The Nepal Seed and Fertilizer Activity Mid-Term Performance Evaluation Report

July 2019

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NEPAL SEED AND FERTILIZER MID-TERM PERFORMANCE EVALUATION

July 2019

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ACRONYMS AND ABBREVIATIONS

ADS	Agriculture Development Strategy
AICL	Agriculture Input Company Limited
APR	Annual Performance Review
CBSP	Community-based Seed Producer Group
CDCS	Country Development Cooperation Strategy
CDD	Crop Development Directorate
CEAPRED	Centre for Environmental and Agricultural Policy Research, Extension and Development
CIMMYT	International Maize and Wheat Improvement Center
COP	Chief of Party
COR	Contracting Officer’s Representative
DAP	Di-ammonium Phosphate
DCC	District Coordination Committee
DO	Development Objective
DSSPRO	District Seed Self-sufficiency Programme
FGD	Focus Group Discussion
FTF	Feed the Future
FY	Fiscal Year
GD	Group Discussion
GFSS	Global Food Security Strategy
GIS	Geographic Information System (or Services)
GON	Government of Nepal
ICT	Information Communication Technology
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
IP	Implementing Partner
ISFM	Integrated Soil Fertility Management
KISAN	Knowledge-Based Integrated Sustainable Agriculture and Nutrition
LxLB	Laxmi Laghubitta Bittiya Sanstha
M&E	Monitoring and Evaluation
MDAGs	Marginalised and Disadvantaged Groups
MEL	Monitoring, Evaluation, and Learning
MoALD	Ministry of Agriculture and Livestock Development
NARC	Nepal Agriculture Research Council
NPC	National Planning Commission
PCU	Polymer Coated Urea
PMAMP	Prime Minister’s Agricultural Modernization Program
SEAN	Seed Entrepreneurs’ Association of Nepal
SEED	Social, Environmental, and Economic Development Office (USAID/Nepal)
SOW	Scope of Work
SQCC	Seed Quality Control Centre
STC	Salt Trading Corporation
TOC	Theory of Change
UDP	Urea Deep Placement
USAID	United States Agency for International Development
ZOI	Zone of Influence

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ABSTRACT

This mid-term performance evaluation of the USAID Nepal Seed and Fertilizer (NSAF) Activity employed a qualitative approach to assessing efforts to increase the availability, accessibility, and use of quality seeds and fertilizers. The evaluation team held 97 key informant interviews and 10 focus group discussions to answer three evaluation questions. Based on the evidence collected, the evaluation team concludes that NSAF has technologies with high potential to increase farmer productivity, including yellow maize hybrids, Polymer Coated Urea (PCU), Urea Deep Placement (UDP) briquettes, and split fertilizer application technologies. A system based on seed companies and agrovets is sufficiently in place to take NSAF seed technologies to scale. However, a growing government fertilizer subsidy program and the "crowding out" of private sector activity may impede the scaling up of fertilizer technologies.

The team recommends that NSAF focuses on the development of yellow hybrid maize varieties, PCU, UDP, and split application fertilizer technologies[1]. NSAF needs to expedite formal release and registration processes and review its exit strategy for seed technologies. NSAF with USAID should review the revised fertilizer technology-scaling model to clarify how the theory of change impacts of "increased investment and private sector opportunity" and "improved economic policy and performance" will be achieved. Actions with the Government of Nepal (GON) to make the fertilizer subsidy more effective need to be emphasized. USAID also should lobby the government in support of NSAF in regard to licensing permissions that are required for PCU and UDP technologies and the space allowed for commercial actors to supply the right fertilizer at the right time and place in line with Agriculture Development Strategy (ADS 2014) commitments.

The activity also needs to focus the remaining period of the contract on technology dissemination with special consideration paid to the hard to reach groups, including women, disadvantaged groups, and minorities.

[1] NSAF report that split application fertilizer technologies are a Best Management Practice and apply to regular urea.

EXECUTIVE SUMMARY

EVALUATION PURPOSE

This evaluation is intended to help in the understanding of the extent to which aspects of the Nepal Seed and Fertilizer (NSAF) theory of change hold and verify the performance of the International Maize and Wheat Improvement Center (CIMMYT) according to its agreement parameters. Further, the purpose of the midterm performance evaluation is to assess efforts to increase the availability and accessibility of quality seeds and fertilizers and their use by local farmers in the Feed the Future (FTF) Zone of Influence (ZOI). The evaluation will examine efforts to strengthen the seed and fertilizer distribution mechanism, including the development and use of hybrid maize and Integrated Soil Fertility Management (ISFM) technologies. The key audiences for the evaluation are USAID and the implementing partner (IP). Performance evaluation findings will be used to strengthen current activities, plan for future actions, and provide evidence of good practice to the broader stakeholder network in Nepal.

PROJECT BACKGROUND

The NSAF initiative is a five-year USAID global FTF activity that began April 1, 2016 and will conclude March 31, 2021. It seeks to improve food security by increasing agricultural productivity. Its overall goal is to build competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation. NSAF currently operates in four provinces and twenty-six districts.

As the NSAF implementer, CIMMYT works in partnership with the Ministry of Agriculture and Livestock Development (MoALD). To effectively reach women farmers and marginalized social groups, NSAF seeks value-driven collaboration with USAID's development partners in raising awareness and improving access to agricultural inputs and services.

The NSAF seed component aims to enhance access to elite and adapted seeds of rice, maize, lentils, and high-value vegetables sustainably by deploying suitable varieties, enhancing the production of quality seed, and supplying them to farming communities. The fertilizer component aims to sustainably catalyze the adoption of ISFM practices at scale through value chain approaches that integrate innovation with market development and entrepreneurship strengthening.

Exhibit 1: Key Evaluation Questions

1. What technologies and/or their combinations that NSAF is developing show a high potential for increasing farmer productivity[1] based on changes in production in trials or other tests?
2. To what extent are systems in place to take seed technologies to scale?
3. To what extent are systems in place to take fertilizer technologies to scale?

FINDINGS AND CONCLUSION

Technologies Showing a High Potential for Increasing Farmer Productivity

Findings: NSAF yellow maize hybrids, PCU, UDP briquettes, and split fertilizer application technologies have a high potential to increase farmer productivity. NSAF seed trials are at an early stage, and new technologies have not been disseminated yet. Farmers were not always aware of what technology was being tested or demonstrated at NSAF sites. Users perceive hybrid seeds as more productive and suited to commercial use but more expensive. Users of NSAF fertilizer technologies perceive them as more expensive and higher yielding, but these people have limited knowledge of future use. Potential users of technologies are larger-scale farmers that can afford and profit from them.

Conclusions: Resource-poor groups, such as marginalized men and women and disadvantaged minorities, may be excluded as the new technologies are expected to cost more than traditional methods. Seed companies are most likely to commercialize hybrid maize seeds. The private sector is largely “crowded out” of the fertilizer sector and is unlikely to commercialize NSAF fertilizer technologies unless there is a change in the government subsidy program and/or state licensing and permit requirements.

Systems to Take Seed Technologies to Scale

Findings: A system based on seed companies and agrovets is sufficiently in place to take NSAF seed technologies to scale. The Government of Nepal (GON) policy and its implementation is allowing space for the private sector to grow in the seed supply sector. NSAF’s new seed technologies will need to pass the government’s varietal release and registration processes, which reportedly, take two to three years.

The amount of seed available in the Nepalese market is increasing. In 2018/19, approximately 800 varieties of seed were under research and development. Sales of rice, maize, and onion seed are rising with the increasing availability of imported hybrid vegetable seed. The quality of available seed is generally good. Nepalese seed production is also increasing, with seed companies mainly producing rice, wheat, and vegetable seed. Seed companies are investing in production, and the volumes produced and sold are expected to increase further. Linkages to cooperatives, farmer groups, agrovets, and agricultural lenders are strengthening with NSAF support. NSAF support to seed companies in performing seed trials, demonstrations, and multiplication and maintaining inbred lines has helped build capacity to produce seed. Capacity to maintain breeding lines varies between companies and will be important for sustainability. NSAF also has helped seed companies to develop marketing materials and business plans and gain access to finance. However, their use and results are yet to be seen. Seed companies and agrovets are valuable providers of information and extension advice, especially as government outreach services are taking time to galvanize during the move to federalism.

Conclusion: Successfully meeting GON release and registration requirements will be crucial for using the growing seed system and achieving scale.

Systems to Take Fertilizer Technologies to Scale

Findings: An appropriate fertilizer system is not in place to take NSAF fertilizer technologies to scale, challenging the underlying logic of the NSAF Theory of Change (TOC). The TOC impacts of “increased investment and private sector opportunity” and “improved economic policy and performance” are not emerging in the fertilizer sector. Fertilizer availability is usually limited and late in the cropping season. Supply is dependent on a government subsidy program or informal cross-border imports. The quality of subsidized fertilizer is good, whereas that of informally imported fertilizer is less reliable. Coated and briquette fertilizers are unavailable, and the timeliness issues around current fertilizer supply challenge split application approaches.

Two parastatals, the Agricultural Input Company Limited (AICL) and the Salt Trading Corporation (STC), dominate fertilizer distribution. STC is interested in commercially viable new fertilizer technologies and represents a possible partner to scale up NSAF fertilizer technologies. Although NSAF has supported training and demonstrations of ISFM approach, traditional farm practices remain widespread with farmers using limited supplies of fertilizer when it is available.

Conclusions: The government's agricultural policy supports private sector involvement in the Nepalese fertilizer system. However, policy implementation is focused on public sector provision of fertilizer with the private sector, largely "crowded out" by the fertilizer subsidy and government permit requirements. NSAF has not taken significant steps to push the government to implement the policies that would expand private sector involvement in the fertilizer sector. Key government decision-makers are interested in making the subsidy more effective, and there is an opportunity for NSAF to use its goodwill and research information with ministries to help achieve this mutual objective of improving the subsidy.

NSAFs new yellow hybrid maize varieties that have a high productivity potential will need appropriate fertilizers to be available on time to perform best.

Gender Equality and Social Inclusion

Findings: NSAF has a valuable Gender Equality and Social Inclusion (GESI) Action Plan (2016) that presents a strategy for gender equity and social inclusion. However, this action plan has not been fully implemented. Women, minorities, and disadvantaged groups are underrepresented at all levels of NSAF's work, except in the provision of agricultural labor and ISFM training. It is unclear how women and marginalized social groups have benefitted from awareness-raising activities and improved access to inputs/services. GESI participation (ensuring women and marginalized people are reached) in identifying needs, agenda formulation, and resource allocation was found to be very limited.

Conclusion: Further work remains to mainstream women and marginalized and disadvantaged groups (MDAGs), especially at the more senior levels of NSAF, among its partners, and in the businesses it supports.

KEY RECOMMENDATIONS

USAID should review the revised NSAF fertilizer technology-scaling model to strengthen and support its implementation, particularly by joint lobbying of the GON to implement ADS (2014) commitments. USAID's review should confirm how the NSAF TOC impacts of "increased investment and private sector opportunity" and "improved economic policy and performance" will be realistically achieved in the fertilizer sector. A lack of government willingness is a significant challenge to achieving these impacts, preventing the TOC from being actualized. The evaluation team recommends that USAID engage with NSAF to lobby for the implementation of ADS commitments and help the achievement of desired impacts in order to strengthen NSAF's fertilizer scaling plans. Joint lobbying should support mutual (NSAF and ADS) objectives of promoting a greater private sector role and leveling the competitive environment by providing the private sector with the same commercial advantages (e.g., subsidies, permits, and facilities) as of current actors in the sector. This should, in turn, provide greater clarity regarding how PCU and briquette technologies will be formally registered and supplied and how split application approaches will achieve scale given challenges with fertilizer availability and timeliness.

NSAF should meet STC to confirm there is a mutual interest in commercial fertilizer technologies as suggested during the performance evaluation's fieldwork. STC has a distribution network that could help take NSAF technologies to scale.

NSAF should focus future trials and demonstrations on the development of yellow hybrid maize varieties and PCU, and briquette and split application fertilizer technologies[2] to improve crop productivity. With two years remaining for the activity and a lengthy GON release and registration process to negotiate for seed, NSAF needs to encourage the government to expedite the process and review its exit strategy to hand over new seed varieties.

NSAF should review its demonstration approach to ensure all necessary steps are taken at a field level to effectively inform farmers about what is being demonstrated. NSAF should clarify how poorer households will access more expensive hybrid seed and fertilizer technologies. The GON's Voucher System for farm inputs presents an option for doing this.

The evaluation team recommends the formation of specific GESI-sensitive groups at both NSAF and farmer levels so that NSAF field level staff members have a more explicit mandate specifying GESI promotion and engagement at the community level. These groups should work to ensure women and other DAGs are involved in decision making and not purely engaged as providers of labor. NSAF should also review and enhance capacity building opportunities for women in financial literacy, leadership, and other relevant skills to support their inclusion in decision-making. This review should produce a document with recommendations and a plan of action. NSAF should review evidence about social behavior change communication approaches from other activities. For example, the use of peer groups, homogeneous groupings, and segmentation of stakeholders, use of multiple communication channels to influence, and use of existing local organizational structures (i.e., local coops) were all approaches intended to reinforce support for behavioral change and for which USAID MEL found evidence of success. NSAF's review should identify examples of communication approaches that have worked in other activities and use them in their work.

NSAF should continue to support a seed company and agrovet-based scaling model for hybrid seed technologies. NSAF support to seed companies should continue to monitor their capacity and provide appropriate support through mentoring and training tailored to individual businesses. Emphasis should be given to building capacity for maintaining hybrids.

NSAF also should continue to strengthen linkages with the Seed Quality Control Centre (SQCC) and Nepal Agriculture Research Council (NARC) by continuing to include these organizations in planning and monitoring work to ensure seed quality and that new varieties meet release and registration requirements.

NSAF should review its GESI Action Plan activities, indicators, mechanisms/tools, responsibilities, and targets. Indicators should be included that reflect NSAF outcome level GESI objectives for participation and empowerment. NSAF should then monitor and biannually report on the revised plan at the outcome and activity level.

Agricultural research and the private sector should take a "pipeline" approach to develop female talent. Agricultural research, including CIMMYT, should analyze the barriers to women entering agricultural research. The agricultural research community should then address these barriers and manage female talent so that suitably qualified women are available and have opportunities to develop their careers. Action also should be taken to incentivize the private sector to increase the role of women in companies. This includes providing breeder scholarships for women, incentives for their hiring, and mentorship, and selecting women through NARC.

[2] NSAF report that split application fertilizer is a Best Management Practice and applies to regular urea.

1.0 EVALUATION PURPOSE

The purpose of this evaluation is to help understand the extent to which the NSAF TOC is valid and to verify the performance of the implementing partner, CIMMYT, against its contract objectives. The midterm performance evaluation also is intended to assess efforts to increase the availability and accessibility of quality seeds and fertilizers and their use by local farmers in the FTF ZOI. The evaluation will examine efforts to strengthen the seed and fertilizer distribution mechanism, including the development and use of hybrid maize and ISFM technologies. Findings from the performance evaluation will be used to strengthen current activities, plan for future actions, and provide evidence of good practice to the broader stakeholder network in Nepal. A full Scope of Work appears in Appendix 1.

The main audiences for the evaluation report are the USAID/Nepal Mission and IP staff. It is intended that the report will allow them to ground truth and discuss the findings and conclusions in detail and brainstorm on framing the possible recommendations. The final report also will be uploaded to the Development Experience Clearinghouse (DEC) for public use. The evaluation report may be disseminated to a wider audience through other platforms, such as workshops or publication of separate documents if required by USAID.

2.0 PROJECT BACKGROUND

NSAF was developed for USAID/Nepal under USAID's global FTF initiative.

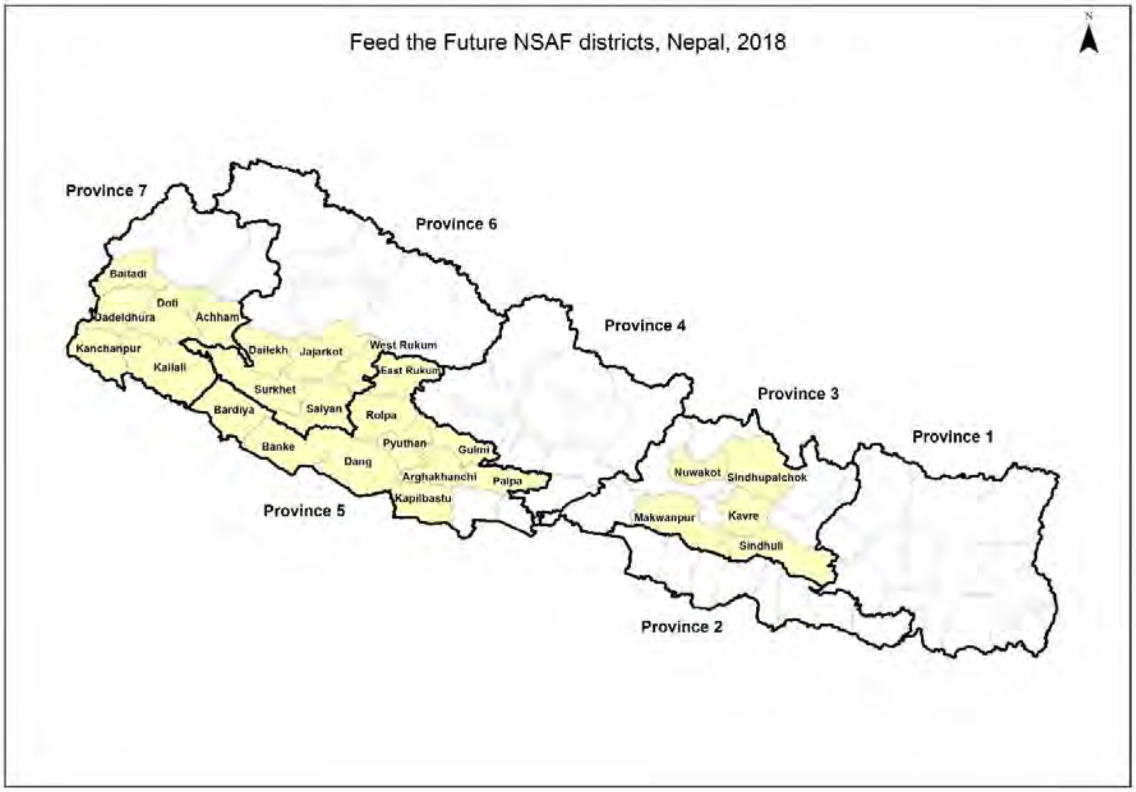
NSAF is a five-year USD15 million activity running from April 1, 2016 to March 31, 2021, working to advance food security objectives by increasing agricultural productivity. The overall goal of NSAF is to reduce poverty and improve food security in Nepal, and the purpose of NSAF is to build competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation.

NSAF has three overall objectives:

- Increase agricultural productivity.
- Strengthen seed and fertilizer value chains.
- Support the development of a private sector, enabling policy for seed and fertilizer sector growth.

NSAF currently operates in four provinces and twenty-six districts, as depicted in Figure 1 below.

Figure 1: NSAF Provinces and Districts



Source: NSAF

The NSAF implementing partner, CIMMYT, collaborates closely with the MoALD. NSAF also seeks value-driven collaboration with USAID's development partners in raising awareness and improving access to agricultural inputs and services to reach women farmers and marginalized social groups effectively.

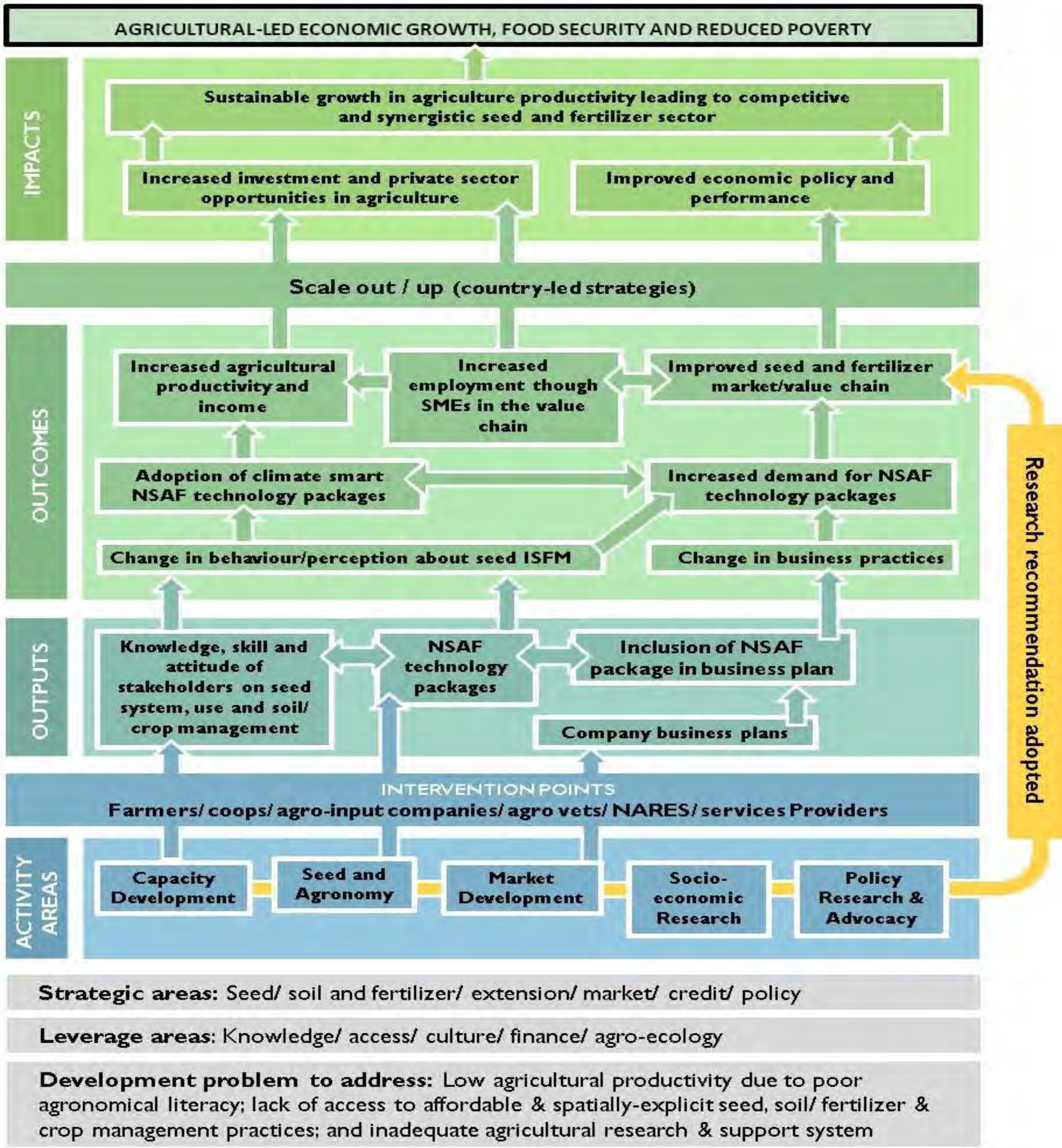
The NSAF seed component aims to enhance access to elite and adapted seeds of rice, maize, lentils, and high-value vegetables sustainably by systematically deploying suitable varieties, enhancing the production of quality seed of such varieties, and supplying those seeds to farming communities through efficient distribution and marketing networks.[3] The fertilizer component aims to sustainably catalyze the adoption of ISFM practices at scale through similar value chain approaches that integrate innovation with market development and entrepreneurship strengthening. These outcomes are aligned with USAID/Nepal's Country Development Cooperation Strategy.

NSAF's TOC (Figure 2) is based on the goal of moving poor, subsistence-oriented smallholder farmers toward improved, sustainable incomes, as well as household-level food and nutrition security. Improving private-sector services and input-delivery mechanisms based on sound business plans around tested and validated NSAF technologies, ISFM, along with effective and efficient extension services (including the use of information communication technologies and digital technologies), is seen by NSAF as having the potential to create a sustainable demand for technologies in Nepal. The adoption of technologies will increase crop productivity, and the surplus can be sold at market to generate additional income. As income increases, there will be new or revitalized incentives to invest in crop production and other asset-building activities, resulting in sustained demand for quality inputs. Additionally, increased production will make more cereals and vegetables available

[3] NSAF report that their seed component only works with registered varieties.

for household consumption. The 2018 NSAF Results Framework appears in Appendix II.

Figure 2: NSAF Theory of Change



Source: NSAF Annual Work Plan Year II 1 October 2017 – 30 September 2018

3.0 EVALUATION QUESTIONS AND METHODOLOGY

The performance evaluation questions appear in Table 1 below. In answering these questions, the evaluation team also analyzed how NSAF has impacted women and other vulnerable groups.

Table 1: Evaluation Questions

Evaluation Area	Evaluation Questions
Agriculture Production and Productivity	**1. What technologies and/or their combinations that NSAF is developing show high potential for increasing farmer productivity based on changes in production in trials or other tests?** A. Who uses these technologies? B. How are they being disseminated? C. What technology scaling models does NSAF use to reach all types of farmers? D. What is the perception of technology users regarding selected technologies with respect to cost, use, and productivity? E. How likely, and by whom, will these technologies be commercialized (produced and sold by the private sector)?
Seed Systems and Capacities	**2. To what extent are systems in place to take seed technologies to scale?** Consider the following as components of the seed system: A. Availability of seed (amount and quality of seed in the market and under research and development). B. Seed production (type, quality, volume, and linkages among producers). C. Seed marketing/business development (quality of business plans, branding, outreach services, etc.). D. Role of GON (central level) in policy and seed quality maintenance. E. Variety release and registration.
Fertilizer Systems and Capacities	**3. To what extent are systems in place to take fertilizer technologies to scale?** Consider the following as components of the system: A. Research and development of ISFM recommendations. B. Availability of fertilizer (amount and quality in the market; imports). C. Fertilizer distribution mechanisms (public and private sector). D. Role of GON in policy and fertilizer distribution.

During the evaluation design, USAID provided a further set of sub-questions. These questions are presented in Appendix III and answered in Appendix IX.

3.1 METHODOLOGY

The performance evaluation of NSAF relied on qualitative methods supported by secondary quantitative data analysis. A consultative, participatory, and inclusive approach was followed throughout the evaluation.

The evaluation team collected data through key informant interviews (KIIs), focus group discussions (FGDs), and group discussions (GDs) supported by the review of available secondary data and program documents to answer the evaluation questions that appear in Table 1. The methodology used existing data, particularly NSAF trial data, and KIIs, FGDs, and GDs to collect primary qualitative evidence. Gathering perceptions from a wide range of stakeholders aimed to capture insight into the different dimensions of change in capacities, context, attitudes, and perceptions of technologies and interventions and to help ensure that biases are addressed. The use of secondary quantitative data and information supported the triangulation of evidence. A structured list of key informants appears in Appendix VI.

National Level: Data collection in Kathmandu included consultation meetings and KIIs with NSAF, USAID, the Agriculture Input Company Limited (AICL), banks (e.g., the Nepal Bangladesh Bank), the Centre for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED), the Crop Development Directorate (CDD), MoALD, the National Planning Commission (NPC), the National Seed Company Ltd., the Nepal Agriculture Research Council (NARC), the Nepal Fertilizer Entrepreneurs Association (NEFEA), the Prime Minister's Agricultural Modernization Program (PMAMP), the Seed Entrepreneurs Association of Nepal (SEAN), STC, the Centre Agricultural Lab, and SQCC.

District Level: NSAF staff/site staff, private sector seed and fertilizer companies/wholesalers, seed fertilizer agri-input retailers/agrovets, the District Seed Self-sufficiency Programme (DSSPRO), Chief District Officers (CDO), banks [i.e., the Nepal Bangladesh Bank and Laxmi Laghubitta Bittiya Sanstha (LxLB)], PMAMP and Regional Agriculture Research Centers, and commodity-specific programs, such as the National Grain Legume Research Program (NGLRP).

Community Level: Farmers, community-based seed producer groups (CBSPs), agriculture extension agents, seed cooperatives/associations, and fertilizer cooperatives/associations.

Analysis of Secondary Data: During the design and field phases, the evaluation team reviewed and analyzed available performance information/data to familiarize themselves with documentation about NSAF and USAID's current assistance in the seed and fertilizer sector in Nepal and the region. A list of review documents appears in Appendix IV. Results of the secondary data review appear in Appendix VIII.

3.1.1 DATA COLLECTION METHODS

The evaluation team used semi-structured questionnaires to collect qualitative data during KIIs and FGDs/GDs. It developed questionnaires for the main types of key informants, including seed companies and government institutions. Questions were based on the Evaluation Questions given in the scope of work (Table 1) for the evaluation, subsequent supporting USAID questions (Appendix III), and the Getting to Answers Matrix (Appendix V). The evaluation team used the questionnaires flexibly during interviews to tailor questions to the specific knowledge and experience of the interviewee or group participants. An example of a questionnaire appears in Appendix VII.

3.1.2 SAMPLING STRATEGY

The evaluation team conducted fieldwork in seven districts, including Kathmandu. It initially selected four districts (i.e., Banke, Kailali, Kavre, and Salyan) in consultation with USAID and the IP. The team selected the four districts based on the following criteria:

i) Province representation: At least one district from each province where NSAF implements activities.
ii) Hill and Terai representation: At least two districts from each region.
iii) The number of NSAF activities in each district, including trials, trainees, and the presence of community-based seed producers, seed companies, fertilizer companies, and cooperatives.

The evaluation team conducted extensive fieldwork in the four districts. During fieldwork, the evaluation team found that seed companies with valuable experience and detailed information regarding seed technologies and tomato, cauliflower, and onion value chain support provided by CEAPRED were under-represented in the initial district selection. In response, the team decided to visit the Dang and Nuwakot districts, locations where it was possible for the evaluation team to meet two more seed companies and CEAPRED beneficiaries.

Table 2: District Selection

District	Province	Rationale for Selection
Banke	5	• High levels of NSAF trainees, trials, and seed producer groups. • Terai region.
Dang	5	• Presence of additional seed companies. • Presence of NSAF tomato, cauliflower, and onion value chain activities (Terai).
Nuwakot	3	• Presence of NSAF tomato, cauliflower, and onion value chain activities (Hill).
Kailali	7	• High levels of NSAF trainees, trials, and seed producer groups. • Terai region.
Kavre	3	• Medium level of NSAF presence in the Hill region.
Salyan	6	• Low level of NSAF presence in the Hill region.

