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NEPAL SEED AND FERTILIZER PROJECT

ANNUAL REPORT YEAR 1

APRIL 1, 2016 – SEPTEMBER 30, 2017

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4Rs	right source, right rate, right time, right place
ADB	Asian Development Bank
AFU	Agriculture and Forestry University
ARS	Agricultural Research Station
AT+	AIDtracker Plus
CBSP	community-based seed producer
CDD	Crop Development Directorate
CEAPRED	Center for Environmental and Agricultural Policy Research, Extension and Development
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	Centro Internacional de Mejoramiento de Maíz Y Trigo (International Maize and Wheat Improvement Center)
CSISA	Cereal Systems Initiative for South Asia
CTEVT	Council for Technical Education & Vocational Training
DADO	District Agricultural Development Office/Officer
DISSPRO	District Seed Sufficiency Programme
DO	Development Objective (FTF)
DoA	Department of Agriculture (Nepal)
FAN	Fertilizer Association of Nepal
FIS	fertilizer information system
FTF	Feed the Future
FTFMS	Feed the Future Monitoring System
FY	fiscal year
Ha	hectare
HTMA	Heat Tolerant Maize for Asia
HVAP	High Value Agriculture Project
ICARDA	International Center for Agricultural Research in the Dry Areas
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
IR	Intermediate Result
IRRI	International Rice Research Institute
ISFM	integrated soil fertility management
KISAN	Knowledge Based Integrated Sustainable Agriculture and Nutrition
KUBK	Kisan ka Lagi Unnat Biu Bijan Kryakram
LxLB	Laxmi Laghubitta Bittiya Sanstha
M&E	monitoring and evaluation
MEL	monitoring, evaluation and learning
MLT	multi-location trial
MoAD	Ministry of Agricultural Development (Nepal)
MoU	memorandum of understanding
MSME	micro, small and medium-sized enterprises

MT	metric tonnes
NARC	Nepal Agricultural Research Council
NARES	National Agricultural Research and Extension System
NEFEA	Nepal Fertilizer Entrepreneurs Association
NGO	non-governmental organization
NRRP	National Rice Research Program
NSAF	Nepal Seed and Fertilizer
NSAI	National Seed Association of India
NSC	National Seed Company, Limited
OPV	open-pollinated variety
PAC	Project Advisory Committee
PAHAL	Promoting Agriculture Health and Alternative Livelihoods
PANI	Program for Aquatic Natural Resources Management
PCU	polymer-coated urea
PMAMP	Prime Minister Agriculture Modernization Project
PPP	public-private partnership
PVA	pro vitamin A
QED	Quantitative Engineering Design
QPM	quality protein maize
R&D	research and development
RARS	Regional Agricultural Research Station
SA	Semi-Annual
SABAL	Sustainable Action for Resilience and Food Security
SEAN	Seed Entrepreneurs' Association of Nepal
SMD	Soil Management Directorate
SMS	subject matter specialist
SOP	standard operating procedure
SPR	seed production research
SQCC	Seed Quality Control Center
SSD	Soil Science Division
SSIS	seed sub-sector information system
STRASA	Stress-Tolerant Rice for Africa and South Asia
Sub-IR	Sub-Intermediate Result
ToR	terms of reference
TRP	Technology Refinement Platform
USAID	United States Agency for International Development
USG	United States Government
VAD	Vitamin A deficiency
Zn	Zinc

INTRODUCTION

The Feed the Future (FTF) Nepal Seed and Fertilizer (NSAF) project was awarded to the International Maize and Wheat Improvement Center (CIMMYT) by the United States Agency for International Development in Nepal (USAID-Nepal). It commenced on April 1, 2016 and will run until March 31, 2021. It is designed to contribute to FTF's goal of sustainably reducing global poverty and hunger, by aligning with the FTF-Nepal multi-year strategy and the Mission's Country Development Cooperation Strategy. Specifically, it aims to strengthen the overall seed and fertilizer systems by enhancing the capacity and role of public, private and community sectors in the seed and fertilizer value chains through the provision of necessary technical and business development services; improving private sector access to inbred lines and research knowledge from national and international research institutions; and enhancing public-private partnerships and coordination by establishing a tripartite research forum and a seed and fertilizer information system at the national level.

The project is being implemented in collaboration with public and private sector actors, including the Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA), International Fertilizer Development Center (IFDC), Center for Environment and Agricultural Policy Research, Extension and Development (CEAPRED), Quantitative Engineering Design (QED), agro-input companies, and various other FTF projects. Working on rice, maize, lentils, onions, cauliflower, and tomatoes, the project will directly engage in 25 districts (20 FTF districts and 5 selected earthquake-affected districts), while also benefiting many more, targeting national-scale value chain and policy interventions:

- Far West Development Region (6 district): Achham, Baitadi, Dadeldhura, Doti, Kailali and Kanchanpur
- Mid-Western Development Region (10 districts): Banke, Bardiya, Dailekh, Dang, Jajarkot, Pyuthan, Rolpa, Rukum, Salyan and Surkhet
- Western Development Region (4 districts): Arghakhanchi, Gulmi, Kapilvastu and Palpa
- Central Development Region (5 earthquake-affected districts): Sindhuli, Kavre, Makwanpur, Nuwakot and Sindhupalchowk

This report is an annual technical progress report for the period covering April 2016 to September 2017. The report will describe the tasks completed in the reporting period (relative to what was anticipated by the approved work plan) and assess overall progress relative to the performance indicator targets. It will also highlight the issues/problems encountered during project implementation.

NSAF pursues sixteen outcomes, nine of which relate to the seed value chain (the 'Seed Component') which aim to sustainably enhance access to elite and adapted seeds of rice, maize, lentils and high-value vegetables 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. The remaining seven objectives make up the 'Fertilizer Component', which aim to sustainably catalyse the adoption of integrated soil fertility management (ISFM) practices at scale through similar value chain approaches that integrate innovation with market development and entrepreneurship strengthening. These outcomes are aligned with USAID's Nepal Country Development Cooperation Strategy. This annual report includes a third component, which is comprised of crosscutting activities related to monitoring, evaluation and learning (MEL) and project coordination.

STRATEGIC DEVELOPMENTS

During the reporting period (April 2016 to September 2017), NSAF went through a renewed process of strategic planning and partnerships. The project restructured and adapted its approach to incorporate learning from implementation, FTF priorities, the Government of Nepal and its partners. NSAF conducted a number of strategic learning exercises and restructured its technical and management approach to increase its relevance and impact and to respond to priorities emerging from improvements in infrastructure, information and communication technologies (ICTs), and several socio-economic parameters. These changes are designed to facilitate the development of strong seed and fertilizer systems in Nepal and ensure long-term sustainability. These strategic developments and their contribution to the results are highlighted below.

NSAF Roadmap

Based on the findings from its assessments of the seed and fertilizer sector in Nepal, NSAF has developed a strategic roadmap. This roadmap is premised on the goal of moving poor, subsistence-oriented smallholder farmers toward improved, sustainable incomes, as well as household-level food and nutrition security, across the project districts. Despite the potential for improved seed and integrated soil fertility management (ISFM) practices to boost productivity in Nepal, little has been done to develop markets for these. The agriculture sector is constrained by a lack of knowledge and spatially-explicit technologies and practices related to improved seed and fertilizer. It also lacks an enabling policy environment for private-sector growth. Improving private-sector services and input-delivery mechanisms based on sound business plans and using tested and validated NSAF technologies, along with effective and efficient extension services (including ICTs and digital technologies), has the potential to deliver improved technologies at scale in Nepal.

For the development and delivery of technologies, NSAF will carry out participatory research and development activities with its partners, develop private-public partnership mechanisms, enhance research and development capacities to generate technologies (for seeds and ISFM), and support the diffusion of such technologies through improved business practices and extension approaches. The capacity of the private sector to respond to the demand generated will lead to the growth of seed and ISFM businesses. Private-sector engagement will also be strengthened through the involvement of seed and fertilizer associations and private-sector agricultural service providers, such as agrovets, micro, small and medium-sized enterprises (MSMEs). With NSAF interventions designed for different typologies of farmers, technologies will cater to the needs of smallholder farmers in rural and disadvantaged areas of Nepal. The adoption of technologies will reduce yield gaps and increase crop productivity; the surplus can be sold at market to generate additional income. As incomes increase, 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 for household consumption.

Widespread adoption of NSAF technologies is critical for agriculture-led economic growth in Nepal. These innovations will provide strong evidence for policy development and use by several government and non-government agencies. This is expected to contribute to the long-term goals of boosting the

competitiveness of seed and ISFM sectors and increasing investment in agriculture by the public and private sectors. This will, in turn, contribute to the inclusive and sustainable growth of the agriculture sector and enhance food and nutrition security for Nepalese households, as envisaged in the Government of Nepal's Agricultural Development Strategy (ADS). NSAF's strategic roadmap is shown in Figure 1.

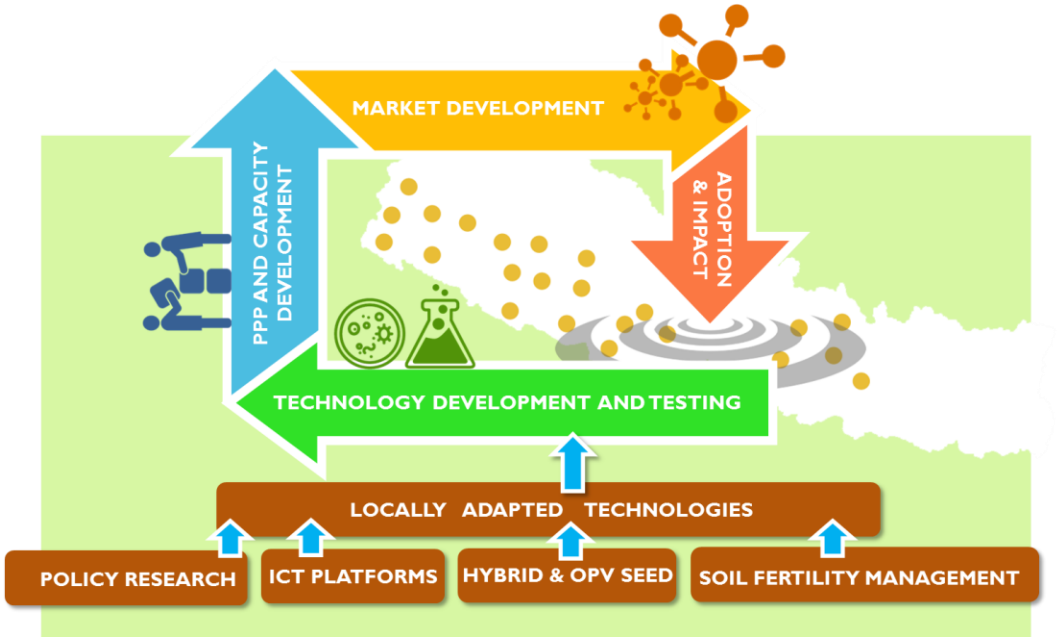


Figure 1. NSAF's strategic roadmap

NSAF Demand Driven Strategies

NSAF's strategy focuses on strong demand-driven and science led innovations and interventions to foster a broad-based economic growth, inclusive social development, and food security in Nepal. Informed by the baseline data, the project is working to develop market oriented innovations around the nine key issues affecting the agriculture sector and is building on the opportunities emerging in social and market systems. The infographic in Figure 2 shows how the findings of the baseline survey underpin NSAF's strategies and interventions.

