at baseline and at graduation. The NIPP programme intends to increase the amount of children being breastfed through educating women on the importance of

breastfeeding as well as highlighting the most important ages for children to be breastfed. **Of the 2,936 beneficiaries who were asked about breastfeeding at baseline and graduation, 56% of children were being breastfed at baseline increasing marginally to 58% at graduation –see table 2.** This was the smallest increases in good behaviour/practises across observed indicators.

While the number of beneficiaries' breastfeeding has not increased significantly, the quality of breastfeeding has clearly been improved based on FGD responses. Participants relayed a significant amount of information that they had learned about breastfeeding during the NIPP programme, including mother position, duration of breastfeeding, the necessity of hygiene, techniques for weaning etc. Participants also consistency indicated that these practises were not being done prior to the NIPP programme. One clear lesson learned by the community is that water is not sufficient for children under 6 months. Participants also indicated that positive practises around breastfeeding are being shared widely in the community, with non-NIPP participants also benefiting from this knowledge. The only existing gap in knowledge around breastfeeding appears to be how to breastfeed a child when they are sick.

Children who begun breastfeeding during the programme were associated with 3% higher weight-for-height growth from baseline to graduation than those who were not breastfeeding at baseline or graduation. However, children who had begun breastfeeding during the programme were associated with a 7.3% lower weight-for-height growth than those who were breastfed at baseline and graduation.

Number of meals

Beneficiaries were asked how many times, not including breastfeeding, children were fed per day (including meals and snacks). To measure the change in number of meals from baseline and graduation, four categories were created (0-1 meals, 2-3 meals, 4-5 meals and 6+ meals). The percentage of children consuming 0-1 meals was relatively unchanged. **The change started to show at 2-3 meals with 69% of children consuming this many meals at baseline and only 29% at graduation. In line with this, the number of children consuming 4-5 meals increased from 27% at baseline to 63% at graduation.**

Enumerator's calculated whether children had met the minimum meal quantity requirements, factoring in age and whether the child was breastfed¹⁵. **There was no statistically significant difference in the improvement in child nutrition between the three main behavioural change groups (consistently positive, consistently negative and improved) with regards to reaching this minimum meal quantity.** There was some evidence that children who had consumed more meals at graduation than baseline were associated with 2.7% lower MUAC growth than those whose number of meals consumed was unchanged.

Food groups

"WE USED TO EAT ONLY BORAGE "ASIDA" IN ALL OUR MEALS, BUT NOW WE ALSO EAT VEGETABLES AND FRUITS"
– FGD PARTICIPANT

Beneficiaries were asked how many food groups their child had eaten the previous day. Education on the benefits of a varying diet as well as how to access and use a range of ingredients is essential in improving the nutrition status of communities, and this is another aim of the NIPP programme. The number of children who had only consumed 0-1 food groups nearly halved from baseline to graduation –see table 2. **The percentage of children who had consumed 2-3 groups fell from 79% to 21% from baseline to graduation. In line with this, the percentage of children who had consumed 4-5 meals increased from 17% to 75% from baseline to graduation. Those consuming 6-7 groups also increased substantially from**

15 The number of which also increased significantly from baseline to graduation.

baseline to graduation.

Supporting this increase in food groups consumed, it was clear from FGDs that beneficiaries have acquired a lot of knowledge around a varied diet. Firstly, all FGDs discussed a greater understand of the importance of vegetables and fruit in meals. To complement this, respondents said that food demonstrations have taught them how to include vegetables in every meal. Some respondents have been using their cooking skills to begin selling food at the local market, some of which had a small but steady income as a result. Volunteers who were interviewed felt that food demonstrations was one of the areas that participants got most enthusiastic about. The use of meat in cooking was not regularly mentioned in FGDs, where it was mentioned, respondents indicated a lack of availability either due to high cost or inconsistent market supply.

Enumerator's calculated whether children had met the minimum dietary requirements, factoring in age, how many food groups the child is consuming and whether the child was breastfed¹⁶. **Children who had not met their dietary requirements at baseline but did at graduation were associated with 2.2% lower growth in MUAC compared with those meeting the requirements already at baseline.** There was no significant difference between the improvement group and those who did not meet the requirements at baseline or graduation.

Additional variables

Questions were also asked regarding whether caregiver's child had taken any liquids the previous day as well as whether fats or oils were used in cooking. **The data for both of these variables indicated over 99% exhibiting good practise at baseline and graduation¹⁷.**

Feeding practises as predictors

In the feeding practise predictor model, there was evidence that the number of meals consumed by the child at baseline and the child being breastfed at baseline were both predictors of larger improvements in nutrition from baseline to graduation – see figure 5. Both of these behaviours were significantly related to child MUAC and weight-for-height growth at the 1% significance level. There was no link between the no. of food groups consumed by the child at baseline and the growth in MUAC or weight-for-height over the course of the programme.

When included in the consolidated model, the no. of meals consumed at baseline held its significance – see annex 1¹⁸. The relationship between breastfeeding practise at baseline and the rate of MUAC and weight-for-height growth in children was no longer apparent in this consolidated model.

16 The number of which also increased significantly from baseline to graduation.

17 For liquids, the data was identical for baseline and graduation with only three of 1,314 respondents indicated no liquids taken. For questions on liquids and fats, consider either removing/altering these questions or enquiring as to whether the data is properly collected.

18 The consolidated model includes all care behavioural practice categories

FIGURE 5: OLS MODEL, BASELINE FEEDING PRACTISE BEHAVIOUR AND NUTRITION IMPROVEMENT

	<i>Dependent variable:</i>	
	Δ MUAC child (1)	Δ dwl (2)
breastfed_baseline	0.332*** (0.055)	0.010*** (0.001)
liquid_baseline	-0.015 (0.535)	0.0004 (0.010)
meals_baseline	0.155*** (0.026)	0.001*** (0.0005)
groups_baseline	0.024 (0.025)	0.0004 (0.0005)
Constant	0.501 (0.542)	0.008 (0.010)
Observations	1,294	1,281
R ²	0.051	0.065
Adjusted R ²	0.048	0.062
Residual Std. Error	0.925 (df = 1289)	0.017 (df = 1276)
F Statistic	17.334*** (df = 4; 1289)	22.184*** (df = 4; 1276)

*p<0.1; **p<0.05; ***p<0.01

Note: The independent variables denote care practises at baseline. The dependent variables denote the change in (child MUAC & child weight-for-height) from baseline to graduation.

Feeding practises: conclusions

- Children of caregivers in the NIPP programme are seeing increases in the number of meals and number of food groups they consume on a daily basis. It can be assumed that the quality of breastfeeding has improved based on the knowledge acquisition of NIPP participants revealed through FGDs.
- A larger number of meals consumed daily by children at baseline is a stand-out predictor of a greater improvement in nutrition over the course of the programme. For no. of food groups consumed, this relationship was less clear. Breastfeeding at baseline was linked to a greater improvement in child nutrition from baseline to graduation in the feeding practises predictor model but this relationship broke down in the consolidated model.
- Children who had improved practises around breastfeeding saw a greater improvement in weight-for-height than those who were not breastfeeding at baseline or graduation. However, for no. of meals and food groups this relationship was insignificant. Similar to other categories, there was some evidence that those improving their feeding practises were experiencing smaller improvements than those who already adopted good feeding practises at baseline.
- The data quality of a number of variables in this category is lacking and a new approach to data collection could be considered.

MICRO-GARDEN AND LIVELIHOODS

Behaviour indicators under micro-garden and livelihoods were focused on whether households had an established micro garden and what they used this garden for, as well as general behaviours around how food is managed by caregivers. The behavioural indicators included in OLS models were: established

micro-garden, food preservation methods, food storage methods and fuel-efficient stoves (FES) - see annex 2 for a description of included variables.

TABLE 3: MICRO-GARDEN AND LIVELIHOODS POSITIVE PRACTISE RATES AT BASELINE AND GRADUATION

	BASELINE	GRADUATION	TOTAL RESPONSES
MICRO-GARDEN	357 (10%)	2736 (80%)	3413
FOOD PRESERVATION	526 (17%)	2998 (94%)	3174
FOOD STORAGE	507 (16%)	2965 (95%)	3116
FES	450 (46%)	758 (78%)	973

Micro-garden

Beneficiaries were asked whether they had an established micro-garden at baseline and at graduation. Micro-gardens are a simple and effective way for vulnerable persons to sustain themselves, the NIPP approach provides training on how to establish and maintain one. **The percentage of beneficiaries with an established micro-garden at baseline was 10%, this increased significantly to 80% at graduation.** This indicates that by the end of the NIPP programme the number of beneficiaries with an established micro-garden increased by 70 percentage points compared with baseline

Households that established a micro-garden during the programme were associated with 2.7% and 1.9% less MUAC and weight-for-height of children respectively than children in households who did not have a micro-garden at baseline or graduation. However, households that had established a micro-garden during the NIPP programme were associated with 11% less child MUAC growth, 10.1% less PLW MUAC growth and 16.9% lower weight-for-height growth than children whose caregivers had an established micro-garden at baseline and graduation.

Focus group participants validated that few community members had an established garden before the programme but NIPP participants became very encouraged to create one. They were happy that they were saving money, not having to go to the market to purchase food. However, **it was clear that community members are facing many challenges establishing a micro-garden.** In every interview conducted with volunteers and staff, micro-gardens were highlighted as the most problematic behavioural change for participants to implement. This supports the above finding that those attempting to establish a micro-garden during the programme are associated with the smallest improvement in nutrition indicators. As discussed in subsequent sections, these challenges also explain the reduction in households with an established micro-garden after graduation.

Respondents were asked about what they use the produce from their micro-garden for. It could be argued that the best practise is that produce is both sold and eaten. Table 4 shows the relevant responses at baseline and at graduation¹⁹.

19 There were significantly more responses at graduation due to the larger number of households with an established micro-garden.

At baseline, 39% of beneficiaries used their produce to eat and sell, this fell significantly to 14% at graduation (although the actual number nearly tripled). This would suggest that those who establish a garden during the NIPP programme are not typically in a position to produce sellable surplus by the time the programme ends.

TABLE 4: USE OF MICRO-GARDEN PRODUCE AT BASELINE AND GRADUATION

	BASELINE	BASELINE TOTAL	GRADUATION	GRADUATION TOTAL
EAT	201 (60%)	333	2313 (86%)	2678
EAT & SELL	129 (39%)	333	362 (14%)	2678
SELL	3 (1%)	333	3 (0.01%)	2678

Food preservation and storage

Part of the NIPP cycle includes the teaching and practising of food processing, preservation and storage techniques. Beneficiaries were asked to name two food preservation methods at baseline and graduation. **Of the beneficiaries who were asked this at baseline and graduation, 17% were able to name two preservation methods at baseline rising to 95% at graduation.** Beneficiaries were also asked to name two food storage methods at baseline and graduation. **Of the beneficiaries who were asked this at both baseline and graduation, 16% were able to name two storage methods at baseline rising to 94% at graduation.** Clearly, there was a significant rise in beneficiary's ability to name food preservation and storage techniques.