The evaluation team conducted 97 key informant interviews, 3 group interviews/discussions, and 9 focus group discussions. One hundred and seventy-nine respondents, including 121 males and 58 females, provided feedback. A list of respondents appears in Appendix VI.

Table 3: Overview of Data Collection Effort

District	KII	FGD / GD	Male (KII+GD/FGD Participants)	Female (KII+GD/FGD Participants)	Total
Kathmandu	17	6	15	2	17
Kavre	20	2	23	14	37
Kailali	17	3	20	23	43
Banke	16	0	34	16	50
Dang	8	0	9	1	10
Salyan	16	1	18	1	19
Nuwakot	3	0	2	1	3
Total	**97**	**12**	**121**	**58**	**179**

3.1.3 VALIDATION OF FINDINGS AND RECOMMENDATIONS WORKSHOP

Once the preliminary data analyses was complete, the evaluation team presented initial observations to USAID/Nepal and NSAF to validate findings and interpretations. The team submitted a draft evaluation report with preliminary recommendations in April. Following this, it held a half-day recommendations workshop on May 17, 2019 at the MEL Activity's office with USAID and IP staff to ground truth in the key findings and conclusions and agree on key realistic and actionable recommendations for the final report.

The workshop included a presentation followed by brainstorming sessions and facilitated discussions to identify and recommend appropriate actions for the remaining period of the project and also for future programming purposes. The evaluation team started the workshop with a presentation that included top-level findings and conclusions that led to recommendations and comments/issues raised during the review of the draft report relating to the recommendations. The evaluation team presented the findings and recommendations by the evaluation questions. A brainstorming session was conducted after the presentation on each evaluation question, where participants were asked to analyze the recommendations based on the following four questions:

1. Is there anything about each existing recommendation that is not supported by the findings and conclusions presented?
2. What could change about each existing (or new) recommendation to make it more actionable?

3. What element from the findings and conclusions could be but is not captured currently in a recommendation?
4. What outside of the report's findings and conclusions should USAID and NSAF consider as recommendations?

As applicable, suggested recommendations that were supported by the evaluation findings have been revised and added accordingly in this final report. The evaluation team submitted separately to USAID recommendations that were outside of the evaluation's scope but were important for high-level follow-on actions for later consideration.

3.2 LIMITATIONS

The evaluation experienced several data limitations, consisting of the following:

1. **Recall Bias**: It occurs when respondents provide inaccurate or incomplete recollections about past experiences, which can happen for a variety of reasons, including when the activity in question occurred a few months prior to the evaluation, which was the case for NSAF-supported farmers who had participated in or observed seed and fertilizer trials. Farmers found it difficult to identify or remember specific technologies that had been tested or demonstrated a few months before the evaluation team's visit. The evaluation team probed and asked the same question differently as a means of validation of their responses and to remind the respondent back to the trials of technologies. The team also relied on NSAF quantitative data to identify technologies with productivity potential. It compared the interview results with quantitative data to confirm the findings.
2. **Selection Bias:** There is a risk of selection bias when implementers help to facilitate contact with activity beneficiaries because they may inadvertently select the most active, responsive, or engaged candidates of a project who may have a more positive view of the project than less engaged participants. For this evaluation, the NSAF team provided most of the stakeholders and respondent groups and assisted in scheduling most of the appointments. It is possible that the IP may have selected respondents and grantees that it thought would provide more positive feedback about the effectiveness of the activity.
3. **Response Bias:** Some value chain actors may have provided positive remarks about NSAF because they would like to benefit from future support. Interviewees expecting NSAF to provide further support (e.g., training and study tours) may have been overly positive about the activity in the hope that it would make them more likely to receive future support. Similarly, respondents that had not qualified for expected support may have been disappointed and overly negative in some of their remarks. The team endeavored to minimize this as much as possible through verification of the data for extremities and using experienced local interviewers to probe deeply in case of any indication of such issues.

The evaluation team addressed the threat of bias through several measures, including 1) using multiple sources of data to triangulate data for each evaluation question; 2) combining information found in documents and interviews with multiple sources; 3)probing any indication of overly expressed positive or negative remarks; and 4) ensuring, to the extent possible, that IP staff were not present for any KIIs, GDs, or FGDs during the data collection. Consequently, the evaluation team is confident in the quality of the data. The responses were consistent across all respondent groups; no response constituted an outlier from the other information collected.

4.0 FINDINGS

4.1 EVALUATION QUESTION 1: NSAF TECHNOLOGIES AND/OR THEIR COMBINATIONS WITH HIGH POTENTIAL TO INCREASE FARMER PRODUCTIVITY

Evaluation Question 1: What technologies and/or their combinations that NSAF is developing show high potential for increasing farmer productivity based on changes in production in trials or other tests?

The evaluation team used NSAF 2017 to 2018 seed trial data[4] and fertilizer trial data given in NSAF PowerPoint presentations to address Evaluation Question 1. It triangulated the results with the interview findings with seed companies and people involved in fertilizer trials.

Data presented in Table 4 show maize seed technologies that NSAF is developing that have a high potential to increase farmer productivity based on changes in production from trials. New maize varieties yielding above 10 MT/Ha were selected as having a high potential to increase farmers productivity. A 10 MT/Ha threshold was used to give a sense of the extent to which new varieties are an improvement. Performance evaluation fieldwork suggested existing varieties available to farmers (e.g., Pioneer maize seeds) achieve this yield level. These maize types are yellow hybrid, heat tolerant, and quality protein maize entries (varieties) that show potential to increase farmer productivity based on trial data.

Table 4: NSAF Maize Seed Technologies with Potential to Increase Farmer Productivity

Type of Maize	Entry	Yield (MT/HA)	Company	Location of Trials
Maize Yellow Hybrid	5	11.63	Unique Seed	Kailali
Maize Yellow Hybrid	5	10.94	Panchashakti	Kailali
Maize Yellow Hybrid	9	10.7 and 12.8	GATE	Dang
Maize Yellow Hybrid	5	14	RARS Khajura	Dang
Heat Tolerant Maize Hybrid (yellow)	29	13.16	Unique Seed	Kailali
Quality Protein Maize (yellow)	27	11.79	Unique Seed	Kailali

Source: Based on the NSAF Preliminary Results of Field Trials and Demo Data 2017 – 2018

Productivity levels of rice varieties released by NARC and supported by NSAF are below the levels achieved by available seeds. Key informants report available hybrid rice varieties achieving above 10 MT/Ha.[5] Data presented in Table 5 presents rice varieties that have the highest yields based on NSAF trial data. Fieldwork results show the popular open-pollinated variety (OPV) rice variety Sarjoo 52 can achieve yields of 7 to 8 MT/Ha.[6] Only one NSAF trial of Bahunguni achieved this level.

Table 5: NSAF Rice Varieties with the Highest Yields Shown in Trials

Type of Rice	Name	Yield (MT / HA)	Company Involved	Location
OPV	Hardinath – 3	4.2	NASIC Seed Co	Dang
OPV	Hardinath – 3	4.9	GATE Seed Co	Banke and Bardiya
OPV	Bahuguni-01	7.9	Gorkha Seed Co	Dang
OPV	Bahuguni-01	4.5	Unique Seed Co	Kanchanpur
OPV	Bahuguni-2	5.4	Unique Seed Co	Kailali

Source: Based on the NSAF Preliminary Results of Field Trials and Demo Data 2017 – 2018

[4] Based on NSAF Preliminary Results of Field Trials and Demo Data 2017 – 2018.
[5] For example, a Kavre agrovet reports rice hybrid (DY68-9) production levels of 11.5 MT/ha.
[6] This was reported by farmers and agrovets in Banke and Kailai.

Review of NSAF trial results[7] for lentils shows mixed or inconclusive results.[8] Productivity potential is unclear based on the data available at the time of the performance evaluation. NSAF highlighted the local self-pollinating Black Lentil - (Kalo Masuro) as having productivity potential. The NGLRP also suggested this variety has outstanding performance.

NSAF vegetable trial data was unavailable at the time of the performance evaluation's fieldwork to assess clearly the productivity potential.

NSAF fertilizer trial results show PCU, UDP Briquettes, and split applications have the potential to increase farmer's productivity. For example, wheat fertilizer trials (Rabi 2017/2018) show reduced nitrogen using PCU has a higher agronomic (in terms of yield per hectare) and economic return (in terms of the cost of inputs compared to the value of outputs). Rice trials (Kharif 2017) show UDP performing best[9]. Maize trials (Kharif 2017) show a nitrogen, phosphorous, and potassium 120:60:40 kg/ha fertilizer application, combined with a nitrogen top dressing applied at growth stages V6 and V10 raising yields from 7 MT to 9 MT/Ha.

4.1.1 Technology Users

NSAF technologies were at a trial and demonstration phase at the time of performance evaluation fieldwork. Seed companies, seed producer farmers groups, and trial and demonstration farmers were using seed technologies and cooperative and farmer groups were testing/demonstrating fertilizers.

Key informant interviews with seed companies and agrovets show commercial farmers are potential users of hybrid seed, and PCU and briquette fertilizer technologies. Some specific varieties (e.g., OPV rice varieties) may be used by subsistence/commercial farmers in particular areas or agro-ecological zones.

Key informant interviews show potential users of yellow maize technologies are farmers supplying the animal feed industry. The performance evaluation's fieldwork shows demand for yellow maize from the animal feed industry[10]. It is unclear who the users of NSAF rice technologies will be. Demonstration farmers report dissatisfaction with NSAF rice varieties. These farmers preferred existing high yielding varieties (i.e., Sarjoo 52). Sarjoo 52 is already being produced by the seed companies and cooperatives in Kailali. Seed companies also commonly requested hybrid varieties. One key informant felt users for OPV rice varieties might exist in specific locations. Kailali rice seed producer farmers suggested Hardinath 3 and Bahuguni were good in lowlands, although they are subject to insect damage. A seed company also reported trialing Chaite 5, an OPV rice seed, along with Hardinath 3 and Bahuguni. Chaite production was reported as very good, and all the production from the trial was distributed as seeds. This seed company reported, "we are going to commercialize this variety (Chaite) for sure."

The performance evaluation found no clear users of NSAF lentil technologies, and the fieldwork shows declining farmer interest in lentil production and a shift to growing wheat. Farmers report changes in climate, a reduced export market, cheaper imports, and volatile prices as negatively affecting production. An example reflecting this change was a Nelapgunj grain buyer that reported buying fewer lentils. He affirmed purchasing approximately 50 MT/annum five years ago to trading about 5 MT/year of lentils in the last year.

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[7] Based on NSAF Preliminary Results of Field Trials and Demo Data 2017 – 2018

[8] The NSAF Preliminary Results of Field Trials & Demonstration Data 2017-2018 presents lentil trial data for three seed companies (GATE, Unique Seed and Lumbini seed company). Khajura-1 has the highest yield in Lumbini Seed Company trials. Khajura-3 has the highest yield in Unique Seed company results. GATE presents results for seven different locations. At the different locations highest yielding varieties are the local check (one location), simal (2 locations), sagun (one location, shital (one location, shikhar (one location and simrik (one location.

[9] This treatment exceeds the nearest other treatment by approximately 15%.

[10] Key informants highlight 100 MT per day of yellow maize demand in the teria

Interviews with agrovets show NSAF vegetable related technologies are most likely to be used by commercial farmers. These farmers are particularly interested in hybrid seeds and associated technologies, such as liquid fertilizers.

NSAF fertilizer technologies are again most likely to be used by commercial farmers using hybrid seed. PCU and UDP briquettes will need to be available if they are to be used. Split application techniques will also require fertilizers to be available at the required times. Briquettes need to be placed between plants, which requires more labor and/or a specific tool called a "dipper." NSAF community volunteers suggest this is more likely to be used in smaller plots of vegetables and maize, and farmers are more likely to allocate labor to these crops[11].

4.1.2 Technology Dissemination

The NSAF technologies are at the trial, training, and demonstration level and have not been disseminated yet. The evaluation fieldwork suggests NSAF intends to use various means of technology dissemination, such as training, demonstrations, traders and farmers meetings, field days, fairs, exhibitions, platforms, campaigns (leaflets/promotions/mobile marketing), and radio. The NSAF Annual Work Plan[12] (2018/19, p.7) for seed reports the activity will support "branding, labeling, mobilizing traders and educating farmers; and campaigns through radio jingles and promotional pamphlets in target market segments." Similarly, for fertilizer, the NSAF Annual Work Plan (2018/19, p.12) reports that technologies will be promoted and disseminated through field demonstrations, agrovets, farmer cooperatives, farmer field days, agriculture fairs and exhibitions, and digital media. These approaches are consistent with the findings of the NSAF baseline that explored ways to disseminate information. The NSAF baseline (2017, p. 38) reports "respondent farmers ranked the traditional means of radio, face-to-face meetings with extension agents, television, training and demonstrations and printed materials as the most useful ways of disseminating information to them."

NSAF has performed various dissemination actions for existing technologies, techniques, and approaches. Trials, training, and demonstrations have been performed for maize, rice, and lentils. NSAF has supported traders and farmers meeting platforms and field days. Campaigns using leaflets, promotions, and mobile marketing were reported in Kavre. Radio information had been supported by NSAF with seed companies. In Kavre, extension agents affirm using mobile apps to promote IFSM technologies. NSAF also report providing information materials to sister projects [i.e., the Knowledge-Based Integrated Sustainable Agriculture and Nutrition (KISAN) project, such as training materials in ISFM] to raise awareness. CEAPRED has performed action research, mostly by trials and demonstrations with agrovets and promoting call centers.

4.1.3 NSAF Technology Scaling Models to Reach All Types of Farmer

Seed

Performance evaluation fieldwork suggests the NSAF scaling model for seed is private sector-led. This model is based on NSAF providing new varietal parent line material to seed companies. Seed companies will then produce foundation seed and will multiply seed in seed producer groups. Seed companies will then buy back, clean, process, pack, and sell what is produced.

Fertilizer

Performance evaluation fieldwork suggests the fertilizer scaling approach proposed in the NSAF 2018/19 work plan (see APPENDIX X: NSAF 2018 to 2019 Annual Work Plan for Fertilizer) is challenged by the

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[11] Indira Lamichhane (CV), Sitapur, Banke

[12] NSAF PROJECT ANNUAL WORK PLAN – YEAR 31 October 2018 – 30 September 2019

private sector being "crowded out" of the fertilizer market by current GON policy implementation, the restricted availability of supply, and the timeliness of supply. These factors are discussed further in section 4.4.

As a result of this observation being presented in performance evaluation debriefing sessions, NSAF developed an additional document (Fertilizer Market System: An Overview of NSAF Interventions and Scaling Approach Draft March 2019) to clarify its fertilizer scaling approach.

NSAF recognizes that significant change in policy is required: "Sustained availability and accessibility of appropriate good quality fertilizers including micronutrients in adequate quantity and in time, through significant change in the policy that involves constructive role of the private sector, enhanced performances and functions of the government agencies, and adoption of best management practices (BMPs) with the support of key services and partnerships is the ultimate objective."[13]

The document proposes a three-pronged approach for scaling improved fertilizer products and practices to achieve this objective:

- Policy engagements with the MoALD to stimulate demand, strengthen private sector engagement in fertilizer import and distribution, and influence change in fertilizer importation, distribution, and local production.
- Promoting new fertilizer recommendations and best management practices through the GON institutions, such as the Agricultural Knowledge Centres or *Krishi Gyan Kendras* (AKC) and local governments, and projects, such as the PMAMP and High-Value Agriculture Project, and USAID-funded projects, such as the KISAN II.
- Private sector involvement: The primary objective of these interventions is to build the capacity of agro-dealers to improve their services in providing appropriate inputs with the right technical information and advice to the farmers. NSAF also will work with NEFEA to register viable alternative fertilizer products, such as UDP, PCU, and several other blended products and use the public-private partnership approach to establish new fertilizer blending plants.

This new scaling approach highlights lobbying and informing evidence-based policy development and recognizes the risk that the government's approach to dealing with new products via the subsidy program needs to be supportive.[14] Several questions remain that challenge the NSAF fertilizer technology-scaling model. These include:

- Whether the government will allow sufficient space for the private sector to engage in fertilizer importation, distribution, and production.
- If AKCs and local governments will be able to promote fertilizer recommendations and BMPs in the lifetime of the NSAF Activity given the disruptive move to federalism.
- If NEFEA, with NSAF support, can register alternative products such as UDP and PCU within the remaining timeframe of the activity.

4.1.4 Users Perceptions of Selected Technologies with Respect to Cost, Use, and Productivity

A summary of user perceptions concerning cost, use, and productivity for selected NSAF technologies appear in Table 6.[15]

[13] Fertilizer Market System: An Overview of NSAF Interventions and Scaling Approach Draft March 2019 (page 1)
[14] Fertilizer Market System: An Overview of NSAF Interventions and Scaling Approach Draft March 2019 (page 12)
[15] Details of how perceptions were collected are provided in APPENDIX V: GETTING TO ANSWERS MATRIX.

Table 6: Users Perceptions of NSAF Technologies with Productivity Potential

Commodity	Cost	Use	Productivity
Maize	Perceptions of the cost vary, Single X > Triple X. Seed companies aren't fully aware of the cost	Yellow Hybrid Maize for Animal Feed	Hybrids – high, are competitive
Rice	No obvious difference	OPVs Sale / Home Use	Below competition
Lentil	No obvious difference/recommended practice - costlier	Sale / Home Use	No clear advantage
Vegetables for seed production	Cost of seed production is higher compared to vegetable production	SEAN buyback guarantees at a good price in Salyan	Good for seed production
Producing Vegetables	No clear advantage	Largely for sale/home use	No clear advantage
Fertilizer	Price premium per kg unit for PCU and briquettes with a reduction in area application rates	Farmers have limited knowledge of technologies, and use is currently unclear.	The general perception is it produces a better yield

Source: Study Findings

Maize users[16] perceived the costs of new varieties as varying depending on seed type. They felt maize varieties were felt expensive (retail prices between 700 to 900 NPR / kg) and that triple cross varieties were cheaper (retail price of approx. 400 NPR). Seed company representatives noted that they do not yet fully know their costs of producing seed. Maize technology users perceived that yellow maize could be used for animal feed, with the stalks/leaves used for animal fodder. Hybrid maize technologies were perceived to have high productivity, comparable to similar imported seed[17].

Rice users[18] perceive no difference in the costs for NSAF-supported OPVs compared to other similar seeds.[19] OPVs rice varieties are often used for own consumption with hybrids or high yielding varieties used for sale. Generally, NSAF-supported rice varieties are perceived as having lower productivity than competing varieties (e.g., Sarjoo 52).

Users of NSAF lentil technologies report no obvious difference in the cost of these varieties compared to others on the market. One seed company reported that use of the NSAF recommended practices for lentil (line sowing after the rice harvest) was costlier than the traditional practice of broadcasting lentil seed in rice fields a few days before the rice harvest. Lentil growers in two focus group discussions also reported that the NSAF approach had increased their workload[20]. NSAF supported varieties were perceived as being used for home consumption or sold. The NSAF-supported variety Kalomasuro/black lentil can be used by pregnant or lactating women and children to address anemia. NSAF lentil technology users perceived no clear advantages with regard to productivity.

NSAF supports vegetables for seed production with SEAN. The productivity of NSAF/SEAN-supported vegetable seed was perceived as good by farmers in Salyan.[21] Farmers reported strong interest in varieties, such as the cauliflower varieties HRD 002 and 003 (large flower and yield of 25 to 30 MT per Ha)[22]. The imported cauliflower variety snow mystic also was reported as yielding well as was the NARC local cauliflower variety Khumal Jyapu. Performance evaluation results suggest these varieties have seed

[16] For maize only, seed company staff members knew the new NSAF varieties.
[17] A seed company technician reported using Pioneer maize hybrid on his own land that yielded 10 MT/Ha. This was roughly equivalent to NSAF new varieties.
[18] Seed companies and farmers exposed to trials and demonstrations have a perception of the NSAF rice varieties.
[19] Hybrid rice seed is reported as having a retail price of at least 400 NPR/Kg. Farmer can use less hybrid seed per unit area. compared to OPVs.
[20] Upakar Krishak Samuha and Muslim Krishak Samuha, Banke.
[21] Trial farmer Salyan.
[22] Trial farmer Dang (Hiralal Chaudhari).

production potential.

NSAF also works with CEAPRED to support vegetable production. Users for NSAF/CEAPRED vegetable technologies perceive that OPVs are cheaper than hybrids. At the time of the performance evaluation's fieldwork, NSAF/CEAPRED was only supporting one hybrid vegetable, the tomato variety srijana. Vegetable hybrids were commonly seen to have commercial use. The perception regarding NSAF/CEAPRED-supported vegetable varieties productivity was mixed with no clear advantage seen at the time of performance evaluation fieldwork.[23]

NSAF supported fertilizer technologies (PCU, UDP Briquetted Urea, and split applications) have been used by NSAF, community volunteers, and trial group farmers. NSAF staff and community volunteers knew the productivity benefits of NSAF technologies. Trial farmers tend to have a general perception of what was used in fertilizer trials. Farmers interviewed at demonstration sites in Kiailali (Munuwa Fert Coop.), Karvre (Anekot, Rabi Opi, and Jorsala), and Banke (Sitapur) perceived higher productivity from NSAF treatments but did not know the details of what was tested. For example, they knew that a mix of fertilizers had been applied but did not know the details. As a result, these farmers tended to know that NSAF technologies had increased productivity, but not the details of the individual technologies tested. Other interviews (e.g., Munuwa and Kailali) show farmers knew and were interested in PCU. In Kavre, farmers reported challenges using NSAF technologies, which required more labor (i.e., split applications and placing briquettes) compared to broadcasting applications.

Users perception of the cost of NSAF fertilizer technologies was unclear at the time of the performance's evaluation fieldwork. NSAF provided the fertilizers used in trials, so farmers tended to be unaware of the cost. NSAF key informants in Banke estimated the cost of PCU to be approximately 30 percent higher than unsubsidized urea. A PhD student studying briquette urea at the Regional Agricultural Research Center in Nepalgunj suggested briquette urea costs approximately 4 NPR more per kg compared to commercially priced urea. This student also pointed out that the normal use of urea could be reduced by 30 percent by using briquettes. NSAF staff and community volunteers recognized similar savings from the use of PCU.

Community volunteers, NSAF staff, and trial farmers felt that new supported fertilizer technologies led to more production. In Kavre, a cauliflower demonstration plot showed clear productivity improvement between NSAF fertilizer treatments and traditional practices. Trials in Jorsalla, Karve, and Sitapur Banke showed improved productivity from NSAF fertilizer treatments. Farmers exposed to trials/demonstrations realized that they could use less PCU than traditional methods and get similar yields.

4.1.5 Technology Commercialization

Maize

Seed companies are likely to commercialize NSAF maize varieties, especially yellow maize hybrids. GATE seed company reports wanting to register two maize varieties before NSAF ends. Panchashakti Seed Company in Kailali reported being interested in commercializing maize entries 3, 5, 14 and 20 depending on the outcome of more trials. Seed companies stated that NSAF supported varieties will need to compete with Chinese/Indian varieties (i.e., Pioneer). An end market for yellow maize is the feed industry, as suggested in Kailali. In this district, 100 MT/day of yellow maize is reported as imported from India by animal feed companies. These companies are further reported as wanting high protein yellow maize.

Cooperatives expressed interest in commercializing Rampur hybrid as well as interest in NARC varieties/OPV and seed banks. These organizations want to promote Nepali varieties and not be dependent on imported hybrids. They affirmed that imported hybrids could be blocked for export by countries as has happened in the past. They also expressed concern about dependence on imported

[23] For example, in Nuwakot CEAPRED vegetable trials have mixed production results.

hybrids and, therefore, see a need for OPVs[24].

Rice

It is currently unclear who will commercialize NSAF supported OPVs rice varieties. NASIC seed reported that NSAF OPVs might be suitable in some locations. However, they also reported local OPVs perform well in comparison with NSAF varieties. Seed companies from varieties, such as Sarjoo 52, also reported strong competition. Gorkha Seed Company expressed an interest in hybrids, as did agrovets.

Cooperatives are more interested in OPV rice varieties and already multiply seeds. Coops report using variety DRR 44 with breeder seed sourced from Khajura Research Stations. Cooperatives also were reported as investing in Hardinath before the inception of NSAF. A Kavre cooperative was reported as producing 4 MT Khumal, 4 OPV rice seed NARC variety.

Lentils

Seed companies did not express interest in commercializing NSAF lentil varieties. One seed company reported that "overall, there is less scope of lentil these days because of the open border. A lot of lentils are imported from India, and Nepali production is not able to compete."

Vegetables

CEAPRED report that they do not know if their supported seeds can be commercialized within the NSAF period of performance. CEAPRED works with six agrovets with no seed company involvement. In Nuwakot, an agrovet working with CEAPRED was interested in developing commercial local seed production. The agrovet had worked with a farmer producing hybrid tomato seed that was reported as generating a good price for both the farmer and the agrovet. At the time of the fieldwork, an onion trial was beginning, and if proven successful, the agrovet would be interested in commercially investing further in the seed.

SEAN is investing in vegetable cauliflower and onion seed production in Salyan. SEAN is already selling vegetable seed in Nepal. There is potential that they will invest further in NSAF supported varieties in the future.

Fertilizer

It is currently unclear who will commercialize NSAF fertilizer technologies. The private sector (Karve wholesalers, Banke Kunal traders, and NEFEA) is interested in fertilizer. However, government permission is required to allow the private sector to trade in technologies, such as PCU and briquettes.

During fieldwork, STC expressed interest in new fertilizer technologies. The STC chief executive officer mentioned that he sees commercial market potential for coated urea. However, he also emphasized that the commercialization of new technologies will take time and would need government approval. Fertilizer is discussed further in Section 4.4.

[24] For example, AKC, Salyan

4.2 EVALUATION QUESTION 2: TAKING SEED TECHNOLOGIES TO SCALE

Evaluation Question 2: To what extent are systems in place to take seed technologies to scale?

4.2.1 Seed Availability

Seed availability in Nepal generally relies on farmers saving their own seed. The government strategy is to reduce levels of farmer-saved seed. The Agriculture Development Strategy (ADS) 2014 reports, "The seed replacement rate (SRR) has remained very low. The desirable SRR for cereal crops is 25 percent to 30 percent. On average, the SRR is 4.4 percent in rice, 3.8 percent in maize, and 1.6 percent per pulses."[25] The National Seed Vision 2013 – 2025 (2017) suggests an 80 percent seed replacement rate in 2019.[26] The National Seed Vision 2013 – 2025 targets seed replacement rates of 25 percent for cereal crops and over 90 percent for vegetables.[27]

Information collected during fieldwork reveals that replacement rates for hybrids, particularly vegetables, are increasing, as discussed in the subsequent sub-sections. NSAF data shows a rising trend in seed sales for the crops that the activity supports (Appendix VIII). A general perception among the respondents is that seed availability (especially hybrid) and quality is improving with increased imports from India, China, and Korea that are sold through agrovets, particularly in the case of vegetables.

Cooperatives also produce seed (usually OPV)[28]. Mechanisms to support cooperative seed production were unclear at the time of the fieldwork. Support to cooperatives was previously the role of the District Agricultural Development Office (DADO). DADOs are used to provide foundation seed and technical support. Some perceive this to be the role of AKC. However, the evaluation team discovered that AKCs are not fully functioning and have inadequate human resources. For example, the Banke Baijanath rural municipality that supports coops complained only four extension workers were supporting 2,500 cooperative farmers.

Evaluation fieldwork with farmers and agrovets shows the overall quality of seed is good. The fieldwork team did find examples of poor seed quality, however. For example, farmers in Kailali complained of poor-quality rice seed (DY69) supplied from agrovets. A Kailail seed company also reported coop production of low-quality seed. Farmers also reported low germination of rice seed being supplied from Panchashakti and Unique Seed. One seed company and an agrovet also noted examples of seed failure during NSAF trials. Some failures are to be expected during NSAF trials when seeds are being tested.

NSAF technologies are still at the trial and demonstration phase. As a result, NSAF has not yet significantly contributed to changes in the availability of seed to farmers and the private sector beyond providing trial and demonstration material (see Appendix IX).

NSAF reported that they have 400 different varietal lines from different international partners that are ready to market. These varieties are being tested for local suitability. NSAF claims these varieties should be available in two years via a fast-tracking registration system. NARC also reported they have 395 individual technologies that are released and/or registered.

[25] Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development Singhdurbar, p 27.
[26] Ministry of Agricultural Development, National Seed Vision 2013 - 2025 (Seed Sector Development Strategy), p 46.
[27] Ministry of Agricultural Development, National Seed Vision 2013 - 2025 (Seed Sector Development Strategy), p 13.
[28] Sana Kishan Krishri Sahakari, Kavre, Shree Suryodaya community Agri Coop, Banke.

Below is information about the quantity of seed available for NSAF supported crops.

Maize
There is a mix hybrid and OPV maize seed[29] in the Nepalese market. NSAF data shows approximately 2,200 MT of OPV and 1,000 MT of hybrid maize seed was sold in 2017. Information derived from KIIs and FGDs reported increasing hybrid seed availability from India and China [i.e., Pioneer (India)]. Maize hybrids are mainly sold through agrovets. Varieties, such as CP 808 and CP 666, are reported as widely used. Some cooperatives (e.g., Atma Nirbhar and Jorsalla) also have bought hybrid maize seed from agrovets and supplied them to their members.

Rice
NSAF data shows approximately 8,150 MT of OPV and 6,600 MT of hybrid rice seed was sold in 2017.[30] During fieldwork, it was unveiled that many unregistered, imported varieties of rice are available in Nepal. SEAN is trying to register some of these varieties as they are in high demand. It reported that Ranjit and Swarna varieties of rice are used by 60 percent of farmers in Teria and Sarjoo 52 is used by 40 percent of farmers in Western Teria. During fieldwork, it was revealed that some NSAF-supported seed companies were processing the Indian OPV variety Sarjoo 52.

Lentils
Farmer saved seed is the main source of lentil seeds. NSAF data shows that approximately 350 MT of self-pollinating lentil seed was sold in 2017.[31] The NGLRP is testing 11 varieties of lentils sourced from the International Center for Agriculture Research in the Dry Areas (ICARDA). The first year of NGLRP field tests was 2018/2019. Many popular Nepali NARC varieties are reported. Seed companies appear less interested in lentils given the smaller market.