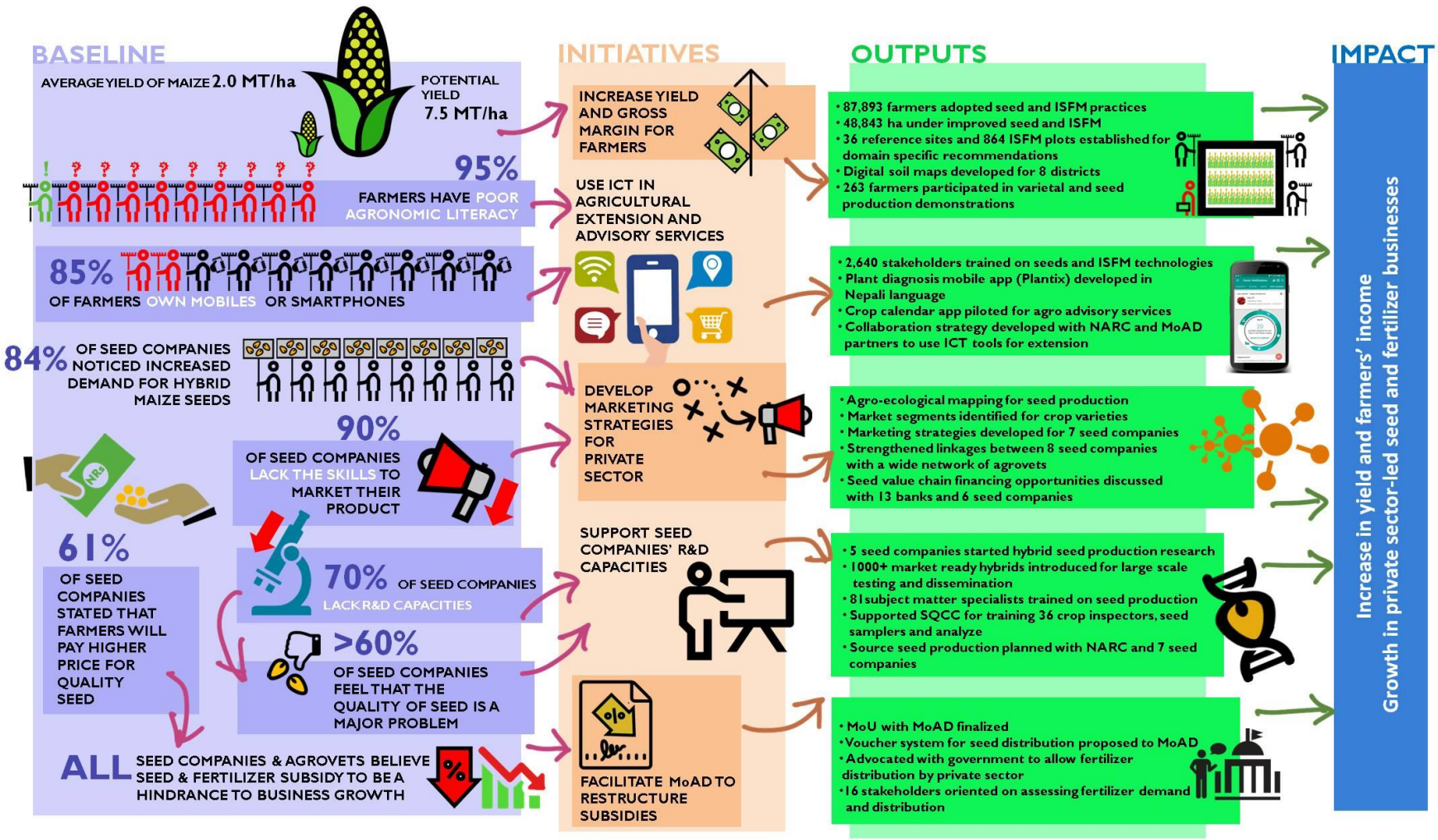


Figure 2. Infographic showing how baseline findings are linked to initiatives, outputs, and impacts

Partnerships and Collaborations

Government of Nepal

NSAF works in partnership with the Government of Nepal to implement its strategies:

- NSAF is in the process of signing a collaborative agreement with the **Ministry of Agricultural Development** (MoAD) to implement key activities with the Seed Quality Control Centre (SQCC); Crop Development Directorate (CDD) and the Soil Management Directorate (SMD). Under this agreement, an NSAF Project Technical Committee, chaired by the Director General of the Department of Agriculture (DoA), will be established to discuss technical issues related to seed and ISFM deployment in Nepal. The agreement will ensure the rapid deployment of technologies; open avenues for technical capacity development of MoAD agencies in seed and fertilizer value chain development; and allow NSAF training and technology packages to be upscaled through national programmes and projects.

- NSAF is also collaborating with the **Prime Minister's Agricultural Modernisation Programme** (PMAMP) to strengthen the maize sector working group of PMAMP; organize a forum for all stakeholders; facilitate a review of current knowledge and practices for maize crops in Nepal; and develop a strategic roadmap for future research and development priorities.

- NSAF has signed a sub-agreement with the **Nepal Agriculture Research Council** (NARC) to carry-out seed and fertilizer research activities. A public-private partnership (PPP) Cell will be activated under the leadership of the Crop and Horticulture Director of NARC, including representation from the SQCC, the Seed Entrepreneurs Association of Nepal (SEAN), and NSAF. A fast-track variety release process will be adopted with the joint efforts of the NARC Commodity Programs, National Seed Board/SQCC, and NSAF. NARC will also speed-up the domain expansion/registration process for varieties released by the National Seed Board/SQCC.

Private Sector

NSAF has been engaging with the private sector in strategic planning and partnerships. As part of this approach, NSAF facilitated a number of seed companies and other sector actors to attend the Seed Congress in India. In addition, NSAF is providing seed companies with technical guidance and resources in terms of standard operating procedures for seed production, support business plan development, access to finance through bank linkages, and support for varietal development through technical guidance and provision of parental lines of well adapted hybrids. In 2017, Hariyali Community Seed Co initiated hybrid maize seed production of Khumal Hybrid-2 in Sindhupalchowk and Kavrepalanchowk districts. In addition, at least five NSAF seed company partners are in the process of parental line multiplication of locally released hybrids received from NARC.

Financing Agriculture

In Nepal the formal seed system covers about 10% 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.

Improving the access, availability and affordability of quality seeds for cash-constrained smallholder farmers is crucial to increase agricultural productivity in Nepal.

MSMEs in Nepal need technical and financial support to upgrade their infrastructure and business operations to enable them to reach more clients and further enhance the sector. Unlike other economic sectors, the seed sector in Nepal is not receiving the attention of financers, which prevents the industry from flourishing. NSAF is working with agri-input dealers and seed companies to enhance their access to finance, in line with the GoN's directive to commercial banks to allocate 10% of their lending to the agriculture sector. NSAF has partnered with Laxmi Laghubitta Bittiya Sanstha (LxLB) to develop and pilot a voucher-based agricultural inputs loan product for smallholder farmers.

Digital Agriculture

In NSAF project sites, 85% of farmers are already using mobiles/smart phones. ICT based agriculture development approaches can be harnessed as a cost effective way to reach farmers. Building on this opportunity, NSAF has partnered with PEAT, Quantitative Engineering Design (QED) and VotoMobile for the following:

- **Digital data systems:** QED has signed a cooperative sub-agreement with NSAF to create integrated digital data collection systems for the project and project partners (NARC and the DoA). This will lead to greater efficiency in programing and update the capacity for NARC scientists to collect data, which will vastly improve the quality and quantity of their work. All of NSAF's data assets will be posted to a publically-available database with open access. In addition, the data will be integrated into a visualization dashboard where users can interact and map the data.

- **SMS and IVR:** VotoMobile is a non-profit that runs SMS and interactive voice response (IVR) systems to deliver agricultural recommendations to smallholder farmers. VotoMobile has established a programme in Nepal and partnered with NSAF to integrate NSAF recommendations into Voto's systems. VotoMobile has also secured additional programme funding through the Big Data platform of the Consultative Group on International Agricultural Research (CGIAR) to develop a mobile phone-based market linkage programme

- **Plantix:** NSAF has partnered with PEAT, to develop Plantix, an image recognition smartphone app that allows users (farmers, agrovets, agriculture extension agents) to submit a photo of an infected plant and receive an accurate pest, disease, or nutrient deficiency diagnosis and recommendation. Plantix has been translated into Nepali and calibrated for the major agro-ecologies in Nepal. If this is successful, Plantix may provide the critical link between farmers and the agro-dealer network, leading to better synchronicity between demand and supply chains.

- **Crop calendar app:** PEAT have recently received the Data-Driven Farming Prize from USAID to develop an integrated crop advisory feature for their app (a crop calendar). The crop calendar (see Figure 3) will integrate all of the outputs of the collaborative agronomy programmes of NSAF and NARC (variety recommendations, soil data, fertilizer recommendations, etc.) into an interactive advisory guide for farmers. NSAF and PEAT are also engaging with DoA to integrate digital tools into their agricultural extension system.

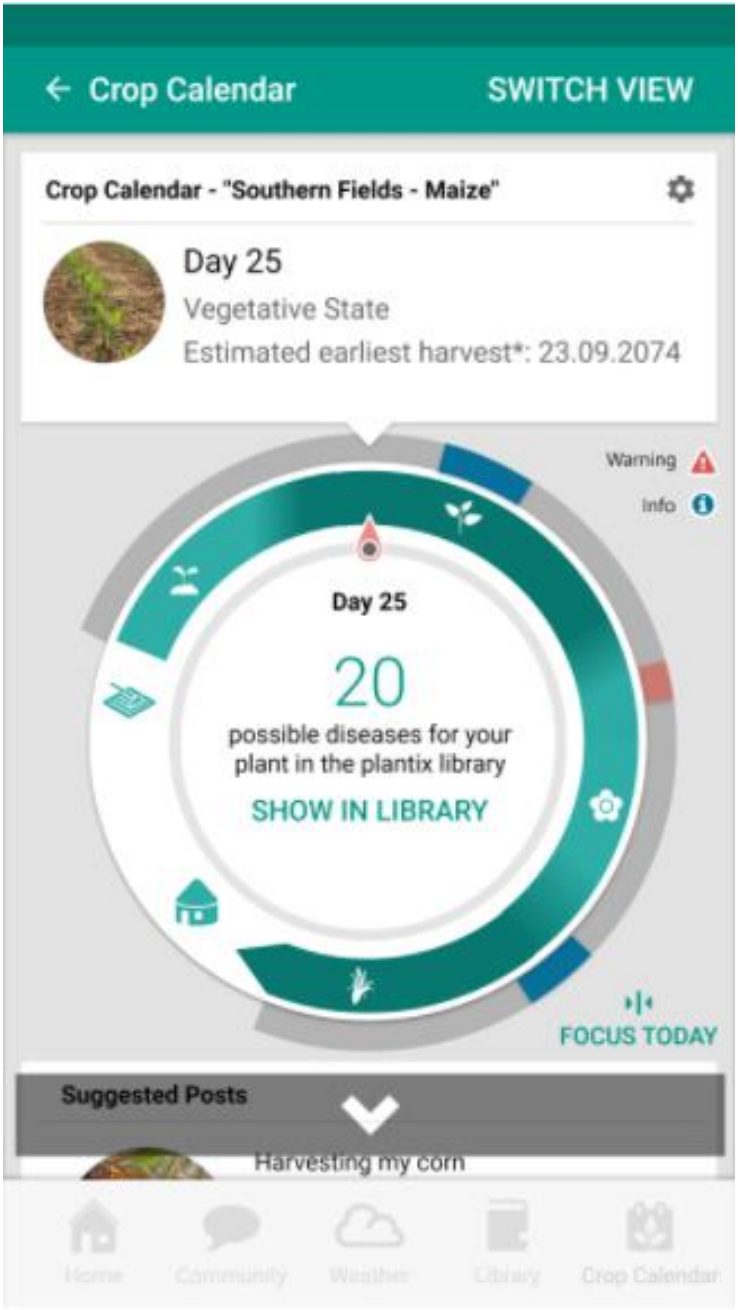


Figure 3. Crop calendar app mock-up produced by PEAT and NSAF

ACTIVITY HIGHLIGHTS

The following key benchmarks were achieved during the reporting period.

Technical Progress

- During the reporting period, 7 seed company partners produced and sold 1,897.3 MT of seed of rice, maize, lentils, cauliflower, tomatoes and onions.
- A total of 48,843 hectares (ha) of land has been covered by NSAF interventions on improved crop varieties.
- A total of 87,893 households (of which 53% are women-headed households) benefited from NSAF interventions on improved technology and management practices.
- A total of 262 varietal (69%) and seed production (31%) related demonstrations were conducted.
- An average of 147% increase in productivity was observed through NSAF's varietal demonstration, as compared to the local check (5.97 MT/ha or improved maize variety - Rampur Composite - and 2.42 MT/ha for local check).
- NSAF established hybrid maize varietal evaluation and validation network among NARC and private seed companies across different agroecologies to identify adaptable products.
- A total of 22 new hybrid maize products were introduced from CIMMYT India and compared with local check varieties, with the participation of 6 private seed companies.
- A total of 46 yellow kernel hybrid maize products were introduced from CIMMYT maize breeding hubs in Colombia and Mexico for winter season evaluation.
- NSAF introduced 43 biofortified maize varieties, including Quality Protein Maize (QPM) hybrids and high kernel Zn enriched varieties for the first time in Nepal for evaluation and validation purposes.
- NSAF introduced 21 white kernel hybrids from CIMMYT-Mexico and distributed them to partner organizations for winter season evaluation.
- Nine tomato and six onion breeding lines were introduced from the World Vegetable Center (AVRDC) for performance evaluation and seed increase.
- A total of 1,999 farmers benefited from fertilizer demonstrations on best management practices.
- The baseline survey found yields for NSAF target crops (paddy: 3.8 MT/ha, maize: 2.0 MT/ha, lentils: 0.8 MT/ha, cauliflower: 7.9 MT/ha, tomato: 12.7 MT/ha, and onion: 4.4 MT/ha) in 2017 to be below the national average, except for rice. However, NARC's research station trials and NSAF's farmer's field trials indicate that the potential yield for all target crops is considerably higher. For instance, NSAF's field trials for maize using best management practices showed a yield

of more than 7.5 MT/ha, an increase in 73% and 67% yield over NSAF's baseline as well as national yield levels respectively (2.0 MT/ha the baseline and 2.5 MT/ha at the national level).