Children whose caregivers acquired knowledge on preservation methods were associated with 4.9% more growth in weight-for-height from baseline to graduation than those whose caregiver did not have this knowledge at baseline or graduation. However, there was no significant difference between these two groups for child or PLW MUAC. Additionally, children whose caregivers acquired knowledge on food preservation methods were associated with a 1.1% and 1.7% lower increase in MUAC and weight-for-height respectively compared with children whose caregivers could name preservation methods at baseline and graduation.

Children whose caregivers acquired knowledge on storage methods were associated with 2% and 6.7% more growth in MUAC and weight-for-height respectively from baseline to graduation than those whose caregiver did not have this knowledge at baseline or graduation. However, children whose caregivers acquired this knowledge were associated with 2.2% lower MUAC growth compared with children whose caregivers could name storage methods at baseline and graduation.

While the above analysis focuses on beneficiary's ability to explain methods, it is also important to assess the degree to which these are actually being used. **FGD participants are clearly very invested in the learnings related to preservation.** The majority of FGDs discussed the benefits of preserving food for the dry season, avoiding the hiked prices in a low-supply food market. **Participants who completed the programme pre-2019 said that the storage methods taught by the programme helped them to retain food into the dry season.** Multiple FGDs did discuss the challenges around preserving food in that it requires an investment – a large purchase of food in the rainy season to support through the dry season.

FES

The NIPP approach includes training on how to set up and use fuel-efficient stoves (FES) as part of the methodology for improving the quality of food prepared by caregivers. Of the 973 household with information on FES at baseline and graduation, 46% had an observed FES at baseline, which rose to 78% at graduation.

There was no significant difference between the rate of MUAC or weight-for-height growth of children in households who established an FES during the programme and those in households who had no FES at baseline or graduation. However, children in households that established an FES during the NIPP cycle were associated with 7.8% lower MUAC growth and 12.7% lower weight-for-height growth than children in households that already had an FES at baseline.

Micro-garden and livelihoods practises as predictors

In the micro-garden and livelihoods predictor model, there was evidence that the presence of a micro-garden at baseline, knowledge of storage methods at baseline and the presence of an FES at baseline were all predictors of greater improvements in household nutrition from baseline to graduation – see figure 6. The presence of a micro-garden at baseline was significantly and positively associated, at the 1% level, with all three dependent variables and had large explanatory power. The presence of an FES at baseline was also significant linked, at the 1% level, with higher growth in child MUAC and weight-for-height over the course of the programme.

When included in the consolidated model, all three of the above variables retained, to some extent, their significant and positive relationship with nutrition growth from baseline to graduation – see annex 1²⁰. This indicates that micro-garden and livelihood baseline indicators are strong predictors of nutrition improvement over the course of the programme. In particular, households with an established micro-garden at baseline are associated with a much larger increase in MUAC and weight-for-height of children and MUAC of PLW from baseline to graduation than those without a micro-garden.

FIGURE 6: OLS MODEL, BASELINE MICRO-GARDEN AND LIVELIHOODS BEHAVIOUR AND NUTRITION IMPROVEMENT

	<i>Dependent variable:</i>		
	Δ MUAC child (1)	Δ MUAC PLW (2)	Δ dwl (3)
micro-garden_baseline	0.816*** (0.060)	1.510*** (0.309)	0.014*** (0.001)
food_preserve_baseline	0.026 (0.068)	-0.036 (0.163)	0.001 (0.001)
food_storage_baseline	0.205*** (0.067)	-0.286* (0.165)	0.002 (0.001)
FES_baseline	0.468*** (0.048)		0.008*** (0.001)
Constant	0.838*** (0.034)	2.243*** (0.064)	0.013*** (0.001)
Observations	1,263	440	1,251
R ²	0.235	0.059	0.180
Adjusted R ²	0.232	0.052	0.177
Residual Std. Error	0.814 (df = 1258)	1.173 (df = 436)	0.016 (df = 1246)
F Statistic	96.351*** (df = 4; 1258)	9.081*** (df = 3; 436)	68.150*** (df = 4; 1246)

*p<0.1; **p<0.05; ***p<0.01

Note: The independent variables denote care practises at baseline. The dependent variables denote the change in (child MUAC, PLW MUAC & child weight-for-height) from baseline to graduation.

Micro garden and livelihoods – conclusion:

- There was a significant increase in the number of caregivers exhibiting good practises around micro-gardens and livelihoods. Around 70% of NIPP participants established a micro-garden during the programme, while 95% of participants were able to name two prevention and two storage methods respectively at graduation. It appeared that the majority of those who established a micro-garden during the programme were using the produce for eating and not selling. Those establishing an FES increased from 450 to 758.
- The presence of a micro-garden and FES at baseline were significant predictors of a larger improvement in nutrition for children and PLWs over the course of the NIPP programme and this held true in the consolidate model. There was some evidence that naming storage techniques was associated with greater MUAC growth over the course of the programme but no evidence of an association between naming prevention methods at baseline and greater improvements in nutrition.
- There is mixed evidence amongst these indicators as to whether households improving their practise experience greater improvements in nutrition than those who remained constantly negative. Households whose caregivers acquired knowledge on prevention and storage were associated with higher improvements in nutrition than those who did not have this knowledge at baseline or graduation. This link was also true for FES but it was not statistically significant. For micro-gardens those improving their practise were associated with lower growth in MUAC and weight-for-height over the course of the programme.
- For all four observed indicators, there was evidence that caregivers exhibiting positive practise at baseline and graduation were linked with the greatest improvement in nutrition indicators from baseline to graduation.

HYGIENE AND SANITATION

Behaviour indicators under hygiene and sanitation were focused on beneficiary's use of latrines and hand washing behaviours. The behavioural indicators included in the OLS model were latrines, hand-washing facilities, what is used for hand washing and diarrhoea - see annex 2 for a description of included variables.

TABLE 5: HYGIENE AND SANITATION POSITIVE PRACTISE RATES AT BASELINE AND GRADUATION

	BASELINE	GRADUATION	TOTAL RESPONSES
LATRINE	2401 (77%)	2689 (86%)	3121
HAND WASHING FACILITY	2489 (80%)	2882 (95%)	3116
HW METHODS - NONE	20 (0.6%)	76 (2%)	3096

HW METHODS - WATER	1400 (45%)	214 (7%)	3096
HW METHODS - ASH AND WATER	166 (5%)	251 (8%)	3096
HW METHODS - SOAP AND WATER	1510 (49%)	2555 (83%)	3096
DIARRHOEA	173 (14%)	94 (7%)	1271

Generally, based on feedback from FGD participants, hygiene and sanitation is an area that has made particular impact on how the wider community behave. People's personal hygiene as well as the cleanliness of neighbourhoods in general have changed considerably in the eyes of beneficiaries. Behavioural change with regards to hygiene and sanitation was also mentioned consistently by volunteers and GOAL staff as the most noticeable area of change in NIPP participants.

Latrines

The NIPP programme included sessions on how to construct latrines with the goal to improving hygiene in households and preventing diseases that could result in malnutrition. Of the 3,129 household where information was recorded on latrines at baseline and graduation, 77% had a functioning latrine at baseline rising to 86% at graduation. This was a relatively small increase in positive practise compared with most of the indicators observed in this evaluation. Part of this reason is that over three quarters of households already had a latrine at baseline.

Children in households that established a latrine during the programme were associated with a lower increase in MUAC and weight-for-height than those who had no latrine at baseline or graduation (although this was insignificant). Children in households that established a latrine during the NIPP cycle were associated with 1.5% and 5.8% lower MUAC and weight-for-height growth respectively than children in households that already had a latrine at baseline.

As well as being encouraged to establish latrines, participants in FGDs reported useful lessons around the maintenance of them. They reported actively keeping them clean and using insecticide spray to do this.

Hand washing

Sessions on hand washing seek to improve the hygiene of beneficiaries, mitigating the risk of diseases that could result in malnutrition. Of the 3124 household where information was recorded on hand washing facilities at baseline and graduation, 80% had a hand washing facility in place at baseline rising to 92% at graduation.

Children in households that established a hand washing facility during the programme were associated with 5.4% more weight-for-height growth than those in households with no hand washing facility at baseline or graduation. However, this relationship was not significant for child or PLW MUAC. Households who establish a hand washing facility during the programme were associated with 3% less child weight-for-height growth and 5.8% less PLW MUAC growth than those who had a facility at baseline and graduation.

Hand washing methods

The NIPP programme also addresses what beneficiaries use when washing their hands. It is generally considered more hygienic to use soap or ash with water, rather than using water alone. Current literature generally agrees that soap is preferable to ash and that ash should be used where soap is unavailable. Respondents were asked at baseline and graduation what they used last time they washed their hands. **Of those who provided this information, 45% used only water at baseline decreasing to just 7% at graduation – see table 6.** Most of these beneficiaries took up the use of ash (the percentage of which rose from 5% to 8%) and soap (the percentage of which rose from 49% to 83%). FGD respondents indicated that soap is now widely used in the community after latrine use and before cooking/eating.

Respondents to FGDs validated the increase in soap usage, saying that it has been made common practise in the community following NIPP sessions. Respondents also recognised the role of ash in that it acts as the next best thing if soap is unavailable. It was mentioned that soap is sometimes too costly for some community members and that ash is utilised in this case.

Additional variables

Caregivers were asked whether their child had had diarrhoea in the two week prior to baseline and graduation. **Of the 1271 beneficiaries for whom this data was recorded at baseline and graduation, 14% said that their child had had diarrhoea at baseline halving to 7% at graduation.** The absence of diarrhoea at baseline also had no association with an improved MUAC or weight-for-height of children over the course of the NIPP cycle.

Hygiene and sanitation practises as predictors

In the hygiene and sanitation predictor model, there was evidence that the presence of a latrine at baseline, the presence of a hand washing facility at baseline and the usage of soap and water when washing hands at baseline were all predictors of a larger or smaller improvement in nutrition from baseline to graduation – see figure 7. The presence of a latrine had a positive, significant link with MUAC and weight-for-height growth in children while the presence of a hand washing facility had a positive, significant relationship with the growth in MUAC of PLW. PLW using soap and water at baseline were associated with less growth in MUAC than those using ash and water²¹.