Vegetables
Imported hybrid seeds dominate vegetable markets. Private sector agrovets are significantly involved and well-organized in vegetable seed supply.

The NSAF partner SEAN Seed Co. is one of the most important Nepali seed companies. With NSAF support,[32] SEAN is producing vegetable seeds in hill regions via cooperatives and farmers groups. In the Salyan district, production of 20 MT of various seed types was reported for 2018 by one SEAN linked cooperative (various types of seed). This seed was processed in Kathmandu and sold nationally.

4.2.2 Seed Production

NSAF has successfully supported seed production by seed companies and the cooperatives and farmer groups with whom they work. Seed companies source parent seed and then engage cooperatives and/or farmer groups to multiply seed. The seed subsequently is sold via agrovets or supplied to governmental bodies. NSAF has provided parent seed, built capacity (e.g., in R&D, product development, and quality seed production), and supported linkages between businesses in the value chain.

Information from the field reveals that the seed companies are investing in expanding production (Unique, GATE, and Gorkha seed companies). An example is Panchashakti seed company, established ten years ago, in Kailali. This company works on rice, wheat, lentil, mustard, cauliflower, and onion seed. As an example of production levels, in 2018/19, this company produced over 200 MT of both wheat and rice seeds. Panchashakti report that if they get source seed materials, they can then multiply it and send it to the

[29] Hybrid seed is not necessarily of better quality compared to OPV seed.
[30] Source: NSAF Project Annual Report Year 1 April 1, 2016 – September 30, 2017.
[31] Source: NSAF Project Annual Report Year 1 April 1, 2016 – September 30, 2017.
[32] SEAN is performing trials on vegetable seed production in Salyan with NSAF funding (cauliflower, onion, and maize hybrid).

market. This may take around three to five years. This year, Panchashakti is performing inbred trials with NSAF. Next year (2019/20), it plans to conduct multi-location trials. Following that, it will be supplying farmers for seed production.

The Munuwa cooperative, also based in Kailali, produces certified and improved seed of rice and wheat. Recently, they were provided with breeder seed from Khajura Regional Research Station and produced 2.3 MT of foundation seed as a result. At the time of fieldwork, this coop had stocks of 15.8 MT of rice seed and 180 MT of wheat seed.

NSAF, working with SEAN, has supported vegetable seed production in Salyan. For example, one farm group working with SEAN reported having started production of cauliflower (local variety) seed that was ready to harvest at the time of the evaluation's fieldwork. The farmers estimated that SEAN would sell approximately 40 kg of cauliflower seed under their production agreement.

NSAF has supported the development of new seed varieties through varietal screening, technical support, evaluation of data analysis, seed maintenance, problem-solving with breeders, training, sowing and direct supervision, and evaluation of results, and has provided staff to each seed company for their development. Also, NSAF has supported the popularization of new seed varieties by developing information, education and communication materials, marketing, radio promotions, website, mobile applications, and linkages to seed companies.

Seed companies see greater commercial potential if they can maintain inbred lines. One company felt it would be a "lifetime business" for them if they could do this. Seed companies have received training in the areas of inbred line maintenance, multiplication, and product evaluation/validation from NSAF. Unique Seed reported improvements in their capacity as a result. Some seed companies requested more staff training, especially for maize (GATE). Unique Seed, NASIC, Hariyali Seed Co., and Panchashakti were concerned about maintaining and broadening their capacity in these areas. As an example, NASIC reported, "The capacity of staff on maintaining the inbred line for hybrid needs to be strengthened. We have a problem in finding a good breeder." SEAN also pointed to a lack of seed breeders in companies.

However, the capacity of seed companies varies in the degree that they can maintain inbred lines, multiply seed, and evaluate and validate new products. Most seed companies report they can maintain inbred lines, multiply seed, and evaluate/validate new products. Some seed companies were maintaining inbred lines (e.g., Gorkha for tomatoes) at the time of the performance evaluation's fieldwork. However, Unique Seed reported that they could maintain OPV lines but not hybrids. NASIC Seed Company felt they could maintain the inbred line for Rampur Hybrid 8 and 10, but not for other varieties (See Appendix IX for further examples). NARC challenges the view that the private sector can maintain inbred lines. NARC has traditionally maintained inbred lines and report this will be a problem for the private sector. NARC's key informants expressed the desire to work together with seed companies in this area.

4.2.3 Seed Marketing and Business Development

Seed companies supported by NSAF report improvements in their capacity to plan business, brand products, and provide outreach to farmers. NSAF has provided training and mentoring to seed companies in the areas of business planning and branding/packaging. The activity also has worked with financial institutions to build linkages between lenders and seed companies to increase access to capital.

Seed companies report they have improved the quality of their business plans with NSAF support. The evaluation was unable to see actual seed company plans. However, as indications of improvement, business plans have been presented to agricultural lenders and financial agreements have been successfully agreed.

Seed companies report improving their marketing and branding. However, NSAF companies were found to be engaged in branding before their involvement in NSAF.

Seed companies, such as GATE, Panchashakti, and Hariyali, were found to be providing a variety of extension services to farmers in support of their products. This is done by conducting demonstrations, having farmer field days, and providing advice and training on their products. Hariyali reported having a mobile service to provide seed samples to their farmer groups. During fieldwork, a CEAPRED-supported agrovet reported participating in training in the use of a mobile application as part of extension support. He confirmed training four to five farmers in the use of the application, and he felt that the farmers were using it. As an example of using the application, the agrovet reported taking a photograph of blight-affected tomato and sending it through the application. Moreover, he reported being given a recommendation after a few days and that the advice worked.

NSAF has supported the linkage of banks to seed companies. During fieldwork, the Nepal Bangladesh Bank in Banke reported establishing a linkage with Gorkha Seed, and Laxmi Bank in Kailali reported having a linkage with Panchashakti Seeds. This linkage is expected to lead to loan agreements in the future. These financial institutions reported being increasingly willing to lend to seed companies. However, no examples of operational loan agreements were found during the fieldwork.

4.2.4 Role of the Government of Nepal in Policy and Seed Quality Maintenance

Government policy in the seed sector is allowing increased space for the private sector, which is allowing seed companies and agrovets to supply more seed. NSAF is successfully supporting this positive development in the seed supply system. Continuing this trend should enable the scaling up of NSAF seed technologies.

MoALD[33] leads policy and planning in the seed sector. The main policy document is the National Seed Vision 2013 to 2025. This vision supports private sector involvement in the seed sector in roles of seed production, processing, conditioning, and marketing, including research and development. Looking forward, the "Seed Vision expects that the role of the public sector in seed multiplication will diminish with a rapid proliferation of the private and community sectors. The share of the private sector in seed supply will increase steadily, assuming a dominant role towards the end of the 2020s."[34]

Performance evaluation fieldwork suggests that the role of the private sector in seed supply is increasing in line with government policy. Private sector companies are taking an increasing role in maintaining inbred lines and multiplying seed. The parastatal National Seed Company was being absorbed into the Agricultural Input Company Limited (AICL) at the time of the evaluation, suggesting a reduced role for this public sector seed organization.

The move to federalism is challenging the role of government in the seed sector. This may negatively affect NSAF objectives of taking technologies to scale. For example, the GON's Seed Quality Control Center (SQCC)[35] has a key role in seed quality maintenance and policy implementation. The Seed Vision 2013 to 2025 (p. 9) identifies the role of SQCC is to provide "support to private sector to follow seed quality and internal quality assurance system" and "coordination with quarantine and quality control services for seed imports and exports and monitor activities of organizations working in the seed sector for quality seed in the market." Observers working with SQCC report that "SQCC does not have adequate manpower for quality control, there are few inspectors for a large area, and they are not able to do their work effectively." A lack of resources challenges the government's role in performing quality assurance.

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[33] http://www.moad.gov.np/en.

[34] Ministry of Agricultural Development, National Seed Vision 2013 - 2025 (Seed Sector Development Strategy), p. 43.

[35] See Appendix IX for a description of how the balance sheet is maintained by SQCC. Detals of SQCC can be found at http://sqcc.gov.np/en.

Increased emphasis on the private sector in ensuring quality may occur if the government continues to lack a sufficient workforce.

It is taking time to clarify roles and responsibilities due to the change in the federal system. The following quote reflects the performance evaluation's findings of time being needed to establish and clarify provincial to local level public sector roles and responsibilities: "The government is in confusion within. This has affected seed and agriculture. There are different levels of authority and different bodies (e.g., the extension providers AKC and PMAMP) that have different approaches. Agriculture is one of the marginalized sectors in the government of Nepal. There is less budget and fewer programs." Reduced budgets and fewer programs will potentially limit the government's ability to provide seed and extension. This could create space for private sector provision of seed inputs and advice.

4.2.5 Variety Release and Registration

NSAF's new seed varieties will need to pass the government's varietal release and registration procedures to be scaled up.

Variety release and registration require three years of trial data. This data is compiled from different NARC stations. The process involves the submission of trial data by research to the SQCC. The SQCC sends the trial data with necessary documents to a technical sub-committee. The sub-committee organizes a "defense meeting." The research program defends the trial variety at the technical sub-committee. If accepted by the committee, the SQCC then sends information about the variety to MoALD's Seed Board. At this stage, SQCC then defends the variety proposed for release. If accepted by the board, the variety is published in the National Gazette. Ownership of the released variety is with the NARC.

If only registration is required, two years of trial data is enough. Ownership of the registered variety remains with the company requesting registration, which gives the company permission to multiply seed.

NSAF is targeting registration of new nine maize varieties by 2020 (see APPENDIX XI: NSAF New Hybrid Maize Varieties Deployment and Seed Scaling Timeframe). If the formal two-year time estimate is followed, this should allow registration before the close-out of the activity. Ownership of any registered varieties will, therefore, be with the company. Available NSAF data targets scaling up in 2021 for the nine varieties. Observers reported that the registration process is time-consuming and that arranging meetings with key government stakeholders can be challenging. NSAF will need to maintain good relations with government partners and push the process forward to ensure registration and release of the new maize varieties before the activity ends.

4.3 EVALUATION QUESTION 3: TAKING FERTILIZER TECHNOLOGIES TO SCALE

Evaluation Question 3: To what extent are systems in place to take fertilizer technologies to scale?

4.3.1 Research and Development on Integrated Soil Fertility Management Recommendations

NSAF's Research and Development support on ISFM recommendations has achieved moderate results at the field level; the evaluation's fieldwork found that traditional farm practices remain prevalent.

NSAF's ISFM[36] support has emphasized a 4 R (right source, right rate, right time, and right placement) approach and BMP when testing a technology's agronomic and economic viability. NSAF has supported training and demonstrations in ISFM approaches with farmers. The activity also has trained agrovets in the 4 R ISFM approach and held workshops on ISFM practices with GON/NAFEA. Field demonstrations have generally compared three approaches:

- Application of the ISFM technology with BMP using hybrid seed.
- Application of the IFSM technology with farmers' practices using hybrid seed.
- Traditional practice.

Information from the field shows mixed results for promoting ISFM recommendations at the farm level. For example, farmers in Kailali reported having better knowledge in row planting and the use of organic manure. Three farmer groups[37] reported IFSM support increased their knowledge and awareness of PCU, briquettes, and split fertilizer applications and the potential of these technologies to increase yield. One farmer group reported not recognizing a change in yield as a result of using IFSM.[38] Another seed company[39] reported farmers being recommended to sow lentil seeds in lines as part of the ISFM approach, which increased the farmers' workload. The company further reported the traditional practice for broadcasting lentil seeds before the harvest of rice. This is done so that lentils already germinate by the time of the rice harvest. This seed company key informant felt more thinking was required to develop an alternative, as the ISFM recommendation represented an added burden to farmers. Questioning the adoption of ISFM approaches, an agrovet described farmers practices: "They do not make the line. Some do lining [meaning farmers plant seeds in rows], but they do not measure the amount of fertilizer. They just broadcast fertilizer based on guesswork. Their top dressing is not measured and not done in time." The performance evaluation's field observations generally showed traditional practices as prevalent. Key informants and observers also generally reported continued widespread use of traditional farm practices (i.e., broadcast application of fertilizer). Overall, fieldwork shows that farmers still lack knowledge of balanced fertilizer use and tend to use what is available.

To help improve ISFM, NSAF also is supporting soil mapping. Soil mapping is intended to improve knowledge of soil fertilizer requirements and allow tailored, appropriate fertilizer applications to be made. As part of this support, NSAF is providing two Mid Infrared Spectrometers (MIRS), which are used for scanning soil samples. A MIRS has been provided to NARC Kathmandu. The second MIRS is waiting for delivery to an Agricultural Research Station in Nepalgunj. Officers responsible for using this equipment have been supported by NSAF by partaking in a Kenya exposure visit and receiving appropriate training.

[36] The NSAF ISFM Fact Sheets (p. 2) reports ISFM as support to germplasm and fertilizer, organic resource management, and local adaptation.
[37] Kavre Women's Group, FGD Rabiopi Coop Group and Jorsalla.
[38] Small Farmers Agric Coop Ltd, Anekot.
[39] NASIC.

4.3.2 Availability of Fertilizer

Fertilizer is in scarce supply and not available in the amounts or at the time required. While there are differences in estimates regarding the level of scarcity, organizations interviewed during the performance evaluation's fieldwork suggested supply was approximately one-third of demand.[40] Scarcity is commonly recognized as highest in the hill and mountain areas — this lack of availability challenges NSAF efforts to take fertilizer technologies, such as split applications, to scale. PCU and briquette fertilizers are generally unavailable.

Available fertilizer is imported into Nepal through a formal government subsidy scheme and by informal cross border trade. Under the subsidy scheme, the central government determines an annual national budget allocation for fertilizer. This budget is allocated to two parastatal organizations, AICL and STC, to buy fertilizer from international markets and bring it to Nepal under a formal system. Approximately, 70 percent of fertilizer imports are managed by AICL and 30 percent by STC. AICL and STC distribute imported fertilizer through their own separate branch network of cooperatives. Informal, illegal imports of fertilizer that are not declared to customs also enter Nepal mainly through the Indian border, particularly in the Terai regions. The ADS (2014) reports, "the use of chemical NPK fertilizer (nitrogen, phosphorous, and potassium) in Nepal 2011/12 was 422,547 MT of which only about 25 percent is imported and officially declared to customs. This amount is sold to farmers at a subsidized rate by the state through agricultural cooperatives."[41] Urea, DAP, and Muriate of Potash are imported under the government subsidy. The availability of fertilizer has increased as the amount of subsidy has risen significantly from 500 million NPR in 2017/18 to 600 million NPR at the beginning of 2018/19. In mid-2018/2019, a further 300 million NPR was added.[42] For the FY 2019/20, 900 million NPR is allocated for fertilizer.[43] This growth in the subsidy should lead to more fertilizer becoming available. However, it also has the potential to put additional strain on GON finances.

Farmers generally report the quality of subsidized fertilizer is good. AICL/STC test fertilizer quality at the Indian port, at the Indian/Nepal border, and at the district level. The quality of informal fertilizer imports is reported as problematic. A Kailali cooperative reported that in 2018/19, "there is an increased shortage of chemical fertilizer, so many farmers had brought from India. But sellers deceived many farmers. After paying good money, they didn't get good quality chemical fertilizer. Instead, they got soil, ashes and mixed chemical fertilizer as well as underweight sacks." Public sector key informants expressed strong concerns regarding the private sector's ability to provide good quality fertilizer, reporting that the fertilizer supplied by the private sector in the 1990s and early 2000s was of poor quality.

Timeliness also is a key challenge with fertilizer supply. Subsidized fertilizer is often unavailable when crops require the nutrients, leading to reduced yields. Those involved in the sector recognize this problem well. Key informants reported that formal permission requirements and changes in world market prices during tender processes contribute to delays. As a result, some organizations try to store fertilizer. Key informants[44] from the government reported that AICL knows when there will be a shortage and keep some fertilizer in storage to address when such situations occur. The evaluation team also found examples of coops storing fertilizer until times of high demand.

Polymer Coated Urea and briquette fertilizers were unavailable at the time of fieldwork. NSAF had provided a briquette machine to NEFEA. The machine was reported as having started production but was not operational at the time of the performance evaluation, as the technology required an operating license

40 NSAF, NAFEA, and SQCC.

41 Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development Singhdurbar, p. 27.

42 AICL Kathmandu.

43 Budget speech 2019/20 May 29, 2019.

44 i.e., CDO Kavre.

that had not been secured from the government[45].

STC key informants expressed interest in new commercially viable fertilizer technologies. STC started selling fertilizer in 2017 and sells single superphosphate, calcium, sulfur, zinc-coated, boron-coated, and ammonium sulfate fertilizers at commercial prices outside of the government subsidy program. By 2020, STC plans to be working with more than ten different fertilizer products. STC also reported promoting organic fertilizer. NSAF did not work with STC at the time of the fieldwork. STC's interest in new fertilizers suggests they could support the scaling up of commercially attractive NSAF technologies.

Coated urea products have been used in Nepal. AICL reported importing 10,000 MT of coated urea[46] in 2017/18 under a government-to-government (G2G) agreement with India. The AICL reported that the coated urea performed well. However, AICL did not import more of this product. No reason was provided for not importing more of this fertilizer. No plans were reported by the AICL representative to do this in the future.

Agrovets trade small volumes of liquid fertilizers, organic fertilizers, and other specialist fertilizers commercially. All agrovets interviewed as part of the fieldwork reported these specialized products are generally used on vegetables. Agrovets also were found to trade in subsidized fertilizers. KIIs reported these products, usually, urea and DAP, are bought from cooperatives and then sold to farmers.

The evaluation's fieldwork showed some availability of organic fertilizers. It found that agrovets (i.e., Kavre) stock organic fertilizers. AKC in Salyan reported recommending farmers to use organic fertilizers except for vegetables, and STC stated that less chemical fertilizer is available in Salyan.

NSAF has worked to identify and address gaps in fertilizer availability through studies and the development of a soil map. It also has worked with NEFEA to address gaps in fertilizer availability by lobbying with the government and providing a briquette machine. The evaluation found that no changes in fertilizer availability could be linked to NSAF. Also, no changes were found to have occurred in the fertilizer quality control system or the way the government forecasts fertilizer demand and supply since the beginning of NSAF (see Appendix IX for further details).

4.3.3 Fertilizer Distribution Mechanisms

AICL and STC working with cooperatives dominate fertilizer distribution. The companies reported buying fertilizer from China and arranging transport to Indian ports. Fertilizer is then transported to the Nepali border and on to district warehouses. From here, it is distributed to cooperatives. The private sector has largely been "crowded out" of fertilizer distribution. Companies previously involved in the sector remain interested but report being unable to obtain the necessary government permissions. As a result, these businesses are investing in other areas of the agricultural sector, including by providing transportation for agricultural inputs.

AICL did not report any interest in supporting new fertilizer technologies. AICL is focused on distributing existing urea, DAP, and potash fertilizers. AICL representatives reported challenges with fertilizer storage. They reported that in the Shyangjha district, the demand for fertilizer is 40,000 MT, but their storehouse has a capacity of just 500 MT. NEFEA reported that the "Big Houses" (mostly private sector conglomerates, namely Nimbus, Golchha, Dugar, ChaChan, and Dallakoti) could access storage capacity for fertilizer of up to 35,000 MT. NEFEA also reported these companies had access to capital through commercial banks to purchase or create additional capacity. STCs are 22 percent government-owned, and they reported interest in NSAF fertilizer technologies and in distributing commercial fertilizer outside of

[45] The NEFEA was engaging the government to secure a license. However, it is seen as speculative to estimate when a license would be secured.

[46] Urea was thought to be coated with Neem. This is done to prevent use in other industries, such as the manufacture of plywood.

the government subsidy program if formal permissions are granted.

NSAF has addressed barriers and attempted to expand the reach of agricultural services (fertilizer application technologies) and inputs (fertilizers) by providing training to farmers and performing trials and demonstrations. The ability of NSAF to scale up fertilizer technologies is impeded by the inability of the private sector to gain access to the fertilizer distribution market. Although NSAF has worked with NEFEA to build the capacity of the private sector to procure, add value, and distribute fertilizers, until the government provides licenses and permits to the private sector to distribute fertilizer, the private sector's ability to apply their new capacity will be constrained (see Appendix IX).

4.3.4 The Role of the Government of Nepal in Policy and Fertilizer Distribution

Government policy does provide an opportunity for the private sector in fertilizer distribution. However, the government continues to rely on state-controlled mechanisms and organizations to distribute fertilizer.

Government policy controls the fertilizer distribution system by subsidizing fertilizer and centrally determining one price for fertilizers in all districts. The ADS (2014) states the policy is to "Maintain fertilizer and other subsidies at current levels in the short term, review them in the medium term, and adjust them in the long term while initiating several measures to improve productivity and fertilizer use."[47] It also states that "complementary measures to improve productivity and fertilizer use efficiency will involve promoting a greater private sector role" and mentions leveling "competitive environment between the private sector and state enterprises in the distribution of agricultural inputs and outputs (e.g., fertilizer). This may involve providing the private sector with the same commercial advantages (e.g., subsidies, permits, and facilities), or removing these advantages from state enterprises." Implementation of this policy for fertilizer, however, is found to be less advanced compared to seed.

The Ministry of Finance determines the level of the fertilizer subsidy, which impacts the national budget. Key informants[48] report the Ministry of Finance's interest in making the subsidy more effective by improving the utilization (i.e., by increasing productivity or by reducing waste) of fertilizers. NSAF technologies, such as PCU, briquettes, and split application techniques, have the potential to do this.

NSAF has engaged MoALD by holding meetings, supporting policy-related studies, conducting exposure visits, and having MoALD representatives on the NSAF Steering Committee (see Appendix IX). KIIs with senior government representatives showed NSAF has a good working relationship with MoALD. This relationship should allow NSAF to provide fertilizer trial-based evidence and advice to support fertilizer policy. Senior MoALD key informants recognized a gap in distributing advanced fertilizer technologies and felt the main challenge was in the capacity of local-level government extension officers. The MoALD informants also recognized that the government policy was to support an increased role for the private sector in agribusiness, including fertilizer. They suggested that the private sector could get involved in distributing non-subsidized fertilizers, such as Single Super Phosphate.

The ADS (2014) is promoting a voucher system for inputs (including fertilizer, seeds, and breeds) and extension services. The voucher system will empower farmers to make decisions regarding extension services and inputs. Initially, this system will be promoted on a pilot basis. Based on the review of the performance of the pilot, the system might be expanded and progressively replace the direct subsidies, such as fertilizer and seed subsidies.[49] The voucher system could widen private sector involvement in fertilizer distribution and presents a potential avenue for NSAF fertilizer technologies to reach women and MDAGs.

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[47] Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development Singhdurbar, p. 64.
[48] i.e., the National Planning Commission.
[49] Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development Singhdurbar, p.17.

With the move to federalism, regulatory guidelines and controls are being decentralized to local government and agricultural knowledge centers. While this is creating uncertainty in other areas, such as the public sector agricultural extension, fertilizer distribution by AICL and STC does not seem to be affected.

NSAF has facilitated relationships/partnerships between public and private sector institutions to address fertilizer policy challenges by providing capacity-building support to NEFEA, supporting the review of a planned urea plant for government stakeholders, supporting government staff to join exposure visits to Bangladesh and Kenya, and delivering information and advice on the importance of blended fertilizers and fertilizer subsidy restructuring options. NEFEA with NSAF support is lobbying the GON to make fertilizer policy suitable for private sector involvement. However, no changes in the policy or its implementation had been identified at the time of the evaluation (see Appendix IX for further details).

4.4 Review of the NSAF GESI Action Plan

The mid-term performance evaluation included an assessment of NSAF activities on advancing GESI. The evaluation team reviewed the NSAF GESI Action Plan[50] and explored the inclusion needs and demands of women and other marginalized/disadvantaged groups during the evaluation.

NSAF aims to achieve increased participation of women and disadvantaged groups in agriculture value chains. The evaluation team compared NSAF's GESI Plan with the findings and observations revealed during the fieldwork. Results appear in Table 7.

Table 7: Comparison of NSAF GESI Plan with Performance Evaluation Fieldwork[51]

GESI Plan Strategies	Performance Evaluation Observations on Achievement
GESI Mainstreaming	GESI is seen in ISFM, limited to training participants, but is not seen in other parts of the activity.
GESI Sensitivity	NSAF and partners are aware of GESI issues, but clear outputs are still lacking.
GESI Indicators	GESI indicators count the number of people included as an indicator of participation. For example, the NSAF second year report states that a total of 51% of project beneficiaries were women, and 55% were DAGs. The evaluation team, however, did not see any indicators devised to measure the meaningful participation and empowerment of women and disadvantaged and marginalized groups. Activities related to breaking the stereotypes, changing gender roles, and integrating women and disadvantaged groups across the value chain was largely missing.
Active Inclusion	No evidence of active, meaningful involvement or inclusion. Most community volunteers were women. However, quota reservations, inclusive and diversified recruitment, and the mobilization of required expertise do not appear to have included women.
Monitoring, Evaluation, and Learning Process	NSAF has disaggregated data. However, it is currently unclear how learning with regard to changing gender relations takes place.
Outreach, Communication, and Technology Dissemination	Information collected during the fieldwork reveals that communication generally is in Nepali as opposed to the local dialects mentioned in the GESI Action Plan.
Data Collection	Data collection includes youth, women, and DAGs. However, this data collection does not appear to have helped with the understanding of the dynamics of gender and develop appropriate initiatives.
Gender Budgeting	The performance evaluation did not review NSAF budgets

[50] NSAF GESI Action Plan Date: Aug 15, 2016.

[51] Source: NSAF GESI Action Plan (2016) combined with the performance evaluation's fieldwork findings and observations.

The performance evaluation's fieldwork suggests that most of the GESI Action Plan (2016) strategies, except those about the ISFM training, have yet to be achieved. It is unclear how women and marginalized social groups have benefitted from awareness-raising and improved access to inputs/services. GESI participation (ensuring women and marginalized people are reached) in identifying needs, agenda formulation, and resource allocation was found to be limited at each value chain level. However, the representation of women and MDAGs was impressive in the ISFM training. Female representation in organizations, such as seed companies, agrovets, and NSAF at the regional and national levels was low. Out of the six seed companies visited during the fieldwork, none showed any representation of women and MDAGs at the decision-making level. Among the sixteen agrovets the evaluation team visited during the fieldwork, only three were female-owned. Also, out of twenty-eight trial and demonstration farmers interviewed, three were female, and fourteen fell under DAGs and Janajati. Land requirements and education levels required for farmers to join demonstrations were found to exclude disadvantaged groups. NSAF, however, is supporting small landholders by allowing farmers to aggregate land to overcome some of these constraints to participation.

Some fertilizer technologies (e.g., briquette urea) are labor-intensive. Farmers interviewed as part of the fieldwork think that these technologies will increase the workload of women and men unless appropriate tools and machines are available[52].

The fieldwork shows that cooperatives follow or exceed the constitutional requirement of 33 percent representation for GESI in their membership. However, cooperative leadership is male-dominated, and only a few females participated in trials and demonstrations. There is a concern that these people will perform labor roles as opposed to being involved in decisions about technologies[53].

NSAF's mass media approach (i.e., the radio) used to increase knowledge of seed and fertilizer technology is reaching all types of farmers. However, this would be improved if local languages used by specific groups are included. Additionally, marginalized farmers may require a combination of different dissemination approaches over the long term, including financial literacy and leadership, to make them ready for the adoption of new technology.

NSAF reports trying to make its recruitment inclusive, but suitable female candidates were not sufficiently available. However, at the field level, most of the community volunteers were female.

[52] Anaikot,Kavre and CV, Sitapur,Banke
[53] Baluwafata, Mahila krishak Sahakari, Kailaili

5.0 RECOMMENDATIONS

1. Focus on technologies with the potential to improve farmer productivity.

<u>Cereals</u>

1A. To strengthen the current activity, NSAF should focus on the development of yellow hybrid maize varieties and PCU and briquette fertilizer technologies to best improve crop productivity. NSAF should report on progress regularly for USAID to monitor. More NSAF trials and demonstrations are needed to strengthen users' perceptions and confirm potential. Future activities should consider the testing and introduction of new rice and lentil varieties.

<u>Vegetables</u>

1B. NSAF/CEAPRED should review vegetable trial results and identify varieties with potential to improve farmer productivity above current levels. New trials should focus on varieties with clear potential to increase productivity.

<u>Handover of New Varieties</u>

1C. With two years of the activity remaining and a government release and registration process to negotiate for seed, NSAF needs to expedite the process and review its exit strategy to ensure the handover of new varieties within the remaining time and regularly report for USAID to monitor.

2. Improve demonstrations to inform farmers and key stakeholders better.

2A. NSAF should review its demonstration approach to ensure all necessary steps are taken at a field level to effectively inform farmers about what is being demonstrated.

2B. Larger demonstrations are recommended, as stakeholders and farmers need to more clearly see change under actual field conditions at a larger scale. A general recommended demonstration plot size is about 0.2 ha based on Indian experience and adapting it under the Nepali context.[54] During the timeframe of the study, the performance evaluation team was unable to find existing specific recommendations for demonstration plots in Nepal. Further research is required if more detailed dimensions are required to be tailored to each crop.

3. Review the GESI approach, revisiting the activity/interventions design from the GESI lens, to ensure the intended empowerment and inclusion of women and minorities.

3A. As NSAF hybrid seed, PCU, and briquette technologies are perceived as more expensive, NSAF should clarify how poorer households will access these technologies. For example, strategies are required to address the affordability of hybrids by smallholders. The GON's Voucher System for farm inputs presents an option for doing this. Vouchers linked to "KISAN cards/poverty cards" could be provided to poor and marginal households for hybrid seed and fertilizer packs. Vouchers could be redeemed at cooperatives or by agrovets. NSAF, KISAN, and USAID should hold discussions to explore the practicality of this

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[54] This is based on the Indian literature that indicates a demonstration size should be 0.4 ha (https://www.nfsm.gov.in/Guidelines/FLDGuidelines.pdf). where the average farm size is 1.08 ha. In Nepal's context, where farm size is around 0.8 ha and each household has about 3 parcels, we recommend a smaller figure.

suggestion. Given challenges to the availability of some technologies, such as PCU and briquettes, this may only be possible in future USAID food security activities as the technologies become available.