- A total of 864 integrated soil fertility management plots were established for maize, rice, and wheat, in collaboration with 124 farmers in 4 Terai districts (Banke, Bardiya, Kailali and Kanchanpur) and 2 hill districts (Dang and Surkhet). These plots will be used to characterize domains and formulate domain-specific product and training packages. Although, wheat is not a target crop for NSAF, it was included in the fertilizer trials due to its importance in the cropping cycle in Nepal (as previously discussed and agreed with USAID). Essentially, fertilizer management for wheat is imperative to engage with fertilizer companies and government fertilizer policy.

- Wheat yields increased from 3.4 MT/ha to 5 MT/ha (a 47% increase) in trial and demonstration plots.

- A total of 36 reference sites were established to create functional agronomic domains to develop and scale domain-specific product packages across similar reference sites across the NSAF target districts in FY 2017–18.

- The first high-resolution digital soil maps were produced for 8 districts (Kanchanpur, Kailali, Bardiya, Banke, Dang, Kapilbastu, Salyan, and Rolpa). Digital soil mapping continues as more existing data is aggregated and additional data comes in. The mapping work will expand to all NSAF target districts by end of FY 2017–18.

- A Geonode online data repository has been established to curate, archive, and host all NSAF data.

- NSAF partnered with two technology firms, QED and PEAT, to develop and integrate novel digital data collection and knowledge dissemination platforms for project staff, agri-extension officers, agrovets, NARC scientists, and farmers. The tools developed include Geosurvey Collect (for the technical staff of research and development organizations) and Plantix (for extension officers, agrovets, and farmers).

- NSAF has partnered with VotoMobile, a digital agricultural communications company, to develop a mobile phone-based market facilitation/access program.

- Three types of custom precision fertilizer scoops were manufactured locally in Kathmandu using 3-D printing.

- Trials completed for a polymer-coated urea (PCU) trial on rice, which is the first such trial in Nepal.

- Precision fertilizer and seed hole spacers for maize have been developed locally. These include rods that are calibrated to indicate seeding depth, fertilizer placement distance, and fertilizer depth.

- Leaf colour charts obtained from IRRI (free of cost) were used for the initial evaluation of precision nutrient application of urea for rice.

- Briquetted urea trail on rice has been completed.

- Surveys on the use of, and demand for, fertilizer by different types of farmers are currently being conducted across the NSAF target districts as part of the baseline.

- The NSAF baseline survey data collection is complete and analysis is being conducted. The baseline report will be prepared by November 2017.

Capacity Development Progress

- Six scientists from NARC and the SMD, one from Tribhuvan University, and five from other institutions have received training in digital soil mapping. CIMMYT scientists are collaborating with NARC and SMD scientists to continue collaboration on digital soil mapping activities. Maps for 8 districts are already complete and ready to distribute. We anticipate full mapping of NSAF target districts to be completed by the end of FY 2017–18.

- The Fertilizer Association of Nepal (FAN) has been re-established under the name Nepal Fertilizer Entrepreneurs Association (NeFEA). The first general assembly of association members was held in Kathmandu in August 2017 and was attended and officiated by the Minister of Agriculture on behalf of the Government of Nepal.

- A 16-member delegation comprising representatives from 9 seed companies, SQCC and MoAD participated in the Seed Congress organized by the National Seed Association of India (NSAI) in Kolkata-India, in February 2017.

- A total of 16 people from the fertilizer programmes of the Government of Nepal (DoA, NARC, MoAD) participated in a willingness-to-pay methods workshop in July 2017.

- Two young breeders working under NSAF and partner Seed Company attended a two-week international training on 'Increasing genetic gains in maize breeding through integration of novel tools and technologies' held in Nairobi, Kenya in June 2017.

- A total of 11 participants from NSAF partner seed companies and others attended a two-day training on seed business and best accounting practice in Kolkata-India, in February 2017.

- NSAF supported 4 students from NARC to undertake post-graduate studies in universities in Nepal.

Knowledge Dissemination Progress

- A total of 1,999 farmers in 4 districts (Kailali, Kanchanpur, Banke and Bardiya) have attended farmer field days showcasing ISFM demonstrations of NSAF best management practices.

- A forum for knowledge sharing and communication among USAID projects (KISAN, PANI, SABAL, PAHAL) and the Government of Nepal was organized by NSAF to identify key area for collaboration in April 2017.

- A total of 2,640 persons including farmers, government officials, private sector actors and cooperatives were trained in 20 topics related to seeds and fertilizers.

Collaboration and Partnership Progress

- A Memorandum of Agreement (MoU) is being signed between NSAF and MoAD. NSAF coordinated closely with government agencies, such as NARC, SQCC, the DoA, SMD and DADOs, for all events and activities.

- NSAF reached-out to international breeding hubs in Latin America (Colombia), Central America (Mexico), Africa (Zimbabwe) and Asia (India and Taiwan) to access breeding lines and market ready products for partners.

- NSAF facilitated a joint variety evaluation and validation network with the participation of public and private partners.

- NSAF had meetings with the secretariat of the PMAMP to identify areas for collaboration and technology transfer, especially in the seed production zones, and to strengthen the planned training and learning centres. NSAF is coordinating and facilitating the maize sector group of the programme.

- NSAF, the International Fund for Agricultural Development (IFAD)-supported Kisan ka Lagi Unnat Biu Bijan Kryakram (KUBK) and the High Value Agriculture Project (HVAP) have agreed to collaborate on developing the business plans and marketing capacities of seed companies.

- A partnership has been established with Laxmi Laghubitta Bittiya Sanstha (LxLB) to develop and pilot a voucher-based agricultural inputs loan product for smallholder farmers.

- A planning meeting was organized with NARC on 18 August 2017 to review progress towards implementation of NSAF activities in year 1 and to plan activities for year 2. The budget and operational plan for the commodity programmes under NARC was updated during the meeting.

- Progress with the seed companies was reviewed and plans for year 2 discussed during the annual review and planning meeting held on 28 August 2017.

IR 2.1: Agriculture-based income increased

Under this IR, NSAF will report on the indicators mentioned below.

EG 3-1: Number of households benefiting directly from USG interventions

NSAF exceed the targeted households benefited by 6% from 84,100 to 89,892. As NSAF is a market-led initiative, beneficiaries are reached by its seed companies/agrovets and local institutional (cooperatives) partners. During the reporting period, seed companies sold 1,642 MT of rice and 236.9 MT of maize seeds in the target districts. The average farm size (calculated from the baseline survey) is 0.43 ha for rice and 0.25 ha for maize. Based on the standard seed rate of 50 kg/ha for rice and 20 kg/ha for maize, the total number of beneficiary households for rice is 76,401 and 47,392 for maize. As per the baseline survey, 71% of households grow rice and maize. Hence, to have a realistic estimate, the number of unique beneficiary household (87,893) is calculated by taking 71% of the sum of rice household and maize households. During the reporting period, an additional 1,999 households benefited from fertilizer farmers field days. Therefore, the total number of beneficiary households reached was 89,892. The progress tables and narratives are presented in Annex 1.

Sub-IR 2.1.1: Agricultural productivity increased

Under this Sub-IR, NSAF will report on the indicators mentioned below.

EG.3-6: Farmer's gross margin per hectare, obtained with USG assistance

NSAF completed its baseline survey in September 2017. Since the baseline values are for the 2016–17 season, the targets and actuals for 2016–17 are taken as the baseline values.

The overall gross margin for rice is USD 371.18 per hectare with open pollinated (OP) and hybrids rice contributing USD 342.88 and USD 468.68 per hectare respectively. Likewise, the overall gross margin for maize is USD 251.06 per hectare with OP and hybrid maize contributing USD 239.55 and USD 540.87per hectare, respectively. The baseline gross margin for lentils, cauliflower, onions and tomatoes is USD 493.90, 1731.74, 678.08 and 2542.54 per hectare, respectively. The progress tables and narratives are presented in Annex 1.

EG.3.2-2: Number of individuals who have received USG supported degree-grant in *agricultural sector productivity or food security training*

During the reporting period, as per the targets, NSAF supported three researchers from NARC to pursue PhD courses and one to pursue an MSc in crop breeding in Agriculture and Forestry University (AFU) Nepal. The progress tables and deviation narratives are presented in Annex 1.

EG.3.2-17: Number of farmers and others who have applied improved technologies or management practices with USG assistance

During the reporting period, the number of farmers and other value chain actors applying improved technology or management practices in NSAF target districts was 87,997, against the target of 84,200. This is 7% above the target for this indicator. Of the total, 87,893 farmers purchased improved seed and 104 traders applied NSAF supported fertilizer management practices. The progress tables and deviation narratives are presented in Annex 1.

EG 3.2-18: Number of hectares of land under improved technologies or management practices with USG assistance

During the reporting period, NSAF contributed to bringing 48,863 hectares of land under improved technology, comprising 48,843 hectares under improved seed and 20 hectares under soil fertility management practices. The progress tables and deviation narratives are presented in Annex 1.

EG.11-6: Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by USG assistance

Two major risk reducing parameters, namely, the adoption of stress tolerant varieties and the application of improved soil fertility management practices with micro nutrients, were used to determine the number of people applying such technologies in NSAF sites. Analysis showed that, of the total 600 households interviewed, only 17.9% (108) farmers were using climate information or implementing risk reduction activities. Applying this percentage to the target households for 2017 indicates that 116,480 households are using such risk reduction technologies. The progress tables and narratives are presented in Annex 1.

Custom-1: Total quantity of target value chain commodities produced by direct beneficiaries with USG assistance that is set aside for home consumption

An average of 745.65 MT of NSAF target crops were set aside for consumption by the households surveyed (or 1.25 MT/household per year): 0.44 MT of maize; 0.11 MT of lentils; 1.2 MT of rice; 0.11 MT of cauliflower; 0.08 MT of tomatoes and 0.10 MT of onions. This will be used as the baseline and achievement for 2017. The progress tables and narratives are presented in Annex 1.

Outcome 2.1.1.1: Crop area and yield gains enhanced through rapid diffusion and application of improved varieties

The baseline found that rice and maize are the dominant crops in the project districts. Hence, to improve crop yields, the programme focused on promoting the use of improved varieties of rice and maize among farmers.

Baseline findings:

- 70% of household in the study sites cultivate rice and maize.
- Yield is the top concern influencing farmers' seed preferences.
- Lack of breeder and foundation seeds of newly-released varieties is a major constraint on the expansion of seed companies' businesses.
- Most farmers (82%) are willing to pay more for improved seed, if better quality and yield are assured.
- 84% of the seed companies agreed that product demonstrations were important to popularize their varieties in their market segments.

Highlights:

- 262 demonstrations – including 180 varietal demonstrations (152 improved maize and 28 improved rice) and 82 seed production demonstration (33 maize and 49 rice) – conducted by seed partner companies
- 22 maize hybrids introduced and evaluated for yield and agronomic performance
- 110 new maize hybrids from diverse maturity groups and with important agronomic and nutritional traits introduced and shared with public-private partners for winter season planting (starting from mid-October 2017)
- Detailed assessment of seed value chains conducted to understand the functions, productivity, market systems, stakeholders, opportunities and challenges in the chains
- 3 radio spots comprising 2 on maize and 1 on rice were aired 945 time on 12 community radio programmes with high listenership among farmers, delivering messages on intercultural operations, methods to combat pests and diseases using appropriate pesticides, and best management practices to increase crop productivity for rice and maize

Value Chain Assessments

To increase crop yields in Nepal, it is essential to produce quality seeds and develop new varieties (including hybrids) locally. NSAF needs to ensure that farmers adopt these new varieties, which means developing markets for these new seeds and working with seed enterprises to build their capacity for both seed production and distribution. To inform seed sector market development strategies, the following value chain assessments were conducted.

Seed Market Assessment

The primary focus of NSAF will be to develop the capacity of seed enterprises to enhance their business (in terms of reach and volume). As this is the first year of the project, emphasis was placed on generating better information on the market size for NSAF target crops, the structure and functioning of the seed value chains, and the issues facing the seed companies and agrovets. The seed market assessment found the market share for target crops to be: 45% for paddy, 42% for wheat, 10% for maize, 1% for vegetables and 2% for lentils. In addition, a market development planning meeting was held with seed company partners and SQCC on January 30–31, 2017 in Nepalgunj to discuss what needs to be done to strengthen NSAF's seed market development strategy. During the meeting, participants assessed the size of the market for open-pollinated varieties (OPVs) and hybrids of target crops. The assessment clearly shows growth in the hybrid seed sector in Nepal for cereals (rice, maize,) and most vegetables (Figures 4 and 5). Parallel efforts were also undertaken to understand the research and development (R&D) efforts being undertaken in the seed sector by NARC.