When included in the consolidated model, only the presence of a hand washing facility maintained a significant relationship with any of the dependent variables – see annex 1²². The link between the size of MUAC or weight-for-height growth in children and the presence of a latrine at baseline disappeared. The use of soap and water was no longer significantly linked with PLW MUAC growth in the consolidated model but a link appeared which indicated that children whose caregivers used only water to wash their hands at baseline experienced lower growth in MUAC from baseline to graduation.

21 This could be because some education would be required in order to know that ash is a means to wash hands.

22 The consolidated model includes all care behavioural practice categories

FIGURE 7: OLS MODEL, BASELINE HYGIENE AND SANITATION BEHAVIOUR AND NUTRITION IMPROVEMENT

	<i>Dependent variable:</i>		
	Δ MUAC child (1)	Δ MUAC PLW (2)	Δ dwl (3)
latrine_baseline	0.176*** (0.062)	-0.006 (0.125)	0.003** (0.001)
hand_wash_facility_baseline	0.113 (0.145)	0.880*** (0.128)	0.001 (0.003)
hand_wash_none_baseline	-0.091 (0.210)	0.805 (1.179)	-0.0001 (0.004)
hand_wash_soap and water_baseline	0.190** (0.097)	-0.938*** (0.349)	0.004* (0.002)
hand_wash_water only_baseline	0.134 (0.098)	-0.529 (0.349)	0.001 (0.002)
diarrhoea_baseline	0.045 (0.071)		0.0002 (0.002)
Constant	0.825*** (0.171)	2.321*** (0.360)	0.014*** (0.004)
Observations	1,599	438	1,208
R ²	0.011	0.135	0.011
Adjusted R ²	0.007	0.125	0.006
Residual Std. Error	0.901 (df = 1592)	1.129 (df = 432)	0.018 (df = 1201)
F Statistic	2.857*** (df = 6; 1592)	13.432*** (df = 5; 432)	2.250** (df = 6; 1201)

*p<0.1; **p<0.05; ***p<0.01

Note: The independent variables denote care practises at baseline. The dependent variables denote the change in (child MUAC, PLW MUAC & child weight-for-height) from baseline to graduation.

Hygiene and sanitation – conclusions

- Rates of positive practises around hygiene and sanitation are already high at baseline. The presence of latrines and hand washing facilities, increased marginally from baseline to graduation. The use of soap increased significantly, with those using waster only to wash their hands decreasing.
- It's clear that, while the quantity of latrines and hand washing facilities did not increase from baseline to graduation compared with other practises, the impact has been evident with regards to the usage and maintenance of them.
- The presence of latrines and the use of soap in hand washing at baseline were predictors of a greater improvement in the nutrition of children from baseline to graduation. The presence of a hand washing facility at baseline was linked to improved MUAC growth of PLWs from baseline to graduation.
- Households that established hand washing facilities during the programme were associated with a larger improvement in nutrition from baseline to graduation than those who did not have one at baseline or graduation. This was not true for latrines, where those exhibiting consistency negative behaviour were associated with a larger improvement in nutrition, although this was statistically insignificant.
- Hygiene and sanitation is an area that beneficiaries are very confident in adopting and, according to FGDs and interviews, has seen one of the most significant changes in the community.

HIV

Behaviour indicators under hygiene and sanitation were focused on beneficiary's knowledge of HIV and of household member's HIV status. There is a well-documented causal cycle between HIV and malnutrition. HIV causes immune impairment leading to malnutrition which leads to further immune deficiency, and contributes to rapid progression of HIV infection to AIDS. The behavioural indicators included in the OLS model were HIV prevention methods, knowledge of adult status and knowledge of child status - see annex 1 for a description of included variables.

TABLE 6: HIV POSITIVE PRACTISE RATES AT BASELINE AND GRADUATION

	BASELINE	GRADUATION	TOTAL RESPONSES
HIV PREVENTION	807 (23%)	3240 (93%)	3486
STATUS – ADULT	92 (4%)	514 (24%)	2175
STATUS – CHILD	5 (0.003%)	298 (20%)	1507

HIV prevention

The NIPP programme includes providing beneficiaries with information on how to prevent HIV/AIDS. Beneficiaries were asked at baseline and graduation to name two methods for prevention, answers were related to safe sex practises and caution with needles. Of the 3486 respondents asked about prevention of HIV at baseline and graduation, 23% were able to name two methods at baseline rising significantly to 93% at graduation.

PLW who acquired knowledge on HIV prevention methods during the programme were associated with 3.5% greater MUAC growth than those who did not have this knowledge at baseline or graduation. This was not significant for child nutrition indicators. Children whose caregivers acquired this knowledge were associated with 1.6% and 3.5% higher MUAC and weight-for-height growth respectively than those whose caregivers had this knowledge already at baseline.

HIV status

Knowing HIV status is key to tackling it. It was apparent at baseline that very few caregivers knew their own status, or their child's. Only 4% of adults knew their HIV status at baseline, this rose to 24% at graduation. Even fewer (0.003%) knew their child's status at baseline rising to 20% at graduation. This marked a significant increase in caregivers having knowledge of HIV status, still at graduation less than a quarter of beneficiaries knew their HIV status and only a fifth knew their child's status.

Caregivers who knew their HIV status at baseline were associated with lower MUAC (5% level), as well as a lower MUAC (5% level) and weight-for-height (1% level) of their children. At baseline, caregivers knowing their HIV status is therefore associated with poorer nutrition. The reason for this might be that those with HIV are more likely to have tested their HIV status, therefore knowing you HIV status is linked to poorer health/nutrition.

Children whose caregivers knew their HIV status at baseline were also less likely to see an increased MUAC from baseline to graduation (at the 1% level). With this association, as well as the conclusion from the above paragraph, knowledge

of household HIV status at baseline is a predictor of poorer nutrition status at baseline and poorer growth in MUAC from baseline to graduation. Again, this could be linked to the fact that households affected by HIV are more likely to have tested it.

HIV practises as predictors

In the HIV predictor model, knowledge of prevention methods at baseline and caregivers knowing their child's HIV status were both predictors of nutrition measurement growth from baseline to graduation – see figure 8. Children whose caregivers could name two HIV prevention methods were significantly linked to higher growth in MUAC and weight-for-height from baseline to graduation.

When included in the consolidated model, the link between child MUAC and weight-for-height growth and caregiver knowledge of HIV status is more evident – see annex 1²³. Children whose caregivers knew their own HIV status were associated with lower growth in weight-for-height and children whose caregivers knew the child's status were associated with lower MUAC growth. The link between child nutrition indicator growth and caregivers knowing prevention method broke down in the consolidated model, indicating not for the first time, that caregiver knowledge in any given area is linked to positive practises/knowledge in other areas.

FIGURE 8: OLS MODEL, BASELINE HIV BEHAVIOUR AND NUTRITION IMPROVEMENT

	<i>Dependent variable:</i>		
	Δ MUAC child (1)	Δ MUAC PLW (2)	Δ dwl (3)
HIV_prevent_baseline	0.286*** (0.055)	0.090 (0.148)	0.005*** (0.001)
HIV_status_adult_baseline	-0.316*** (0.113)	0.428 (0.286)	0.001 (0.004)
HIV_status_child_baseline	-0.089 (0.307)		-0.009 (0.007)
Constant	1.190*** (0.026)	2.437*** (0.068)	0.019*** (0.001)
Observations	1,651	561	1,255
R ²	0.017	0.006	0.015
Adjusted R ²	0.015	0.003	0.013
Residual Std. Error	0.908 (df = 1647)	1.403 (df = 558)	0.018 (df = 1251)
F Statistic	9.603*** (df = 3; 1647)	1.748 (df = 2; 558)	6.516*** (df = 3; 1251)

*p<0.1; **p<0.05; ***p<0.01

Note: The independent variables denote care practises at baseline. The dependent variables denote the change in (child MUAC, PLW MUAC & child weight-for-height) from baseline to graduation.

HIV – Summary

- Knowledge of HIV prevention methods has been successfully passed to participants with 93% of participants naming two methods at graduation. Knowledge of caregiver and child HIV status had improved significantly from baseline to graduation, however the percentage of caregivers knowing this status is still quite low.
- Children whose caregivers knew the HIV status of themselves or their

children were linked to lower MUAC and weight-for-height growth from baseline to graduation.

- PLW who acquired knowledge on HIV prevention were associated with higher MUAC growth than those who did not have this knowledge at baseline or graduation.

PREVENTION OF MAM

It is also an ambition of the NIPP programme to ensure that positive practises/ behaviours are maintained after the project cycle has ended. This will be a key factor in determining whether the programme is successful in preventing MAM from arising in beneficiaries after the cycle is finalised. In order to measure these long-term impacts, follow-ups are made at 2-month, 6-month and 12-month intervals after the project has ended.

It should be noted again that the number of cases included in the follow-up data are considerably lower than at baseline and graduation²⁴. Measuring the predictors of prevention of MAM post-NIPP programme would therefore lack accuracy and so this section will focus on descriptive statistical differences²⁵.

MAM rates post-programme

The percentage of beneficiaries who were not malnourished at graduation was 96%. The data collected during follow-ups indicate that 98%, 98% and 100% were not malnourished at 2-months, 6-months and 12-months respectively. To support this upward trend, three paired t-test were carried out: the first compared graduation MUAC measurements with 2-month follow-up measurement, the second compared 2-months with 6-months and the third compared 6-months with 12-months. The results indicated that there was a statistically significant difference in MUAC measurements over each period, increasing with time. It can be concluded that MAM prevalence continues to fall after the NIPP cycle has ended.

As discussed previously, 98% of children saw an improvement in their MUAC from baseline to graduation, this figure fell over post-programme intervals – see table 7. From graduation to the two-month follow-up, 85% of children had improvements in their MUAC, with 11% experiencing decreases. Similarly, from the 6-month follow-up to the 12-month follow-up, 84% of children had improvements in their MUAC, with 13% experiencing decreases. Both of these intervals saw fewer children improve MUAC measurements (and more children decrease) compared with the change seen from baseline to graduation. **Overall, from graduation to the 12-month follow-up, 93% of children experience improved MUAC measurements, while 6% deteriorated.** This is a very promising statistic indicating that the NIPP programme has longevity in its effects.

An indicator of the ability of the NIPP programme to prevent MAM is whether any participants became malnourished from graduation to any of the follow-up intervals. **Of the 412 children where MUAC was recorded at graduation and at the 2-month follow-up, 1.5% (6 children) became malnourished by 2-months post-graduation.** This would equate to 57 children if follow-up were recorded for every child that was recorded at baseline. This indicates that there is some initial potential for MAM to prevail after graduation. **However, for children whose**

24 There were a minimal amount of follow-ups for PLWs so this section will look only at the nutrition status of children after graduation.