3B. The formation of specific GESI-sensitive groups is recommended at both NSAF and farmers level so that NSAF field-level staff members have a more explicit mandate specifying GESI promotion and engagement at the community level. These groups should work to ensure women and other DAGs are involved in decision making and not purely engaged as providers of labor.

3C. NSAF also should review and enhance capacity building opportunities for women in financial literacy, leadership, and other relevant skills to support their inclusion in decision making. This review should produce a document with recommendations and a plan of action for USAID to monitor.

4. **Support larger participation in demonstrations with more intensive outreach.**

NSAF should review evidence about social behavior change communication approaches from other activities. For example, the use of peer groups, homogeneous groupings and segmentation of stakeholders, use of multiple channels to influence, and use of existing local organizational structures (i.e., local coops) were all approaches intended to reinforce support for behavioral change and for which USAID MEL found evidence of success. NSAF's review should identify examples of communication approaches that have worked in other activities and use them in their work.

Farmers' field day conducted by seed companies should improve their outreach to women to better apply techniques and approaches.

5. **Review and enhance NSAF GESI Action Plan.**

NSAF should review its GESI Action Plan (2016), including the activities, indicators, mechanisms/tools, responsibilities, and targets. Indicators should be included that reflect NSAF outcome level objectives for participation in value chains and empowerment, including those in organizational transformation,[55] and move beyond counting participants in activities. NSAF should then monitor and report regularly on the revised plan at the outcome and activity level (including disaggregation by men, women, geographic and ethnicity/caste, and by economic status categories, such as rich, medium, poor and ultra-poor).

6. **Supporting women towards prominent positions in agriculture.**

6A. Women are underrepresented in private sector seed companies and NSAF. NSAF reports that suitably qualified women are currently unavailable. Therefore, the evaluation team recommends that agricultural research and the private sector take a "pipeline" approach to develop female talent. Agricultural research, including CIMMYT, should analyze the constraints and barriers to women entering agricultural research. The agricultural research community should then address these barriers and manage female talent so that qualified women are available and have opportunities to develop their careers.

6B. Action also should be taken to incentivize the private sector to increase the role of women in companies, such as by providing breeder scholarships for women, incentives to their hiring, and mentorship, and by selecting women through NARC. NSAF and USAID should discuss the opportunities for doing this in the second half of the activity. If it is considered feasible within the available timeframe, NSAF should develop a plan with indicators that can be monitored by USAID.

[55] Section 3.2 in the NSAF GESI Action Plan mentions organizational transformation in terms of administrative, financial, and organizational procedures in projects and programs.

7. **Support market linkages for smallholders of hybrid yellow maize.**

When improved yellow maize varieties are released, USAID should consider future initiatives supporting market linkages between potential growers and end-users in the animal feed industry. Smallholder farmers will need support to aggregate and consistently meet quality and volume requirements of large-scale animal feed industry buyers.

8. **Continue to support a seed company and agrovet-based scaling up model for seed technologies.**

This support should follow a more "demand-driven" approach, as seed companies and agrovets emphasize the demand for hybrids as opposed to OPVs. This approach requires USAID and NSAF to jointly review support to OPVs. OP varieties have a lower productivity potential but have household resilience advantages as the seed can be saved and used again in the following season.

9. **Continue to monitor and develop the capacity of seed companies.**

Seed companies vary in their capacity requirements (e.g., managing breed lines, business planning, quality control, outreach, and branding) and can lose staff, which dents their capacity. NSAF should continue to monitor and report on seed company capacity as part of quarterly reporting to USAID. NSAF should then provide appropriate capacity-building support through mentoring and training tailored to individual businesses. USAID should focus its monitoring on (i) reports of seed company capacity assessment in quarterly reports and (ii) the results of subsequent mentoring and training. The performance evaluation's fieldwork suggests emphasis should be given to building and maintaining inbred parental line maintenance capacity, particularly in hybrids.

10. **Maintain a strong relationship with government seed related organizations at the central, provincial, and local levels.**

10A. NSAF should continue and strengthen linkages with SQCC and NARC by continuing to include these organizations in planning and monitoring work to ensure quality and support varieties to meet release and registration requirements.

10B. NSAF also should strengthen its linkages with the government at the local and provincial levels (i.e., including the Provincial Ministry of Agriculture, AKC, and agriculture unit of Palikas in planning and monitoring events). This should enhance the government's understanding and confidence to make it easier for the development and dissemination of new seed.

NSAF should monitor attendance at planning and monitoring events from participant lists at the central, provincial, and local levels and report to USAID regularly so they can monitor the progress of supported varieties though release and registration processes.

11. **Review the revised NSAF fertilizer technology-scaling model and support its implementation, particularly in lobbying the Government of Nepal to implement ADS (2014) commitments.**

11A. NSAF has developed a revised fertilizer scaling approach recognizing the need for the government to allow increased space for the private sector in fertilizer importation, distribution, and local production. USAID should review the revised scaling approach. This review should ensure a clear fertilizer scaling plan, including presenting indicators to show how PCU and briquette technologies will be registered and made available to farmers. NSAF, working with the GON, should be responsible for implementing the plan.

11B. To support scaling, USAID should actively support NSAF in its plans to lobby and inform the government. Joint lobbying should support mutual objectives of promoting a greater private sector role and leveling the competitive environment by providing the private sector with the same commercial advantages (e.g., subsidies, permits, and facilities), which should, in turn, provide greater clarity regarding how PCU and briquette technologies will be formally registered and supplied and how split application approaches will achieve scale given challenges with fertilizer availability and timeliness.

12. Enhance linkage to actors in the fertilizer sector.

NSAF should meet the STC to confirm the mutual interest in fertilizer technologies suggested by the performance evaluation fieldwork. The STC has a distribution network that could help take NSAF technologies to scale.

13. Continue to work with the Government of Nepal to support efforts that make the fertilizer subsidy more effective.

13A. NSAF should continue to develop and share its research evidence base with government stakeholders to effectively inform decisions. NSAF should target specific events and committees and engage decision-makers via larger demonstrations of its fertilizer technologies and tailored workshops/seminars. These events and discussions should continue to support ADS (2014) policy implementation, allowing space for the private sector in fertilizer through licensing permission for non-subsidized fertilizers, including NSAF technologies (i.e., PCU/briquettes).

13B. NSAF and NEFEA should continue to lobby for an increase in the number of private sector actors allowed to supply subsidized fertilizer (i.e., allowing more than AICL and STC to distribute subsidized fertilizer). This should help incentivize the incumbents to improve performance and deliver fertilizer on time.

14. Increasing the role of the private sector in fertilizer will need to address quality concerns.

NSAF should research ways that help to ensure that the private sector delivers quality fertilizer (e.g., via branding). NSAF and NEFEA should explore the possibility of additional private sector actors using or replicating existing AICL and STC quality control systems.

15. Focus ISFM support on technologies with potential.

15A. NSAF should focus its ISFM support on PCU and briquette fertilizer technologies as fertilizer technologies with potential. This should be done after NSAF has first worked with the government to get these technologies registered and available.

15B. Given the limits to fertilizer availability, NSAF's ISFM support regarding the 4 Rs (right source, right rate, right time, and right placement) should be suspended until fertilizers are available. When NSAF succeeds in implementing its fertilizer scaling model (Recommendation 11), ISFM training then should be delivered by private sector partners supported by NSAF.

16. Review CEAPRED engagement of the private sector.

CEAPRED should review its work in line with the intended NSAF TOC impact of "increasing investment and private sector opportunities in agriculture." The review should clarify if all CEAPRED supported varieties present private sector investment opportunities. To best achieve TOC intended impacts, the evaluation team recommends that CEAPRED focus on varieties where there is private sector opportunity.

APPENDIX I: EVALUATION STATEMENT OF WORK

STATEMENT OF WORK FOR THE EVALUATION OF USAID/NEPAL'S NEPAL SEED AND FERTILIZER (NSAF)

1) BACKGROUND

Nepal's agriculture is mostly small-scale and subsistence-oriented, characterized by a mix of crop and livestock farming and providing few economies of scale in production and marketing. The agriculture sector represents about one-third of the GDP, and 66% of the labor force is engaged in agriculture. With an average landholding size of 0.7 hectares and 55% of farms operating on less than 0.5 hectares, most farms are unable to produce enough to meet their household food requirements for the whole year. The urban population is growing at 4.7%; therefore, it will not be possible for Nepal to meet the growing domestic food demand without increased agricultural productivity and competitiveness of domestic production. Major cereal crops and vegetables have low yields, but there are significant prospects for increases through improved seed and soil fertility management practices. A large part of the yield gap is a result of inadequate access to affordable improved technologies, extension services, and markets due to the weak public and private sector capacity to provide the support services needed by small-scale farmers.

The Feed the Future Nepal Seed and Fertilizer (NSAF) Activity aims to increase the availability of technologies to improve productivity in maize, rice, lentils, and high-value vegetable farming. The Activity works to improve the capacity of both the public and private sectors in their respective roles for technology development and its in-country dissemination. Specifically, NSAF works to provide better fertilizer products to farmers and strengthen the overall seed system to make improved seed varieties available to farmers in its operating area.

The activity is led by the CIMMYT collaborates with the Ministry of Agriculture and Livestock, Development (MoALD). To effectively reach women farmers and marginalized social groups, the Activity will also seek value-driven collaboration with USAID's development partners in raising awareness and improving access to agricultural inputs and services.

This statement of work describes the scope of the mid-term evaluation of NSAF. The purpose of this evaluation is to understand better the extent to which aspects of its theory of change still hold and verify the performance of CIMMYT according to its agreement parameters. Findings from the evaluation will be used to strengthen current activities, plan for future activities and provide evidence of good practices to the broader stakeholder network in Nepal.

2) DESCRIPTION OF THE PROJECT

Activity Name	Nepal Seed and Fertilizer (NSAF)
Implementer	CIMMYT
Cooperative Agreement/Contract #	AID-367-IO-16-00001
Total Estimated Ceiling of the Evaluated Project/Activity (TEC)	$15,000,000
Life of Strategy, Project, or Activity	April 1, 2016 to March 31, 2021
Active Geographic Regions	Twenty-one districts in the Western, Mid-Western, and Far-Western regions and five earthquake-affected districts.
Development Objective(s) (DOs)	DO2. Inclusive and sustainable economic growth to reduce extreme poverty IR2.1. Agriculture-based income increased IR2.2. Small enterprise opportunities expanded
USAID Office	Social, Environmental and Economic Development Office, USAID/Nepal

The NSAF project was developed for USAID/Nepal under USAID's global Feed the Future (FTF) initiative, a five-year program, working to advance food security objectives by increasing agricultural productivity. Nepal was one of 19 countries chosen for the Presidential FTF Initiative in 2010, under which NSAF was one Activity. Since then, Nepal was selected as one of 12 Global Food Security Strategy (GFSS) countries. The GFSS is a US Government, an inter-agency initiative that serves as the follow on to FTF and is known as the second phase of FTF. The overall goal of the FTF and GFSS initiatives is to reduce poverty and improve food security in Nepal. The NSAF Activity falls under both FTF phase one and phase two (GFSS). Its project purpose, which contributes to the achievement of this goal, is to build competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation.

The FTF Zone of Influence (ZOI) in Nepal comprises 21[56] districts in Nepal, covering 10 districts in the Province 5: Arghakhanchi, Gulmi, Kapilvastu, and Palpa, Banke, Bardiya, Dang, Pyuthan, Rolpa, and East Rukum; five districts in Province 6: Salyan, Surkhet, Dailekh, Jajarkot, and West Rukum; and six districts in Province 7: Achham, Baitadi, Dadeldhura, Doti, Kailali, and Kanchanpur, containing both hill and terai agro-ecological zones. Following the April 2015 earthquake in Nepal, four districts in Province 3 were added: Kavrepalanchok, Makwanpur, Nuwakot, and Sindhupalchowk. Therefore, NSAF operates in the expanded FTF ZOI inclusive of these 25 districts, plus Sindhuli.

[56] Please note that Rukum used to be one province and was split into two provinces. Previous documentation refers to the P1-ZOI with 20 districts and P2-ZOI with 24 districts. As of 2018, P1-ZOI has 21 districts and P2-ZOI has 25 districts while still covering the same geographic areas as previously noted.

The **overall goal** of the NSAF project is to build a competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation in Nepal. NSAF has three overall objectives:

1. Increase agricultural productivity.
2. Strengthen the seed and fertilizer value chain.
3. Support a private sector enabling policy for seed and fertilizer sector growth.

NSAF intervenes in an agriculture sector that is constrained by a lack of knowledge, technologies, and practices related to seed and fertilizer and private sector enabling policy for seed and fertilizer sector growth to achieve its goal. NSAF though its interventions, will increase agricultural productivity and income for smallholder farmers, strengthen seed and fertilizer (including integrated soil fertility management - ISFM) value chains to foster adoption of seed and fertilizer technologies and increase employment through SME along the seed and fertilizer value chains. With the project interventions designed for different typologies of farmers, the project interventions will be inclusive and cater to the needs of smallholders in rural and disadvantaged areas and households.

Widespread adoption of NSAF technologies is critical for agriculture-led economic growth. NSAF technologies will be scaled through various diffusion pathways including ICT to the value chain stakeholders. NSAF also has a strong emphasis on agricultural policy environment for promoting private sectors in developing, distribution and deployment of agricultural inputs and services to catalyze systemic change in the seed and fertilizer value chains. The capacity of the private sector to respond to the demand generated will lead to the growth of seeds and ISFM businesses. This is expected to contribute to the long-term goals of boosting the competitiveness of the seeds and ISFM business and increased investments from the public and private sectors. This would, in turn, lead to the inclusive and sustainable growth of the agriculture sector and enhanced food and nutrition security of Nepalese households as envisaged in the Agriculture Development Strategy.

The theory of change (Figure 1) and the results framework (Appendix-1) essentially indicate similar argument/ pathway on how NSAF will attain its goal. Thus, the success of the NSAF project essentially depends on how well these six core development hypotheses can be attained.

Development Hypothesis A: If the capacity of the public and private partners in Nepal's seed and fertilizer value chains to develop and deploy seed and ISFM technologies is strengthened, then Nepal's agricultural productivity will be increased.

Development Hypothesis B: If scaling intermediaries in Nepal (e.g., agricultural retailers and cooperatives, extension agents, etc.) are trained on ISFM and the 4Rs of fertilizer management, then Nepal's fertilizer value chain will be strengthened.

Development Hypothesis C: If the capacity of the private sector in research and development of new varieties, standard seed industry practice and 4R's including ISFM to the value chain stakeholders is developed through training, practice and exposure visits, then the entrepreneurial skills of Nepalese seed businesses will be strengthened.

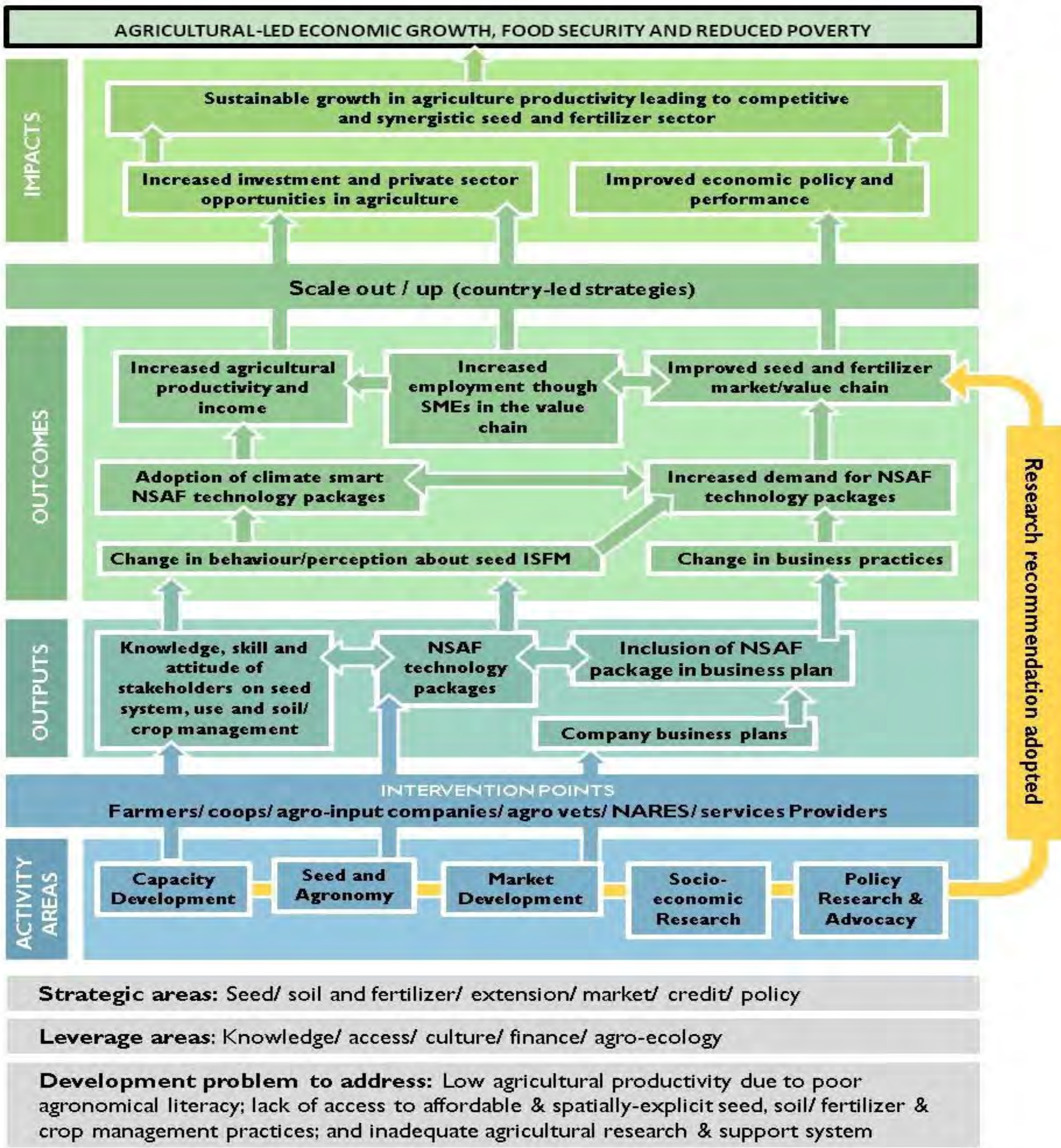
Development Hypothesis D: If Nepalese seed enterprises receive mentorship on business plan development and finance; and financial institutions and investors are better informed about the opportunities in seed and fertilizer businesses, then access to financial and business services will be increased.

Development Hypothesis E: If a market-responsive seed production and deployment strategy based on a national seed information system is developed together with spatially-explicit ISFM product development, and efficient distribution and marketing of fertilizer through public and private sector investment, then access to markets by different value chain stakeholders will be increased.

Development Hypothesis F: If seed and fertilizer associations strengthen their capacity to advocate for seed and fertilizer market and distribution system based on evidence from policy experiments together with strong programmatic linkages with local governments to forge strong public-private partnerships, then private sector service delivery will be improved.

These six Development Hypotheses underpin the six Sub-Intermediate Results (Sub-IRs) and three Intermediate Results (IRs) in the Results Framework that NSAF expects will lead towards achieving NSAF's overall goal of building competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation in Nepal.

Figure 1. Theory of Change Diagram



3) PURPOSE OF THE EVALUATION

The purpose of this midterm performance evaluation of the NSAF project is to assess USAID/Nepal's efforts to increase the availability and accessibility of quality seeds and fertilizers and their use by local farmers in the FTF ZOI. The evaluation will examine the project's effort to strengthen the seed and fertilizer distribution mechanism, including the development and use of hybrid maize and Integrated Soil Fertility Management (ISFM) technologies. Findings from the evaluation will be used to strengthen current activities, plan for future activities, and provide evidence of good practices to the broader stakeholder network in Nepal.

4) EVALUATION QUESTIONS

The following evaluation questions will guide the final evaluation process. In answering these questions, the evaluation team must analyze how the project has impacted women and other vulnerable groups.

Evaluation Area	Evaluation Question
Agriculture Production and Productivity	**1. What technologies and/or their combinations that NSAF is developing show high potential for increasing farmer productivity[57] based on changes in production in trials or other tests?** A. Who uses these technologies? B. How are they being disseminated? C. What technology scaling models are used by NSAF to reach all types of farmers? D. What is the perception of technology users regarding selected technologies with respect to cost, use, and productivity? E. How likely, and by whom, will these technologies be commercialized (produced and sold by the private sector)?
Seed Systems and Capacities	**2. To what extent are systems in place to take seed technologies to scale?** Consider the following as components of the seed system: A. Availability of seed (amount and quality of seed in the market and under research and development). B. Seed production (type, quality, volume and linkages among producers) C. Seed marketing/business development (quality of business plans, branding, outreach services, etc.). D. Role of GON (Central level) in policy and seed quality maintenance E. Variety release and registration.
Fertilizer Systems and Capacities	**3. To what extent are systems in place to take fertilizer technologies to scale?** Consider the following as components of the system: A. Research and Development on ISFM recommendations. B. Availability of fertilizer (amount and quality in the market; imports). C. Fertilizer distribution mechanisms (public and private sector). D. Role of GON in policy and fertilizer distribution.

5) EVALUATION DESIGN AND METHODOLOGY

The midterm evaluation for NSAF will be a performance evaluation relying on qualitative methods and secondary quantitative data analysis. The evaluation contractor will further refine a rigorous methodology, including a sampling strategy that will yield meaningful insights into key project outcomes as specified by the evaluation questions.

The evaluation team, in collaboration with USAID, will finalize the evaluation methodology before fieldwork begins. USAID expects that, at a minimum, the evaluation team will:

- Review and analyze the existing performance information/data;
- Conduct site visits for field testing survey instruments [when applicable and feasible];

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[57] Productivity is understood to represent total production by the area from where the production came from.

- Meet and interview USAID project participants, partners, and host government counterparts at appropriate levels;
- Interview USAID staff and a representative number of experts working in the sector.
- Spend approximately 40 days in the region carrying out this Statement of Work. Upon award, the team members shall familiarize themselves with documentation about the project and USAID's current assistance in the seed and fertilizer sector in the region. USAID will ensure that this documentation is available to the team before their arrival in the region.

Data Collection Methods

1) **Desk review of documents and secondary data**
    a. **Document review:** A thorough review of project documents including the M&E plan and theory of change, monitoring data, and secondary literature to identify key trends in agricultural production including seed production, food security, and market systems, among others, in Nepal.
    b. **Review of national, FTF ZOI districts and beneficiary statistics:** A thorough review of available data in NSAF areas, including baseline and beneficiary data collected by NSAF and trial data from technology trials; national statistics on agricultural productivity/yield; additional data on sale of products, consumption of inputs, and private sector investment in agriculture, among others.
2) **Primary data collection**
    a. **Focus group and key informant interviews:** FGDs and KIIs will be conducted with various stakeholders such as value chain associations, including women's groups, and beneficiaries to obtain a deeper insight into the different dimensions of change in capacities, context, attitudes, and perceptions of technologies and interventions.
    b. **Field observations:** The evaluation team should visit and make strategic observations of NSAF field sites, including trial locations, cooperative plots, public and private sector partners (GON offices, companies, agrovets, and others) to observe and validate quantitative data (from 1b). The observations can be done simultaneously with the focus group and key informant interviews.

Data Analysis

Primary and secondary data should be analyzed to respond to the three main questions, and sub-components listed above.

Quantitative secondary data analysis: Comparative analysis of existing data from NSAF field trials and national statistics on agricultural productivity/yield; analysis of sale of products, consumption of inputs, and private sector actors (number of agrovets, companies, wholesales, etc.), among others, by geographic, including notation of where NSAF partners are operating. The evaluation team should analyze these data, including using maps, to demonstrate geographical variations within the ZOI per NSAF's activities to date.

Qualitative data analysis: Systematic approach to coding, interpreting, and understanding the data. The focus group and in-depth interviews will be tape recorded with the consent of the participants. Along with interview notes, all tape-recorded data will be transcribed and translated into English0 and coded using Dedoose, a qualitative data analysis software.

Disaggregation: Data collection and analysis will be disaggregated by sex and <u>marginalization status</u> of target populations to discern differences and similarities of experiences, perceptions, needs, and barriers, among others.

The contractor will submit the preliminary evaluation design in response to the SOW, which will be

reviewed by USAID. The Evaluation Contracting Officer's Representative (COR) will approve the finalized evaluation design two weeks before the team's arrival in the country.
The evaluation design matrix should include a data analysis plan for each evaluation question. Requests of the offeror can include an explicit description of major limitations in data collection and analysis.
The evaluation must operate in line with the current USAID policy on the treatment of human subjects when applicable. The SOW can request that the offeror account for ethical considerations such as: Institutional Review Board (IRB) requirements (USAID and in-country), protocols for ensuring respondents are not harmed (i.e., "Do No Harm" principles—especially relevant if there are sensitive questions involved and/or in non-permissive environments), collection and safety of personally identifiable information (PII). (See USAID Scientific Research Policy.)

6) EVALUATION TEAM

The evaluation team will consist of experts comprising a range of skills directly relevant to the purpose of the NSAF midterm evaluation. The evaluation team will be composed of a team leader/evaluation expert, a sector specialist, an inclusive market systems expert, and field researchers.

Team Leader/Evaluation Expert (1): The Team Leader must have extensive experience working on or implementing FTF activities. S/he should have a postgraduate degree, in agricultural economics, economics, agribusiness or a related field in social sciences, with at least 10 years of experience leading and/or evaluating agricultural market development activities for USAID or other donor agencies. S/he should have experience leading evaluations and assessments for USAID and be familiar with current USAID evaluation policy and guidance and have experience with both quantitative and qualitative research methodologies. The Team Leader should have a background in statistics and evaluation methods. This experience should include the development of research questions, and critically examining the validity of results frameworks and theories of change within the context that projects are operating within. Experience in systems and sustainability analysis and assessing the development of agricultural market systems with experience in seed and/or fertilizer (or other agriculture inputs) systems or related. The ideal candidate will have excellent oral and written communication skills in English; writing samples from recent evaluations or reports, and three professional references will be requested.

Sector Specialist (1): The Sector Specialist is a senior expert on promoting agribusiness and agriculture sector should have extensive experience working with USAID or other donor agencies. The Sector Specialist should have a postgraduate degree, in business, agricultural economics, agronomy or a related field, from a recognized national or international university, with at least 10 years of experience working as a senior officer or researcher in agriculture and agribusiness, including with questions relating to agricultural input systems (seed and fertilizer preferred). Experience leading or serving as a senior technical expert, in agriculture sector evaluations and assessments for USAID or other donor entities is preferred. The ideal candidate will have excellent oral and written communication skills in English; writing samples and three professional references will be requested.

Market systems expert (1): The Market Systems expert should have explicit experience in Gender and Social Inclusion/inclusive market development and/or inclusive agriculture policy. S/he should have a minimum of a master's degree in social science or relevant subject area, and at least five years of experience as a member of an evaluation team. The Market Systems expert must have extensive knowledge about inclusive market systems and GESI issues in Nepal. This expert will work with the evaluation team to develop an evaluation methodology to assess how the project has affected women and other marginalized/vulnerable groups.

Field Researchers (3-6): The team will include Nepali Field Researchers with a master's degree or equivalent in social sciences, preferably in agriculture development studies, from a recognized national or international university with at least three years of experience working in the development sector, preferably with a focus on agriculture or a bachelor's degree with at least eight years of experience. They must have experience working with international organizations and stakeholders; knowledge of Tharu & Abadhi local languages, excellent oral and written communication skills in English; and demonstrable skills utilizing software applications such as excel, word, PowerPoint, etc.

7) KEY DOCUMENTS FOR REVIEW

- NSAF Annual Work Plans
- NSAF and other FTF M&E plans
- NSAF and other FTF Progress Reports (Annual, quarterly)
- FTF Multi-Year Strategy (MYS)
- GFSS Country plan
- Baseline Report
- Monitoring data
- Other studies, reports
    - Adoption and Diffusion Study (IFPRI)
    - Nepal FTF Population-Based Surveys (2013 and 2015)
    - NSAF Fertilizer study

8) KEY STAKEHOLDERS TO BE CONSULTED

The following are suggested stakeholders for the evaluation team to consult. The team will propose their target stakeholders as part of the evaluation design.

- NSAF participants
    - Seed companies
    - Fertilizer cooperatives
    - Agrovets
    - Market players/actors (retailers, agrovets, wholesalers, traders, and processors)
- GON officials (MOAD, SQCC and DoA, PMMP, SSD and SMD)
- NARC
- NEFEA, SEAN
- Banks and other financial institutions
- Relevant NGOs and INGOs
- USAID/Nepal and NSAF staff

9) TIMELINE FOR EVALUATION

The following is a tentative timeline for the evaluation tasks; the detailed timeline will be developed during the team planning meeting and as part of finalizing the evaluation design.

Timing (Anticipated Months or Duration)	Proposed Activities	Important Considerations/ Constraints
Nov-2018	• Sign consulting agreements (Oct-Nov)	
	• Desk Review	
	• Preparing the evaluation design and evaluation plan	
Dec-2018	• Preparing the evaluation instruments	
	• USAID Review of the evaluation plan and instruments	
	• Travel of team leader to Nepal	

	• USAID in-brief, NSAF team briefing and planning meetings	
Jan-2018	• Key Informant Interview (KII) with USAID staff, NSAF staff and key stakeholders in Kathmandu • Field data collection	
By mid of February 2019	• Sharing of preliminary findings (Debrief presentation)	
End of February 2019	• Finish transcription/translation of data, data coding, and analysis	
By the end of March 2019	• Consultants develop the draft report	
	• Consultants submit the draft report to MEL	
	• MEL revision of the draft report	
	• Draft report submitted to USAID	
Early- to mid-April 2019	• Recommendations workshop (timing contingent on availability and review time desired by Mission)	
	• Review of the draft report by USAID and NSAF team, provide prioritized comments	
By mid of May 2019	• The evaluation team incorporates feedback from the workshop and written comments.	
	• Iterative review by the MEL Activity and request for further changes.	
	• Copy edits	
	• Submission of the final evaluation report to USAID for final approval	

10) DELIVERABLES

The following is a set of evaluation deliverables, with the expected timing of each adhering to the above Evaluation Timeline.