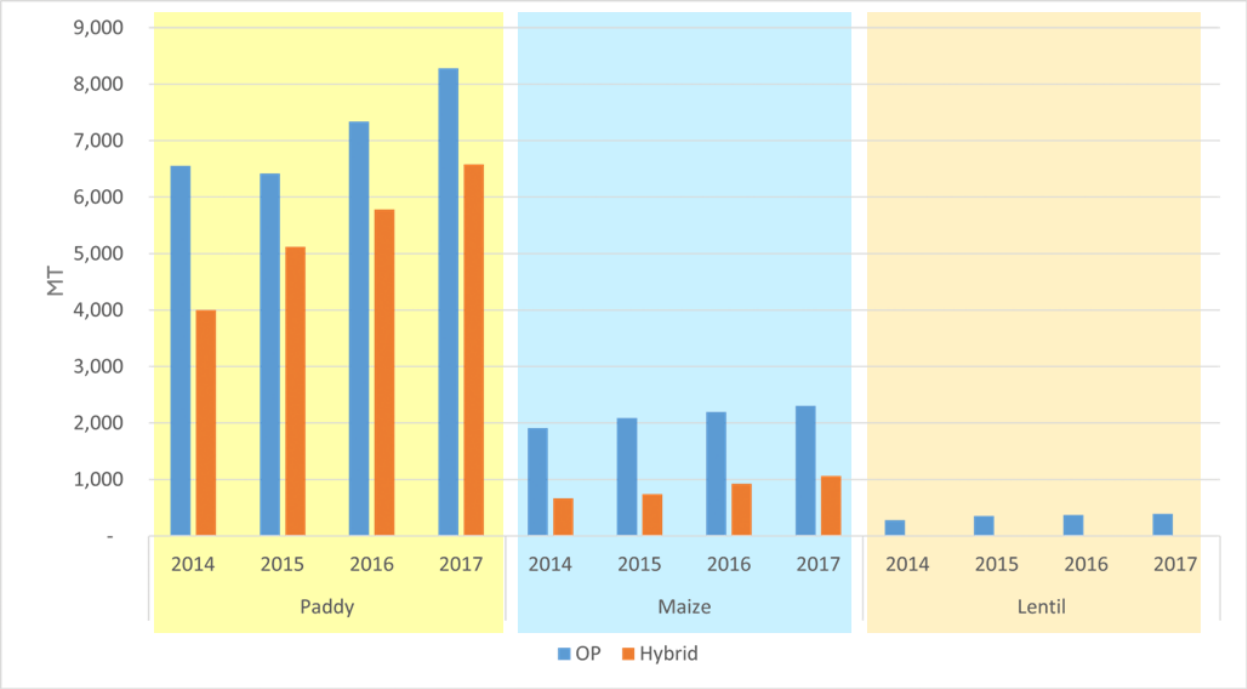


Figure 4. Cereal seed sector sales growth in Nepal (2014–2017)

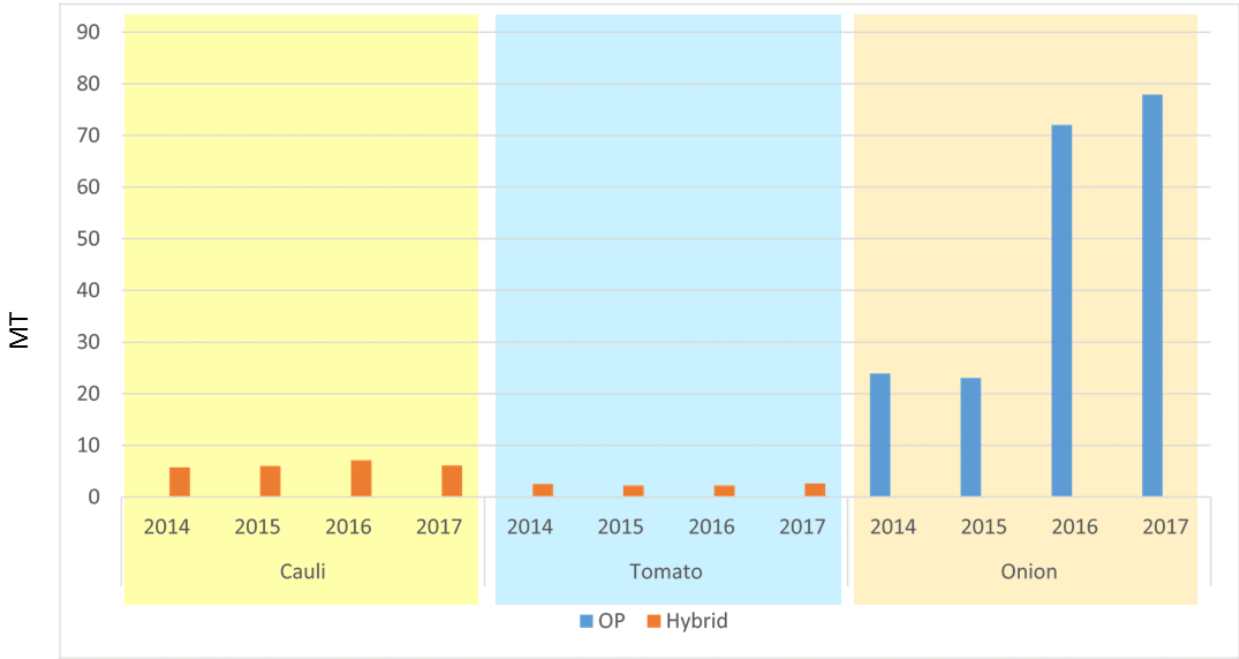


Figure 5. Vegetable seed sector sales growth in Nepal (2014–2017)

It is estimated that the market for OPV rice seeds has grown by 21% (from 6,554 MT in 2014 to 8,285 MT in 2017) and that of hybrid rice seeds by 39% (from 3,999 MT to 6,579 MT over the same period). In the case of maize, the OPV market grew by 17% (from 1,910 MT in 2014 to 2,304 MT in 2017) and the hybrid market grew by 37% (from 665 MT to 1,060 MT over the same period). In the case of lentils, seed sales have grown by 28% (from 280 MT to 390 MT between 2014 and 2017) (Figure 4). Between 2014

and 2017, the seed sales for cauliflower, onions, and tomato grew by 7% (from 5.7 to 6.1 MT), 69% (from 24 MT to 78 MT) and 4% (from 2.52 MT to 2.6 MT), respectively (Figure 5). These initial assessments will be used as the basis for planning detailed market and value chain studies to finalise the seed market development strategy.

Vegetable Sector Rapid Assessment

Vegetables are an important crop for farmers, but only 20% of farmers grow these crops in NSAF project sites as estimated from the baseline. Hence, it is important to understand the vegetable sector in order to be able to increase crop area and yield. Accordingly, a rapid assessment (focus group discussions with farmers, agrovets and DADOs in two pockets in each district) of the vegetable sector was conducted together with CEAPRED in 13 districts (Doti, Baitadi, Kailali and Kanchanpur in Far West Nepal; Dailekh, Jajarkot, Banke, Dang in Mid-West Nepal; Palpa, Gulmi and Kapilvastu in West Nepal and Nuwakot and Sindhupalchowk in Central Nepal) to identify trends in vegetable production, understand the vegetable market systems, and identify potential sites and NSAF strategies for intervention in each district. The report is in the process of being compiled, but it is clear that different factors determine the productivity, technology transfer and income from vegetables in each of the 13 districts. Hence, a pocket area approach will be used as the basis for NSAF intervention in year 2 and beyond.

Vegetable Sector Rapid Assessment: Key Findings

- In most cases, the productivity of cauliflower, tomato and onion crops in the project sites is lower than the national average of 14 MT/ha, 17MT/ha and 12MT/ha, respectively (MoAD data for 2014/15). This is consistent with NSAF's baseline assessment.
- In terms of varietal characteristics, stakeholders suggested the need to introduce high yielding compact head cauliflower, hardy and thick flesh varieties of tomato, and high-keeping varieties of onion.
- Agrovets mostly sell hybrids and demand for OPVs is very low in relation to seed quality apart from farmers yield preferences.
- Most farmers know the importance of using fertilizer, however, they use very limited quantities of chemical fertilizer, relying mainly on farmyard manure.
- Farmers are unaware of specific role of micronutrients in crop development, however, they apply micronutrients as advised by agrovets.
- In all of the districts surveyed, agrovets also provide after sales advisory services (services free of cost with a sale of agri inputs) to farmers on nursery raising, plant protection, crop production techniques, and poly-house construction for targeted crops.
- There are well established vegetable marketing systems in the districts, however, these can be improved through partnerships with key market actors.

Seed Sector Development Strategies

Based on the value chain assessment findings, the NSAF seed component will work to improve the systemic competitiveness of the seed system in Nepal. The seed value chain will be upgraded based on 'good seed business practices', which will provide the overall framework for the component. This is guided by the FTF indicators and targets and the priorities of the National Seed Vision and ADS (see Annex 2 for NSAF seed component operational framework).

The seed component will focus on the various stages of the value chain including establishing or strengthening two new functions in the chain, namely, R&D and marketing (depicted by dotted boxes in Annex 2). NSAF has identified and prioritized market segments in the target districts to deliver its products and services through public, private and civil society actors. Within each segment, crop-wise actors, functions and partners (such as seed companies, DADOs, cooperatives, millers, and feed industries) are being identified and clusters developed for coordination and management. At the micro

level, NSAF is operating from its hub offices in Banke and Kailali with adequate field-based staff positioned at the hub and market segment level. At the meso level, NSAF will partner with regional centres of NARC, the regional agriculture directorate, RSTL, SEAN, seed producer associations, etc. At the meso level, NSAF is partnering with regional centres of NARC, the regional agriculture directorate, RSTL, SEAN, seed producer associations, etc. At the macro level, NSAF will partner with the DoA (CDD), SQCC, NARC and MoAD. Thus, interventions are being implemented at the micro, meso and macro levels in the seed value chains.

Crop Strategies

Bridging the yield gap is the centre piece of NSAF's approach to promote its' target crops in Nepal. The main factors preventing smallholder farmers from attaining the potential yield for these crops are lack of availability and access to improved quality seeds, suitable varieties as well as ISFM practices. NSAF is working on upstream value chain components to increase market access and the adoption of these commodities. To foster a market-oriented approach, NSAF has adopted the following crop-wise strategy to achieve quick gains (see Table 1).

Table 1. NSAF's crop-wise strategies for maize, rice, lentils and vegetables

Maize strategy	• Promote the production and distribution of recently released/registered hybrids and OPVs in the NSAF target districts for rapid diffusion and adoption. • Introduce market-ready maize hybrids with diverse genetic backgrounds and product profiles from international breeding hubs for evaluation and validation in the different maize growing agroecologies in the project target areas. • Introduce and evaluate biofortified maize products for human and poultry use. • Introduce and promote climate resilient maize products. • Foster private sector-led and owned hybrid maize product development and marketing in line with the National Seed Vision. • Establish a public-private maize varieties evaluation and validation network to fast track deployment, scale up seeds of new products and identify important trait combinations. • Engage value chain actors in Nepal at different levels to enhance synergies and cement collaborations to increase maize production, productivity and utilization in Nepal.
Rice strategy	• Scale up recently released climate resilient rice varieties in partnership with public and private institutions. • Engage in the pre-release popularization of new high-yielding rice varieties by acquiring them from International Rice Research Institute (IRRI) and local sources to ac NSAF will identify important yield and agronomic traits based on the demand of farmers and consumers alike. • Collaborate with public and private partners in the quality production of early generation seeds of rice to ensure availability of source seeds for successive multiplication of seed generation classes • Engage with value chain actors at different levels to enhance synergies and cement collaborations to increase rice production, productivity and utilization in Nepal.

Lentil strategy	• Fast track seed production of recently released climate resilient (including early maturing and water-logging tolerant) lentil varieties in partnership with public and private institutions. • Introduce, evaluate and promote lentil germplasms with tolerance to biotic stresses (including Stemphylum blight, root rot and wilt diseases). • Explore appropriate sources of, and geographies in which to, introduce lentil germplasm with high breeding and economic importance. • Improve agronomic and crop husbandry practices to enhance lentil yields. • Engage with value chain actors in Nepal at different levels to enhance synergies and cement collaborations to increase lentil production, productivity and utilization.
Vegetable strategy	• Introduce high yielding compact head cauliflower, hardy and thick flesh varieties of tomato, and long shelf life varieties of onion. • Promote ISFM to increase yields in vegetable production. • Facilitate access to source seeds through NARC/Vegetable Development Directorate, as well as the official process of registration/release of the varieties. • Link agrovets and farmers and provide ICT based agro-advisory services. • Facilitate market-orientated production and linkages between contract producers and traders. • Facilitate links with local governments (e.g., agriculture unit), local/district level vegetable traders, insurance companies and financial institutions.