25 Due to this limited data, this section will not assume direct causality between the NIPP programme and post-graduation nutrition status. It will however assume the NIPP programme to be a factor affecting the nutrition status of beneficiaries after the programme.

MUAC was recorded at the 12-month follow-up, zero were malnourished at this stage²⁶. This would suggest that over a longer period after graduation, MAM does not resurface in children.

TABLE 7: MUAC IMPROVEMENTS IN CHILDREN POST-GRADUATION

	IMPROVED	DETERIORATED	REMAINED THE SAME	TOTAL CASES
BASELINE TO GRADUATION	98%	1%	1%	3451
GRADUATION TO 2 MONTHS	85%	11%	4%	411
2 MONTHS TO 6 MONTHS	90%	7%	3%	330
6 MONTHS TO 12 MONTHS	84%	13%	3%	158
GRADUATION TO 12 MONTHS	93%	6%	1%	167

Behaviour/knowledge post-programme

The NIPP programme focuses on tackling MAM through changing the behaviour and instilling positive practises in participants. To sustain real impact, the programme aims to ensure that beneficiaries do not revert to pre-programme behaviour but continue to put what they have learned into practise in the long-run. As with monitoring at baseline and graduation, the NIPP programme records the behavioural practises of beneficiaries at 2, 6 and 12 months after the programme. This data can be used to measure the sustainability of the programme's impact.

Focus groups with beneficiaries who had finished the programme a number of years ago indicated that they and the community in general are still abiding by the behavioural change achieved during the NIPP programme.

Care practises

Tests were not undertaken during follow-up visits. For the other knowledge-related variables (causes, prevent and HE porridge), information was taken. Since these were approaching 100% at graduation, the key test here was to see whether that knowledge had been retained at 6 & 12 months. **For all three indicators, respondents retained their knowledge consistently both at 6 months and 12 months after the programme had ended – see table 8.** There were a few beneficiaries who appeared to acquire or lose the knowledge after the project had end, but this was a negligible quantity.

The percentage of children who were taking vitamin supplements decreased substantially post-programme. For those whom this information was provided for at 2-months, 73% were taking vitamin A supplements despite 91% of these taking supplements at graduation. A full year after the project ended, just 20% of the 88 children for whom this data was recorded were taking vitamin A supplements, 80 of these 88 children were taking supplements at graduation. It appears that this is one good practise that does deteriorate post-programme.

26 It would be useful to see follow-up for 1000+ cases and see how close to zero this figure would be.

The upward trend of children being vaccinated from baseline to graduation appears to continue after graduation. At 2-months after the programme, 87% of children were up to date on their vaccinations where 73% of them were vaccinated at graduation. By 6-months after the programme, 98% of children had been vaccinated and this was more or less maintained up until 12-months after the programme.

TABLE 8: CARE PRACTISE BEHAVIOURAL PRACTISE ADOPTION POST-GRADUATION

	2-MONTH	6-MONTH	12-MONTH
CAUSES		99% (99% at grad)	100% (100% at grad)
PREVENTION		99% (98% at grad)	98% (99% at grad)
HE PORRIDGE		99% (98% at grad)	99% (99% at grad)
VITAMIN A	73% (91% at grad)	49% (83% at grad)	20% (91% at grad)
VACCINATIONS	87% (73% at grad)	98% (72% at grad)	97% (74% at grad)

Note: For each practise, the percentage of caregivers exhibiting positive practise at graduation changes in each interval due to varying sample sizes. Generally, fewer caregivers were interviewed at later intervals.

Feeding practises

The percentage of children consuming four or more meals 2 months after graduation was greater than at graduation. This trend continues through to 12-months after graduation where 76% of children had consumed four or more meals, 57% of which had consumed four or more meals at graduation. A similar pattern was observed for the number of food groups eaten by children, although to a lesser extent.

TABLE 9: FEEDING PRACTISES BEHAVIOURAL PRACTISE ADOPTION POST-GRADUATION

	2-MONTH	6-MONTH	12-MONTH
MEALS (0-3)	25% (36% at grad)	22% (37% at grad)	24% (43% at grad)
MEALS (4+)	75% (64% at grad)	78% (64% at grad)	76% (57% at grad)
GROUPS (0-3)	19% (23% at grad)	15% (21% at grad)	14% (22% at grad)
GROUPS (4+)	81% (77% at grad)	85% (79% at grad)	86% (78% at grad)

Note: For each practise, the percentage of caregivers exhibiting positive practise at graduation changes in each interval due to varying sample sizes. Generally, fewer caregivers were interviewed at later intervals.

Micro-garden and livelihoods

There was a significant decline in the percentage of beneficiaries having an established micro-garden post-programme – see table 10. At graduation, 80% of the 3,243 respondents had a micro-garden established. This marginally declined to 75% 2 months later and then fell significantly to 58% and then 36% at 6-months and 12-months after graduation respectively. Of the 166 respondents asked about micro-gardens at the 12-month follow-up stage, 150 had had a micro-garden at graduation falling to only 60 12 months later. There is evidence here to suggest that beneficiaries are unable or unwilling to sustain the presence of a micro-garden after the NIPP cycle has finished.

The above finding was supported by the responses provided by beneficiaries in FGDs. Micro-gardening was the most commonly mentioned practise that was hard to sustain over time. The primary reasons were inadequate access to water (particularly during dry season) and a lack of space to develop the gardens. Additionally, some respondents said that they do not have the tools necessary to maintain their garden and also that the quality of land is insufficient. These responses highlight the reason for the significant reduction in households with a micro-garden after graduation.

The two livelihood knowledge indicators (on food preservation and storage) maintained a high percentage of beneficiaries who retained this knowledge. After 6 months, 98% and 97% of beneficiaries were able to name two food preservation methods and two food storage methods respectively. There was some indication that this knowledge was not consistently retained into the 12 months. Twelve months after the programme, 96% of beneficiaries could name two preservation methods (100% of which could name them at graduation) and 91% could name two storage methods (98% of which could name them at graduation). Interview respondents indicated food preservation as an area that beneficiaries were consistently putting into practise after graduation, this is unsurprising given the evident enthusiasm of FGD participants for preservation.

The data indicated that the percentage of beneficiaries with a Fuel-Efficient Stove increases over the 6 months following graduation. At 6 months, 88% of beneficiaries asked about FES had one in place (of which 76% had one at graduation). This affect appeared to breakdown after 12 months, however only 40 beneficiaries were asked about FES at this stage, which is not representative of the wider population.

TABLE 10: MICRO-GARDEN AND LIVELIHOODS BEHAVIOURAL PRACTISE ADOPTION POST-GRADUATION

	2-MONTH	6-MONTH	12-MONTH
MICRO GARDEN	75% (84% at grad)	58% (84% at grad)	36% (90% at grad)
FOOD PRESERVATION	99% (99% at grad)	98% (99% at grad)	96% (100% at grad)
FOOD STORAGE	99% (97% at grad)	97% (99% at grad)	91% (98% at grad)
FES	84% (81% at grad)	88% (76% at grad)	70% (84% at grad)

Note: For each practise, the percentage of caregivers exhibiting positive practise at graduation changes in each interval due to varying sample sizes. Generally, fewer caregivers were interviewed at later intervals.

Hygiene and sanitation

The percentage of beneficiaries with a latrine remained consistent with the percentage at graduation. After 12-months 94% of beneficiaries whose latrine presence was observed by data collectors had a latrine in place²⁷.

The percentage of beneficiaries who had a hand washing facility was also maintained at a very high quantity. At 2 and 6 months, there is evidence that a proportion of beneficiaries who did not have a hand washing station at graduation had installed one. Even 12 months after the project, 98% of beneficiaries had a hand washing station in place.

The percentage of beneficiaries washing their hands using soap and water maintained a steady rate although fell slightly from 6-months to 12-months. Similarly, the proportion who were using water only (no soap or ash) was consistent through the follow-up period. At 12 months after graduation, only 5% of beneficiaries were washing their hands with water only.

This strong retention of good practise beyond graduation for hygiene and sanitation was highlighted by FGD respondents. They consistently mentioned hygiene and sanitation as an area that had seen the most change and was most enthusiastically implemented by NIPP participants and the wider community. Volunteers affirmed that hygiene and sanitation practises are most notably retained by NIPP participants after the programme.

TABLE 11: HYGIENE AND SANITATION BEHAVIOURAL PRACTISE ADOPTION POST-GRADUATION

	2-MONTH	6-MONTH	12-MONTH
LATRINE	89% (87% at grad)	96% (93% at grad)	94% (96% at grad)
HAND WASHING	99% (92% at grad)	99% (92% at grad)	98% (100% at grad)
SOAP AND WATER	81% (83% at grad)	81% (84% at grad)	76% (80% at grad)
WATER	8% (7% at grad)	8% (6% at grad)	5% (5% at grad)

Note: For each practise, the percentage of caregivers exhibiting positive practise at graduation changes in each interval due to varying sample sizes. Generally, fewer caregivers were interviewed at later intervals.

MOTIVATORS

NIPP sessions

When asked about what was positive about the NIPP programme, 14 out of 15 FGDs focused their responses around the act of learning. It was clear from data discussed above that the knowledge of beneficiaries considerably improved during the programme and that efforts were made to retain this knowledge up to 12 months after graduation. Beneficiaries clearly valued learning something new that will help them to improve the health within their household. In particular, cooking demonstrations were mentioned as a particularly fruitful learning experience.

27 It would be worth collecting data on the quality of latrines. They are unlikely to reduce in number but likely to reduce in quality (degradation, lack of maintenance).

FGD beneficiaries also repeatedly mentioned that, aside from the resultant benefits of knowledge acquired through sessions, the sessions themselves were very enjoyable. Volunteers and GOAL staff suggested that they see a great deal more enthusiasm from female participants compared with males. They suggested that the most significant motivator for men was seeing their spouse attending sessions and the resultant positive change in the household.

Participants were particularly interested in programmes that had direct financial benefit to their household. This ranged from learning to produce their own food instead of purchasing it at markets to setting up small businesses using the skills learned from the programme. IGAs are an area that the NIPP programme could look to more systematically incorporate into sessions. It was clear from the dataset that few participants who had set up a micro-garden were using it to sell food; this is one example of beneficiaries missing an opportunity to generate income. Additionally, four FGDs revealed interest in Incoming Generating Activity (IGA)-related sessions upon closing of the discussions. Market linkages and basic business/financial skills training could be considered as a compliment to nutrition focused behaviour change.

Community relations

Strong community relations are a key avenue by which the NIPP programme can seek to treat and prevent MAM. A close community will reinforce the messages spread through NIPP circles as well as allowing NIPP participants to pass on the behaviour learned to those not involved in the NIPP programme. This concept was reinforced through FGDs where participants repeatedly spoke of a healthy competition dynamic whereby NIPP participants would compare the positive practises adopted by themselves with other households. Community volunteers also re-iterated this point. They indicated that this competition dynamic was a significant motivator for positive change.