1. **Evaluation Design:** Following the discussions of plan and design with the Mission, the evaluation team will start work on the evaluation design. The evaluation team must submit an evaluation design (which will become an Appendix to the Evaluation report). The final evaluation design will include: (1) Background and Project Description including Project Theory of Change; (2) Key Evaluation Questions; (3) Methodology (including data collection methods, sampling, and data analysis) (4) a detailed evaluation design matrix that links the Evaluation Questions in the SOW to data sources, methods, and the data analysis plan; (5) draft questionnaires and other data collection instruments or their main features[58]; (6) the list of potential interviewees and sites to be visited and proposed selection criteria and/or sampling plan (must include calculations and/or a justification of sample size, plans as to how the sampling frame will be developed, and the sampling methodology, where applicable); (7) Evaluation work plan including the anticipated schedule and logistical arrangements and a list of the members of the evaluation team, delineated by roles and responsibilities; (8) known limitations to the evaluation design; and (9) a dissemination plan.

[58] Data collection instruments can be provided separately as developed and included in the final devaluation design.

2. **Discussion of plan and design:** An in-briefing with USAID/Nepal upon the Team Leader's arrival in Nepal for introductions and to discuss the team's understanding of the assignment, initial assumptions, evaluation questions, methodology, and work plan, and/or to adjust the Statement of Work (SOW), and the evaluation design, if necessary.
3. **Sharing of initial findings with the Mission and IP (Debriefing session):** At the end of the fieldwork and after time for internal analysis (about 10 working days) the evaluation team is expected to conduct a debriefing session and share their initial findings to the Mission and IP separately. This presentation of findings will provide an opportunity for the Mission and IP to validate any factual inaccuracies and develop better ownership of the outcomes of the evaluation later. The informal document shared could also provide an overview of the likely conclusions that seem to be emerging based on the team's reflection of data collection work.
4. **Draft Evaluation Report:** The contractor will submit a draft evaluation report of not more than 25 pages in length, single-spaced in TNR 12-point font, excluding Appendixes, with an executive summary within nine weeks of the Team Leader's arrival in Nepal. See section 8A below for details on requirements of the final report.
5. **Recommendation workshop:** Approximately a week after sharing the draft report (contingent on Mission and IP availability), the team will undertake a one-day joint workshop with USAID and IP with a brainstorming session and facilitated discussions to ground-truth conclusions and recommendations for the final report.
6. **Final Evaluation Report:** A final evaluation report of not more than 25 pages in length, single-spaced in TNR 12-point font, excluding Appendices, within 10 working days of receipt of consolidated comments in electronic format from USAID. All the qualitative data collected as part of this evaluation must be submitted as an appendix to the final report, either in summarized format or transcripts, with PII removed. The Final approved evaluation report must be submitted to the Development Experience Clearing House (DEC).

11) EVALUATION REPORT CRITERIA

A. FINAL REPORT FORMAT

The final evaluation report should include an abstract; executive summary; background of the local context and the strategies/projects/activities being evaluated; the evaluation purpose and main evaluation questions; the methodology or methodologies; the limitations to the evaluation; findings, conclusions, and recommendations. For more detail, see "How-To Note: Preparing Evaluation Reports" and **ADS 201mah, USAID Evaluation Report Requirements**. An optional evaluation report template is available in the Evaluation Toolkit.

The executive summary should be 3–5 pages in length and summarize the purpose, background of the project being evaluated, main evaluation questions, methods, findings, conclusions, and recommendations and lessons learned (if applicable).

The evaluation methodology shall be explained in the report in detail. Limitations to the evaluation shall be disclosed in the report, with attention to the limitations associated with the evaluation methodology (e.g., selection bias, recall bias, unobservable differences between comparator groups, etc.)

The Appendixes to the report shall include:

- The Evaluation SOW.
- Any statements of difference regarding significant unresolved differences of opinion by funders, implementers, and/or members of the evaluation team.
- All data collection and analysis tools used in conducting the evaluation, such as questionnaires, checklists, and discussion guides.
- All sources of information properly identified and listed.
- Signed disclosure of conflict of interest forms for all evaluation team members, either attesting to a lack of conflicts of interest or describing existing conflicts of.
- Any "statements of difference" regarding significant unresolved differences of opinion by funders, implementers, and/or members of the evaluation team.
- Summary information about evaluation team members, including qualifications, experience, and role on the team.

In accordance with ADS 201, the contractor will make the final evaluation reports publicly available through the Development Experience Clearinghouse within three months of the evaluation's conclusion.

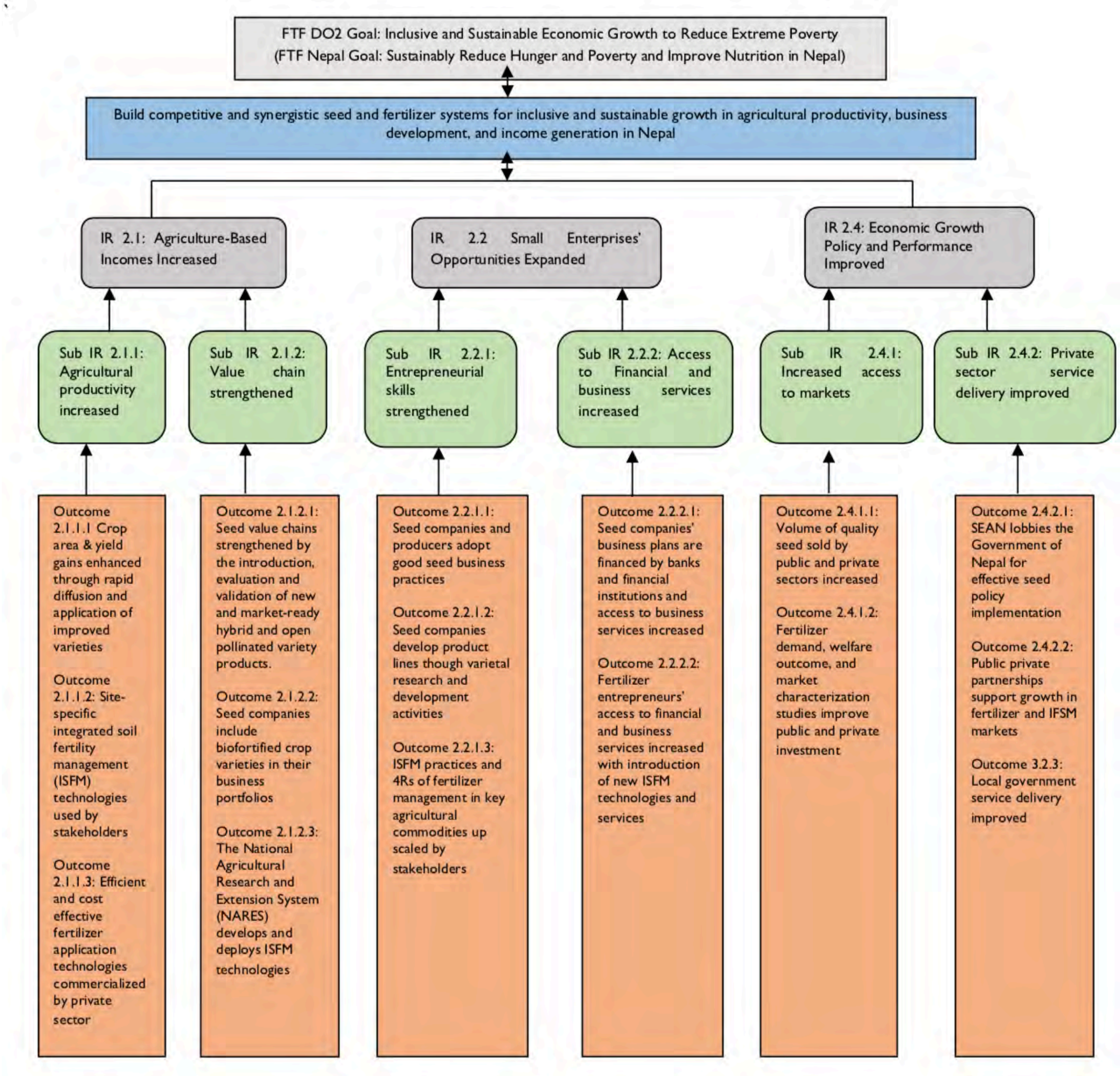
B. CRITERIA TO ENSURE THE QUALITY OF THE EVALUATION REPORT

Per **ADS 201maa, Criteria to Ensure the Quality of the Evaluation Report**, draft and final evaluation reports will be evaluated against the following criteria to ensure the quality of the evaluation report.

- Evaluation reports should represent a thoughtful, well-researched, and well-organized effort to objectively evaluate the strategy, project, or activity.
- Evaluation reports should be readily understood and should identify key points clearly, distinctly, and succinctly.
- The Executive Summary of an evaluation report should present a concise and accurate statement of the most critical elements of the report.

- Evaluation reports should adequately address all evaluation questions included in the SOW, or the evaluation questions subsequently revised and documented in consultation and agreement with USAID.
- Evaluation methodology should be explained in detail and sources of information properly identified.
- Limitations to the evaluation should be adequately disclosed in the report, with particular attention to the limitations associated with the evaluation methodology (selection bias, recall bias, unobservable differences between comparator groups, etc.).
- Evaluation findings should be presented as analyzed facts, evidence, and data and not based on anecdotes, hearsay, or simply the compilation of people's opinions.
- Findings and conclusions should be specific, concise, and supported by strong quantitative or qualitative evidence.
- If evaluation findings assess person-level outcomes or impact, they should also be separately assessed for both males and females.
- If recommendations are included, they should be supported by a specific set of findings and should be action-oriented, practical, and specific.

APPENDIX II: RESULTS FRAMEWORK



Source: NSAF Semi-Annual Progress Report No 2, Year Two – October 2017 To March 2018 Appendix 1

APPENDIX III: SUPPLEMENTARY USAID QUESTIONS

Evaluation Area	Evaluation Question
Agriculture production and productivity	**1. What technologies and/or their combinations that NSAF is developing show high potential for increasing farmer productivity based on changes in production in trials or other tests?** a. Who uses these technologies? b. How are they being disseminated? c. What dissemination models reach all types of farmers? d. How likely is it these technologies to be commercialized and by whom (produced and sold by the private sector)?
Seed systems and capacities	**2. To what extent are systems in place to take seed technologies to scale?** Consider the following as components of the seed system: ● Availability of seed (amount and quality of seed in the market): o How has the availability of seed changed for farmers and the private sector since working with NSAF? o What changes have been made to seed distribution and marketing since NSAF? o How has the seed quality control system changed since working with NSAF? What models show potential? What gaps still exist? o How has NSAF affected barriers to access quality seeds (information, R&D, market channels, etc.)? ● Seed production (type, quality, volume, and linkages among producers): o How has NSAF facilitated relationships/partnerships between public and private sector institutions? o What is the role of NSAF in developing and popularizing new seed varieties in the market? Are new varieties meeting farmers' needs? o What is the capacity of the private sector after the intervention of NSAF in the following: ▪ Commercially maintaining the inbred line? ▪ Commercial multiplication of seeds? ▪ New products evaluation and validation? ● Seed marketing/business development (quality of business plans, branding, services, etc.): o How have seed companies made changes to their business plans and/or marketing to improve quality seed distribution and/or address gaps in the seed system? o To what extent have seed companies taken on the role of providing extension services to farmers? o In NSAF areas, how has demand for improved seed changed among farmers and agrovets since NSAF became operational? o To what extent has NSAF improved access to agriculture lending for private seed companies and seed producers? ● Role of GON in policy and seed quality maintenance: o How has NSAF facilitated dialogue within the GON on seed systems, seed policy gaps, and opportunities? o How is GON's seed balance sheet maintained? o To what extent have projects intervention stimulated upgrades in the

	system (seed information system/balance sheet)?
Fertilizer systems and capacities	**3. To what extent are systems in place to take fertilizer technologies to scale?** Consider the following as components of the system: • Availability of fertilizer (the amount and quality in the market; imports): o How has NSAF identified and addressed gaps in fertilizer availability for both the public and private sectors? o What steps has the public and private sector initiated as a result of working with NSAF on fertilizer availability and distribution? o How has the fertilizer quality control system changed since working with NSAF? o To what extent are farmers using recommended NSAF fertilizer application rates and methodologies? o What steps has the GON taken to better forecast fertilizer demand and supply as a result of NSAF activities? • Fertilizer distribution mechanisms (public and private sector): o How has NSAF reduced barriers to, and/or expanded the reach of agricultural services (fertilizer application technologies, ISFM extension, etc.) and inputs (fertilizers)? o How and why has the private sector changed its approach to fertilizer importation and distribution since working with NSAF? o What steps have been taken by NSAF to build the capacity of the private sector to procure, add value, and distribute fertilizers? • The role of the GON in policy and fertilizer distribution: o How has NSAF facilitated dialogue within the GON on fertilizer policy gaps and opportunities? o How does the policy environment for private sector engagement in fertilizer affect distribution? What steps is NSAF taking to address these issues? o How has NSAF facilitated relationships/partnerships between public and private sector institutions to address fertilizer policy challenges?

APPENDIX IV: REVIEWED LITERATURE

Title
Regional Level
Cereal Systems Initiative for South Asia in Nepal (CSISA-NP) Agronomy & Seed Systems Scaling Annual Report, October 2017
USAID Regional Trade in Seed, Fertilizer, and Strategic Grains: A Review of the Legal, Regulatory, and Institutional Constraints to Growth Across South Asia, April 2014
USAID Cereal Systems Initiative for South Asia (CSISA) Phase II Evaluation Report
National, USAID Level (For Context)
Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development Singhdurbar
Feed the Future Initiative Nepal Strategy, May 2011
Feed the Future Nepal 2015 Zone of Influence Interim Assessment Report, July 2016
Feed the Future Nepal FY 2011–2015 Multi-Year Strategy U.S. Government Document
Feed the Future Nepal Zone of Influence Baseline Report, December 2013
Feed the Future The Global Food Security Strategy (GFSS) Nepal Country Plan, April 18, 2018
Government of Nepal Office of the Investment Board Invitation for Expression of Interest for A Feasibility Study to Establish a Chemical Fertilizer Plant in Nepal (March 2014)
Government of Nepal, National Seed Policy 1999 (2056 BS)
Government of Nepal, The Seeds Act, 2045 (1988)
Ministry of Finance, Government of Nepal (May 29, 2019), Budget Speech of Fiscal Year 2019/20
IFPRI (Aug 2017) Adoption and Diffusion of Agricultural Technologies in Nepal: Status, Determinants, and Impact
IFPRI (Sept 2017) Political Economy of Fertilizer Subsidy Reform in Nepal September 2017 * Draft *
International Food Policy Research Institute (IFPRI), Adoption and Diffusion of Agricultural Technologies in Nepal: Determinants and Impact, New Delhi, August 2017
LI-BIRD and The Development Fund. 2017. Farmers' Seed Systems in Nepal: Review of National Legislations. Pokhara, Nepal: LI-BIRD.
Ministry of Agricultural Development Nepal: Zero Hunger Challenge National Action Plan (2016 - 2025) February 2016
Ministry of Agricultural Development Statistical Information on Nepalese Agriculture 2014 / 2015
Ministry of Agricultural Development Statistical Information on Nepalese Agriculture 2016 / 2017
Ministry of Agricultural Development, National Seed Vision 2013 - 2025 (Seed Sector Development Strategy)
National Planning Commission, Strategic Review of Food Security and Nutrition in Nepal. A study conducted by NARMA Government of Nepal 2018
Seed Entrepreneurs' Association of Nepal (SEAN) List of Members
Seed Quality control Centre, Seed Related Legal Mechanism and Institutions in Nepal by Dila Ram Bhandari Chief Seed Development Officer
Synopsis of Policies, Plans, and Programmes On Agriculture Development in Nepal Final Report Practical Action, Central Office Kathmandu, Nepal; March 2012
The Journal of Agriculture and Environment Vol: 11, Jun.2010 Review Paper: Fertilizer Policy Development in Nepal Ram Krishna Shrestha, MSc
USAID Final Report Baseline Study of Food for Peace Development Food Assistance Projects in Nepal, February 14, 2017
USAID Gender Equality Social Inclusion Analysis Knowledge-Based Integrated Sustainable Agriculture in Nepal (KISAN II), November 10, 2016
USAID GESI Action Plan Date: Aug 15, 2016 Version: Draft 2.0
USAID Global Food Security Strategy (GFSS) Nepal Country Plan, April 18, 2018

USAID Nepal Fact Sheet Feed the Future Seed and Fertilizer Project
Program Level
Cornell Chronicle, Community-based Seed System Initiative Thrives in Nepal 7/30/2018
Ministry of Health, 2016 Demographic and Health Survey
Nepal Food Security Monitoring System Nepal (NeKSAP) Brief on the Food Security Situation in Nepal Reporting period: Mid-July to mid-November 2017
Nepal Food Security Monitoring System (NeKSAP) August 2018 Market Watch - 89
NSAF Annual Work Plan Year II, 1 October 2017 – 30 September 2018
NSAF Annual Work Plan – Year 3, 1 October 2018 – 30 September 2019
NSAF Fertilizer Market System: An Overview of NSAF Interventions and Scaling Approach Draft March 2019
NSAF GESI Action Plan, Aug 15, 2016
NSAF Preliminary Results of Field Trials and Demo Data 2017 – 2018
NSAF Project Baseline Survey FY 2017 Final Report
NSAF Project Annual Report Year 1: April 1, 2016 – September 30, 2017
NSAF Project Annual Work Plan Year 1: 1st April 2016 – 31st March 2017
NSAF Project MEL Plan Appendix 1: Summary of Performance Indicators Tracking Table (PITT)
NSAF Project Monitoring, Evaluation and Learning Plan, 16 August 2016 Version: Draft 2.1
NSAF Project Monitoring, Evaluation and Learning Plan, July 2016
NSAF Project Nepal FTFMS data November 2017 BFS comments – NSAF Dec 22 updated by lava (1)
NSAF Project Response to USAID Comments on NSAF Semi-Annual Report Oct 16 to March 17
NSAF Project Review of Nepal Seed and Fertilizer M&E Plan Summary Sheet
NSAF Project Semi-Annual Progress Report No 2, Year One – October 2016 to March 2017
NSAF Project Semi-Annual Progress Report 1 April 1 to September 30, 2016
NSAF Project Semi-Annual Report Year 2: October 1, 2017 – March 31, 2018
NSAF Project Updated Results Framework (2017)
WFP Nepal Country Brief September 2018

APPENDIX V: GETTING TO ANSWERS MATRIX

Sub Question	Measures	Data Sources	Methodology / Tool	Data Analysis
Technology Potential				
1. What technologies and/or their combinations that NSAF is developing show high potential for increasing farmer productivity based on changes in production in trials or other tests?	The productivity potential of NSAF technologies (i.e., seed varieties, crop treatments, sowing, fertilizer application, and urea products) and their combinations.	• GON officials (at the national, regional, and district levels) • NSAF program staff • NSAF partners • Private sector actors • Development partners, NGOs, and other projects	• NSAF trial data • Other test data • National data • KIIs/FGDs • Field observations	• Quantitative data analysis of trial and test results • Comparative analysis of NSAF field trials to national statistics • Triangulation to qualitative views/perspectives on demand/market potential and field observation to confirm potential
A. Who uses these technologies?	Technology users	• NSAF program staff • Community-level organizations (cooperatives) • Farmers (seed producer farmers of companies) • GON officials (at the district/local level)	• NSAF data • KIIs • Field observations	• Listing of users crosschecked and compared to KII/FGD results and observations • Gender/youth/social analysis – percentages engaged, trends, types of users (i.e., small/large scale farmers)
B. How are they being disseminated?	• Types of technology dissemination mechanism • Events – farmer field days; demonstrations, trader meetings, farmer meetings. Training of trainers (TOTs) for agrovets, government agencies, radio promotions; ICT tools, etc.	• NSAF program staff • Community-level organizations • Farmers • Agrovets • GON officials (at the district/local level)	• KIIs • NSAF reports • Field observations	• Compile a list of technology dissemination mechanisms, cross-checked and compared to KII/FGD results and observations
C. What technology scaling models are used by NSAF to reach all types of farmers?	• NSAF technology scaling models (market-led, and private sector driven; public-private partnerships (PPP) approach; fast-tracking systems; branding and marketing; and business	• NSAF program staff • Community-level organizations • Farmers • Hybrid seed production guidelines, GON officials (at	• KIIs • NSAF reports • Field observations	• Compile a list of NSAF technology dissemination mechanisms, crosschecked and compared to KII/FGD results and observations

Sub Question	Measures	Data Sources	Methodology / Tool	Data Analysis
	associations • Cost sharing models with private seed companies	the district/local level)		
D. What is the perception of the technology users regarding selected technologies with respect to cost, use, and productivity?	• Cost, use and productivity perceptions of technology users (farmers/others) for selected technologies	• Technology users (seed companies, fertilizer traders, seed producers, and participating farmers of cooperatives, etc.)	• FGD – discuss each criterion to collect perceptions of the technology from the discussion • KIIs with individual seed companies	• Content Analysis - identification of common perception themes/word frequencies and notable differences between the three criteria.
E. How likely, and by whom, will these technologies be commercialized (produced and sold by the private sector)?	• Margins (current/potential) for actors in the value chain • Current and potential markets (market volumes, values) • Current and potential end buyers (who, when, volumes demanded, ability to pay)	• Private sector actors • Banks/financial institutions • Government programs, such as PMAMP	• KIIs structured around technologies	• Margin analysis • Demand analysis – market size (values, volumes) • Assessment of commercial interest – to lend/invest (amounts/terms)
Seed System				
2. To what extent are systems in place to take seed technologies to scale? Consider A to D below as components of the seed system:	• End markets • Business enabling environment (Link to 2D below) • Linkage (vertical, horizontal – include consideration of human/organization capacity for scale at the different levels – link to 2C below) • Support markets • Value chain governance • Inter-firm relationships	Actors in the Seed Value Chain • Agrovets • National Seed Company Ltd. • Wholesalers • Seed companies • SQCC • CBSPs, coops • Nepal Agricultural Research Council (NARC) • GON officials (at the national, regional, and district levels) **Observers** • Development partners • Relevant NGO	• KII • Secondary data • Field observations	Market systems/value chain analysis including: • Situation analysis • Opportunities for scale • Constraints to scale

Sub Question	Measures	Data Sources	Methodology / Tool	Data Analysis
A. Availability of seed	Amount and quality of seed in the market and under research and development	• Seed companies • NARC • SQCC • CBSPs, coops • GON	• KIIs • Available secondary data on seed stock and trade levels • Field observations	• Quantitative analysis of available data • Map estimates of volumes and qualities at different levels of the seed system • Triangulate and compare to KII/FGD results and observations
B. Seed production	Seed type, quality, and volumes produced	• Seed companies • SQCC • CBSPs, coops • GON	• KIIs • Available secondary data on seed production (present and forecast) • Field observations	• Quantitative analysis of available data • Map estimates of production volumes, qualities, and trends for each seed type • Triangulate and compare to KII/FGD results and observations
C. Seed marketing/business development	• Quality of business plans, branding, outreach services, finance/funding, human and organizational capacity	• Private sector actors • Outreach service providers (agrovets) • Funding/finance organizations • SQCC and RSTL • CBSPs, coops • NARC • NSAF partners	• KIIs • Review of business plans and branding • Secondary data on marketing/business capacity	• Review current marketing and business development capacity and compare to required capacity (Capacity Needs Assessment) • Compare to secondary data
D. Role of GON (at the central level) in policy and seed quality maintenance	• Strengths, weaknesses, opportunities, and threats (SWOT) of GON in policy and seed quality maintenance	• GON officials (at the national, regional, and district levels) • USAID officials • NSAF program staff and partners • Private sector actors • Development partners, NGOs, and other projects	• KIIs • Field observations • Secondary literature, esp. regional experience	• SWOT analysis • Compare to regional experience
E. Variety release and registration	• Varieties released and registered (present and future plans) • Effectiveness and efficiency of the registration process	• Actors involved in seed release and registration (NARC)	• KIIs • Collect available quantitative data	• Quantitative analysis of available data • Map volumes for the different seed varieties/types

Sub Question	Measures	Data Sources	Methodology / Tool	Data Analysis
Fertilizer System				
3. To what extent are systems in place to take fertilizer technologies to scale? Consider A to D below as components of the fertilizer system.	• End markets • Business enabling environment (link to 3D below) • Linkage (Vertical, horizontal – include consideration of capacity for scale at the different levels – linked to 3C below) • Support markets • Value chain governance/market power • Inter-firm relationships59	• Actors in the Fertilizer Value Chain, including: • Cooperatives • Agriculture Input Company Limited (AICL) • National Planning Commission (NPC) • Chief district officers/district coordination committee (DCC) • MoALD • Private sector (importers, wholesalers, retailers) • Observers • Development partners • Relevant NGO	• KIIs • Secondary data • Field observations	• Market systems/value chain analysis including: • Situation analysis • Opportunities for scale • Constraints to scale
A. Research and Development on ISFM recommendations (4 Rs of fertilizer use; BMPS)	• Performance data and endorsements from stakeholders	• Actors involved in ISFM R&D: • NARC • MoALD • Private sector • (Fertilizer companies, importers, ICT companies)	• KIIs • Collect available quantitative data	• Quantitative analysis of available data • Map volumes for the different fertilizer varieties/types
B. Availability of fertilizer	• Amount and quality in the market • Systems for improving access and availability of fertilizers and domain-specific recommendations (fertilizer blends/new products)	• Formal Actors involved sourcing, transporting, storing and distributing fertilizer • AICL • NPC • Chief district officers / DCC • Informal fertilizer traders, wholesalers, stockists	• KIIs • Available secondary data on fertilizer import, stock and trade levels. • Field observations	• Quantitative analysis of available data • Map estimates of volumes and types at different levels of the fertilizer system • Triangulate and compare to KII/FGD results and observations
C. Fertilizer distribution mechanisms	• Linkages/mechanisms in public and private sectors –	• Actors involved distributing fertilizer	• KIIs • NSAF reports	• Map distribution networks and linkages

[59] Measures based on https://www.marketlinks.org/good-practice-center/value-chain-wiki/326-value-chain-analysis-table

Sub Question	Measures	Data Sources	Methodology / Tool	Data Analysis
	Values, volumes, and timeliness • Fertilizer business intelligence systems	• AICL • NPC • Chief district officers/DCC • Informal fertilizer traders, wholesalers, stockists	• Secondary literature • Field observations	• Quantitative analysis of available volume and value data • Triangulate and compare to KII/FGD results and observations
D. Role of GON in policy and fertilizer distribution	• SWOT of GON in policy and distribution • SWOT of NSAF ISFM policy interventions	• GON officials (at the national, regional, and district levels) • USAID officials • NSAF program staff • NSAF partners • Private sector actors • Development partners, NGOs, and other projects	• KIIs • Field observations • Secondary literature, esp. regional experience	• SWOT analysis • Compare to regional experience

APPENDIX VI: DETAILED METHODOLOGY

Sample Selection Methodology:

Stakeholders to be included for the study were selected based on the scope of work, team review of data, and recommendations made during initial briefing meetings. Additional interviewees also were identified during fieldwork. The list of stakeholders consulted during the evaluation are listed in the table below:

List of Interviews in Kathmandu

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
1.	7 January 2019	NSAF	CIMMYT Office, Satdobato	Seed component staff	GD
2.	7 January, 2019	NSAF	CIMMYT Office, Satdobato	Fertilizer component staff	GD
3.	18 January, 2019	NSAF	CIMMYT Office, Satdobato	Chief of Party, Project Coordinator, M&E Specialist	GD
4.	7 January 2019	KISAN, MEL director	Sanepa, Lalitpur	Sunil Regmi	KII
5.	8 January, 2019	Seed Entrepreneurs' Association of Nepal (SEAN), program coordinator	Tripureswor, Kathmandu	Lalu Prasad Acharya	KII
6.	8 January, 2019	Crop development director (CDD)	Pulchowk, Lalitpur	Shabnam Shiwakoti	KII
7.	8 January, 2019	CEAPRED, research program coordinator	CEAPRED office, Sanepa	Anil Kumar Acharya –and Keshav Datta Joshi	KII
8.	8 January, 2019	Nepal Agricultural Research Council (NARC)	SinghDurbar Plaza, Kathmandu	Kamal Shah, Supra Pandey, Ramesh Acharya, Deepak Bhandari	KII
9.	9 January, 2019	Prime Minister Agriculture Mechanization Project	Khumaltar, Lalitpur	Parashuram Rat	KII
10.	9 January, 2019	NEFEA	Kathmandu	Chandra Kanta Dallakoti	KII
11.	10 January, 2019	Ministry of Agriculture and Livestock Development (MALD), Joint Secretary	SinghDurbar Plaza, Kathmandu	Tej Bahadhur Subedi	KII
12.	11 January, 2019	National Planning Commission (NPC)	SinghDurbar Plaza, Kathmandu	Mahesh Kharel	KII
13.	13 January, 2019	National Seed Company	Teku, Kathmandu	Chief	KII
14.	25 January, 2019	Agriculture Input Company Limited (AICL)	Teku, Kathmandu	Achyut prasad Poudel	KII
15.	January 2019	Agriculture lab	Pulchowk, Lalitpur	Harihar Adhikari, Prakash Poudel	KII
16.	31 January 2019	Salt Trading Corporation	Teku, Kathmandu	Pankaj Joshi	KII
17.	8 January, 2019	Seed Quality Control Center	SinghDurbar Plaza, Kathmandu	Madan Thapa	KII