Farmer Outreach

Varietal Demonstrations

The adoption of new high-yielding varieties (and technologies) by farmers is key to improving agricultural incomes. In Nepal, most of the newly-released varieties have not reached local farmers. NSAF will reach out to farmers through various extension activities, such as demonstrations, district-level trader meetings, farmers' meetings, radio, ICT and other means of communication.

Field demonstrations are one of the most effective ways of encouraging farmers to adopt new crop varieties. In the summer of 2017, 180 varietal demonstrations were carried out by 4 seed company partners: Hariyali, GATE-Nepal, Unique and Panchashakti. Varietal demonstrations of paddy and maize were carried out in one ropani of land (0.05 ha) using only two varieties (demo and local check) with the same management practices. The results from the various demos will be reported in the next report after data analysis is completed. Based on this first year experiences NSAF will increase the number of demo plots and participating partners in the upcoming project years.

Farmers' Field Days

Farmers' field days are an important part of NSAF's varietal intervention and deployment strategy. Such events help to demonstrate project's intervention in comparison with existing practices. They are an effective way to increase the adoption rate of technologies in the project area.

Field day 1: Banke

In September 2017, GATE-Nepal – one of NSAF's seed company partner- organized a farmers' field day at Baijanath-6, Banke. The field day aimed to show a maize demo field of Mrs. Om Sara Gharti Magar-a women farmer who hosted a varietal intervention demonstration. Farmers were able to observe the yield difference between Rampur Composite which was provided by the seed company against the local check. The demo variety was new to most of the farmers in the surrounding, as they used to plant only locally available maize seed. Despite the low plant population of Rampur Composite, farmer Om Sara was happy to report the 2.0 MT/ha grain yield she harvested as compared to the 0.7 MT/ha from her local variety. This threefold yield increase indicates how farmers can easily achieve yield gains through the use of improved varieties. A total of 73 participants (13 male and 60 female) attended the field day who requested such seeds to be available for the next cropping season. Although NSAF was able to demonstrate to farmers the benefits of varietal intervention in increasing farm level yields, its focus will remain to enhance adoption of recently released varieties together with best agronomic practices."

Photograph 1. Demo farmer comparing and explaining the advantages of NSAF's demo variety compared to her local maize cobs (Photo: Darbin Joshi)

Field day 2: Kanchanpur

A second farmers' field day was organized by NSAF and Panchashakti Seed Company, in Kanchanpur with the attendance of 78 farmers (4 men and 74 women) (Photograph 2). Farmers were able to see the difference in performance of paddy variety Hardinath-1 and check variety of Radha-4. Majority of the farmers were interested by the earliness (by 2 weeks) in maturity of Hardinath-1 which was near harvest during the visit as compared to Radha-4 which was at flowering stage. Some of the farmers also shared their concern that extra earliness might expose Hardinath-1 to field weevil in case farmers unable to harvest timely. The major lesson for farmers' preference of earliness is a climate risk avoidance strategy due to change in seasonal weather and the extra time they could get to prepare the land for the next crop cycle.

Photograph 2. Farmers' field days give farmers easy access to information on demo varieties and a chance to ask questions (Photo: Darbin Joshi).

Seed Production Demonstration

Maximising yields requires efficient seed production, which requires knowledge of best management practices. Accordingly, in the summer of 2017, 82 seed production demonstrations for paddy and maize were carried out by GATE-Nepal and Unique. The demonstrations aimed to analyse the intervention of best management practices on the seed yield of similar varieties. The results from this activity will be shared in the next report, once the field data compiled and further analysed. NSAF has set targets to organize further seed production and varietal demonstration for recently released varieties of all NSAF target crops.

Collaborating with Ministry of Agricultural Development

NSAF is in the process of signing a memorandum of understanding (MoU) with the MoAD to provide technical support to SQCC and the DoA for establishing processes for the sustainable production of source seed for pre and newly released varieties. A technical committee will be formed under the Chairmanship of the Director General of the DoA for joint development and endorsement of NSAF technologies and extension materials.

In addition to formalizing the activities of NSAF has:

- Supported SQCC technically, by way of providing technical resource persons to its training and meetings viz., inspectors, seed samplers and analysts at Butwal in 31 May – 3 June 2017 and for Seed Vigour Testing Training, held at SQCC headquarters, in Kathmandu in August, 2017.
- Supported subject matter specialists at the DADOs and commodity programmes of DoA and SQCC in seed production, processing, storage and quality assurance of hybrid and OPVs.

- Participated in different seed-related workshops to provide its view on the growth and development of the seed sector in Nepal.

- Facilitated and sponsored the participation of three staff from MoAD and SQCC to participate in India Seed Congress -2017.

- Received support from the DADO and the commodity programme of the DoA, SQCC, and MoAD in its different workshops, meetings and training programmes.

TRP Centres

The testing of OPVs and hybrid varieties of target crops is essential to ensure that they are suitable to local conditions. Hence, NSAF attempted to establish Technology Refinement Platforms (TRPs) for this purpose. The following activities were undertaken:

- Discussions were held with national partners (NARC and its commodity programmes), international organizations (IRRI and World Vegetable Centre), and the National Germplasm Centre to obtain source materials (OPVs and hybrid varieties) for six NSAF target crops for testing and screening at the TRP centres. A material transfer agreement (MTA) was signed between CIMMYT and World Vegetable Center in June 2017 and nine lines of tomato and six lines of onion were received for testing from World Vegetable Center, Taiwan. These materials have been handed over to the Horticultural Research Division at NARC, Khumaltar for further trialling and multiplication.

- Two TRPs were established: one in Khajura, Banke (NARC) and one Kalakate in Dang (NSC).

In total, 1,477 lines (1,340 of maize, 79 of paddy, 4 of lentils, 29 of tomato, 20 of cauliflower and 5 of onion) were tested at the TRP centre in Khajura. In Kalakate 54 lines (29 of tomato, 20 of cauliflower and 5 of onion) were tested. However, as per the new roadmap developed in June 2017, NSAF has decided to promote market-ready products sourced from the various breeding hubs of CIMMYT and other international organizations to fast track the identification and registration of new products by reducing product screening and selection time. This makes the need for large-scale and successive adaptability and screening trials a lessor priority. NSAF will therefore focus on testing the adaptation of finished products i collaboration with public and private partners.

Photograph 3. Technology Refinement Platform (TRP) site in Khajura, Banke (Photo: Darbin Joshi)

Outcome 2.1.1.2: Site-specific integrated soil fertility management technologies used by stakeholders

Together with promoting the use of improved varieties to increase crop yields, the project also conducted trials and demos to determine the site-specific optimum fertilizer and agronomy management practices for target crops.

Baseline finding:

- 40% of farmers consider poor knowledge of soil/fertilizer management as a barrier to their farming.
- Other problems include shortages of fertilizer, poor quality seed, lack of money to purchase seed and fertilizer, and agricultural labour shortages.

Highlights:

- 33 new technology trials and 11 demo plots conducted for wheat, rice and maize on the fields of 135 farmers within 51 cooperatives
- Fertilizer management wheat yields: 5 MT/ha under best management practices, compared to 3.4 MT/ha under farmer practices (a 47% yield increase)
- Fertilizer best management practices are currently being translated into location-specific trainings, which will be disseminated to private industry through the fertilizer association, agrovets, and the national extension programme.

Wheat Crop Findings

Wheat trials were conducted on demo plots in farmers' fields, in conjunction with cooperatives, to determine the optimal fertilizer amounts for wheat and the best agronomical practices. Optimum basal fertilizer management for wheat in western Terai was estimated as 100 kg of DAP per hectare and 30 kg MOP per hectare. Optimum top-dress nitrogen fertilizer application rates were estimated as 130 kg urea per hectare (split twice, 21 days after planting and again at panicle initiation) for high soil fertility zones (Banke and Kanchanpur districts) and 250 kg urea per hectare (split twice, 21 days after planting and again at panicle initiation) for low soil fertility zones (Bardiya and Kailali districts). The trials results are shown in Figures 6 and 7.

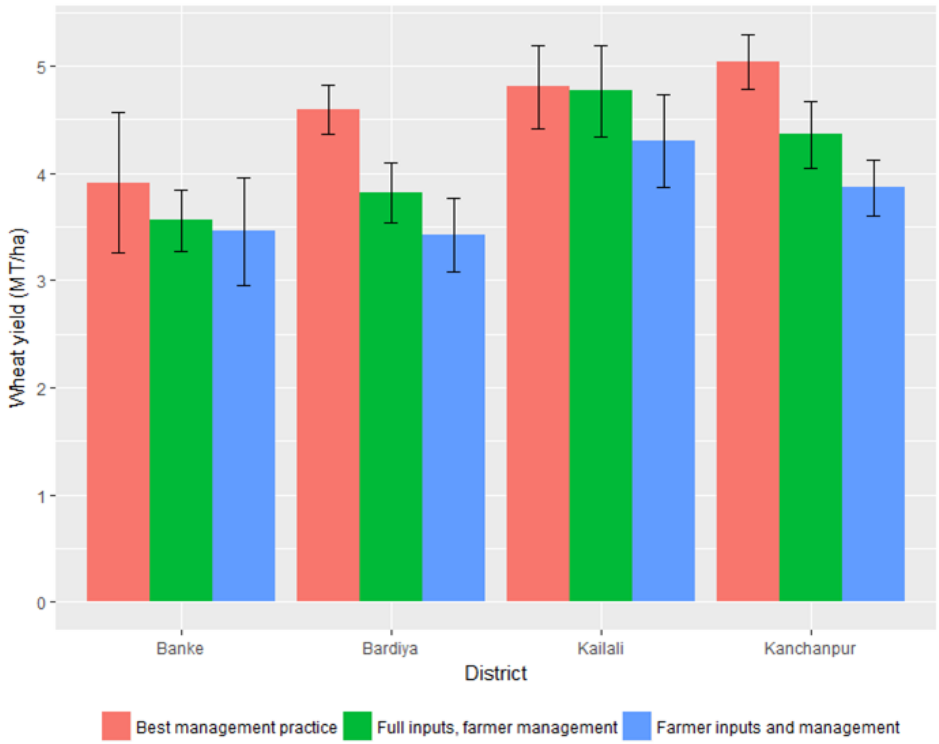


Figure 6. Yield response for fertilizer 'best management practice' demo plots for wheat, 2016/2017

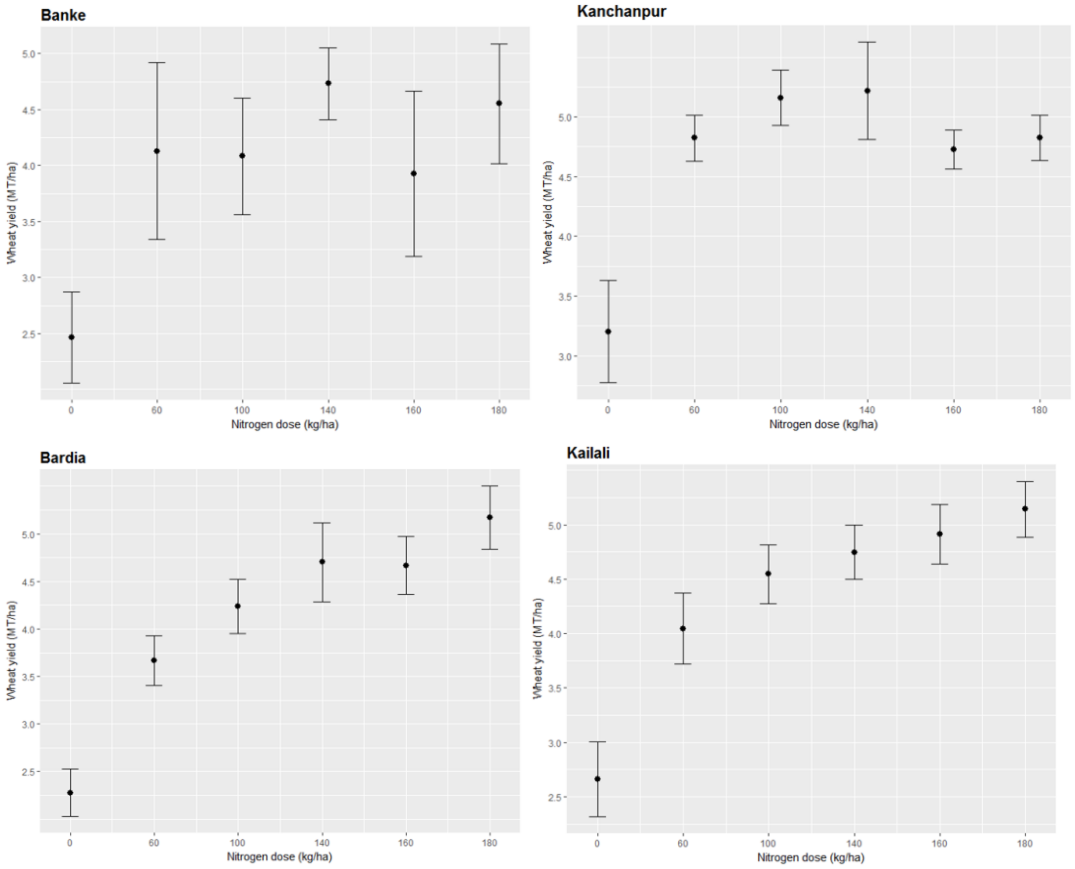


Figure 7. Yield response for fertilizer nitrogen optimization plots for wheat, 2016/2017

Rice Crop Cut Survey

During the reporting period, NSAF analysed a systematic rice crop cut survey to identify primary yield drivers and completed site-specific ISFM package development trials for wheat, rice, and maize. The results of the rice crop cut data indicate strong yield gaps exist across the Terai. For example, a 1.5 MT/ha yield gap (40%) exists for rice across most of the western Terai. The principle drivers of this gap are spatial location, water stress, nitrogen fertilizer amount, and phosphorus fertilizer amount.