Numerous FGD participants mentioned becoming a model caregiver in the community as a result of things learned in the NIPP programme. It was suggested that those who had not participated in the NIPP programme were observing the improved behaviours of NIPP participants. This was a further reason that beneficiaries wanted to maintain positive practise, feeling as though they were playing an important model role in the community.

In 10 FGDs, participants agreed that they all felt comfortable contributing to NIPP sessions, even those who felt shy at first grew in confidence as the weeks went on. They also discussed the change that the interactions through the NIPP programme has had on community relations and the closeness people felt towards one another. There is an evident enthusiasm that goes beyond the sessions themselves, with nine FGDs revealing that the community regularly discuss the sessions in their own time and support/encourage each other with regards to the adoption of positive practises. This is a clear added value of a participatory programme and it's evident that the NIPP is successful in motivating communities to make changes as a community with minimal NGO oversight.

There is clear evidence that community cohesion has been strengthened by the programme. This was mentioned by the director of nutrition, as well as beneficiaries and volunteers, as one of the significant changes brought about by the programme.

Finally, two FGDs also reported that they would apply small punishments to fellow NIPP participants who either missed sessions or were late to sessions. While it would be to some degree inappropriate for GOAL to formalise a punishment process, this does reveal a degree of passion within participants who are self-enforcing punishments in an attempt to increase attendance and community buy-in.

Motivators for Community volunteers

NIPP volunteer's responsibilities are mostly twofold. Firstly, they support with the screening process to identify MAM children and PLW. Secondly, they are trained by GOAL to facilitate NIPP sessions. **The biggest motivators for volunteers was the growth in confidence, the ability to support their community and general enjoyment of running sessions/taking a leadership role in the community.** They indicated that the training was more than sufficient to do their roles and appreciated the close level of support provided by GOAL staff.

CHALLENGES

Social challenges

A large proportion of FGD participants, as well as volunteers and GOAL staff, mentioned child birth, illness or death in the family as reasons for not attending NIPP sessions. Sudanese usually support the relatives of the deceased person, by gathering at the house and staying for several days leading to unintended absence at NIPP sessions. One volunteer indicated that when a beneficiary misses a session for a reason such as the above they try to tailor a catch-up sessions for them such that they can catch up on what they missed.

A few participants mentioned social commitments, such as weddings or hosting guests, as reasons for missing NIPP sessions. In four discussions, travelling was pointed out as a challenge when attending sessions. Visiting the market, which is far away and only open twice per week, was mentioned twice. One group also mentioned that mothers could not attend, because they would have to stay at home to care for their children. Other participants did also explicitly ask for toys at the NIPP sessions and a space to feed their children in the morning.

It was also pointed out that some participants would skip cooking sessions out of embarrassment due to their inability to bring food/tools to these sessions.

One group mentioned that some families were having difficulties to get to the health centre, where NIPP circles were taking place. Another group, on the other hand, pointed out that the distance to the health centre was not too far and/or worth the travelling.

It was positive that none of the female participants mentioned their male family members preventing them from attending NIPP sessions and two groups even pointed out that their attendance was encouraged. All six volunteers interviewed stressed this point, that men are encouraging, rather than preventing, their spouses to participate. This is another key positive that came out of discussions, that female participation is strengthening the relationship with their husbands, giving them more autonomy in daily life to strengthen the household.

Financial challenges

Another aspect that reoccurred across the discussions was the financial constraint on families. Some participants, for example, mentioned that they could not afford to rent more land or buy water (be it for gardening, drinking or cooking). Other participants mentioned certain foods being too expensive for them to be able to maintain a diverse diet. **Financial constraints were also brought forward for not attending the NIPP sessions at all** - Beneficiaries sometimes have to work in the farm and provide for their family instead.

Some participants suggested that the programme should provide more financial support, such as for renting farming land. Many participants also expressed the need for more crafts training (using *local* materials) to increase family income and for more support in income generating activities, especially for women.

Challenges faced setting up or maintaining micro-gardens

As the findings from the quantitative analysis suggest, beneficiaries are experiencing difficulties maintaining their micro-gardens after graduation. This was a topic that came up in all focus group discussions.

The main challenge faced by participants when maintaining micro-gardens seems to be water scarcity, especially at the time when GOAL Sudan provides seeds. There is a lack of good soil, equally due to the season, but there is also a lack of space and land generally. Some families only have the space to grow the food needed for their daily consumption and do not have the capacity to grow beyond this. A few participants also mentioned insects destroying their crops and the need for gardening tools.

Further needs

Six focus groups expressed concerns about having to bring their own cooking tools and food items to cooking sessions, which they felt should be provided for. This was further corroborated as an issue by multiple community volunteers. The need for longer or more cooking sessions to be able to practice more and learn further types of meals was mentioned by a number of participants across four focus groups.

One group asked for more awareness raising sessions, including for women about children care and health as well as for young men on HIV and AIDS. Another group asked for an illiteracy eradication programme and first aid training. Support in building latrines was also brought up.

Although one group felt that the structure of the programme did not need changing, three other groups expressed the need for more and/or longer sessions. One group asked for facilitators to use education means and materials (Information Education Communication) and to record jingles and songs for others to listen to. Another group suggested to train volunteers more. It was also recommended to provide writing boards and book notes and one group had the idea of providing a graduation certificate as a means to motivate participants.

GOAL staff, and volunteers themselves, indicated that a lack of financial incentives is presenting a challenge for volunteers and could reduce retention. They pointed out that the training necessary to replace volunteers who end their involvement in the programme could become an unnecessary cost, not to mention that volunteers work hard and deserve something in return.

COST EFFICIENCY

The NIPP approach is a low-cost programme with a focus on enabling beneficiaries to improve their own living standards, rather than being provided with direct food or non-food items. A small budget was targeted in order to enable small, localised NGOs to implement the programme themselves. A key factor in driving down expenses is the utilisation of community volunteers who are trained in facilitating NIPP circles.

The following analysis looks at the expenses incurred by GOAL Sudan while implementing the NIPP programming across multiple time periods: May 2016 – June 2017, July 2017 – May 2018 and June 2018 – May 2019²⁸.

This section will then look to compare the expenses incurred with the number

28 This is a less rigorous cost-efficiency analysis. See recommendations for details on how GOAL should approach having an extensive cost-effectiveness study conducted for the NIPP programme.

of NIPP circles run/number of beneficiaries reached across the respective time periods. Expenses included training of community volunteers, tools/items used during NIPP circles (e.g. seeds or cooking ingredients), planning/review meetings etc. Additionally, partner costs were incorporated for applicable time periods.

Inflation rates were factored into budget data for previous years, such that all three years could be aggregated and compared. Inflation rate calculations are shown in figure 9 and used statistics from Statista²⁹. Inflation on May 2016 – June 2017 budget data was compounded by multiplying by 1.36 and then by 1.52.

FIGURE 9: CALCULATIONS OF INFLATION RATES APPLIED TO COST DATA

$$\begin{aligned} &\text{BETWEEN MAY 2016 – JUNE 2017 AND JULY 2017 – MAY 2018}^{30}: \\ &\frac{2016 \text{ INFLATION RATE} + (2017 \text{ INFLATION RATE} * 2) + 2018 \text{ INFLATION RATE}}{4} = 36\% \\ &\text{BETWEEN JULY 2017 – MAY 2018 AND JUNE 2018 – MAY 2019}^{31}: \\ &\frac{2017 \text{ INFLATION RATE} + (2018 \text{ INFLATION RATE} * 2) + 2019 \text{ INFLATION RATE}}{4} = 52\% \end{aligned}$$

TABLE 12: TOTAL EXPENSES OF NIPP IMPLEMENTATION³²

PROJECT PERIOD	EXPENSES W/O INFLATION	EXPENSES WITH INFLATION ³³
MAY 2016 – JUNE 2017	€30,179.52	€62,387.1
JULY 2017 – MAY 2018	€45,419.14	€69,037.09
JUNE 2018 – MAY 2019	€39,598.52	€39,598.52
TOTAL	€115,885	€171,023

Over the course of these three projects periods, GOAL Sudan have spent around €115,000, equivalent to around €170,000 in 2019's money – see table 12. The outputs of this expenditure have resulted in the running of 296 NIPP circles (for 12 weeks each) consisting of a total of 4,199 participants. Based on these figures, in Sudan, direct expenses for the running of one NIPP circle for the full 12 week

29 <https://www.statista.com/statistics/727148/inflation-rate-in-sudan/>

30 Applicable to 2016-2017 data

31 Applicable to 2016-2017 and 2017-2018 data

32 These figures include direct project applicable expenses by GOAL. Additional data was not collected to calculate and incorporate support costs (staff time, office running etc.)

period costs GOAL €580³³. On average, the NIPP programme costs €40.70 per participant over 12 weeks.

TABLE 13: EXPENSES PER OUTPUT

	NUMBER	AVERAGE EXPENSES
CIRCLES RUN	295	€579.5
PARTICIPANTS	4,199	€40.73

The cost to cure a child relative to the above figures is dependent on how many malnourished children are enrolled in the programme for each respective NIPP participants. Table 14 shows the cost to cure a child for households with different quantities of malnourished children enrolled in the programme, assuming the 95% cure rate stated above. In households with one child enrolled in the programme, it costs €42.90 to cure each child while in households with three children enrolled it costs €14.30 to cure each child³⁴.

TABLE 14: COST TO CURE FOR VARIOUS HOUSEHOLDS

NUMBER OF CHILDREN ENROLLED IN NIPP PARTICIPANT HOUSEHOLDS	COST TO CURE
1	€42.90
2	€21.45
3	€14.30

Five key activity categories stood out from the budgets, the cost percentage for each of these categories can be found in table 15. **Training of staff and Community Nutrition Volunteers (CNVs) accounted for nearly a quarter (23.7%) of project expenses, this activity accounted for the largest percentage of budget costs. The expenses for seeds used for the micro-gardening component of NIPP sessions also accounted for nearly a quarter (23.5%).** Screening of beneficiaries accounted for around one fifth (21.5%) of project expenses while planning, monitoring and review related activities accounted for around one eighth (12.9%). Finally, the direct running costs of the NIPP programmes accounted for 9.9% of total costs.

33 Sudan has had very high inflation in the last couple of years, inflating the cost figures in this analysis. Therefore, these costs should take into account the purchasing power of the Euro if compared with programmes in foreign countries.

34 GOAL should look to calculate the average number of children enrolled in the programme per caregiver to establish a final figure related to cost to cure a child.