List of Interviews in the Kavre District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
18.	14 January 2019	Agriculture Knowledge Center (AKC)	Dhulikhel, Kavre	Krishna Bhadra Adhikari	KII
19	14 January 2019	Prime Minister Agriculture Mechanization Project (PMAMP)	Kavre, Banepa	Madhu sudan Ghimire	KII
20	14 February 2019	SURYA Bhakta Store Private Limited	Banepa, Kavre	Roshan Shrestha	KII
21	14 January 2019	FGD with non-NSAF female	Dhulikhel Narayanthan, Kavre	Female farmers	FGD
22	14 January 2019	Saraswati Krishi Sahakari,	Kavre	JK Makaju Shrestha	KII
23	15 January 2019	Paanchkhaal Seed and Agrovets center	Paanchkhaal, Kavre	Saroj Sapkota	KII
24	15 January 2019	Extension Agent Agriculture office	Paachkhal, Kavre	Rameswore Shrestha	KI
25	15 January 2019	Tulasi Agro Center, Hokse	Hokse, Kavre	Tulasi Prasad Dhungana	KII
26	16 January 2019	Sana Kishan Krishi Sahakari,	Rabiopi, Kavre	Ramesh Koirala	KII
27	16 January 2019	Extension Agent, District Agriculture Office	Bhakundebesi, Kavre	Anjan Poudel	KII
28	16 January 2019	Hariyali Seed Company ltd	Sindhupalchowk	DB Bhandari	KII
29	16 January 2019	Laxmi Micro Finance Ltd	Bhakundebesi, Kavre	Dosh Bdr Thapa	KII
30	16 January 2019	NSAF community volunteer/trial coordinator	Rabiopi, Kavre	Navaraj Koirala	KII
31	16 January 2019	FGD farmer group	Rabiopi, Kavre	Farmers	FGD
32	16 January 2019	Atmanirvar Cooperative Ltd	Rabiopi, Kavre	Kedar Sapkota	KII
33	16 January 2019	District Administration Office, CDO	Dhulikhel, Kavre	Krishna Bahadur Rawat	KII
34	17 January 2019	District Self Sufficiency Program (DSSPRO)	Kavre	Khadga Bahadur BC	KII
35	17 January 2019	FGD with female beneficiaries	Methinkot Namobuddha-4,	Female beneficiaries	FGD
36	17 February 2019	Kavre Krishi Bajar	Banepa, Kavre	Purna Chandra Sigdel	KII
37	17 January 2019	Samridda Kavre Krishi Sahakari	Banepa, Kavre	Jayaram Sigdel	KII
38	17 January 2019	Jorsalla vegetables seed producers cooperative Ltd	Jorsalla, Kavre	Sher Bahadur Mijar, Rudra Bahadur Bisunkhe	KII
39	18 January 2019	Agriculture Input Company Limited (AICL)	Dhulikhel, Kavre	Basudev Sharma	KII
40	18 January 2019	District NGO Federation,	Kavre	Padam Dulal	KII

List of Interviews in the Kailai District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
41	17 January 2019	CDO, District Administration Office	Dhangadi, Kailali	Babu Krishna Shrestha	KII
42	17 January 2019	NSAF CV	Badhaipur, Kailali	Pabitra Chapagain	KII
43	17 January 2019	Ministry of Land Management, Agriculture and Cooperative	Dhangadi, Kailali	Rabindra Bahadur Pradhan	KII

44	17 January 2019	Prime Minister Agriculture Mechanization Project (PMAMP)	Udashipur, Kailali	Govinda raj Joshi	KII
45	21 January 2019	NSAF, Assistant Research Associate, Field Research Technician	Dhangadi, Kailali	Darwin Joshi, Uttam Kunwar	KII
46	21 January 2019	Unique Seeds Farmers, FGD	Kailali Gaun, Kailali	Unique seed female beneficiaries	FGD
47	22 January 2019	Ghortal Krishi Sahakari Sanstha LTD	Pachmudiya, Kailali	Mihilal Chaudhary	KII
48	22 January 2019	Sana Kishan Krishi Sahakari Sanstha	Gauri Ganga Rural Municipality, Kailali	Bandana Joshi	KII
49	22 January 2019	Mahila Krishak Sahakari	Baluwafata, Kailali	Fulpati Chaudhary	KII
50	22 January 2019	Farmers engaged in Trial	Baluwafata, Kanchanpur	Farmers	FGD
51	22 January 2019	Unique Seeds Company	Dhangadi, Kailali	Dipendra Dhakal, Laxmi Dhakal, Lok Raj	KII
52	22 January 2019	Farmers engaged in IPM,	Dhangadi, Kailali	Ram Pyari Chaudhary	FGD
53	22 January 2019	Panchashakti Seed Company	Dhangadi, Kailali	Rajendra Kunjera, Om Prakash Paneru	KII
54	23 January 2019	Agriculture Input Company Limited (AICL)	Dhangadi, Kailali	Nawal Singh Bogati	KII
55	23 January 2019	Agriculture unit Dhangadhi sub Metropolitan city	Dhangadi, Kailali	Suhasini Chaudhary	KII
56	23 January 2019	Krishak Sahayog Kendra	Dhangadi, Kailali	Laxmi Kanta Dhakal	KII
57	23 January 2019	National Seed Company	Dhangadi, Kailali	Madhu Sharma Ojha	KII
58	23 January 2019	Extension Agent National seed company	Dhangadi, Kailali	Ramesh Bhattarai	KII
59	23 January 2019	Nepal Salt Trading	Dhangadi, Kailali	Assistant Managing Director	KII
60	24 January 2019	Beej Briddhi Sahakari, President	Munuwa, Kailali	Ramfal Badayek	KII

List of Interviews in the Banke District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
61	18 January 2019	Farmer group Trainee (FGD) Shree Upakar Sahakari Sanstha LTD	Betahini, Banke	Farmers	FGD
62	25 January 2019	NSAF district office (Seed component)	Nepalgunj, Banke	Darbin Joshi, Arun Thapa, Jivan Shrestha	KII
63	25 January 2019	National Grain Legume Research Center, Coordinator/Senior Scientist	Khajura, Banke	Rajendra Darai	KII
64	25 January 2019	Siddha Baba Agrovet	Samjhana Bazar, Banke	Ganesh Basnet	KII
65	25 January 2019	Laxmi microfinance	Sitapur, Nepalgunj, Banke	lalijan Aidi, Maya Chaudhari, Dipendra	KII
66	25 January 2019	NSAF district office (Fertilizer)	Nepalgunj, Banke	Roshan Shah, Surya Bahadur Thapa	KII
67	25 January 2019	RARS Scientists	Khajura, Banke	Gobinda K.c, Kamana, Ramdass	KII
68	25 January 2019	RARS	Khajura, Banke	Gautam Shrestha,	KII

				Bandhu Raj Baral	
69	25 January, 2019	Gate Nepal seed company	Lalpur, Banke	Tikaram Rijal, Heaven Shahi, Tej Khadka,	KII
70	26 January 2019	Kunal Traders (Agrovet)	Nepalgunj, Banke	Kunal Baishya	KII
71	26 January 2019	Modern Agrovet,	Nepalgunj, Banke	Kiran Khanal	KII
72	27 January 2019	Gupta Daal Mill (owner), Pramod Gupta	Nepalgunj, Banke	Pramod Gupta	KII
73	27 January 2019	Muslim Krishak Samuha (FGD, Trainee Farmers)	Bankatti, Banke	Not mentioned	FGD
74	27 January 2019	Salt Trading Cooperation (Assistant Manager)	Nepalgunj, Banke	Dhirendra Shrestha	KII
75	27 January 2019	Akram Vegetable wholeseller	Nepalgunj, Banke	Mohammad Akram	KII
76	28 January 2019	Shree Suryodaya community Agri Cooperative Sanstha Ltd	Sitapur, Banke	Arjun Kumar Shrestha	KII
77	28 January 2019	Nepal Bangladesh Bank	Nepalgunj, Banke	Keshav Gautam	KII
78	28 January 2019	NSAF, Community Volunteer,	Sitapur, Banke	Indira Lamichhane	KII
79	28 January 2019	Fertilizer Trial and Demo Farmers (Shree Suryodaya community Agri Cooperative Sanstha Ltd)	Sitapur, Banke	Trial and Demo farmers	FGD

List of Interviews in the Dang District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
80	28 January 2019	Gorkha Seed Company,	Bijauri, Dang	Bishnu Marahatta, Pashupati Sharma	KII
81	29 January 2019	NASIC Seed Company	Dang	Basanta Ranabhat, Hariraj Bhattarai	KII
82	29 January 2019	CEPREAD, Local technical Assistant,	Satbariya, Dang	Bhuma Chaudhari	KII
83	29 January 2019	Trial Farmer (CEAPRED, Tomato)	Rampur, Dang	Sher Bahadur Chaudhary	KII
84	1 February 2019	Trial farmer (Cauliflower),	Rampur, Dang	Hira Lal Chaudhary	KII
85	2 February 2019	Trial farmer (CEPREAD,	Satbariya, Dang	Due Mani Chaudhari	KII
86	2 February 2019	Trial farmer (Tomato)	Satbariya, Dang	Thaguram Chaudhary	KII
87	2 February 2019	NSAF Field Research Technician,	Dang	Resham KC	KII

List of Interviews in the Salyan District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
88	30 January 2019	Abha Agovet	Shree Nagar, Salyan	Yam Bahadur Dangi	KII
89	30 January 2019	Garijyula Krishi cooperatives, Chairman and secretary	Lanti bazar, Salyan	Hemalal Bohara, Sharad Kumar Shrestha	KII
90	30 January 2019	SEAN Seed	Lanti bazar, Salyan	Amrit Chaudhary, Arjun Chand	KII
91	30 January 2019	Prime Ministers Agricultural Modernization Program	Shitalpati, Salyan	Ram Prasad Gautam	KII
92	30 January 2019	Seed producer farmer (Trial Farmer)	Barala, Salyan	Jagat Bhandari	KII

93	30 January 2019	Seed producer farmer (Trial Farmer)	Shankhamool, Salyan	Indra Bahadur Budhathoki	KII
94	30 January 2019	Farmer engaged in varietal Trial	Lanti bazar, Salyan	Motiram Oli	KII
95	31 January 2019	Salt Trading Corporation	Salyan	Bijay Kumar Paswan	KII
96	31 January 2019	Seed producer farmer (Trial Farmer)	Damachaur, Salyan	Deep Bahadur Chand	KII
97	31 January 2019	Agriculture Service center, Horticulture Officer	Salyan	Chop Narayan Khanal	KII
98	31 January 2019	Seed producer farmer	Damachaur, Salyan	Janak Bohora	KII
99	31 January 2019	Chief District officer	Salyan	Kamal Dhakal	KII
100	30 January, 2019	Chattreswori municipality	Chattreswori municipality, Salyan	Amar Magar, Amar Rawat	KII
101	31 January 2019	District coordination center office, District coordination officer	Salyan	Mohan Khadka	KII
102	31 January 2019	Farmer engaged in trials	Bistachaur, Salyan	Pabitra K.c, Kul Bahadur K.C	FGD
103	1 February 2019	Extension Agent	Shitalpati, Salyan	Madan Poudyal	KII
104	1 February 2019	Unnat Krishi Kendra	Kapurkot, salyan	Sharada Sharma	KII

List of Interviews in the Nuwakot District

SN	Date	Organizations/ Groups	Venue	Interviewee	Type
105	25 January 2019	CEAPRED	Kakani Belkotgadhi, Nuwakot	Arjoo Sedai	KII
106	3 February 2019	Suman Agrovet/ private	Kakani Belkotgadhi, Nuwakot	Suman Shrestha	KII
107	3 February 2019	Trial Farmer (CEAPRED, Onion)	Nuwakot	Mukunda Dhakal, Private	KII

Evaluation Process

The evaluation team started with an in brief with the Mission followed by the in brief with the IP. The in briefs laid the groundwork for the stakeholder selection and further interviews. The evaluation team conducted national level meetings in Kathmandu during the first week of commencement of the evaluation. The field researchers were trained on the tools for the key informant interviews, focus group discussions, and group interviews conducted at the district level. The team launched the fieldwork in a district starting from Kavre, whereby all the team members went to the field together.

However, in later districts in the field, the team divided themselves into three groups, so that they could talk to all the potential stakeholders in the district. Every three to four days after the fieldwork, the team got together for the debrief session for the day. The summary of top-level findings was noted in a preliminary findings' matrix and the plan for the next day was reviewed to ensure that there was no duplication and none of the stakeholders were left behind.

Informed Consent and Confidentiality

The American Evaluation Association Guiding Principles for Evaluators guide CAMRIS's evaluation practices. All interview and FGD participants were conducted following an informed consent statement (in the local language) to ensure that respondents understand that participation in data collection was voluntary. Participants were informed that they do not have to answer questions that make them uncomfortable and could halt their participation at any time and that the representative quotes from data collection will be used in the report to add context to findings. They were informed, however, that participants will not be identified by name. Protection of research participants is paramount in evaluation and the evaluation team has taken every step to minimize any risks associated with participation in data collection activities. Confidentiality procedures were explained to all participants involved in the data collection.

Analysis

Analysis of data started by analyzing the data generated through secondary sources. NSAF trial data was analyzed to identify technologies with productivity potential. The team held an initial meeting to generate a common understanding of the fertilizer and seed systems. As data was collected, the team held preliminary analysis sessions that discussed emerging findings for each evaluation question. This was an iterative process. As data collection proceeded, new learning was added, and existing themes confirmed. At the end of the fieldwork, detailed team analysis sessions were held to discuss and cross-check findings. The team also developed initial ideas for conclusions and tentative recommendations. From this analysis, a presentation for the IP and USAID was developed. Presentations were held to verify findings, initial conclusions, and preliminary recommendations.

APPENDIX VII: DATA COLLECTION INSTRUMENTS

Interview Checklist: NSAF and Partners

Name:	Contact Details:
Organization:	Position:
Location:	
Sex (M/F):	
Interviewer:	
Note taker:	
Date:	

Note: All questions relate to changes since April 2016 unless otherwise stated.

Evaluation Question	Sub-Question
Introduction	• Please, could you tell us about your role and how you interact with NSAF/partners?
Agriculture production and productivity	• What NSAF technologies and/or their combinations show a high potential for increasing farmer productivity based on changes in production in trials or other tests? • Who uses these technologies? (Probe men, women, small scale farmers, large-scale commercial farmers, disadvantaged groups) • How are they being disseminated? • What dissemination models reach all types of farmers? • How likely is it that these technologies will be commercialized and by whom (produced and sold by the private sector)?
2. Seed systems and capacities	
Availability of seed (amount and quality of seed in the market):	• How is improved seed availability (OPV and hybrid) changing for farmers and private sector companies? What is causing these changes? What is the NSAF role in this? • Are changes occurring in the way seed is distributed and marketed? What is causing these changes? What is the NSAF role in this? • Has seed quality changed? If so, how? What is the NSAF role in this? • How has the seed quality control system changed? What models show potential? What gaps still exist? What is the NSAF role in this? • How has NSAF affected barriers to access quality seeds (information, R&D, market channels, etc.)? • Who are the users of this seed? Who is being left from availing the seeds? What strategies are being used to avail the seeds to different types of stakeholders, especially smallholder farmers, women, and other vulnerable farmers? What improvements are needed?
Seed production	• Have relationships/partnerships between public and private sector institutions

(type, quality, volume and linkages among producers):	changed? How? What has caused these changes? What has been NSAF role? • Are new varieties meeting different types of farmers' (large, small, medium, and marginal) needs? Probe reasons for the answer given. • Does NSAF have a role in developing and popularizing new seed varieties in the market? If so, what is this? • What is the current capacity of the private sector in the following: o Commercially maintaining the inbred line? o Commercial multiplication of seeds? o New product evaluation and validation? • Has NSAF contributed to any change in private sector capacity in these areas? Please describe. • What NSAF strategies are needed to further strengthen their entrepreneurial skills (capacity)?
Seed marketing/business development (quality of business plans, branding, services, etc.):	• How have seed companies made changes to their business plans and/or marketing to improve quality seed distribution and/or address gaps in the seed system? • To what extent have seed companies taken on the role of providing extension services to different types of farmers (large, medium, small, and marginal)? • In NSAF areas, how has demand for improved seed changed among farmers and agrovets since NSAF became operational? • To what extent has NSAF improved access to agriculture lending for private seed companies and seed producers? • Are you involved in seed variety release and registration? If so, please describe.
Role of GON in policy and seed quality maintenance	• How has NSAF facilitated dialogue within the GON on seed systems, seed policy gaps, and opportunities? (What sorts of dialogues, how effective were they, what should be done differently to make them more results oriented) • How is GON's seed balance sheet maintained? • To what extent have NSAF project interventions stimulated upgrades in the system (seed information system/balance sheet)?
3. Fertilizer systems and capacities	
Availability of fertilizer (amount and quality in the market; imports):	• What challenges (gaps) exist in the fertilizer supply system? What are these? Please describe. • To what extent are systems in place to take (NSAF) fertilizer technologies to scale? • What steps have the public and private sector initiated to improve fertilizer

	availability and distribution? • Has the fertilizer quality control system changed? If so, how? What has been the NSAF role? • To what extent are farmers using NSAF recommended fertilizer rates and methods? Probe. • What steps has the GON taken to better-forecast fertilizer demand and supply? What has caused these steps to be taken? Who supported these steps?
Fertilizer distribution mechanisms (public and private sector):	• What are the challenges to expanding the reach of fertilizer and related services (fertilizer application technologies; ISFM extension etc.)? Have any changes been made? What caused these changes? Is there a NSAF contribution? Please describe. • Has the private sector changed its approach to fertilizer importation and distribution? Why have they changed? What caused the changes? Is there a NSAF contribution? Please describe. • Has there been any changes in the capacity of the private sector to procure, add value, and distribute fertilizers? What has contributed to the change(s)? Is there a NSAF contribution? Please describe. • How is NSAF improving ISFM in Nepal? What is the NSAF implementation approach? How could these be made more effective and efficient?
Role of GON in policy and fertilizer distribution:	• How has NSAF facilitated dialogue within the GON on fertilizer systems, policy gaps, and opportunities? Probe. • How do GON policy and its implementation affect the private sector in the fertilizer system? What steps is NSAF taking to address these issues? • How has NSAF facilitated relationships/partnerships between public and private sector institutions to address fertilizer policy challenges?
Other	• What strategies have NSAF adopted to meet the needs and demands of women and other marginalized/disadvantaged groups? • Have there been any effects of changing the administrative structure (federalism) of the country on agriculture and the seed and fertilizer sectors in particular? Please describe. • Are there any emerging actors/stakeholders in seed and fertilizer? Who are they and what do they do? How can they be mainstreamed to generate synergy? • In addition to Nepal Bangladesh Bank and Laxmi Laghu Bitta Bittiya Sansthan, are there other investors in seed and fertilizer industries? How is NSAF coordinating with them to increase credit flow to seed and fertilizer?

Interview checklist: Farmers and Cooperatives:

Name:	Contact Details:
Organization:	Position:
Location:	
Sex (M/F):	
Interviewer:	
Note taker:	
Date:	

Note: All questions relate to changes since April 2016 unless otherwise stated.

Evaluation Questions	Sub-Questions
• Agriculture production and productivity	• What crops do you grow? • Have you changed the crops you grow over the last three years? What are you growing more and less of? Why? • Is your land more productive than it was three years ago? What has changed? Why? • Have you or any member of your household (HH) participated in training, interaction, and other activities supported by NSAF? List the activities by male and female. As a result of your participation in NSAF activities, what are the changes in your skill level on the use of soil and crop management practices? Who in the HH has used these technologies (male/female) • Have you changed your use of seeds and fertilizer and other related technologies over the last three years? How? Are these technologies affordable to you? • Are these technologies easily accessible to you on time? • In your opinion, are these technologies deteriorative to soil productivity or climate resilient?
• Seed systems and capacities	• What types of seed do you use? • Where do you get your seed? • Have you changed the way you get seed over the past three years? What has changed? How? • Has the quality of seed changed over this time? How? • How do you learn about using seed? Probe types of extension and who supplies it. • Is farmer demand for commercial seeds (seeds farmers pay for) growing? If so, how?
• Fertilizer systems and capacities	• What types of fertilizer do you use? • Where do you get your fertilizer? • Have you changed the way you get fertilizer over the past three years? What has changed? How? • Has the quality of fertilizer changed over this time? How? • How do you learn about using fertilizer? Probe types of extension and who provides it. • Is farmer demand for commercial fertilizer (fertilizer farmers pay for)

	growing? If so, how? • Can you access enough fertilizer? • If no, what types of fertilizers are undersupplied? Where are the gaps? Try to estimate the volumes involved. • Have there been any changes in fertilizer quality since April 2016? If yes, please describe. • What fertilizer application rates and methodologies do you or local farmers typically use? • Is the use of new fertilizer technology improving your productivity? Approximately how much in percentage terms? (Try to estimate an approximate average increase.) • Are you involved in GON fertilizer demand and supply forecasts? If yes, has anything changed in the way forecasts have been done since April 2016? What has changed? • Have you noticed any changes in the reach (distribution/dissemination) of agricultural services (such as fertilizer application technologies; ISFM extension, etc.) and inputs (fertilizers)? • Has anything changed in the way your coop works with the private sector? If yes, please describe. • Has NSAF facilitated any new relationships/partnerships between your coop and public and/or private sector institutions? If so, please describe.

APPENDIX VIII: RESULTS OF SECONDARY DATA REVIEW

This section presents findings from a literature review focusing on key trends in agricultural production, including seed production, food security, and market systems.

Agricultural Production (Including Seed Production)

Agriculture is a key element of the Nepalese economy, providing a livelihood for almost two-thirds of the population but accounting for less than a third of gross domestic product (GDP). Agriculture occupies approximately 29 percent of the country's land. Main agricultural products are pulses, rice, corn, wheat, millet, sugarcane, jute, root crops, milk, and buffalo meat. Much industrial activity involves the processing of agricultural products, including pulses, jute, sugarcane, tobacco, and cereal grain.[60]

General agricultural production is rising. Data presented in Table 1 shows an increase in food and crop production indexes and rising cereal production, which suggests land used for cereal production is approximately constant with yields having risen over the past ten years. Data presented in Table 9 and Table 10 shows data for area, production, and yield for maize and lentils (respectively) in NSAF supported districts. This data also suggests maize and lentil yields have improved.

[60] https://www.cia.gov/library/publications/the-world factbook/geos/print_np.html

Table 8: Food, Crop and Fertilizer Data (2007 to 2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cereal yield (kg per hectare)	2,213	2,356	2,369	2,290	2,477	2,714	2,570	2,748	2,744	2,605
Food production index (2004-2006 = 100)	100	107	112	113	122	140	131	136	136	138
Crop production index (2004-2006 = 100)	99	107	113	113	124	138	130	140	139	139
Cereal production (metric tons to the nearest '000)	7,337	8,077	8,122	7,771	8,615	9,458	8,580	9,563	9,266	8,614
Land under cereal production (hectares to the nearest '000)	3,315	3,428	3,428	3,394	3,479	3,485	3,339	3,480	3,377	3,306
Fertilizer consumption (kilograms per hectare of arable land)	2	1	18	25	36	27	54	67	74	NA

Source: https://data.worldbank.org/topic/agriculture-and-rural-development?locations=NP

Table 9: Maize Area, Production and Yield in NSAF Districts

	Maize (2012/13)			Maize (2014/15)			Maize (2016/17)		
	Area (Ha)	Prod (MT)	Yield (Mt/ha)	Area (Ha)	Prod (MT)	Yield (Mt/ha)	Area (Ha)	Prod (MT)	Yield (Mt/ha)
Achham	3,350	9,525	2.8	3,652	10,163	2.8	6,685	14,707	2.2
Arghakhanchi	16,914	49,441	2.9	16,500	49,500	3.0	16,500	51,308	3.1
Baitadi	14,500	18,850	1.3	14,500	23,417	1.6	14,500	23,925	1.7
Banke	10,697	29,760	2.8	8,990	19,328	2.1	8,500	17,300	2.0
Bardiya	8,000	20,000	2.5	1,299	3,000	2.3	2,500	6,650	2.7
Dadeldhura	3,744	8,236	2.2	3,744	10,895	2.9	3,755	13,143	3.5
Dailekh	20,150	36,975	1.8	20,150	39,292	1.9	20,150	44,268	2.2
Dang	23,400	46,891	2.0	23,200	46,168	2.0	23,375	45,673	2.0
Doti	2,630	5,240	2.0	2,748	5,221	1.9	3,505	7,711	2.2
Gulmi	24,856	58,542	2.4	24,014	52,900	2.2	23,940	52,316	2.2
ajarkot	7,890	11,930	1.5	9,366	14,539	1.6	14,095	31,734	2.3
Kailai	5,700	12,000	2.1	5,540	5,755	1.0	6,125	15,618	2.5
Kanchanpur	5,950	10,450	1.8	3,600	6,840	1.9	2,950	6,200	2.1
Kapilbastu	1,400	3,350	2.4	3,120	9,500	3.0	2,400	7,800	3.3
Kavre	25,353	48,334	1.9	25,354	60,849	2.4	23,700	65,630	2.8
Makwanpur	23,636	63,114	2.7	23,650	70,950	3.0	24,555	68,759	2.8
Nuwakot	20,100	41,434	2.1	20,450	63,435	3.1	16,917	54,135	3.2
Palpa	21,580	40,368	1.9	20,210	42,386	2.1	20,210	42,043	2.1
Pyuthan	12,058	18,351	1.5	12,058	21,108	1.8	11,858	23,716	2.0
Rolpa	10,305	16,304	1.6	11,880	27,342	2.3	12,640	30,607	2.4
Rukum	15,107	16,013	1.1	16,289	32,578	2.0	16,281	35,539	2.2
Salyan	11,560	22,242	1.9	19,370	40,059	2.1	19,850	41,598	2.1
Shindhuli	18,510	44,410	2.4	23,620	58,500	2.5	24,815	70,226	2.8
Shindhupalchowk	24,900	50,833	2.0	24,900	53,301	2.1	23,650	59,125	2.5
Surkhet	16,100	43,407	2.7	15,281	39,730	2.6	15,251	38,483	2.5
Average	348,390	726,000	2.1	353,485	806,756	2.3	358,707	868,214	2.4

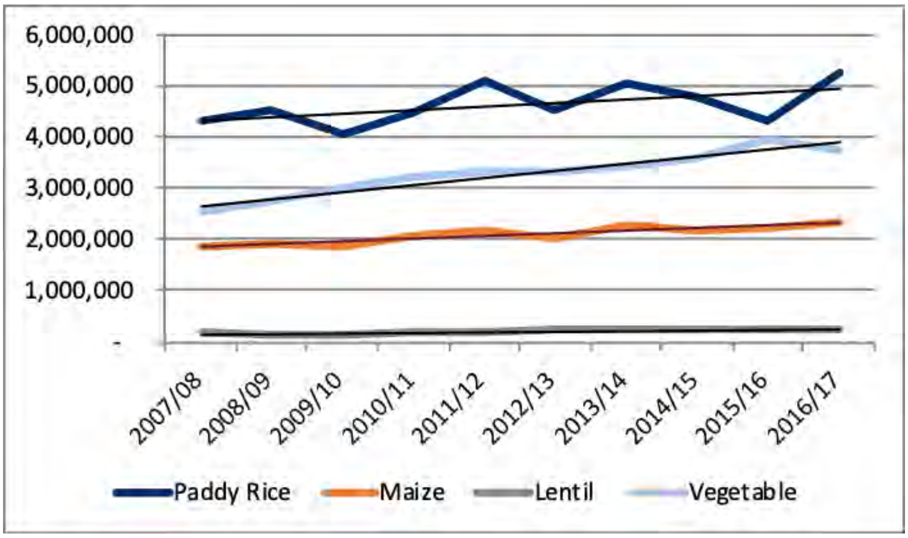
Source: Ministry of Agriculture, Livestock and Development

Table 10: Lentil Area, Production and Yield in NSAF Districts

	LENTIL 2012/13			LENTIL 2014/15			LENTIL 2016/17		
DISTRICTS	Area (Ha)	Prod (MT)	Yield (Mt/ha)	Area (Ha)	Prod (MT)	Yield (Mt/ha)	Area (Ha)	Prod (MT)	Yield (Mt/ha)
Achham	25	21	0.8	26	21	0.8			
Arghakhanchi	345	310	0.9	345	305	0.9	321	289	0.9
Baitadi	415	398	1.0	300	315	1.1			
Banke	11,323	11,340	1.0	11,314	11,460	1.0	11,371	14,532	1.3
Bardiya	15,223	15,102	1.0	18,000	21,052	1.2	18,090	24,172	1.3
Dadeldhura	450	401	0.9	340	350	1.0			
Dailekh	311	241	0.8	311	33	0.1	313	279	0.9
Dang	27,580	27,663	1.0	27,590	30,120	1.1	27,728	34,291	1.2
Doti	365	324	0.9	860	955	1.1			
Gulmi	123	208	1.7	255	433	1.7	156	145	0.9
Jajarkot	356	220	0.6	510	329	0.6	513	330	0.6
Kailali	21,500	21,510	1.0	21,000	23,600	1.1	21,105	27,738	1.3
Kanchanpur	3,433	3,667	1.1	5,000	5,400	1.1	5,025	6,834	1.4
Kapilbastu	4,545	4,432	1.0	5,855	5,813	1.0	5,884	6,847	1.2
Kavre	65	55	0.8	50	30	0.6	50	55	1.1
Makwanpur	199	289	1.5	310	375	1.2	312	377	1.2
Nuwakot	12	12	1.0	85	106	1.2	85	107	1.3
Palpa	150	132	0.9	152	135	0.9	153	166	1.1
Pyuthan	126	134	1.1	130	140	1.1	131	115	0.9
Rolpa	88	70	0.8	157	142	0.9	158	143	0.9
Rukum	75	72	1.0	180	135	0.8	181	136	0.8
Salyan	425	370	0.9	985	615	0.6	990	719	0.7
Shindhuli	420	425	1.0	526	736	1.4	529	740	1.4
Shindhupalchowk	400	385	1.0	439	462	1.1	441	465	1.1
Surkhet	1,381	1,455	1.1	1,725	1,955	1.1	1,734	1,965	1.1
Average	89,335	89,236	1.0	96,445	105,017	1.1	95,270	120,445	1.3

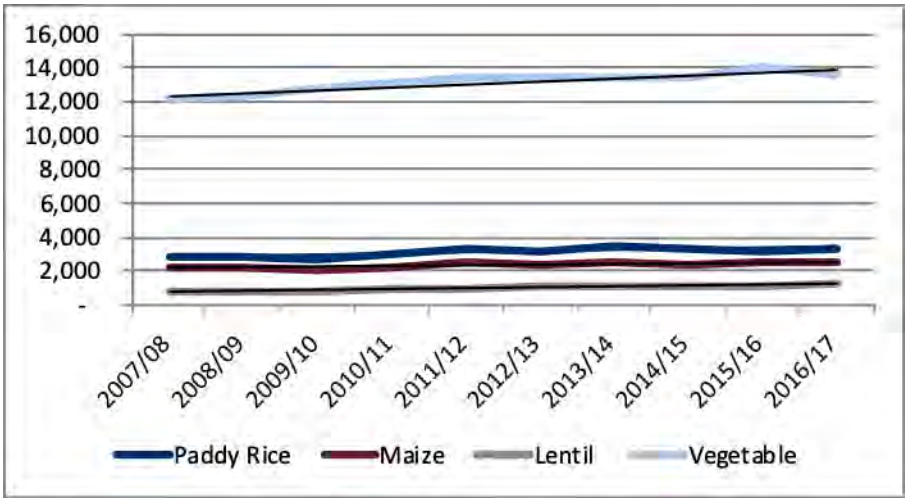
Figure 3 shows the production data for NSAF crops. This data also indicates rising production trends for paddy rice, vegetables, maize, and lentils.