The strong spatial correlation in the data indicates that site-specific management is key to addressing these gaps. Accordingly, 12 new technology trials and 4 demo plots were conducted each for rice and maize and 9 new technology trials and 3 demo plots were conducted for wheat. The principal objective of these trials was to determine the optimum fertilizer and agronomy management programme for the crops, localized to regional needs.

The strong spatial correlation in the data indicates that site-specific management is key to addressing these gaps. Accordingly, 12 new technology trials and 4 demo plots were conducted each for rice and maize and 9 new technology trials and 3 demo plots were conducted for wheat. The principal objective of these trials was to determine the optimum fertilizer and agronomy management programme for the crops, localized to regional needs.

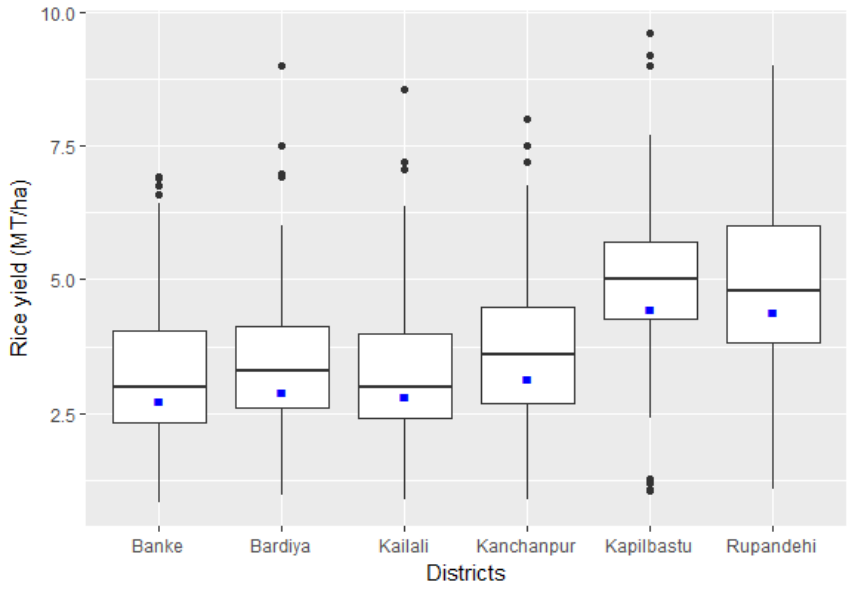


Figure 8. District-level yield variability from rice crop cut survey

Outcome 2.1.1.3: Efficient and cost-effective fertilizer application technologies commercialized by private sector

After establishing several regionally-adapted ISFM product packages (fertilizer, seed, and optimum agronomic management practices), the next step is to evaluate and scale cost-effective fertilizer application technologies through the private sector.

Baseline findings

- Urea is the most commonly purchased fertilizer (81% of households), followed by DAP (69% of household).
- 13% of the households that used fertilizer used more than one type of fertilizer.

Highlights:

- 3 types of custom precision fertilizer scoops manufactured locally in Kathmandu using 3-D printing
- Polymer-coated urea evaluation for rice conducted for the first time in Nepal
- Precision fertilizer and seed hole spacers for maize evaluated and developed locally
- Leaf colour charts trialed for precision application of urea for rice
- Briquetted urea evaluated for rice

Precision Fertilizer Application Methods

While sufficient quantity of appropriate fertilizer is important to improve productivity, precision fertilizer application methods are equally important to increase the economic efficiency of fertilizer use. GoN's agricultural programmes typically focus on mechanization as a way to achieve this goal. While mechanization is appropriate in many situations and can lead to improved yields, tractor-based mechanization may not be feasible in many of the rugged and hilly regions of Nepal. NSAF has looked at several locally-available precision fertilizer application technologies for farmers in these terrains. In principle, these tools and technologies should be able to increase agricultural productivity and/or reduce labour requirements (see Table 2).

Figure 9. Custom precision fertilizer scoops produced by the Robotics Association of Nepal (blue scoop is for DAP and red is for MOP)

Table 2. Precision fertilizer application technologies

Application method	Description
Custom-made precision fertilizer scoops (maize)	NSAF has worked with the Robotics Association of Nepal to make precision fertilizer scoops using modern low cost 3-D printing technology. Based on the best management practices for fertilizer spacing for maize, these scoops precisely deliver optimum amounts of fertilizer per plant. 3-D printing technology, which offers the flexibility to produce rapid-prototypes of objects are made from a variety of materials (plastics and metals). This allowed NSAF to make assessments of these farm tools (e.g. fertilizer scoops) and to rapidly incorporate farmer-feedback to customize them to the local conditions. Scoops have been made for DAP, MOP, and urea (not shown) (Figure 9). These scoops can be easily mass manufactured and

	scaled through fertilizer companies, seed companies, and agrovets for a few rupees a piece.
Polymer coated urea (rice)	Polymer coated urea (PCU) consists of traditional urea granules coated in a biodegradable polymer. This polymer slowly breaks down in the soil, which gives the urea a 'slow-release' property. In theory, PCU fertilizer products can all be applied at planting, eliminating the need for labour-intensive follow-up fertilizer applications (top-dressing) later in the season. PCU products are being evaluated in Nepal for use in rice. Results from Bangladesh have shown that PCU can be effective in reducing labour costs and increasing agricultural productivity. While principally a urea product, it is not covered by the current fertilizer subsidy and may be an attractive entry point for the private sector.
Briquetted urea (rice)	Briquetted urea is common urea that has been physically compressed to form small bricks. These briquettes also act as a slow-release fertilizer. It is possible that briquetted urea can also be applied at planting, potentially saving farmers substantial labour costs from follow-up fertilizer applications. Briquetted urea is being evaluated in Nepal for use in rice.
Leaf colour charts (rice)	When crops are deficient in nitrogen the leaves of the plants turn yellow. By timing fertilizer nitrogen application (urea) to the colour of crop leaves, it is possible to reduce the number of fertilizer applications while maintaining or increasing yields. Leaf colour charts show a series of standard colours (green to yellow) that correspond with various levels of nitrogen deficiency in rice. These charts are off-the-shelf products that have been evaluated by IRRI in India. NSAF is evaluating these with farmers in Nepal for rice.
Precision fertilizer and seed hole spacers (maize)	One of the principles of precision nutrient management is tight synchronicity between fertilizer placement and seeding location. Often, farmers haphazardly plant seeds and apply fertilizer using a stick or hand hoe. With simple instructions farmers can manufacture precision tools from on-farm resources to uniformly plant and fertilize their crops using commonly available materials around the farm (sticks and nails). NSAF is evaluating these training materials and farmer-made hole spacers this season for maize.

Sub-IR 2.1.2: Value chains strengthened

Under this Sub-IR, NSAF will report on the indicator mentioned below.

EG 3.2-7: Number of technologies or management practices under research, under field testing, or made available for transfer as a result of USG assistance

During the reporting period, in phase one, out of 43 technologies targeted, NSAF conducted research on 66 technologies. Research was conducted on 33 trials of maize crop varieties in the TRP, for screening of traits related to productivity and resistance to biotic and abiotic stress, and 33 different fertilizer treatment trials for wheat, maize and rice in farmers' fields.

In phase two, a total of 640 trials and demos of crop varieties (40 rice, 518 maize, 38 tomato, 20 cauliflower, 12 onion, 4 lentil) were tested for productivity and resistance to biotic and abiotic stress in multi locational trials. In addition, a total of 8 nutrient management technology packages were tested in fertilizer demonstration plots (2 rice, 3 wheat and 3 maize). The progress tables and deviation narratives are presented in Annex 1.

EG 3.2-20: Number of for-profit private enterprises, producers' organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied improved organization-level technologies or management practices with USG assistance

During the reporting period, 64 organizations applied improved technologies or management practices against a target of 49: 8 for profit private enterprises (seed companies), 1 trade and business organization (NeFEA), 20 producer's organization (seed producers groups) and 35 community-based organizations (agricultural cooperatives).

Private seed companies applied new technologies and management practices (e.g., business plans, conducting trials and demos). Producer organizations applied seed production technologies (e.g., maintaining isolation distance, rouging and layout design). The 35 agricultural cooperatives conducted trials and demos in Banke, Bardiya, Dang, Surkhet, Kailali and Kanchanpur districts. The progress tables and deviation narratives are presented in Annex 1.

Outcome 2.1.2.1: Seed value chains strengthened by the introduction, evaluation and validation of new and market-ready hybrid and OPV products

The introduction of new varieties as well as the maintenance of existing varieties is an integral part of an effective seed system. The public sector (NARC), private sector and CGIAR centres working in Nepal all

have their strengths on seed value chains. These strengths can be leveraged for greater synergy through a pragmatic approach that focuses on collaboration through public-private partnerships.

Baseline findings:

- Most seed companies reported an increase in the sale of hybrid rice (77%) and maize (84%) seeds.
- Nearly all agrovets surveyed (99%) sell hybrids seeds of cereals and vegetables.
- Most agrovets surveyed reported an increase in the sale of hybrid rice (85%) and maize (79%), driven by farmer demand.

Highlights:

- Discussions held with NARC and private seed sector partners about establishing a NSAF-PPP Coordination Cell at NARC (it has been decided to strengthen the existing system of NARC rather than establishing new one)
- 22 new hybrid maize products from CIMMYT India introduced and evaluated for grain yield performance and other agronomic traits
- 110 hybrids, including local check varieties, have been introduced and distributed to partners for winter planting (mid-end October 2017)
- 6 private companies, in collaboration with NARC, are engaged in the product evaluation and validation network
- 9 tomato and 6 onion breeding lines introduced from World Vegetable Center in Taiwan
- Provision of early generation seeds of target crops for multiplication by public and private partners facilitated by NSAF
- Various meetings and discussions held with seed importers, agrovets, feed mills, CBSP groups, seed companies and public sector representatives to strengthen collaborations across value chains for NSAF target crops

NSAF-PPP Coordination Cell

Two meetings were held in Kathmandu in August: an NSAF-NARC Progress Review and Planning Meeting on 18 August and an NSAF Seed Partners Review and Planning Meeting on 28 August 2017. During these meetings, it was agreed to establish a tripartite mechanism – an NSAF-PPP Coordination Cell at NARC – to build the capacity of Nepali breeding programme and the seed companies and increase their access to improved germplasm and licensing of varieties released by NARC. The following organizations will be part of the cell: CGIAR institutes (CIMMYT, IRRI, International Center for Agricultural Research in the Dry Areas [ICARDA], and World Vegetable Center); NARC institutions (National Maize Research Program [NMRP], National Rice Research Program [NRRP], Grain Legume Research Program [GLRP], and Horticulture Research Division [HRD]); and at least five private seed companies.

In general, the coordination cell will have a key role in strengthening the capacity of local breeding programmes in product development and fast tracking their release. It will further stimulate the sharing of breeding materials and released varieties for seed scale up and distribution by seed companies and agrovets. To strengthen this cell, NSAF is drafting guidelines in coordination with NARC, SQCC, the

government and private sector partners to operationalize the tripartite mechanism between CIMMYT (represented by NSAF), NARC and private seed companies. The cell will source germplasm and hybrids and OPVs of high yielding and climate resilient crops for testing, release and registration.