TABLE 15: EXPENSES BY ACTIVITY

INPUT CATEGORY	ACTIVITIES INCLUDED	PERCENTAGE OF COST
TRAINING	Training of NIPP staff, CNVs and partner staff.	23.7
COST OF RUNNING	Direct inputs for running NIPP circles: coal, materials, volunteer incentives etc.	9.9
COST OF SEEDS	Seeds used for micro-gardening component	23.5
PLANNING/MONITORING/REVIEW	Including planning/review meetings, cost of monitoring	12.9
SCREENING AND SURVEILLANCE	Nutrition screening and surveillance	21.5

As previously indicated, there are costs not captured by this analysis. A particularly important cost that will require further research and data collection are the societal costs (financial costs incurred by the community). This has been a thread throughout the report and is particularly pertinent to behavioural change programmes. There are clear financial costs, as indicated in the challenges section, to NIPP participation which further analysis should look to capture, thus informing future programming.

CONCLUSIONS

Treatment

- Moderate Acute Malnutrition rates in children decreased from 87% at baseline to 4% at graduation based on MUAC measurements. This corresponded to a 95% cure rate.
- Moderate Acute Malnutrition rates in PLWs decreased from 93% at baseline to 37% at graduation based on MUAC measurements. This corresponded to a 78% cure rate.
- All 19 behavioural practises analysed had improved positive practise rates at graduation compared with baseline. Of these increases, only the increase in breastfeeding practises was negligible, although FGD participants indicated that the quality has been enhanced substantially. This is clear evidence that the NIPP programme is effective in instilling positive behavioural change in participants.
- There is clear evidence that the knowledge of NIPP participants has improved significantly from baseline to graduation.
- Practises under hygiene and sanitation had the smallest growth in the percentage of beneficiaries adopting positive practises. This was in part due to large numbers of beneficiaries already adopting these practises at baseline.
- There was a clear association between caregivers who had already adopted positive practise at baseline and greater household nutrition indicator growth from baseline to graduation. This was true for the following behavioural practises: knowing two causes of malnutrition, knowing two malnutrition prevention methods, knowing how to make high-energy porridge, children being breastfed, a larger no. of meals eaten daily by the child, having an established micro-garden, knowing two food storage methods, having an established FES, having an established latrine, having an established hand-washing facility and knowing two methods of HIV prevention. At baseline, these behaviours are all predictors of which households will benefit most from the programme. A caregiver adopting none of these practises at baseline is likely to experience less growth in them and their family's nutrition indicators as a result of participating in the NIPP.
- For the majority of observed care and knowledge practises (8 out of 14), households exhibiting an improvement in positive practise from baseline to graduation were associated with a greater improvement in nutrition than those who were consistently negative. These nine practises consisted of six out of seven knowledge-related indicators included in the study. In the case of five of the remaining six practises there was no evidence of a statistically significant divergence in nutrition growth between these two groups.
- For two indicators (micro-gardens and latrines) households who exhibited consistently negative behaviour (no micro-garden/latrine at baseline or graduation) experienced a greater improvement in nutrition over the course of the programme than those who had improved (established a micro-garden/latrine during the programme), although this was only significant for micro-gardens. It could be that behavioural change that involves an investment in time and financial resources such as micro-gardens or latrines diverts resources away from other, more short-term,

positive practises. It may also reflect the challenges faced by beneficiaries (as identified in subsequent sections) in setting up micro-gardens is causing this. More research could be considered to explore this.

- Beneficiaries exhibiting positive behaviour at baseline and graduation were consistently associated with the largest improvement in nutrition indicators. Those who had improvements in their practise were associated with a lower growth in nutrition indicators than this group. This indicates that the programme is particularly successful, in the short-term, in improving the effectiveness of positive practises that beneficiaries are already adopting going in to the programme.

Prevention

- MAM rates in children continued to decline up to 12 months after graduation. Of the 167 children for which data was collected 12-months after graduation, none were malnourished.
- From graduation to 12-months post-graduation, the MUAC improved in 93% of children. This is a success for the programme, indicating that even where the intervention is ended, the vast majority of households are still seeing improvements up to 12 months after the programme has ended.
- There was a larger percentage of children whose MUAC declined between graduation and the 2-month follow-up compared with the percentage from baseline to graduation. This trend continued from 6-months to 12-months post-graduation. This indicates that after the NIPP cycle has ended, children are more prone to seeing their nutrition indicators decline than during it. There is therefore some evidence that relapse is occurring, although to a small extent, post-graduation which has some implications for the objective to prevent MAM. In total, six (1.5%) children became malnourished between graduation and the two-month follow-up.
- The majority of positive behaviours/knowledge was sustained up to 12 months after the programme ended. The percentage of beneficiaries adopting a positive practise/behaviour reduced for only three variables from graduation to 12-month follow-up: micro-gardens, FES and vitamin A supplements. The remaining practises saw a sustained or even an increase in the percentage of beneficiaries exhibiting positive practise.
- There appeared to be a sustained improvement in the number of meals and food groups consumed by children after graduation. The percentage of children up to date on their vaccinations also increased, this is more likely since children cannot be 'un-vaccinated'.
- Post-graduation findings for the five knowledge-focused measurements of positive practise (causes, prevention, HE porridge, storage and preservation) indicate that beneficiaries do retain knowledge at least over the 12-month follow-up period. There appeared to be a slight decrease in the knowledge of storage and preservation methods but this was insignificant.
- The most noteworthy decline in positive practise was observed for micro-gardens. FGD participants also referenced micro-gardens as the practise that the community struggle most to maintain. Given the consistency of association between having a micro-garden and improvement in nutrition-related indicators this is a finding that should feed in to future planning for NIPP programmes.

Motivators & challenges

- The observation of other community members enacting positive practise is a clear motivator for NIPP participants. There appears to exist a competition dynamic whereby community members want to maintain or exceed the standards set by their neighbours.
- NIPP participants are also encouraged by the idea that they are acting as models for the wider community, generating high standards for others to follow.
- The simple act of learning is the biggest motivator for NIPP participants, in particular where this learning is able to improve the practises that they operate within their households. There is clear buy-in from beneficiaries with regards to this, in particular in the areas of hygiene & sanitation and food demonstrations.
- An avenue of motivation mentioned by beneficiaries that GOAL could look to further capitalise on are financial benefits. Primarily, this could mean utilising the skills learned through NIPP sessions to establish IGAs. Additionally, highlighting the money saved through, for example, households producing their own food rather than having to purchase it at markets.
- Unexpected family events (including child birth, illness, or death in the family) are the key reasons for missing NIPP sessions.
- Financial challenges such as the purchase of tools/materials needed for behavioural change and commitments to working were also widely reported by beneficiaries.
- There is no evidence of potential tensions between men and women in the household over female participation in the programme. GOAL staff and volunteers indicated that while there was some scepticism from men at the start, it has now become a big motivator for them to see their spouses engaged in the programme and improving the household situation.
- Volunteers are highly motivated to run and engage in the programme but a number of sources suggested that GOAL should look into providing financial incentives to enhance retention.

RECOMMENDATIONS

Programmatic

Incorporate IGA-related sessions – Consider a fourth ‘part’ to every other session with a focus on IGAs. This would include basic financial/business training as well as establishing market linkages relevant to the items produced through other NIPP activities. This would become a core element of MAM prevention and a good advocacy tool for the NIPP as a sustainability building tool.

Revise the approach to micro-garden sessions – There is substantial evidence that beneficiaries are struggling to sustain their micro-gardens after graduation, for a range of reasons. Areas to consider are: how to sustain a micro-garden through the dry season, how to acquire a sufficient supply of seeds, how to cultivate land, how to manage insects etc. Further support beyond the 12-week cycle may be a consideration in order to help beneficiaries sustain the use of micro-gardens.

Water-integrated approach – There is a lack of water in targeted communities particularly during the dry season, limiting the effectiveness of particular behavioural changes in targeted communities. The programme should explore an integrated approach with water-related activities. GOAL should look to anticipate the need for water in different climates/seasons so that a measureable response can be made. GOAL should also explore other technologies/rural practises that are drought resistant.

Dry season – The NIPP implementation guidelines factor in the challenges with rainy season and harvesting season, but do not explicitly consider the dry season. During this time it is evidently more challenging for beneficiaries to establish micro-gardens, purchase food etc. The programme should consider these challenges during the dry season, either adjusting sessions during this time or advising programme teams not to run cycles during it.

Model-mother approach – NIPP participants are enthusiastic about supporting others to establish positive change. Identify NIPP participants who display leadership skills and buy-in to positive behavioural change and include additional sessions to instil some responsibilities within them. Post-graduation, these individuals could make house visits, provide support to other community members, pass on feedback to GOAL etc. There is clear appetite for this kind of community lead approach post-graduation and GOAL should capitalise on this.

Establish predictor system – The findings above can be used to predict which households will see the largest improvement in nutrition indicators based on positive practises already adopted at baseline. Consider putting greater focus of support to those who are predicted to see smaller improvements (generally speaking, these are households exhibiting poor behaviours/knowledge at baseline).

Focused support – There is some evidence that caregivers who are constructing/establishing micro-gardens or latrines during the programme are associated with the lowest improvement in nutrition indicators up to graduation. GOAL should identify those establishing these facilities and commit to household visits to assess the challenges they are facing around resource distribution.

Baby friendly spaces – Set up baby friendly spaces, with toys provided, such that mothers do not have to prioritise caring for their child over participation in NIPP sessions. A cost efficient approach to this would be to, if possible, organise NIPP circles to be conducted in places where baby-friendly spaces are already in place in the community.

Catch-up sessions – There are a number of reasons identified for participants

having to miss sessions. Consider a process by which participants can have catch-up sessions in cases where they can justify their absence.

Additional motivators – Small motivators can generate a widely enhanced uptake of positive practises. This is something GOAL could be doing more of, in addition to the achievement day. Examples could be a certificate upon successful completion of the NIPP cycle, setting up weekly, un-regulated coffee meetings for groups to discuss the changes they have made, visiting identified households to take pictures of changes made to the household to be presented at the achievement day. All these could feed in to the above mentioned competition dynamic that beneficiaries repeatedly spoke of, further enhancing the uptake of positive practises.

Data capture

Measurements (child length, weight-for-height) - There was some evidence that the weight-for-height measurements of children were more accurate than for MUAC. However, weight-for-height was available at baseline and graduation for around 1/3 of the children where MUAC was available. The programme should look to make weight-for-height measurements common practise, with a focus on how to systematically collect 'length' data which was missing in many cases.

Increase follow-up data cases – The current targeted sample size is on the basis of calculating the mean difference in one indicator across two points in time. In order to build more complex predictor models to find associations between positive practises and nutrition measurements, a greater sample size will be needed. Additionally, the target should factor in missing cases (for which there are many after 12-months) – calculate a buffer that factors in expected missing responses for each indicator.