Figure 3: Crop Production (Mt)



Source: Ministry of Agricultural Development Statistical Information for Nepalese Agriculture 2016 / 2017

Figure 4: Crops Yield Trend (Kg/Ha.)



Source: Ministry of Agricultural Development Statistical Information for Nepalese Agriculture 2016 / 2017

Table 11: NSAF Baseline Input Data for Project Crops

Crop	Rice	Maize	Lentil	C/flower	Tomato	Onion
% Farmers Growing Crop	71%	69%	27% (82% in Terai)	20% (most in hills)	15%	13%
Main Use	Home	Home	Home	Sale	Sale	Sale
Main Seed Source	Agrovets	Saved seed	Saved seed	Agrovets[61]	Currently not available	Agrovets
% Seed Purchased	(39%)	28%	-	92%	97%	88%
Average Fertilizer Application / Ha	53 kg N 28 kg P 2 kg K	18 kg N 7 kg P 0 kg K	6 kg N 5 kg P 0 kg K	37 kg N 36 kg P 13 kg K	72 kg N 43 kg P 17 kg K	39 kg N 27 kg P 2 kg K
Average Spend / Ha	$418	$273	$76	$512	$757	$501
Average Yield MT/ha	3.78 (Hill = 3.33, Terai = 3.95)	1.96 (Hill = 2.01, Terai = 1.68)	0.77 (Hill = 0.7, Terai = 0.77)	8.3 (Hill = 8.79, Terai = 6.11)	12.53 (Hill = 8.08, Terai = 21.65)	4.43 (Hill = 3.46, Terai = 5.25)

Source: NSAF Baseline Survey (2017), Note: N = Nitrogen, P = Phosphorous and K = Potash

The NSAF Baseline Survey (2017) shows most farmers use subsistence methods with very limited mechanization and a high dependence on manual and animal labor. Only 2 percent of farmers owned capital-intensive machinery, like tractors and power tillers. NSAF Baseline data shows average agricultural landholding of 0.63 ha, with an average of 0.83 ha for Terai (lowland) farmers and 0.46 ha for hill farmers. NSAF Baseline data presented in Table 2 shows most farmers grow rice and maize with fewer than 20 percent of farmers growing NSAF focus vegetables. Farmers appear not to invest in commercial inputs for lentils using saved seed and low levels of inorganic fertilizers. The NSAF April 2018 Semi-Annual Report highlights falling demand for lentil seeds, low varietal adoption rates, and low farmer interest in improved management practices. Farmer investment in vegetables is higher (especially, tomatoes). Data presented in Table 2 also suggests vegetable growers usually use commercial seed (87 percent to 97 percent) and relatively higher levels of inorganic fertilizer. Rice and maize growers are less likely to use commercial seed. Rice farmers are suggested as using more inorganic fertilizer than maize growers.

The Government of Nepal policy targets increasing commercialization of the agricultural sector. The Agricultural Development Strategy (ADS) 2015 conceptual framework plans to accelerate agricultural transformation from subsistence to commercialized agriculture, led by the private sector with smallholder farmers integrated within competitive value chains.[62] The Global Food Security Strategy (GFSS) (2018) Nepal Country Plan supports this approach and is designed to expand market systems and robust private sector networks, including agrovets, to reach smallholders and provide inputs and training to farmers with particular attention to the specific needs of women, youth, and other vulnerable populations, throughout the value chain.[63] The GFSS (2018) identifies some challenges to commercialization, including limited public and private investment, declining competitiveness, unpredictable trade flows, and the "mixed performance" of government policies, plans, and programs. The Central Bank proactively mandates 10 percent of commercial bank loan

[61] Sources include other farmers, retail shops and agric coops
[62] Agriculture Development Strategy (ADS) 2014 Ministry of Agricultural Development
[63] The Global Food Security Strategy (GFSS) Nepal Country Plan April 18, 2018 (Page 9)

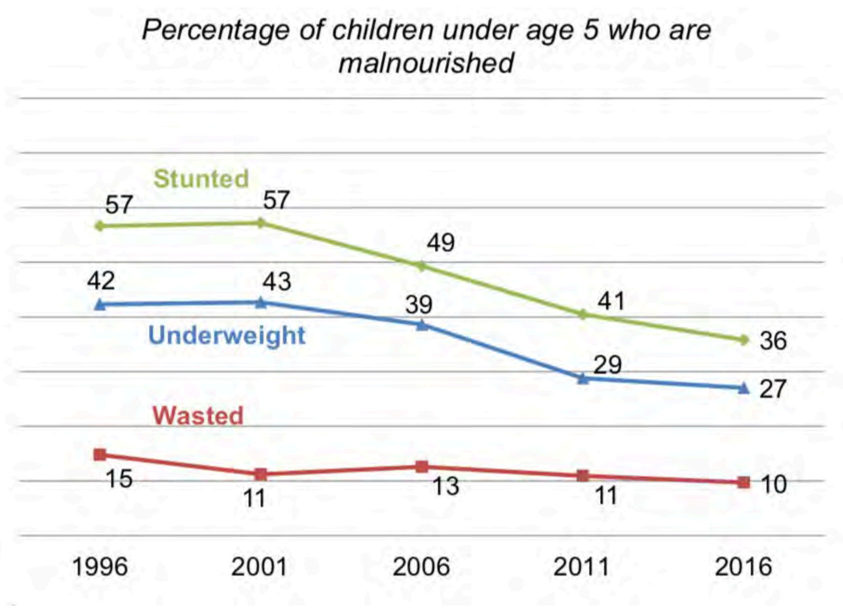
portfolio go to agricultural ventures. However, low capital expenditure rates and slow public sector investment in infrastructure projects, such as roads and irrigation,[64] impede agricultural growth and limit opportunities to attract more private investment.[65]

Press reports suggest some cause for optimism regarding private sector investment. At a general economic level, the *Kathmandu Post* (Apr 27, 2017) reported a rise in private sector's investment in fixed capital assets. "Lately, a huge chunk of investment has gone into the construction sector," said Suraj Vaidya, former president of the Federation of Nepalese Chambers of Commerce and Industry. "If there is political and policy stability, investment will flow into other sectors as well." Imports of agricultural equipment and parts, for example, surged 122.8 percent to Rs11.1 billion in the first eight months of the fiscal year, shows the latest report of the Nepal Rastra Bank.[66]

<u>Food Security</u>

The World Food Program (WFP) Zero Hunger Strategic Review (ZHSR), conducted in 2017-18, found that Nepal suffers from serious food insecurity and malnutrition. The WFP (2018) report that 4.6 m people are food insecure in Nepal.[67] Some available data suggests the food security situation in Nepal is improving. Demographic Health Survey (2016) data presented in Figure 3 suggests the prevalence of stunting and underweight among children under age 5 have markedly decreased, from 57 percent to 36 percent, and from 42 percent to 27 percent, respectively, in the last 20 years (1996-2016). This data also indicates stunting in children declined by 14 percent between 2001 and 2006, declined by an additional 16 percent between 2006 and 2011, and dropped by 12 percent between 2011 and 2016.

Figure 5: Trends in the Nutritional Status of Children



Source: DHS 2016

Mountain zones are reported as having the highest levels of food insecurity (Figure 4). DHS (2016) reports that in mountain zones the proportion of children who are stunted is almost half (47 percent), while the proportion of wasting and underweight is highest in terai zones

[64] Only 18% of the total agricultural land is irrigated with year-round irrigation infrastructure
[65] The Global Food Security Strategy (GFSS) Nepal Country Plan April 18, 2018 (Page 6)
[66] http://kathmandupost.ekantipur.com/news/2017-04-27/investment-in-fixed-capital-assets-up-416pc.html
[67] WFP Nepal Country Brief September 2018

(12 percent and 33 percent, respectively). Province 6 has the highest percentage of stunted children (55 percent) while Province 3 and Province 4 have the lowest proportion of stunted children (29 percent each).[68] NSAF (2017) report Nepal is among the countries where the prevalence of Vitamin A Deficiency (VAD) among preschool children is above 40 percent. NSAF further highlight zinc deficiency as another nutrition-related problem in Nepal. NSAF also associate the prominence of maize as a dietary staple with this issue.

The Nepal Food Security Monitoring System (NeKSAP Market Watch – 89) report (July 2018) the overall supply of food commodities is good and stable across Nepal. NeKSAP states this is due to sufficient availability from domestic production and imports, and stable transportation services. It suggests food prices are rising. In July 2018, the overall consumer price index (CPI) released by Nepal Rastra Bank was 121.3, an increase of 0.8 percent month-on-month. The food and beverage group of the CPI reached a level of 117.4, an increase of 1.9 percent month-on-month and 3.9 percent year-on-year. Several sub-groups showed relatively high year-on-year increases, including vegetables (18 percent) and cereal grains (5.1 percent).[69] Rising vegetable and cereal prices should increase demand for NSAF supported inputs.

[68] Ministry of Health, 2016 Demographic and Health Survey
[69] Nepal Food Security Monitoring System (NeKSAP Market Watch – 89)

Figure 6: Map of the Food Security Situation of Nepal (mid-July to mid-November 2017)

Source: NeKSAP

Market Systems

Seed

The market system for seeds contains many actors. At an informal local community-based level a farmer-based seed system exists based on:

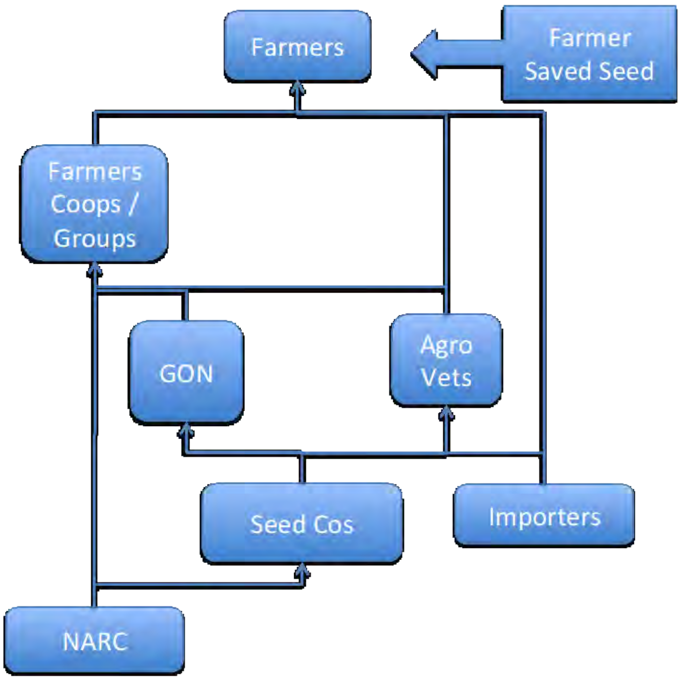
- Community-based seed production (CBSP) small seed enterprises (SSEs).
- Community seed banks (CSBs).
- Groups organized under district seed self-sufficiency program (DISSPRO).

A more formal seed production and marketing system exists through the government-owned national seed company and the private sector (LI-BIRD, 2017). Increasing competition between various actors involved in the cereal seed business is reported over the last ten years. This sector is now seen as becoming increasingly dynamic and innovative (Joshi et al., 2012 in LI-BIRD, 2017). The performance of public sector actors in the competitive environment after 1999 has been particularly poor in seed delivery, while private seed companies and SSEs have been emerging as important actors for food crop seeds.[70] Performance evaluation fieldwork shows the parastatal National Seed Company is being merged with the fertilizer focused Agricultural Input Company Limited (AICL).

An overview of the seed market system is presented in Figure 7. This figure attempts to show the main actors involved at different stages of the seed system from research and development to the end user. Figure 7 is based on performance evaluation fieldwork supported by secondary documentation.

[70] LI-BIRD and the Development Fund. 2017. Farmers' Seed Systems in Nepal: Review of National Legislations. Pokhara, Nepal: LI-BIRD.

Figure 7: The Seed Market System



Source: Performance Evaluation Findings

In Nepal, the formal seed system covers about 10 percent of seed transactions and the country imports nearly all its hybrid maize and vegetable seed to meet the increasing demand for high-yielding crop varieties.[71] Formal seed is currently understood to be that supplied by registered organizations. Informal seed is understood to include farmer-saved seed, informal imports, and seed that is supplied by organizations that are not formally registered. Date presented in Figure 8 and Figure 9 shows increasing seed sales for rice paddy (Open Pollinated, OP, and Hybrid), maize (OP and Hybrid) and onions (OP).

[71] NSAF Project Annual Report Year 1April 1, 2016 – September 30, 2017

Figure 8: Cereal Seed Sector Sales Growth in Nepal (2014–2017)

Source: NSAF Project Annual Report Year 1 April 1, 2016 – September 30, 2017

Figure 9: Vegetable Seed Sector Sales Growth in Nepal (2014–2017)

Source: NSAF Project Annual Report Year 1 April 1, 2016 – September 30, 2017

Analysis of IFPRI (Aug 2017)[72] data suggests farmers are most likely to use own maize and lentil seed. Most private sector involvement is suggested in maize (hybrid) and vegetables (cauliflower and tomato). IFRPI (Aug 2017) also report "access difficulties for the quality seed of improved varieties in Nepal due to

[72] IFPRI (Aug 2017) Adoption and Diffusion of Agricultural Technologies in Nepal: Status, Determinants and Impact

bottlenecks in the early generation seed value chain." Relatively modest public sector involvement is reported in seed markets. This can be seen from the data presented in Table **12**, which supports LI-BIRD (2017) observation of low involvement by the public sector in seed delivery after 1999. IFPRI (Aug 2017) note that about 5 percent of surveyed households used seeds procured from NGOs.

Table 12: Seed Procurement Sources for Different Crops (in percent)

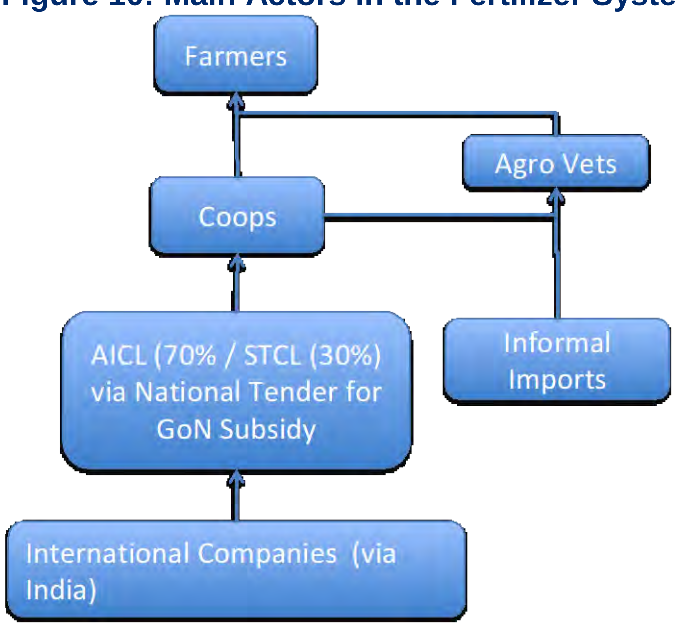
Crop	Own Seeds	Private Dealers	Public Institutions	Other Farmers	NGOs	Others
Rice	34.5	32	17	9.5	4	3
Maize	56.5	18.5	7.5	10	7	1
Lentil	65	12.5	10	10.5	1	1.5
Cauliflower	12	52.5	11.5	15.5	8	1
Tomato	13.5	50	12	16.5	6.5	1

Source: Authors estimates based on Table 5 in IFPRI Aug 2017 based on seven districts (Gulmi, Banke, Bardiya, Dailekh, Kanchanpur, Puythan and Nawalparasi). n = 1980

Fertilizer

AN overview of the main actors in the fertilizer system is shown in Figure 10. Figure 10 shows a system dominated by subsidized fertilizer procured and distributed by the parastatal Agriculture Input Company Limited (AICL) and Salt Trading Company, a private company with the government holding 22 percent of the share capital. Most fertilizer, usually urea and Di-ammonium Phosphate (DAP), is procured internationally by AICL and STC. They bring the fertilizer to Nepal via India and distribute it via cooperatives.

Figure 10: Main Actors in the Fertilizer System



Source: Performance Evaluation Findings

The fertilizer market procurement system is described by IFPRI (Sept 2017).[73] This description has been adjusted according to performance evaluation findings. The current policy is implemented as follows:

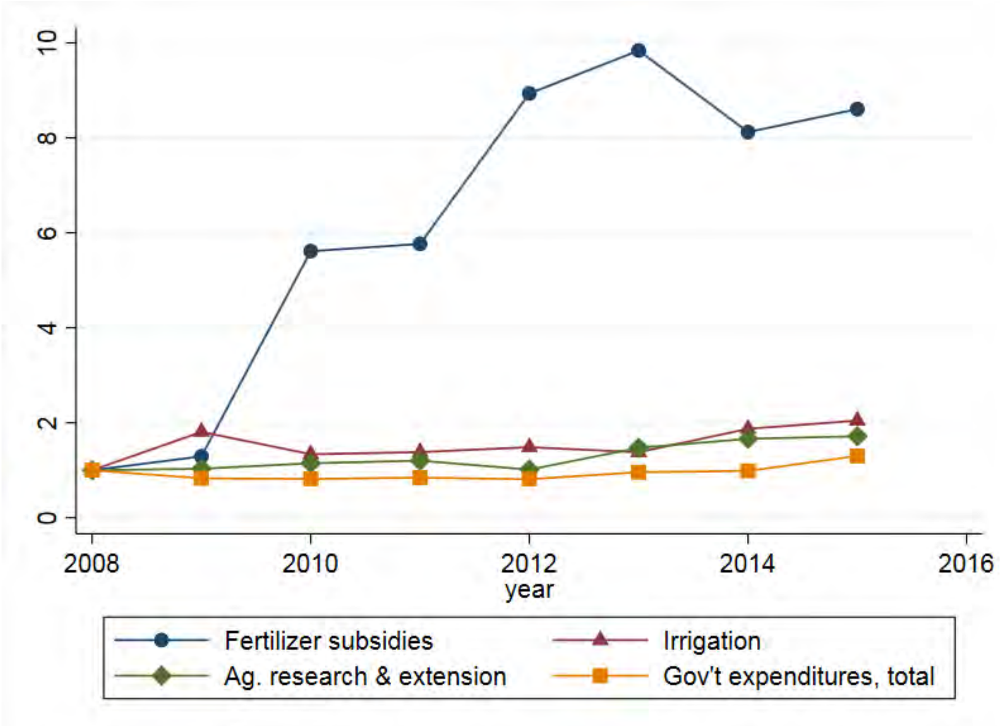
[73] IFPRI (Sept 2017) Political Economy of Fertilizer Subsidy Reform in Nepal September 2017 * Draft * Page 12.

- First, cooperatives are responsible for collecting information on fertilizer demand by farmers.
- This information is then submitted to the district and then regional Agriculture Input Company Limited (AICL) offices—located in 41 locations across 35 districts—which then submit the figures to the MoALD and National Planning Commission (NPC).
- MoALD also estimated fertilizer demand based on estimated crop areas and their fertilizer requirements.
- Based on overall national budgeting priorities, the NPC sets a ceiling for the fertilizer subsidy program; the submitted demand figures are always higher than the budget ceiling that is fixed. Thus, there is a need to revise how much fertilizer will be distributed to each regional office after the budget has been fixed.[74]
- AICL procures and distributes approximately 70 percent of subsidized fertilizer. STC procures and distributes the remaining 30 percent.
- Once fertilizer has been procured[75] and distributed to regional AICL/STC offices, the regional AICL/STC offices are responsible for releasing the fertilizer to cooperatives.
- In theory, farmers then purchase fertilizer from cooperatives.
- Chief District Officers are responsible for setting any local targeting rules and for managing potential conflicts over inadequate supply.

IFPRI (Sept 2017) report that the provision of agricultural input subsidies in Nepal is a complex and highly political issue, particularly as it is linked to Nepal's long-term goals of commercializing the agricultural sector and improving food security. Fertilizer subsidies have increased significantly in Nepal in recent years. AICL report that in 2017/18 the fertilizer subsidy was 500 million Nepali Rupees. In 2018/19 this increased significantly to 900 million Nepali Rupees Although the size of the subsidy program cannot yet meet the demands of Nepali farmers, it is also clear that the formal supply of fertilizer has increased manifold since 2009 (see Figure 11).

[74] Initial fieldwork shows fertilizer supply is limited by GON budget constraints. This will be explored further as the study proceeds.
[75] Salt Trading Company (STC) is understood to be involved in fertilizer supply but it is not known how. It is assumed fertilizer maybe bought by GON from STC at this point.

Figure 11: Index of Real Agricultural Spending, 2008-2015



Source: IFPRI 2017
Note: The vertical axis represents an index with figures converted to constant 2008 currency.

Based on the information from the field, the private sector has largely been crowded out of the fertilizer sector. IFPRI (Sept 2017) reported more small and marginal farmers report purchasing inorganic fertilizers in 2016 compared to 2010 and farmers are increasingly purchasing chemical fertilizers through official distribution channels rather than through private and informal channels. Overall, by 2016, 36 percent of those who purchased fertilizer did so either through government channels or through cooperatives compared to only 9 percent in 2010. Pandey (2013 in IFPRI, 2017) reported formal supply covering less than 25 percent of total fertilizer use in Nepal. Even with the recent growth in official fertilizer distribution, informal supply (usually from India) — with the associated quality problems — remains a significant supply source.

While supply has improved over time, Nepal still faces significant fertilizer supply constraints. Most households that want to purchase fertilizer are now able to purchase at least some. However, only 25 percent report that they were able to purchase fertilizer in sufficient quantities, and poorer households report being more constrained.[76] The (fertilizer) program primarily benefits larger farmers in the central region, rather than small and marginal farmers in Nepal's western regions, which are poorer and suffer more from food insecurity.[77]

Low storage capacity can push cooperatives to sell their fertilizer quotas to agrovets, who may then repackage and mark-up subsidized fertilizer before selling to farmers. Small and marginal farmers can be motivated to purchase repackaged fertilizer through agrovets because subsidized fertilizer sold at cooperatives is only sold in large packages that often exceed their available budget and needs. Agrovets

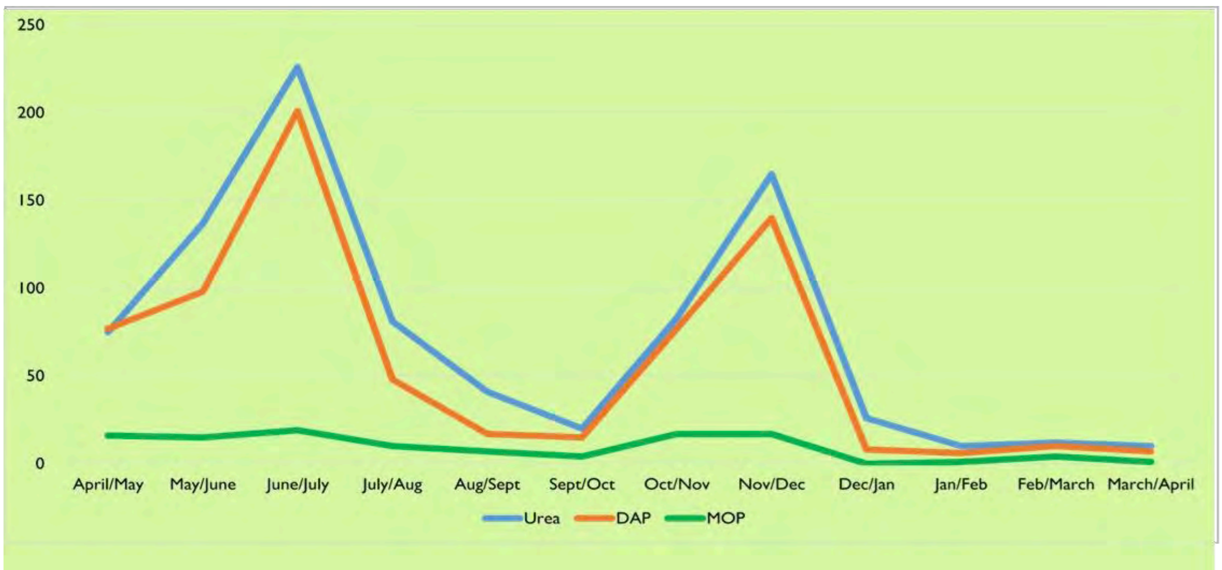
[76] IFPRI (Sept 2017) Political Economy of Fertilizer Subsidy Reform in Nepal September 2017 * Draft * Page 2.
[77] IFPRI (Sept 2017) Political Economy of Fertilizer Subsidy Reform in Nepal September 2017 * Draft * Page 3.

may also provide credit to farmers for fertilizer purchases, whereas cooperatives frequently require up-front payments.

The government-imported urea, DAP, and MOP are subsidized at the point of import entry. The final retail price, which is fixed by cooperatives, is determined after accounting for transportation and other overhead costs, which differ from district to district.

NSAF baseline (2017) findings show urea is the most commonly purchased fertilizer followed by DAP and that 13 percent of households using fertilizer use more than one type. Fertilizer use peaks around paddy transplanting time and again just after the rice harvest in May to July and September to December periods (Figure **12**).[78]

Figure 12: Number of Households Purchasing Fertilizers in Different Months in 2016/17

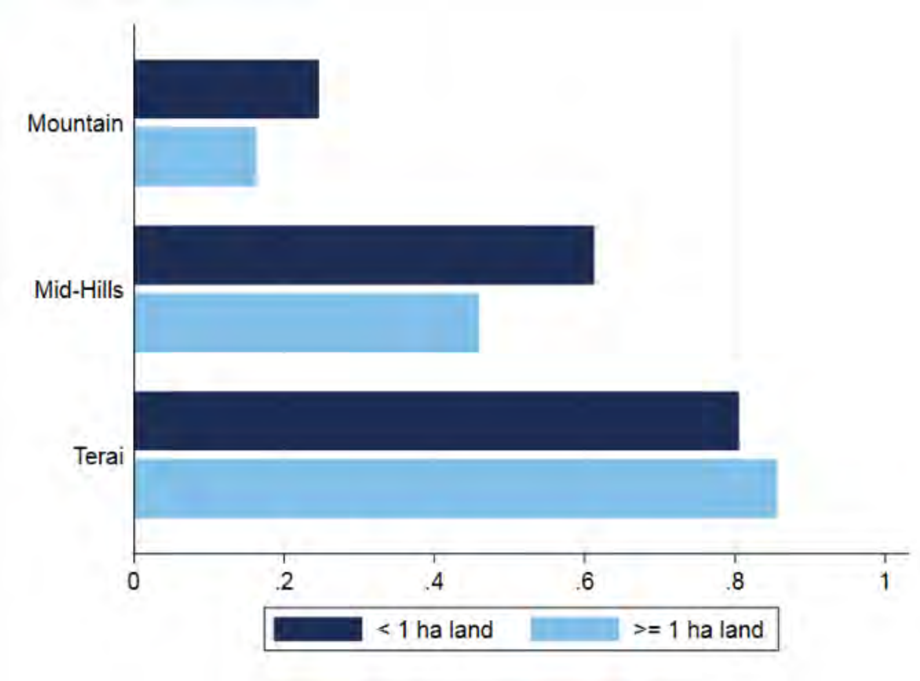


Source: NSAF Project Annual Report Year 1: April 1, 2016 – September 30, 2017

Levels of fertilizer shortage vary geographically. IFPRI (Sept 2017) report that despite the proximity to informal trade supply from India, fertilizer shortages are still most significant in the Terai region; with over 80 percent of farmers reporting that they were unable to purchase the desired amount of fertilizer. IFPRI (Sept 2017) further report that over 90 percent of households in the Far-Western development region report that they were unable to purchase the desired amount of fertilizer. By comparison, supply constraints are much lower in the Eastern, Central, and Western regions. These geographic inequities no doubt stem in part from the poor infrastructure in Nepal's western regions, which likely limit the amount of informal trade in fertilizer in the region. The Central region receives a disproportionate share of Nepal's limited supply of formally supplied fertilizer, while the Mid- and Far-Western regions receive significantly less than would be expected under equitable distribution. Proportions of farmers reporting fertilizer supply constraints appear in Figure 13 and Figure 14.