Sourcing Market Ready Products

The purpose of sourcing suitable germplasm from international sources, including crop-specific research consortia is to strengthen the hybrid development capabilities of NARC and local seed partners for current and future expanded product portfolio. Trial materials were sourced from NARC institutions, other CGIAR institutes (such as IRRI and ICARDA), the United States Department of Agriculture (USDA), Heat Tolerant Maize for Asia (HTMA), CSISA and Stress-Tolerant Rice for Africa and South Asia (STRASA). NSAF received 2,328 entries/lines of trial materials of different crops, including hybrids and OPVs, in the years 2016 and 2017 (Table 5). This will be an ongoing activity throughout the project period, with specific annual targets and performance data will be periodically updated, analysed and shared in the next report

Table 3. Sourcing of trial materials for seed partners

SN	Crop	Source organization	2016	2017		
				Received	Tested	Balance
1	Maize	CIMMYT	1,340 (31 trials)	836 (74 trials)	518 (64 trials)	318 (10 trials)
2	Paddy	Private/Public	79	-	-	-
3	Lentil	NARC/private	4			
4	Cauliflower	Nepalese and Indian Seed Companies	20	-	-	-
5	Tomato	Nepalese and Indian Seed Companies	29	9*	9*	-
6	Onion	Companies/CEAPRED	5	6*	6*	-
Total			1,477	851	533	318
Note: * = World Vegetable Centre						

Outcome 2.1.2.2: Seed companies include biofortified crop varieties in their business portfolio

According to the findings of the NDHS, 2011, over 40% Nepalese children are chronically malnourished. This figure could be higher now, particularly after the earthquake in 2015, which left many families without access to nutritious food. Similarly Nepal is among the countries where the prevalence of Vitamin A Deficiency (VAD) among preschool children is above 40%. Another nutrition-related problem in Nepal is

zinc deficiency. Both deficiencies have detrimental effects on the health and development of the population. This calls for concerted interventions for improving child and maternal nutrition.

Maize is a dietary staple and often the only source of protein energy for millions of Nepalese. However, normal maize is deficient in essential amino acids, lysine and tryptophan – key protein building blocks that cannot be synthesized by the human body and must be acquired from food. As a result, when diets are comprised mainly of maize, consumers face the risk of malnutrition, particularly those with high protein requirements, like young children and pregnant or lactating women.

Although it is possible to tackle these challenges through diet diversification, industrial fortification and supplementation, these might not be sustainable or suitable solutions for low-income and marginalized communities. Hence, biofortification of widely available crops is a promising alternative for reaching millions of farmers and consumers. Hence, NSAF is working on the introduction and validation of biofortified products to meet rapidly evolving demand for nutritious food and animal feed in Nepal. NSAF is currently testing the adaptability of diverse biofortified maize products, including QPM, PVA QPM+Zn and Kernel Zn enriched hybrids, in partnership with public and private partners.

Baseline findings:

- Stakeholders reported that there are no biofortifed hybrid maize in Nepal.

Highlights:

- 34 protein enriched hybrids (QPM) introduced and shared with 3 private and public partners for evaluation during winter season 2017
- 9 kernel Zn enriched hybrids and synthetics, including those with QPM+Zn background were introduced and shared with partners for adaptability test
- Over 80 Pro vitamin A (PVA) hybrids and OPVs with various maturity groups tested for adaptability at three partner's sites (ARS Doti, Unique Seed and Panchashakti) in summer 2017 (heavy rains and flood affected the performance of the trials, which complicated the selection process by the evaluation team)

Outcome 2.1.2.3: NARES develop and deploy ISFM technologies

Strengthening NSAF target crop value chains will require the development and deployment of ISFM technologies. For this NSAF is partnering with NARES. The NSAF ISFM field programme was conducted in partnership with NARC, principally the SSD, and with the involvement of various representatives of the DoA.

Baseline findings:

- 70% farmers believe that line application of fertilizer would require more seed and fertilizer.
- Around 87% of respondents think training on soil management would be helpful for their household.
- Most farmers did not know which fertilizers made which nutrients available to the plant
- Over 90% farmers do not know the nutrients associated with different types of fertilizer
- 99% farmers consider nutritional deficiency in their maize and rice plots is related to pest and diseases problem.
- About 87% of farmers think that training in IFSM will be useful for them.

Highlights:

- Coordinated with DoA training division to develop and test ISFM extension materials
- Collaborated with the DoA and NARC on co-developing digital extension tools (crop calendar) for endorsement by the DoA and integration into extension programmes
- 13 participants trained in digital soil mapping, including 6 staff from NARC and the SMD
- Historical soil data from 8 NSAF target districts aggregated (more data is coming in)
- Geonode data repository created
- 16 Government of Nepal staff trained by NSAF on willingness to pay for fertilizers

Digital Soil Mapping and Data Aggregation

By the second half of FY 2016, NSAF had moved forward with capacity development of its local partners. In March 2017, NSAF held an advanced digital soil mapping workshop that included three staff members from NARC and three staff members from SMD (Photograph 4). In addition, seven local staff from other international organizations were also trained at this workshop. The outputs of this workshop include the first high-resolution digital soil maps of Nepal (Figure 10). These maps will be used to strategically guide NSAF field programming, drive the development of market-led fertilizer products, and inform/update soil management recommendations through the MoAD and will be leveraged to suggest fertilizer policy reforms. NSAF is continuing to work with the SMD and NARC to aggregate historic soil data and complete digital soil mapping for all of the FTF districts and more. CIMMYT has created a Geonode digital spatial data repository to house all of the aggregated soil and other data for map generation.

Photograph 4. NARC and SMD staff viewing output from digital soil mapping training (Photo: David Guerena)

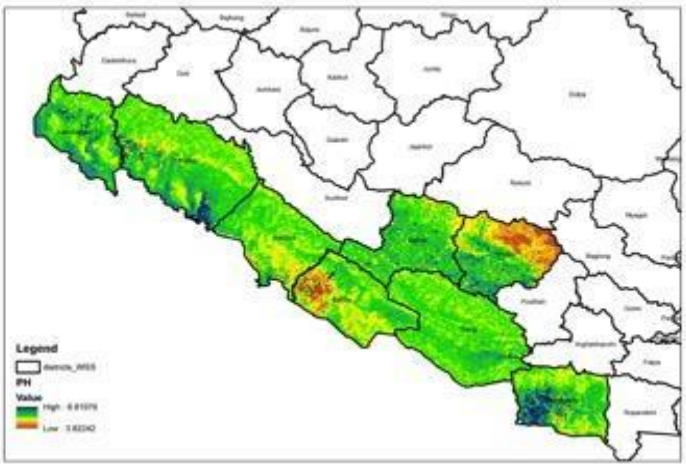


Figure 10. High resolution soil pH maps for all FTF Terai districts and two hill districts

IR 2.2. Small enterprise opportunities expanded

To expand small enterprise opportunities, NSAF is implementing a number of training programmes for stakeholders across the value chain. It has also developed SOPs for seed value chain actors, is strengthening the entrepreneurial skills of private sector, and is working to improve seed companies and fertilizer entrepreneur's access to financial and business services.

Under this IR, NSAF will report on the indicator mentioned below.

EG 5.2-1: Number of firms receiving USG-funded technical assistance for improving business performance

NSAF assisted 14 private sector firms (8 seed companies and 6 fertilizer importers/traders), by providing assistance for improving business performance. Technical assistance by training seed companies and fertilizer importers were provided. Technical sessions to increase the skills of seed companies by incorporating the principles of good seed business practices, marketing, branding and accounting in their operations were conducted. The targets and actuals together with deviation narratives are provided in Annex 1.

Sub-IR 2.2.1: Entrepreneurial skills strengthened

Under this Sub-IR, NSAF will report on the indicator mentioned below.

EG 3.2-1: Number of individuals who have received USG supported short-term agricultural sector productivity or food security training.

During the reporting period, NSAF trained 2,640 persons. NSAF conducted training on 20 different topics including: seed production and post-harvest handling, seed processing and quality assurance, cropping system and disease pest management, market development strategies, field trial data collection, best practices for seed businesses, digital data capture and data processing, improved access to finance, work planning support to partners, farmer field days, policy issues in fertilizer sector, fertilizer trials and demonstration for community volunteers, strengthening the Fertilizer Association of Nepal (FAN), advocacy training to revitalize NeFEA, NeFEA pre-assembly session, Geographical Information Systems

(GIS), agrovets market strategy, innovative mobile application, quantifying farmers preferences, ISFM, and the 4Rs of stewardship.

In these events, 1,958 farmers received training of which 894 were women and 1,064 were men. A total of 197 persons were trained from the government (women: 31, men: 166). From the private sector, 272 persons (women: 11, men: 261) were trained. A total of 213 people from civil society (women: 92, men: 12) received training.

NSAF developed its roadmap, which entailed several training activities for its partners and stakeholders. Moreover, the reporting period includes an additional six months, which was done to align NSAF with USAID's reporting periods. Hence, the number of individuals trained far exceeded the targets set. The detailed figures and deviation narratives are presented in Annex I.

EG 3.2-4: Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG food security related organizational development assistance

During the reporting period, NSAF provided institutional strengthening assistance, such as field demonstrations, seed production, business planning, access to finance and organizational management to eight private seed companies, two fertilizer importing agencies, one fertilizer association (NeFEA), 35 agricultural cooperatives and 20 community based seed production groups. The detailed figures and deviation narratives are presented in Annex I.

Outcome 2.2.1.1: Seed companies/producers adopt good seed business practices

To strengthen entrepreneurial skills, NSAF is supporting stakeholders through training programmes, exposure visits, support in degree granting courses and curriculum development.

Baseline findings:

- All of the seed companies surveyed stressed the need for training, with 53% wanting marketing-related training, about 70% wanting training on seed production and processing, and 61% wanting training on maintaining seed quality. Only 23% requested training on seed extension activities.
- 92% of seed companies prefer to sell seed through market channels using their own brand.
- 84% of seed companies agree that agrovet channels are the most important for their sales.

Highlights:

- Good seed business practices handbook prepared for stakeholders
- Strategic market development meeting conducted in January 2017 with 10 seed companies, the National Seed Company, DADO and SQCC
- Delegation of 12 representatives from private seed companies and the Government of Nepal attend the Seed Congress in India
- Meeting held with AFU on September 14, 2017 on developing curriculum for short-term certificate and diploma courses in seed technology
- 4 scientists (1 for MSc and 3 for PhD) sponsored to undertake their thesis research on topics related to NSAF target crops (viz. maize, rice, and vegetables)

Seed Sector Training

The availability of a skilled workforce is crucial to support the growth of the seed industry, as envisioned in the National Seed Vision. NSAF, in collaboration with NARC and other project partners, is implementing a capacity-building programme to address the identified and prioritized needs on seed sector development. A total of 39 customized training events have been jointly organized with partners to sharpen the technical skills of their staff. Training programmes on participatory research trials, seed production, seed production research, business development, and marketing have been organized for 9 participating seed companies, CBSPs, NGOs and seed partners to support and strengthen both the formal and informal seed system. The trainees will become subject matter specialists for future in-house trainings at their respective institutions and stakeholders in their market segments

Seed Technology Course

NSAF is working with the Council for Technical Education & Vocational Training (CTEVT) to develop a seed technology course to train technicians. The project is in the process of developing a curriculum for short-term certificate and diploma courses, as per industry requirements, and aims to build the capacity of Nepal's universities and colleges to offer these programme within the first two years of the launch of the project. In this regard, a discussion was held with AFU, which is based in Rampur, Chitwan, on September 14, 2017. The curriculum initially developed by AFU has room for improvement; therefore, the parties have agreed to initiate the curriculum updating process.

Support for Post Graduate Studies

In order to meet the Seed Vision target of 40 hybrid varieties (20 in vegetables, 10 in maize, and 10 in rice), NARC needs to significantly strengthen its capacity to conduct research on crop hybrids and component technologies, such as parental line maintenance and hybrid seed production. In this regard, NSAF is supporting four scientists to enrol in MSc and PhD programmes focused on heterosis breeding and hybrid seed production technologies. CIMMYT and NARC will provide research guidance to these scientists.

Identifying Market Opportunities

NSAF organized a meeting in January 2017 for seed company partners on how to identify and develop marketing strategies. After the training, the companies realised the importance of meaningful engagement with their customers to ensure customer satisfaction and convey the value of their brand to gain recognition in a competitive market. As a follow up, NSAF is supporting 5 seed company partners in developing their business plans and operational strategies.

Seed Congress in Kolkata

A delegation of 12 representatives from the public and private sectors participated in the Seed Congress in Kolkata-India in February 2017. During the business sessions, SEAN members were able to gain information on new hybrids of rice, maize and vegetables, identify business opportunities, and discuss hybrid seed production technologies with breeders from Indian companies. Following the meeting, the NSAF seed company partners have developed linkages with seed companies in India. Two seed companies have imported rice hybrid seeds from Ganga Kaveri Seed Company for trial in Nepal and are discussing licensing arrangements with this company. A member of the Ganga Kaveri Seed Company visited Nepal in October 2017 for a field inspection and to discuss the terms of engagement.

Outcome 2.2.1.2: Seed companies develop product lines through varietal research and development (R&D) activities

Seed companies in Nepal lack of R&D capacities for new product development. NSAF is facilitating seed companies to conduct varietal evaluation and validation trials for hybrid maize development.