Capture incentives, motivations and belief systems – The current databases captures behaviours and knowledge. GOAL could consider building in indicators around incentives, motivators and beliefs such that they can be linked to behavioural practises. For example, is an increased willingness to learn, rather than the learning itself, causing improved nutrition in participants.

Consider more complex testing – Graduation is contingent on participants completing the post-test. The current test is passed by 99% of respondents at graduation. This would suggest that it is not a good indicator of knowledge gained from the programme. Consider a more complex post-test to isolate those who have acquired in-depth knowledge. Additionally, build a similar compiled indicator around behavioural quality (ask respondents to perform tasks related to food preparation, hygiene, breastfeeding etc.)

Incorporate knowledge use into database – Knowledge indicators do not capture the actual implementation of knowledge. Consider capturing more data around the uptake of behavioural knowledge (e.g. food storage/prevention methods).

Quality indicators – Current hygiene and sanitation indicators, in particular whether a household has an observed latrine or hand washing facility, do not capture significant change, particularly given that these facilities are widely in use already at baseline. Consider indicators on the quality of facilities factoring in the amount of degradation, accessibility, usage etc. Quality indicators should be considered for other behavioural areas too.

IGA related indicators – Following the programmatic recommendation for an increased focus on IGA establishment, build IGA-related indicators into the database (income, no. of IGAs etc.).

Further research

Resource allocation – The findings in this study indicated that those who established a micro-garden during the NIPP programme experienced less

improvement in nutrition than those who had no garden at baseline or graduation. Generally, those establishing facilities were not seeing greater improvements than those who weren't. This could indicate that establishing household facilities diverts resources away from the short-term nutrition needs of participants. Further research could be considered to explore this and the future implications for the NIPP programme. More detailed post-graduation data could explore whether this reduced nutrition improvement in those improving their care-practise is short-term or long-term.

Cost analysis – *see below*

Full cost-effectiveness assessment

As mentioned previously, the cost-efficiency analysis in this evaluation has its limitations given the number of days available to conduct it. GOAL Sudan should consider a full cost-effectiveness study in order to allow for more robust analysis and conclusions of the cost to implement the NIPP programme. Here is a detailed outline of what this study would require:

Length of time – Cost effectiveness studies are time-intensive. A full study should be expected to last around three months, with around 55 working days for the consultant delivering the study. The budget should allow for this as well as additional primary data collection conducted in the field.

Additional data – The study would need to factor in a wide-range of data in addition to what GOAL, or any other organisation, would typically have. Data would be needed to factor in the support costs of NIPP requiring calculation of staff time (HR, finance, programme managers), office running costs, HQ support costs etc. Additionally, societal costs would need to be considered. This is the cost to the community/beneficiaries of participating in the NIPP programme. These societal costs would be particularly relevant to the NIPP programme given that it requires a large amount of beneficiary's time as well as requiring them, in some cases, to purchase their own materials/tools in order to enact behavioural change taught by the programme. These societal costs could incorporate a range of financial challenges put forward by FGD participants, such as opportunity costs, travel costs, costs of water/seeds etc. The data collected for this could also inform future programming, such that financial challenges are addressed.

Data collection – This additional data would need to be collected, with tailored data collection tools, in-country by the consultant. Data collection would typically last around three weeks and include interviews with staff to assess staff time/ office running costs and FGDs with beneficiaries to ascertain the financial sacrifice and costs of NIPP participation for them.

Control group – In order to draw out meaningful conclusions, a cost effectiveness assessment will require a control area – something to compare the cost per outcome of the NIPP programme with. This control area would ideally be within another area where GOAL implement in Sudan, where no NIPP programme has been conducted. Instead, this area would have been supported through other nutrition programmes. The result would then assess the cost effectiveness of the NIPP programme against alternatives. If this is not possible, the control area could include an area that has not had NGO support, therefore assessing the cost effectiveness of the NIPP programme against spontaneous malnutrition recovery where no programme is present.

GOAL Sudan's role – The existing data provided by GOAL to the evaluators of this report is well structured and should form a guideline for the additional data required. GOAL will have to work closely with the consultant to identify all of the hidden/economic costs relevant to the NIPP programme and facilitate data collection such that these costs are effectively captured. GOAL would also be responsible for, along with the consultant, identifying the optimal control area with which to compare the NIPP programme with.

ANNEX 1: CONSOLIDATED PREDICTOR MODEL

	<i>Dependent variable:</i>		
	Δ MUAC (1)	Δ dwl (2)	Δ PLW (3)
test_baseline	-0.020*** (0.007)	-0.055*** (0.015)	0.009 (0.015)
causes_baseline	0.017*** (0.006)	0.031** (0.013)	-0.011 (0.009)
prevent_malnutrition	0.001 (0.007)	0.011 (0.015)	0.003 (0.009)
HE_porrdige_baseline	0.016*** (0.006)	0.051*** (0.012)	-0.015** (0.007)
breast_baseline	0.010 (0.007)	-0.0003 (0.015)	
meals_baseline	0.012*** (0.002)	0.013** (0.005)	
groups_baseline	0.001 (0.002)	0.007 (0.005)	
FES_baseline	0.040*** (0.005)	0.072*** (0.012)	
micro_garden_baseline	0.090*** (0.007)	0.140*** (0.014)	0.057*** (0.016)
food_preserve_baseline	-0.003 (0.007)	-0.007 (0.015)	0.007 (0.009)
food_store_baseline	0.023*** (0.007)	0.024 (0.015)	-0.021** (0.009)
latrine_baseline	0.0003 (0.007)	-0.001 (0.014)	-0.002 (0.007)
hand_wash_baseline	-0.008 (0.014)	-0.024 (0.029)	0.044*** (0.007)
hand_wash_none	-0.043** (0.020)	-0.039 (0.042)	0.036 (0.063)
hand_wash_soap and water	0.003 (0.009)	-0.006 (0.019)	-0.054*** (0.019)
hand_wash_water only	0.010 (0.009)	0.007 (0.020)	-0.037** (0.019)
HIV_prevent_baseline	0.008 (0.006)	0.016 (0.012)	
HIV_status_adult_baseline	-0.034* (0.019)	0.005 (0.040)	
HIV_status_child_baseline	-0.032 (0.034)	-0.131* (0.071)	
log_age	-0.003 (0.004)	-0.027** (0.012)	
MUAC_baseline	-0.327*** (0.037)		
dwl_baseline		-0.163*** (0.027)	
PLW_MUAC_baseline			-0.497*** (0.042)
Constant	1.238*** (0.134)	0.709*** (0.076)	2.354*** (0.188)
Observations	1,137	1,129	435
R ²	0.337	0.290	0.402
Adjusted R ²	0.324	0.276	0.384
Residual Std. Error	0.079 (df = 1115)	0.164 (df = 1107)	0.061 (df = 421)
F Statistic	26.930*** (df = 21; 1115)	21.501*** (df = 21; 1107)	21.793*** (df = 13; 421)

Note:

*p<0.1; **p<0.05; ***p<0.01

ANNEX 2: DESCRIPTION OF VARIABLES

VARIABLE NAME (IN REPORT)	VARIABLE DESCRIPTION	RESPONSE OPTIONS
MUAC_CHILD	The MUAC measurement of the child	Numeric
MUAC_PLW	The MUAC measurement of the PLW	Numeric
DWL	The weight-for-height of the child (using length and weight measurements)	Numeric
TEST	Whether the adult had passed the pre/post test	Yes/no
CAUSES	Whether the adult could name two causes of malnutrition	Yes/no
PREVENT	Whether the adult could name two method of preventing malnutrition	Yes/no
HE PORRIDGE	Whether the adult could describe the method for making high-energy porridge	Yes/no
MICRO ACCESS	Whether a PLW was accessing micronutrients from local health services	Yes/no
VITA	Whether child was up to date on Vitamin A supplementation per national guidelines (for children under 5)	Yes/no
VACC	Whether child was up to date on vaccinations per national guideline (for children under 5)	Yes/no
BREASTFEEDING	Whether children was being breastfed	Yes/no
MEALS	How many times, not including breastmilk, was child fed the previous day (including snacks and meals)	Numeric
GROUPS	How many different food groups did the child eat the previous day	Numeric
LIQUID	Whether the child given anything to drink the previous day	Yes/no
MICRO-GARDEN	Whether there is an established micro-garden at the homestead that the participant is actively participating in	Yes/no
MICRO-GARDEN USE	What is the produce from the micro-garden used for	Eat, eat and sell, sell
FOOD PRESERVATION	Whether the adult can name 2 methods of food preservation	Yes/no
FOOD STORAGE	Whether the adult can name 2 methods of food storage	Yes/no

FES	Whether there is a Fuel Efficient Stove visible in the household	Yes/no
LATRINE	Whether there is a functional latrine visible in use in the household	Yes/no
HAND WASHING FACILITY	Whether there is a functional hand washing facility visible in use in the household	Yes/no
HAND WASHING METHOD	What the adult last used to wash their hands	Water only, soap and water, ash and water, none
DIARRHOEA	Whether the child had had diarrhoea in the previous 2 weeks	Yes/no
HIV PREVENT	Whether the adult could name 2 methods of HOV prevention	Yes/no
HIV STATUS ADULT	Whether the adult knew their HIV status	Yes/no
HIV STATUS CHILD	Whether the adult knew their child's HIV status	Yes/no

Note: Answers were based on household visits including an interview with the respective NIPP participant. Some questions were referencing the adult (the interviewee), some were referencing the child (of the interviewee, if they were enrolled because that child was malnourished) and observations.

ANNEX 3: RESEARCH OUTLINE

Country: Sudan

1 Background

GOAL has been operational in Sudan since 1985 and currently has well established programmes across in Kutum locality, North Darfur state and in Kassala state.

GOAL's programme in Sudan is built around four sectors: women's literacy and empowerment intervention (REFLECT), water-sanitation-hygiene (WASH), Nutrition and Health (including community health). The nutrition programme, implemented in collaboration with the Ministry of Health (MoH), includes nutrition curative interventions through the management of Out-patient Therapeutic Programme (OTP) and the delivery of technical support to Stabilisation Centre - (SC).

The Nutrition Impact and Positive Practice ([NIPP](#)), designed by GOAL in 2012, is a key element of GOAL preventative nutrition programming in Sudan. Goal Sudan (GS) has been implementing NIPP since 2013, and the approach has reached over 7,200 direct beneficiaries and an estimated 30,205 immediate indirect beneficiaries (household members of male/female participants), with a positive impact on both nutrition-specific and sensitive behaviours. NIPP implementation in Sudan has been supported through pooled funds from various donors.