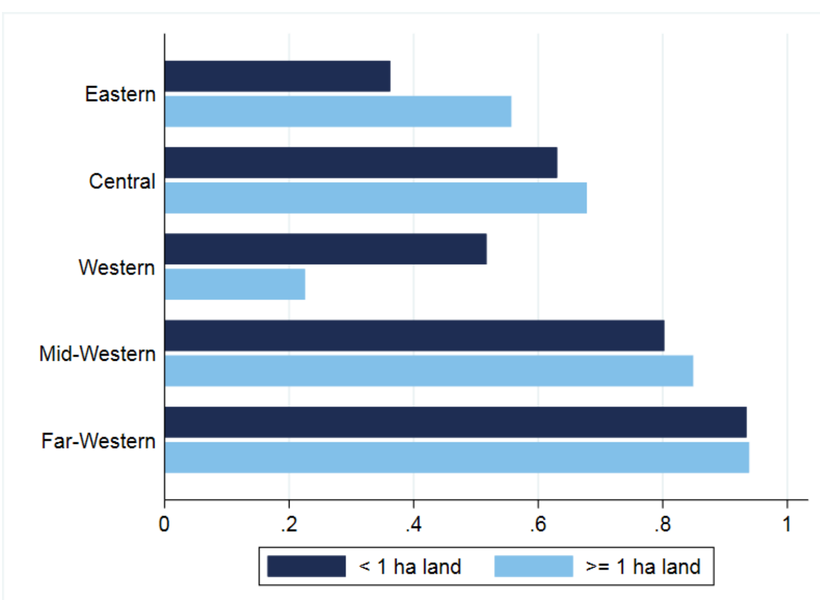
[78] NSAF Project Annual Report Year 1: April 1, 2016 – September 30, 2017, p. 47

Figure 13: Geographic Variation in Share of Farmers Reporting Supply Constraints by Agro-Ecological Zone (2016)



Source: NRHS (2016)

Figure 14: Geographic Variation in Share of Farmers Reporting Supply Constraints by Development Region (2016)



Source: NRHS (2016

APPENDIX IX: RESULTS FOR ADDITIONAL USAID QUESTIONS

Key Area	Additional Evaluation Question	Findings
Seed Availability	*How has the availability of seed changed for farmers and private sector since working with NSAF?*	NSAF has not yet significantly contributed to a change in the availability of seed to farmers and the private sector beyond providing trial and demonstration material. This is true throughout all visited districts. NSAF has worked on seed trials to test new varieties. As part of these trials, NSAF has provided seed to seed companies and farmers. Trialed varieties have not yet been registered or released. As a result, there has not been a change in seed availability. CEAPRED report supporting NARC varietal release and up-scaling to 5,000 Households in six districts. Performance evaluation fieldwork found that in Nuwakot tomato demonstrations has led to 442g of tomato seed (Srijana) to made available and sold via an agrovet. And a varietal trial done in cauliflower in Salyan by SEAN seed company is ready to harvest around 40-50kg)
	What changes have been made to seed distribution and marketing since NSAF started?	Seed companies and ago vets have grown since NSAF started. Volumes of seed distributed have increased, and seed companies are branding products. Several factors have contributed to this growth. These include a more favorable environment for the private sector to supply seeds, growing effective demand for seeds, and support from NSAF and previous development partner projects. NSAF has supported seed companies and agrovets. This has included linkage creation and strengthening between seed companies and agrovets. NSAF also has supported the capacity of seed companies in areas, such as business planning, varietal maintenance, and the conduction of trials and demonstrations. It also has provided support to SEAN Seed and trained agrovets. Additionally, NSAF has supported seed companies in marketing though work on radio, branding and traders meetings, and Farmer Field Days. NSAF further supported SEAN to perform a seed market survey for NSAF and traders interface meeting.

Key Area	Additional Evaluation Question	Findings
	How has the seed quality control system changed since working with NSAF?	No specific changes in the seed quality control system were found as part of this study. SQCC is responsible for the seed quality control system and report no changes since working with NSAF. SQCC report that NSAF invite them to board and review meetings, and that they also participated in one capacity building training in a foreign country No changes are reported in the Crop Inspection System where the Government of Nepal provides rules on seed quality. NSAF has provided training to seed company personnel in seed quality. For example, fifty-two days training was reported as having been received by a GATE technician. This training is reported as helping seed companies address quality issues.
	What (seed quality control) models show potential?	Models for supporting seed quality control in the market: • Seed company-based model: Under this model, the seed company sources its seed from farmer groups where seed is multiplied under seed company supervision. During the farmer group stage, the crop is inspected by the appropriate Regional Agricultural Research Centre. Seed is then harvested and processed by the seed company. The Seed company checks quality (i.e., moisture content and germination percentage). • Cooperative model: Cooperatives provide foundation seed to their farmers for multiplication. During multiplication, the cooperative inspects seed and then buys it back. The cooperative will then process and pack the seed checking quality (germination and moisture content) as this occurs. Buyback guaranty is given to farmers. Seed is then sold to members, agrovets, and/or the government. Under this system, there also is the potential for AKC to inspect at the seed multiplication phase, especially at harvest. Given the move to federalism, the role of AKC is not entirely clear. • NGO / CEAPRED model: Under this model, the NGO provides foundation seed to a farmer group. The NGO can inspect the seed during multiplication. The seed is harvested and sold to a seed company where quality is checked as in model 1. • The Government of Nepal model: Under this model, the GON supplies seed to producers' groups. These may be cooperatives or independent groups. GON seed inspectors and subject matter specialists inspect the crop during multiplication. Multiplied seed is then harvested, processed, and packed before being distributed

Key Area	Additional Evaluation Question	Findings
		to GON programs (i.e., PMAMP) or promotions/demonstrations.
	What gaps still exist (in the quality control system)?	Gaps exist in human resources. Quality control systems lack sufficient numbers and technical skills. Budgets also are suggested as limited to allow crop inspection. Nepal continues to face challenges in meeting international seed standards. This will need to be addressed to support the export of seeds to international markets.
	How has NSAF affected barriers to access quality seeds (information, R&D, market channels, etc.)?	NSAF has performed initial work to support access to information, research and development, and market channels. At the time of the performance evaluation, no large-scale change was found that was affected by NSAF as part of reducing barriers to access for quality seed. NSAF has supported information provision through radio broadcasting providing information on seed availability (i.e., GATE and Unique Seed Co.). NSAF CEAPRED also has worked on a mobile application that was seen by the performance evaluation team in Nuwakot. This app had been used by a CEAPRED fieldworker to help diagnose plant disease issues with farmers. Key informants in Kavre also described online/app-based information as helping provide information on fertilizer and seed availability and plant health information. The potential was found to improve involvement and information to group members during trials and demonstrations. Low involvement of farmers/other group members was commonly reported in trial and demos (iin Nuwakot, Kavre, and Kailali). Farmers were not aware of what was being tested or demonstrated in trials. Discussions with these groups suggested data/information was extracted for research purposes as opposed to shared locally – ifarmers didn't know the details from (maize) seed or fertilizer trials [i.e., Trial farmers didn't know variety names (Kavre)]. Exceptions were found, such as in Kailali where FDG participants knew rice varieties and lentils being demonstrated. Market channels for the private sector are suggested as relatively clear (i.e., seed company to agrovet to farmer). NSAF has been supporting these channels.

Key Area	Additional Evaluation Question	Findings
Seed production	*How has NSAF facilitated relationships/partnerships between public and private sector institutions?*	NSAF has facilitated public-private partnerships through different initiatives. These include: Establishing a hybrid maize varietal evaluation and validation network among NARC and private seed companies across different agro-ecological zones to identify adaptable products. Organizing a review and planning meeting. A meeting was held in September 2018 with all seed company partners and NARC to review progress and plan 2018-19 activities. With the facilitation of NSAF, NARC provided inbred lines of hybrid maize to five seed companies for strengthening hybrid seed production NSAF supported SEAN to become a member of SQCC's public-private partnership committee and hybrid licensing technical working committee Supporting the National Grain Legume Research Program in organizing a national lentil workshop in February 2018 involving more than 40 farmers, processors, researchers, customs officials, and other value chain actors. The workshop was the first of this kind in Nepal, and the NGLRP staff appreciated the NSAF support during the KII of this evaluation. Organizing an international training workshop on hybrid seed business management at CIMMYT's offices in Kathmandu for 34 participants from Nepal and Pakistan's public and private seed sectors.

Key Area	Additional Evaluation Question	Findings
	What is the role of NSAF in developing and popularizing new seed varieties in the market?	NSAF has supported the development of new seed varieties through: • Varietal screening, technical support, evaluation of data analysis, maintaining seed, problem-solving with breeders, providing training, sowing and direct supervision, evaluating results and providing staff to each seed company for their development. • NSAF has supported the popularization of new seed varieties by: Developing information, education, and communication materials; marketing; radio promotions; website; mobile applications; and linkages to seed companies. • As the capacity of seed companies develops, they should take a larger role in developing and popularizing new seed varieties in the market. NSAF should continue to support seed companies develop this capacity for the remainder of the activity's implementation period.
	Are new varieties meeting farmers' needs?	Performance evaluation fieldwork consistently shows that farmers generally want high yielding varieties (i.e., Hybrids). Farmers, agrovets, seed companies and many observers report this. NSAF new high yielding yellow maize varieties have the potential to meet these needs. Yellow maize varieties are required by the animal feed industry. NSAF supported rice varieties are OPVs that are lower yielding than the completion. Generally, these OPV varieties are not meeting farmers high yield requirements. There may be specific agro ecological zones or niche markets where these varieties do meet farmers' needs. These are not expected to be large scale. FGD participants in Banke and Kailai have shown their interest in hybrid rice and are planning them. The vegetables that NSAF CEAPRED is supporting are mainly OPVs (exception: Tomato Srijana). Agrovets report strong demand for hybrids from farmers. Farmers also report interest in high yielding varieties. It is unlikely that the vegetable varieties supported by NSAF will meet farmer's needs. Kunal Agrovet in Kailai, Panchalkhal and Tulshi Agrovet in Kavre and other AgroVet in bank, all of them reports high demand for hybrid seed.

Key Area	Additional Evaluation Question	Findings
	What is the capacity of private sector after intervention of NSAF in: • *Maintaining inbred lines* • *Seed multiplication* • *New products evaluation/validation?*	The capacity of seed companies varies in the degree that they can maintain inbred lines, multiply seed and evaluate and validate new products. Most of the seed companies report they have the capacity to maintain inbred lines, multiply seed, and evaluate/validate new products. Some seed companies were seen to be maintaining inbred lines (e.g., Gorkha for tomatoes). Panchashakti claim that they can maintain the in-breed line (maintaining male and female Maize lines). Unique Seed reported that they can maintain OPV lines but not hybrids as they need the parental line and can't maintain this on their own. NASIC Seed felt they could maintain the inbred line for Rampur Hybrid 8 and 10, but not for other varieties. GATE reported that they could maintain in breed lines. Hariyali Seed Co. reported that they were performing this role for parental lines supplied by NARC. Seed companies see greater commercial potential when they can maintain breeds – will be a "lifetime business" for companies. NARC challenges the view that the private sector has the capacity to maintain in bred lines. They report this will be problem for the private Sector. NARC key informants expressed the desire to work together (NARC and seed companies) in this area. NARC have traditionally maintained in bred lines. Seed companies have received training in the areas of in bred line maintenance, multiplication, and product evaluation/validation. Unique Seed report building up their capacity. However, they feel they may lose staff. Some seed companies requested more training for their staff, especially for maize (i.e. GATE). Unique Seed, NASIC, Hariyali Seed Co., and Panchashakti report concern about maintaining and broadening their capacity in these areas.

Key Area	Additional Evaluation Question	Findings
Seed Marketing	*How have seed companies made changes to their business plans and/or marketing to improve quality seed distribution and/or address gaps in the seed system?*	Seed companies report having the capacity of plan their business, market their products and distribute their seed. Seed companies report they are improving the quality of their business plans with NSAF support. NSAF report seed company business plans have improved. Business plans have been successfully presented to agricultural lenders as an indication of improvement. Seed Cos report valuing NSAF training in these areas although no concrete examples of business plans were seen by the performance evaluation team. It is suggested that these plans are sensitive or that written plans do not or only partially exist. GATE report it being useful for them to now forecast income and expenditure. NASIC reported that 'our plans are kept in different places'. SEAN reports NSAF provided funds for capacity building of seed traders on business plan development. Seed Companies report improving their marketing. NSAF seed companies are producing their own brands. Key informants report that this was being done before NSAF. Non-NSAF seed companies were also found to be branding their products.
	To what extent have seed companies taken on the role of providing extension services to farmers?	Seed Companies are providing a variety of extension services to farmers in support of their products. Seed Companies such GATE and Hariyali Seed Co report providing extension services to farmers. This is done though demonstrations, Farmer Field days, and providing advice and training in their products. Panchashakti report having six junior technical assistants providing extension services. Hariyali Seed Company reports having a mobile service where seed samples are provided to their farmer groups. In addition, examples were found of Agrovets providing extension services (i.e. Panta Agrovet, Kisan Agrovet, Krishak Sasayog Kendra. Modern Agrovet). These companies report having junior technician that visit farmers and provide advice, if requested by the farmer. Agrovets also provide information / advice in their shop. SEAN seed company in Salyan is also providing extension service to their seed produced farmers. CEAPRED support this claim reporting that agrovets are providing extension.
	In NSAF areas, how has demand for improved seed changed among	Demand for improved seed has grown since April 2016, especially for hybrid seeds. In Teria areas wheat is reported as increasingly popular as a winter crop planted before rice.

Key Area	Additional Evaluation Question	Findings
	farmers and agrovets since NSAF became operational?	
	To what extent has NSAF improved access to agriculture lending for private seed companies and seed producers?	Performance evaluation fieldwork shows banks increasingly willing to lend to seed companies. NSAF has worked with lenders building capacity and linkage to Seed Companies. Fieldwork results suggest this has been successful. Banks report increasingly lending to the agriculture sector, mostly to vegetable growers. Banks further report a willingness to lend to seed companies. One bank confidentially reported being in the processing of providing a loan to a seed company. Nepal Bangladesh Bank in Banke report linkage with Gorkha Seed and Laxmi Bank in Kailali report linkage with Panchashakti Seeds. The managers met during performance evaluation fieldwork did not know much about the NSAF project. A microfinance organisation met during performance evaluation fieldwork reported being invited to a meeting of Seed Growers, once "some 1.5 years back" and further reported that it was its only contact with the NSAF. Commercial Banks (Nepal Bangladesh Bank) also report being invited for traders and companies meeting facilitated by CIMMYT. MFIs report lending to seed growers, mostly to the landless disadvantaged farmers who lease land to grow vegetables.
Role of GON (Central level) in policy and seed quality maintenance	*How has NSAF facilitated dialogue within the GON on seed systems, seed policy gaps and opportunities?*	NSAF has facilitated policy dialogues, interactions and presentations with government and private sector representatives at various technical and steering committee meetings. NSAF is supporting SEAN to lobby GON to prepare and implement private sector friendly policies. NSAF is also supporting evidence-based policy lobbying by developing policy recommendations and conducting policy roundtable meetings. CEAPRED – report policy engagement (i.e. in Seed Vision 2013 - 2025 processes) under other project funding, not NSAF.

Key Area	Additional Evaluation Question	Findings
	How is GON's seed balance sheet maintained?	SQCC prepares and maintains the GON seed balance sheet. The seed balance sheet is produced annually. The process of constructing the annual balance sheet begins at provincial level annual planning meetings. A meeting is held between the Provincial Agricultural Ministry and SQCC. At this meeting they fix which 'demand organizations' (i.e. AKC, Local Gov Agric Unit, Research Centres and Seed Companies) should collect specific seed from which 'resource centres' (i.e. Research centres, Coops, Farmer Seed Producer Groups, Seed Companies), where possible in an effort to match estimated demand with supply. A cumulative nation balance sheet is prepared finally by SQCC for the entire country. SQCC then monitors progress. NSAF has a plan to support SQCC develop of an online seed information system in 2019. This is intended to enable stakeholders to share their seed demands, sources and availability online. It has a provision for an interactive and dynamic seed catalogue with up-to-date information on plant varieties that are released and registered. NSAF has initiated the process of hiring a consultant to make the digitalized system functional in 2019. See: http://sqcc.gov.np/images/section/National-Seed-Balance-Sheet-2074-75.pdf
	To what extent have projects intervention stimulated upgrades in the system (seed information system/balance sheet)?	No upgrades to information systems or the seed balance sheet where found that could be connected to the NSAF activity at the time of the performance evaluation. As mentioned above NSAF is in the process of hiring a consultant to support a digitalized seed information system. Working with SQCC is suggested as being challenging as an interview with the Chairman suggested a difficult relationship. When asked about NSAF the SQCC chairman replied that 'I don't care about NSAF I can do it by myself'.
Availability of fertilizer	*How has NSAF identified and addressed gaps in fertilizer availability for both public and private sectors?*	NSAF has worked to identify gaps through supporting studies and efforts to develop a soil map. NSAF has worked with NEFEA to address gaps in fertilizer availability. To help identify gaps in fertiliser availability NSAF conducted a Willing to Pay study in eight districts of Nepal. It has also made recommendations for domain specific fertilizer planning based on soil maps. To understand gaps in fertilizer availability and better match supply with requirements NSAF has supported a national soil map. A current map is based on historic (old and potentially out of date) Government soil sample results. To update soil information NSAF has purchased two soil testing machines (Soil Mass Spectrometers). One machine has been delivered to NARC, Kathmandu. Delivery of a second machine is expected in 2019 at the Regional Agricultural Research Station (Banke). When operational the soil map is intended to better match fertilizer supply to specific soil requirements in different areas and avoid or limit blanket application approaches. NSAF also supported the Feasibility Study to Establish a Chemical Fertilizer Plant in Nepal in support of the GON.

Key Area	Additional Evaluation Question	Findings
		This study found that establishing a fertilizer plant in Nepal was not viable. To address a gap in availability, NSAF has worked with NEFEA to develop briquette urea and DAP fertilizers. NSAF funded acquisition of necessary machinery and briquettes were produced. After initial success issues were reported with the size and fragility of briquettes and licencing of the technology. At the time of performance evaluation fieldwork briquettes were not being made.
	What steps has the public and private sector initiated as a result of working with NSAF on fertilizer availability and distribution?	No changes (steps) were found in fertilizer availability or distribution that could be linked to NSAF by either public or private sectors, as part of the performance evaluation. NSAF has performed fertilizer field trials and collected valuable data and information in two specific fertilizer. This information has potential to inform future steps by public and private sectors. NSAF has supported NEFEA to engage with GON in policy and its implementation. At the time of the performance evaluation this appears at an activity level and no clear changes (steps) were identified as part of this study. NSAF has supported NEFEA though capacity building, support to buy machinery for briquette production and funding a study tour to Kenya, Bangladesh. NSAF also report having trained 10,000 farmers in polymer-coated urea and briquetted urea.
	How has the fertilizer quality control system changed since working with NSAF?	No change was found in the fertilizer quality control system due to NSAF at the time of the performance evaluation. The performance evaluation results suggest fertilizer supplied in Nepal is of generally good quality. One exception was CEAPRED senior staff who suggested fertilizer quality is always an issue and questioned nitrogen content. MoALD reported confidence in AICL/STCL supplied fertilizer reporting it was tested at the ports in India. AICL use an Indian recognized organization (SGS Calcutta) to test imported fertilizer at ports and then again at district level in Nepal. There is significant remaining mistrust (especially in GON) of the private sector to supply due to 1990's/2000's experience. In the recent past, the 1990s to 2000s, the private sector was seen to have supplied low quality fertilizer.
	To what extent are farmers using recommended NSAF fertilizer application rates	NSAF is still testing fertilizer technologies, rates and methods of application in trials and demonstrations. No change in farmers practice was found as part of the performance evaluation fieldwork. The performance evaluation fieldwork shows some change in farmer's knowledge. Farmers (i.e., Kavre Women's

Key Area	Additional Evaluation Question	Findings
	and methodologies?	Group, FGD Rabiopi Coop Group, and Jorsalla, Sitapur, Banke) were aware that PCU, Briquettes and split applications increased yield. Some did not show a change in knowledge reporting that data was not shared with them (Small Farmers Agric Coop Ltd, Anekot). Key informants report that farmers generally don't use recommended fertilizer rates. At the time of the performance evaluation fieldwork, the government was using blanket fertilizer recommendations. Farmer knowledge was also reported as not strong. Anecdotal evidence was found that farmers confuse SSP (Single Super Phosphate) and urea. These fertilizers look the same, and agrovets charge same price. Farmers are reported as thinking SSP is urea. AICL key informants report that farmers are using more urea as soil quality declines. Discussions with farmers show broadcast methods of fertilizer application on crops, such as wheat and rice are common (i.e. Kailali, Banke). Briquette based methodologies (use of a "dipper") are not used as briquettes are not available. A growing interest in organic fertilizer is reported (Salyan, Kavre) and organic fertilizers were stocked by some agrovets (Kavre) seen during performance evaluation fieldwork. Though some farmers know of split application approaches, they were unable to use split application methodologies as fertilizer is not available at required times.
	What steps has the GON taken to better forecast fertilizer demand and supply as a result of NSAF activities?	The GON has not changed the way it forecasts fertilizer demand and supply since the inception of NSAF. MoALD key informants report that the current system was started 50 years ago. To forecast fertilizer demand, AICL report that local government collect demand from cooperative in their area. These requests are submitted to District Officials and are combined, usually by AICL staff. District figures are then compiled at a provincial level by the AICL regional office. These requests are sent to the AICL Kathmandu office and then to MoALD. MoALD then looks at last year's figures and review known areas of major crops and their fertilizer requirements to confirm demand estimates. These figures are then compared to available budgets. The overall forecast is then sent to the Ministry of Finance and has to be within the National Planning Committee budget ceiling.
Fertilizer distribution	*How has NSAF reduced barriers to, and expanded the reach of agricultural services (fertilizer application technologies; ISFM extension, etc.) and inputs (fertilizers)?*	NSAF has addressed barriers and attempted to expand the reach of agricultural services and inputs by providing training and performing trials and demonstrations. The lack of public sector capacity and private sector presence challenges efforts to provide services and support the development of sustainable agricultural service delivery systems and inputs. NSAF efforts are apparent at an activity level and had not resulted in clear outputs in term of expanded fertilizer related services or input use at the time of performance evaluation fieldwork.

Key Area	Additional Evaluation Question	Findings
		Inadequate numbers of extension workers challenge public sector agricultural service delivery. Fifteen percent of farmers are reported as being reached by GoN extension[79]. Performance evaluation fieldwork also suggests the technical capacity of GoN extension workers is challenging. The move to federalism is also presenting challenges to public sector agricultural services, as the role of AKC is currently unclear at a local level. Agrovets are reported to provide agricultural advice related to their products. These can include specialist fertilizers, particularly for vegetables (Kavre). STC also report providing extension and advice for fertilizers. Examples were seen during performance evaluation fieldwork of STC fertilizer information including boron and zinc fertilizers that was shared with agrovets.
	How and why has the private sector changed its approach to fertilizer importation and distribution since working with NSAF?	The private sector has largely withdrawn from fertilizer importation and distribution. No evidence was found as part of the performance evaluation to suggest change by the Private Sector since working with NSAF. Performance evaluation fieldwork shows the private sector is mistrusted by GON (MoALD, ACIL) as a fertilizer supplier. This mistrust is suggested to have arisen during the 1990s/2000s when the private sector did import and distribute fertilizer. NSAF is working with NEFEA to lobby the GON to create space for the private sector to import and distribute fertilizer, but these efforts have not yet resulted in change (the subsidy increased in 2018/19 season). NEFEA is not universally respected. During fieldwork, different public sector interviewees called them "smugglers" and a "cartel." NEFEA report interest in PCU, Briquettes, liquid fertilizers and micronutrients. STC report challenging the fertilizer subsidy and interest in commercial fertilizer importation and distribution.
	What steps have been taken by NSAF to build the capacity of the private	NSAF has supported the NEFEA in following ways: • Visit to Bangladesh to observe the manufacturing, distribution, and use of briquetted urea

[79] Strategic Review of Food Security and Nutrition in Nepal. A study conducted by NARMA Consultancy for the National Planning Commission/Government of Nepal 2018 page 125

Key Area	**Additional Evaluation Question**	**Findings**
	sector to procure, value add and distribute fertilizers?	• Imported a urea briquette machine. • Observed the performance of two new fertilizer products in the field – polymer-coated urea and deep urea placement. • Held planning meetings with NEFEA on creating best management practice. • Provided training materials on rice, wheat, maize, and vegetables for NEFEA members. • Supported a cost-benefit analysis and a business assessment on the two new products (PCU and briquettes). • Educated NEFEA members on the 4Rs of soil nutrient management for fertilizer policy lobbying • Helped design a brochure, signboard and administrative materials (letterhead, envelope and visiting card) for NEFEA for its consistent branding. • Provided support in developing and strengthening the NEFEA partnering with ICT firms to develop and introduce digital innovations for agricultural development.
Role of GON	*How has NSAF facilitated dialogue within the GON on fertilizer policy gaps and opportunities?*	NSAF has facilitated GON dialogue by: • Facilitating follow up meetings on (i) planning the public-private partnership approach, (ii) Nepal's fertilizer manufacturing policy, (iii) the willingness-to-pay studies, (iv) the endorsement and validation of project technologies and (v) the development of the Digitally Enabled Seed System (DESS). • Reviewing a feasibility study for setting up a urea fertilizer plant in Nepal, which helped the government to decide not to establish a urea fertilizer plant in Nepal. • Supporting a willingness to pay study on chemical fertilizers and assisted with a preliminary policy draft that has been shared with a MoALD focal person. • Supporting policy exposure visits for key stakeholders involved in fertilizer import, distribution and policymaking. The GON is represented on the NSAF Steering Committee. MoALD recognize NSAF is trying to coordinate with GON. During performance evaluation fieldwork MoALD representatives requested increased coordination in NSAF planning activities. MoALD report interest in lessons from NSAF informing GN. The example given by MoALD representatives was of messages from NSAF pilots and demonstrations being taken to farmers.

Key Area	Additional Evaluation Question	Findings
	How does the policy environment for private sector engagement in fertilizer affect distribution? *What steps is NSAF taking to address these issues?*	The policy environment has a significant effect on fertilizer distribution. As reported above, distribution is centered on AICL and STC. GON policy is to increase commercialization of the agricultural sector including fertilizer distribution. The Agricultural Development Strategy (2014) is the primary policy document. The ADS reports the following: "Complementary measures to improve productivity and fertilizer use efficiency will involve promoting a greater private sector role." (ADS p102) "Level the competitive environment between the private sector and state enterprises in the distribution of agricultural inputs and outputs. For example, the level playing field in the purchasing and distribution of fertilizer, seed, artificial insemination, milk. This may involve providing the private sector with the same commercial advantages (e.g., subsidies, permits, facilities), or removing these advantages from state enterprises." (ADS p110) Performance evaluation findings show that private sector engagement in fertilizer distribution remains low. Interviews with private sector representatives (Kavre, Nepalgunj) who used to distribute fertilizer or are interested in future distribution report that obtaining necessary government permissions and competing against low priced subsidized fertilizer deter them from entering the market. To address the private sector involvement in fertilizer distribution NSAF is engaging the government through dialogue and working with NEFEA as described in the question above. Development partners at the national level who served as key informants reported that "the private sector is invited to policy meetings, but only cooperatives get the subsidized fertilizer."
	How has NSAF facilitated relationships/partnerships between public and private sector institutions to address fertilizer policy challenges?	NSAF has facilitated relationships/partnerships between public and private sector institutions to address fertilizer policy challenges by: NSAF reviewed the feasibility of a planned urea plant for government stakeholders and presented findings in an April 2018 meeting held at the National Planning Commission. GON staff members were included in the NSAF supported exposure visits to Bangladesh and Kenya where private sector representatives also participated. NSAF with MoALD representatives delivered a presentation on the importance of blended fertilizers and fertilizer subsidy restructuring options as part of feedback from the Kenya visit.

APPENDIX X: NSAF 2018 TO 2019 ANNUAL WORK PLAN FOR FERTILIZER

In the NSAF 2018 to 2019 Annual work plan (p 12) the following is detailed.

- First, the project will work with the partners of the National Agricultural Research and Extension System (NARES) (e.g., NARC's soil division and the Soil and Fertilizer Testing Laboratory/Section) to develop new soil fertility management recommendations that are efficient, scalable and suited for different types of farmers.
- Second, the project will work to commercialize precision fertilizer application technologies, which will form the basis of new small businesses.
- Third, the project will work with the Department of Agriculture and fertilizer importers, retailers and cooperatives to generate awareness of the yield and economic value of ISFM technologies, thereby building demand for high-quality fertilizers and the capacity of the private sector to deliver them.

The project will support private sector investors to design and implement business models based on findings from the economic analysis and disseminate them to private and government stakeholders. The project will support this work by subsidizing the raw materials used for producing blended fertilizers, providing advice on the design and operation of the processing plant/machine and marketing. Informative brochure and audio-visuals on the competitive advantage of these products and their availability will be promoted and disseminated through field demonstrations, agrovets, farmer cooperatives, farmer field days, agriculture fairs and exhibitions and digital media. The project will help brand and design the packaging of the new fertilizer products and blends that will be marketed by the private sector.

APPENDIX XI: NSAF NEW HYBRID MAIZE VARIETIES DEPLOYMENT AND SEED SCALING TIMEFRAME

Number	Candidate Varieties	Type of Hybrid	Kernel Color	Seed Source	No. of Locations (Seasons Tested in Nepal (Until 2018)	Expected Year of Registration	Expected Year of Seed Production	Expected Year of Seed Scale Up
1	Entry 1	Zinc enriched	White	Colombia	6	2019	2020	2021
2	Entry 3	"	White	"	6	2019	2020	2021
3	Entry 1	Three-way cross normal hybrid	White	Mexico	6	2019	2020	2021
4	Entry 14	Three-way cross normal hybrid	White	"	6	2019	2020	2021
5	Entry 12	Three-way cross normal hybrid	Yellow	"	6	2019	2020	2021
6	Entry 11	"	Yellow	"	6	2019	2020	2021
7	Entry 14	"	Yellow	"	6	2019	2020	2021
8	Entry 9	"	Yellow	"	6	2019	2020	2021
9	Entry 31	QPM hybrid	Yellow	"	4	2020	2020	2021
10	Entry 6	Single cross normal hybrids	Yellow	Colombia	3	2020	2020	2021
11	Entry 5	Single cross normal hybrids	Yellow	"	3	2020	2020	2021
12	Entry3	Single cross normal hybrids	Yellow	"	3	2020	2020	2021
13	Entry 9	Single cross normal hybrids	Yellow	"	3	2020	2020	2021
14	Entry 28	Heat stress tolerant Hybrids	Yellow	India	3	2020	2020/21	2021/22
15	Entry 10	"	Yellow	"	3	2020	2020/21	2021/22
16	Entry 9	Early Maturing hybrids	White	Zimbabwe	3	2020	2021	2022
17	Entry 43	"	White	"	3	2020	2021	2022
18	Entry 10	Provitamin A enriched hybrids	Orange	Nigeria	2	2021	2022	2023
19	Entry 14	"	"	"	2	2021	2022	2023

Source: NSAF

APPENDIX XII: DISCLOSURE OF ANY CONFLICT OF INTEREST

Name	David John Spilsbury
Title	Consultant
Organization	CAMRIS International
Evaluation Position?	■ Team Leader ☐ Team member
Evaluation Award Number *(contract or other instrument)*	AID-367-C-15-00001
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	
I have real or potential conflicts of interest to disclose.	☐Yes ■ **No**
If yes answered above, I disclose the following facts: *Real or potential conflicts of interest may include, but are not limited to:* *1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated.* *2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation.* *3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project.* *4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated.* *5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated.* *6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation.*	

I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Signature	
Date	October 1, 2018

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