In recent years, GOAL Sudan has successfully advocated for the integration of NIPP into Sudan national protocol for the management of Moderate Acute Malnutrition (MAM). Motivated by this success, GOAL Sudan has worked, in collaboration with the Federal Ministry of Health (FMoH), to build a NIPP Technical and Advisory Service (NTAS) to facilitate the scale up of NIPP across Sudan, by providing technical assistance to organisations who wish to implement NIPP, and by building the capacity of the FMoH on the training, coordination, implementation and monitoring of the NIPP approach.

As part of GOAL efforts to continuously learn about and improve the NIPP approach for a greater impact on nutrition outcomes on one side, and to support NTAS advocacy strategy to increase buy-in among various key stakeholders for NIPP scale up across Sudan on the other side, GOAL intend to conduct a piece of research combining quantitative evaluation of NIPP outcomes to date complemented by qualitative assessment and cost analysis.

2 Project overview

GOAL Sudan has been implementing health and nutrition programme in Kutum locality since 2004, in response to the humanitarian crisis. GOAL remains the only INGO supporting MoH for the provision of

life-saving treatment of severe acute malnutrition through integrated OTP. Additionally, GOAL nutrition and health programming has a strong preventive component through the NIPP approach.

NIPP was designed by GOAL as a gender sensitive, multi-sectoral and grass-rooted approach, to fill a potential gap in the nutrition support system, by

focusing on sustainable interventions to addressing the cross-sectoral underlying behavioural determinants of malnutrition. The NIPP initiative involves groups of community leaders, female and male caregivers meeting separately on a regular basis for 12 weeks to receive practical behaviour change education on health, hygiene-sanitation and nutrition reinforced by practical activities including cooking demonstrations, micro-gardening, building latrines, Tippy-taps and fuel-efficient stoves, as well as experimenting food processing, preservation and storage techniques. (Annex 1). Community engagement and low-input coupled with the voluntary participation, the practical nature of this approach, the peer-led support and the explicit inclusion of both males and females, have resulted in highly credible outcomes among NIPP participants, with an excellent level of maintained cross-sectoral positive practices over time. To promote sustainability, NIPP circles are facilitated by trained volunteers from positive deviant households. NIPP comes with an extensive MEAL package (Annex 2) capturing ~20 different indicators including anthropometry, MIYCF as well as health, WASH and livelihood behaviours and practices. Longitudinal monitoring is used to collect data on knowledge, behaviour uptake and nutritional status including wasting and stunting, from all NPP participants at baseline and graduation (after 12 weeks). Then, up to 12-month post-graduation data is collected from a representative sample of NIPP participants to monitor the maintenance of positive behaviours over time (outcomes sustainability).

Overall NIPP achievements to date in Sudan include an 86% moderate acute malnutrition (MAM) cure rate in children 6-59 months and a 78% MAM cure rate in pregnant and lactating women (PLW), admitted with MAM and discharged non-MAM after completing a 12-week cycle of NIPP. This is an improvement from the 82% and 75% cure rate observed in 2016 respectively for children 6-59 months and PLW with MAM. These cure rates would be considered high compared to rates commonly achieved by traditional food-aid type projects, such as supplementary feeding, used exclusively in the treatment of moderate acute malnutrition. NIPP also has the advantage of sustaining many of the positive practices adopted by the community members. In NIPP households with children aged 6-23 months, the Minimum Dietary Diversity (MDD) has increased from 27% at baseline to 70% at graduation and was maintained among 68% of NIPP households 12 months after NIPP circle completion. To promote dietary diversity, participants also engaged in establishment and maintenance of micro-gardens. The proportion of NIPP households with a micro-garden has increased from 44% at baseline to 77% at graduation and was maintained among 55% of NIPP households 12 months after NIPP circle completion. In addition, hand-washing with soap or ash improved from 58% at baseline to 85% at graduation and was maintained among 87% of NIPP households 12 months after NIPP circle completion. In conjunction with this indicator, the percentage (%) Households with functional latrines and functional hand-washing facilities also improved, where 51% of Households reporting latrines on admission, rose to 72% at graduation and continued to rise to 83% 12 months post-graduation. 35% of Households were observed as having functional hand-washing facilities on admission, 87% on graduation and 84% at 12 months post-graduation.

3 Purpose of the evaluation

Over the past five years, GOAL has amassed evidence to show the plausible impact around NIPP curative properties for the management of MAM in children under five and in PLW. Improvements achieved with NIPP in terms of positive and sustained cross-sectoral behaviours, are strong indicators that this approach has the potential to contribute to significant improvement in maternal and child health, by contributing to the treatment of moderate acute malnutrition as well as the prevention of both wasting and stunting. However, more detailed research is required to independently demonstrate the plausible impact of NIPP on

malnutrition treatment and prevention and its associated cost/cost-effectiveness. As such, GOAL proposes to conduct a piece of research to formally assess, using retrospective quantitative methodology triangulated by qualitative methodology, NIPP effectiveness at treating and preventing MAM and estimate the cost/cost-effectiveness of the NIPP approach in Sudan.

The overall purpose of this piece of research is to inform GOAL HQ and GOAL Sudan in particular on one hand, on the contribution of the NIPP approach to improved knowledge, behaviours and nutritional status of participants and, on the other hand, on the cost efficiency of NIPP implemented in Kutum and Al Waha localities, North Darfur. Therefore, the research report should address all the elements of the Terms of Reference (ToR), provide findings and conclusions validated by a strong quantitative assessment relying on the statistical analysis of NIPP project own data and supplemented by a relevant and appropriate qualitative assessment.

4 Specific objectives

The evaluation study should respond to all the following questions supporting the evaluation two specific objectives:

OBJECTIVE 1: Evaluation of NIPP contribution to moderate acute malnutrition treatment and prevention

- 1.1** To assess NIPP contribution to moderate acute malnutrition treatment through retrospective quantitative method triangulated with qualitative method as appropriate:
 - Is the NIPP approach contributing to treating moderate acute malnutrition in children under five (admitted with MAM) and in PLW (admitted with MAM)?
 - If so, what are the predictors (in terms of NIPP-related behaviours/practices) of MAM treatment among NIPP participants?
- 1.2** To assess NIPP contribution to moderate acute malnutrition prevention through retrospective quantitative method triangulated with qualitative method:
 - Is the NIPP approach contributing to preventing moderate acute malnutrition in children under five (admitted non-MAM) and in PLW (admitted non-MAM) following graduation from the programme i.e. at 2 months, 6 months and 12 months post-graduation?
 - Put in another way, is NIPP able to have a sustainable contribution to the adoption of positive behaviours and practice over time?
 - If so, what are the predictors (in terms of NIPP-related behaviours/practices) of MAM prevention among NIPP participants?
- 1.3** To generate learning on good practices around NIPP approach implementation, including the motivators and barriers influencing the adoption of positive behaviours and practices among NIPP participants through prospective qualitative method:
 - What are the barriers NIPP participants face in adopting positive nutrition, health, hygiene-sanitation and livelihoods behaviours and practices during NIPP 12-week cycle?
 - What are the motivators influencing the adoption of positive nutrition, health, hygiene-sanitation and livelihoods behaviours and practices among NIPP participants in North Darfur?
 - How can/should the NIPP approach be modified to ensure NIPP

participants can adopt positive behaviours and practices during NIPP 12-week cycle i.e. to ensure positive outcomes among NIPP participants?

OBJECTIVE 2: Estimation of NIPP cost efficiency in relation to moderate acute malnutrition treatment and prevention

- 2.1** To estimate the cost-efficiency of NIPP approach in relation to malnutrition treatment and/or prevention through retrospective quantitative method:
- How much does it cost to implementing organisation/GOAL to treat MAM in children and PLW using the NIPP approach?
 - How much does it cost to implementing organisation/GOAL to prevent MAM in children and PLW using the NIPP approach?

4 Methodology for the evaluation

While a stronger focus should be put on the quantitative assessment of NIPP approach data, the evaluation should adopt mixed methods design using both quantitative and qualitative assessments. The qualitative assessment focus should be informed by an initial review of the NIPP project data and should be participatory with the involvement of key stakeholders of the NIPP approach. Some of the suggested tools are individual interviews and focus group discussions with former NIPP beneficiaries. The consultant/firm will be expected to suggest an appropriate design that is rigorous and most relevant to meet the evaluation specific objectives.

The consultant/firm will be expected to lead remotely on this evaluation meaning they will not be expected to make any in-country and/or field visit. However, while retaining technical leadership and support, they will be expected to strongly engage with a local consultant contracted by GOAL Sudan and/or GOAL Sudan team especially for the design, analysis and reporting of the qualitative assessment. Primary data collection supporting the qualitative assessment will be performed in-country by the local consultant and/or GOAL Sudan team.

Regarding the cost analysis, the consultant/firm, will be expected to focus on the analysis of NIPP project financial data, meaning that no primary data collection supporting the cost analysis will be expected.

5 Deliverables

5.1 Report

The first draft report is tentatively expected by May 7th, 2019 and the final research report expected by May 15th, 2019.

The main body of the report (draft and final versions) must be limited to 30 pages (excluding annexes). One of the annexes should consist of a table which summarizes the findings and key recommendations for NIPP project improvements. The suggested report structure is:

- 1** Executive Summary
- 2** Background
- 3** Introduction
- 4** Research methodology
- 5** Results
- 6** Conclusions

- a** Summary of achievements against research questions
 - c** Overall impact and cost/efficiency
 - d** Lessons learnt (where relevant)
- 5** Recommendations
- 6** Annexes (such as)
 - a** Evaluation/research framework
 - d** Data collection tools
 - e** List of people consulted (as relevant)
 - f** List of supporting documentary information
 - g** Details of the evaluation team
 - h** Grantee management response to findings and recommendations (as relevant).
- 5.2** A slide deck giving an overview of the report will also be prepared and presented back to all relevant parties via webinar.
- 5.3** Research/evaluation tools
- 5.4** Datasets (complete and organized) in MS Excel (and any other relevant i.e. SPSS, STATA, etc.)

All data collected during the research study should be appropriately stored and anonymised electronic copies of data and calculations will be made available to GOAL in Excel workbooks (and any other relevant format for data and output files, i.e. SPSS, STATA if applicable). GOAL will retain the ownership of the secondary and primary data collected. Transcripts (anonymised with any potential identifying information redacted wherever relevant), will be made available to GOAL.

ANNEX 4: THE NIPP APPROACH DIAGRAM





Action Against Hunger
6 Mitre Passage
Greenwich Peninsula
London, SE10 0ER
Tel.: +44 (0)20 8293 6190
Registered Charity: 1047501

Cover photo
© Action Against Hunger

Designed by



**ACTION
AGAINST
HUNGER**



USAID
FROM THE AMERICAN PEOPLE