Baseline findings:

- 70% of the seed companies surveyed reported that lack of R&D facilities hinders business growth.
- None of the seed companies in Nepal have their own varieties cereal and lentil.
- Only one seed company has developed its own vegetable variety.

Highlights:

- 6 seed companies participated in the evaluation of 22 new hybrid maize varieties for grain yield performance and other important agronomic traits
- 110 hybrids including local checks have been introduced and distributed to partners for winter planting
- NSAF facilitated the introduction of 9 tomato and 6 onion breeding lines from World Vegetable Centre, Taiwan

Varietal Evaluation and Trials

Seed companies in Nepal did not conduct research and development (R&D) as part of their operations and thus companies are not in a position to innovate and add new products to their product range. NSAF has been facilitating seed companies to conduct varietal evaluation and validation trials. During the reporting period 6 seed companies participated in the evaluation of 22 new hybrid maize varieties, introduced from CIMMYT India, for grain yield performance and other important agronomic traits. Based on their performance NSAF will facilitate further testing and deployment of selected potential hybrids.

Similarly, to diversify the product portfolio of NSAF partners, 110 hybrid maize trials materials have been introduced from CIMMYT's maize breeding hubs in Mexico and Colombia which have been distributed to partners for winter planting (mid-end October 2017). These hybrids consisting of white and yellow kernel as well as biofortified (QPM, QPM+Zn and Kernel Zinc enriched) will be tested for adaptation across the different maize growing ecologies, mainly in the Terai and mid-hills, using irrigation. This evaluation will be repeated in the spring/summer season to check the season's performance and the stability of the hybrids in collaboration with public and private partners of NSAF.

In addition, NSAF facilitated the introduction of nine tomato and six onion breeding lines from World Vegetable Center. These breeding materials are being tested for adaptation and seed increase. NARC is currently taking the lead in testing these new lines and, upon identification of well adapted materials, the private sector will be engaged for further testing and the scaling up.

These activities will help private companies to have branded products that will keep them competitive in the market. The involvement of the public sector in the process will underpin NSAF's strategy to establish a public-private variety evaluation and validation network in Nepal. This will further enhance Nepal's efforts to realize the targets of National Seed Vision 2013–2025 in the development and production of hybrid seeds.

Outcome 2.2.1.3: ISFM practices and the 4Rs of fertilizer management in key agricultural commodities up scaled by stakeholders

Over the reporting period NSAF implemented and promoted ISFM practices and the principles of the 4Rs of soil nutrient management with stakeholders. The strategy is to develop materials that can train trainers, who will then be responsible for training farmers.

Baseline findings:
• Most farmers know the right dose of fertilizer, however, they use very limited quantities of chemical fertilizer, relying mainly on farmyard manure. • Farmers are unaware of micronutrients and their specific role in crop development, however, they spray micronutrients as advised by agrovets.

Highlights:

- 131 individuals (cooperative leaders, agrovets, and extension specialists from the DoA) trained in ISFM practices and the principals of the 4Rs of soil nutrient management
- 276 intermediaries (cooperative members and leaders) trained in ISFM principles for maize
- 14 training activities involving 212 trainees conducted to scale initial-stage ISFM practices beyond cooperatives
- Instructional pamphlets developed and disseminated in conjunction with varietal recommendations through maize seed companies

Best management practices for maize

Instructional pamphlets were developed and disseminated in conjunction with varietal recommendations through maize seed companies. While these recommendations are not yet optimized for specific domains (planned for FY 2017-18), they have been drawn from extensive research outcomes of NSAF, NARC and CSISA (Figure 10). These are being finalized together with USAID and the DoA for large-scale distribution.

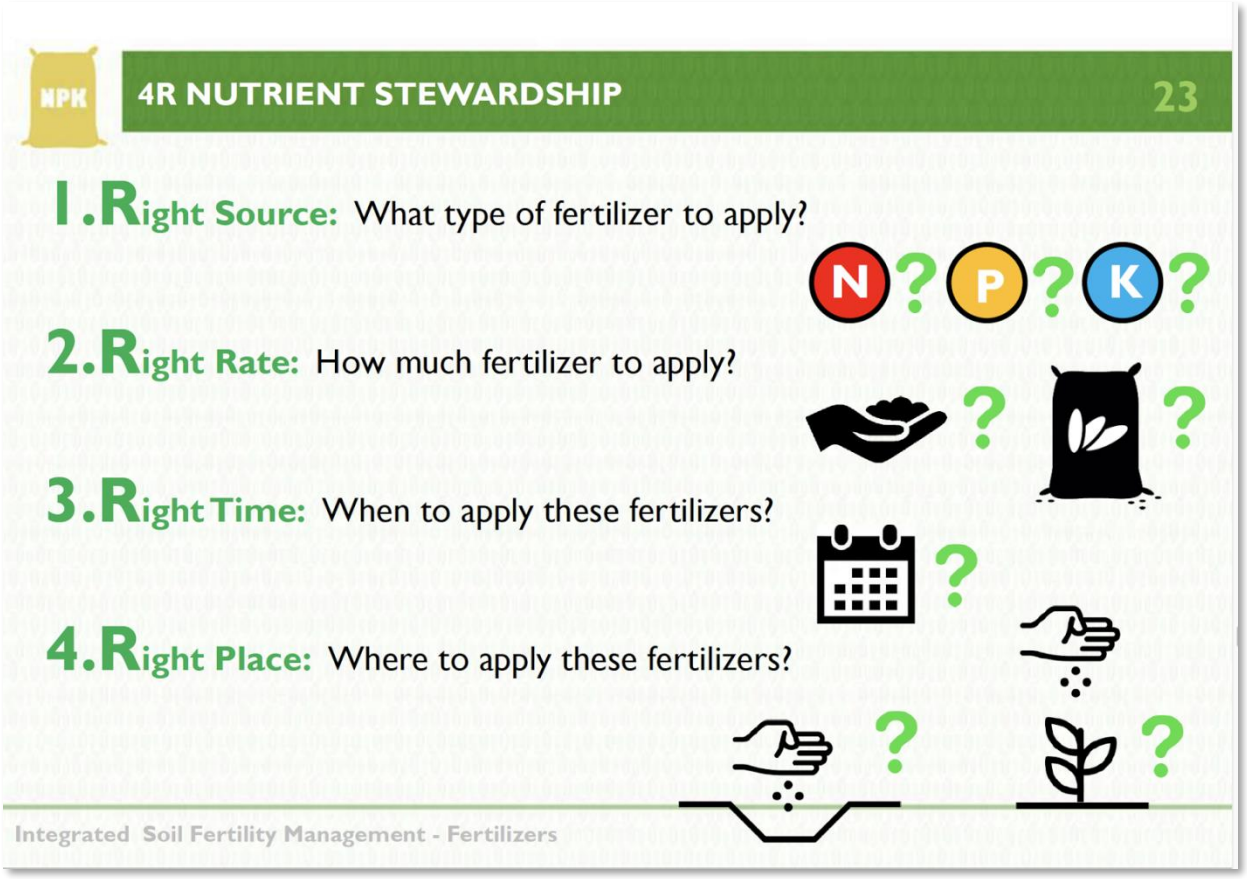


Figure 11. Excerpt from the ISFM and 4Rs extension programme developed by NSAF

Sub-IR 2.2.2: Access to financial and business services increased

Under this Sub-IR NSAF, will report on the indicator as mentioned below.

EG 3.2-3: Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance.

NSAF has recently organized discussions with 8 banks to educate them about seed business. In addition, a forum was organized between the seed companies and banks to discuss the seed financing modalities. The mechanisms for financing seed business are being worked out and will be completed in the 2017–18 fiscal year. The detailed figures and deviation narratives are presented in Annex I.

Outcome 2.2.2.1: Seed companies' business plans are financed by banks and financial institutions (BFIs) and access to business services is increased

NSAF is developing the capacity of seed companies to develop strategic business plans so that they can access finance, by linking with banks to allocate 10% of their lending to the agriculture sector, by financing the seed business as stipulated by the GoN.

Baseline findings:

- Just over half of seed companies sourced loans from commercial banks, cooperatives and private lenders at interest rates of 10% to15%.
- All the seed companies mentioned need for low interest rate credit for business growth.
- All of the seed companies surveyed reported having some form of business plan, but requested support in improving their plan.
- Households also loaned money to buy seed and fertilizer at rates as high as 25 to 30% (when borrowed from other financial institution).

Highlights:

- Business plan development template developed and piloted in one seed company
- Meeting held with banks and seed companies in September 2017, at which four banks expressed keen interest to provide soft loans for seed production

Strategic Business Plans

NSAF is supporting seed companies to develop strategic business plans to set their goals, objectives and activities for business growth. This process involves a series of exercises to build the capacity of seed companies for strategy formulation, implementation planning, environmental assessment and organizational direction setting. Strategy formulation is about establishing/reviewing goals, objectives and activities for business growth.

After strategy formulation, seed companies will be supported to develop a yearly action plan. Major highlights will be the inclusion of hybrid maize in their product portfolios.

Developing Business Plans

During the reporting period, NSAF reviewed the existing business plans of seed companies and discussed scope for improvement. A business plan development template has been developed and piloted in one company. However, as business plan is a confidential document, NSAF will individually facilitate seed company partners to develop their strategic business plan in the next three months.

While reviewing the business plans of seed companies it was also learnt that:

- Most seed companies lack vison for growth of their business and mostly do yearly planning based on previous years information
- The seed volume sold in 2017 ranged from 610 MT to 1,939 MT (for 4 seed companies), with rice and wheat contributing about 90% of the sale.
- All the seed companies do not have good accounting records to attract bank finances.
- Capital investment in seed companies is low. In recent years, seed companies have developed storage and processing facilities with financial and technical support from development projects.

Meeting with banks

The GoN has stipulated that all banks in Nepal shall allocate 10% of their lending (approx. USD 12.7 million) to the agriculture sector in 2017. In September 2017, NSAF organized a meeting between bankers and seed companies to provide a platform for banks and seed companies to share information and identify business opportunities to support NSAF's seed system development approach. During the meeting, SEAN highlighted that 20,000 MT of OP varieties of cereal seed worth USD 20 million is produced in Nepal each year. At the meeting banks agreed to provide soft loans to seed companies for seed production. It was agreed that value chain finance through tripartite agreements between banks, farmers and seed companies was a viable approach that could be initiated immediately. To start with, four banks have shown a keen interest in partnering with the NSAF seed companies to finance seed production with soft loans. The Nepal Bangladesh Bank has already conducted a follow up meeting with NSAF. A working group comprising banks, seed companies and the GoN, led by NSAF, will be formed to provide strategic direction on financing seed business.

Outcome 2.2.2.2: Fertilizer entrepreneur's access to financial and business services increased with the introduction of new ISFM technologies and services

NSAF is rolling out a locally-adapted agronomic product package in collaboration with agrovets to provide financial and technical services (quality seed and fertilizer) to farmers. This is being done with support from LxLB.

Baseline findings:
• Farmers loan money to buy seed and fertilizer at rates as high as 25 to 30% (when borrowed from informal sources). • Only 42% of agrovets reported having with a business plan, although 67% agreed that they need a business plan as well as technical support to prepare it. • About 66% of agrovets said that they had not received any agricultural training in the last 5 years.

Highlights:

- Localized agronomic product package consisting of improved seed, fertilizer, and agronomic practices developed for wheat to be used in the lending package
- Partnership established with LxLB to develop and pilot a voucher-based agricultural inputs loan product for smallholder farmers
- 50 women farmers from Banke and Dang signed up in the NSAF-LxLB lending package

LxLB Model

NSAF is collaborating with Laxmi Laghubitta Bittiya Sanstha (LxLB) to create financial loan products to link smallholder farmers with the private fertilizer industry. NSAF and LxLB have agreed on a voucher-based, crop specific credit model for seed and fertilizer, which has been integrated into their existing loan products (i.e., Income Generation Loan and Seasonal Agricultural Loan). A Letter of Intent has been drafted, outlining the overall NSAF-LxLB Credit Model and delineating the roles and responsibilities of each. In this programme, NSAF has created a complete, locally-adapted agronomic product package (fertilizer, improved seed, and agronomic training). LxLB will work with groups of farmers to provide the loan. An adequate quantity and quality of seed and fertilizer will be made available to the borrowers of agriculture loans using the vouchers through local agrovets and borrowers will receive technical backstopping from agrovets (trained by NSAF) on crop production practices. The farmers will also be

enrolled in the NSAF digital support tools (SMS, IVR, or smartphone-based crop calendar) depending on their preferred method. The primary role of NSAF will be to disseminate knowledge on best management practices and effective fertilizer utilization to the borrowers in the form of trainings, digital media, leaflets, and posters. Throughout the season, farmers will continue to receive localized agricultural extension service. This programme is being piloted with 50 farmers in two areas of Banke and Dang districts. After evaluation, the programme will be scaled up in the monsoon season of 2018.

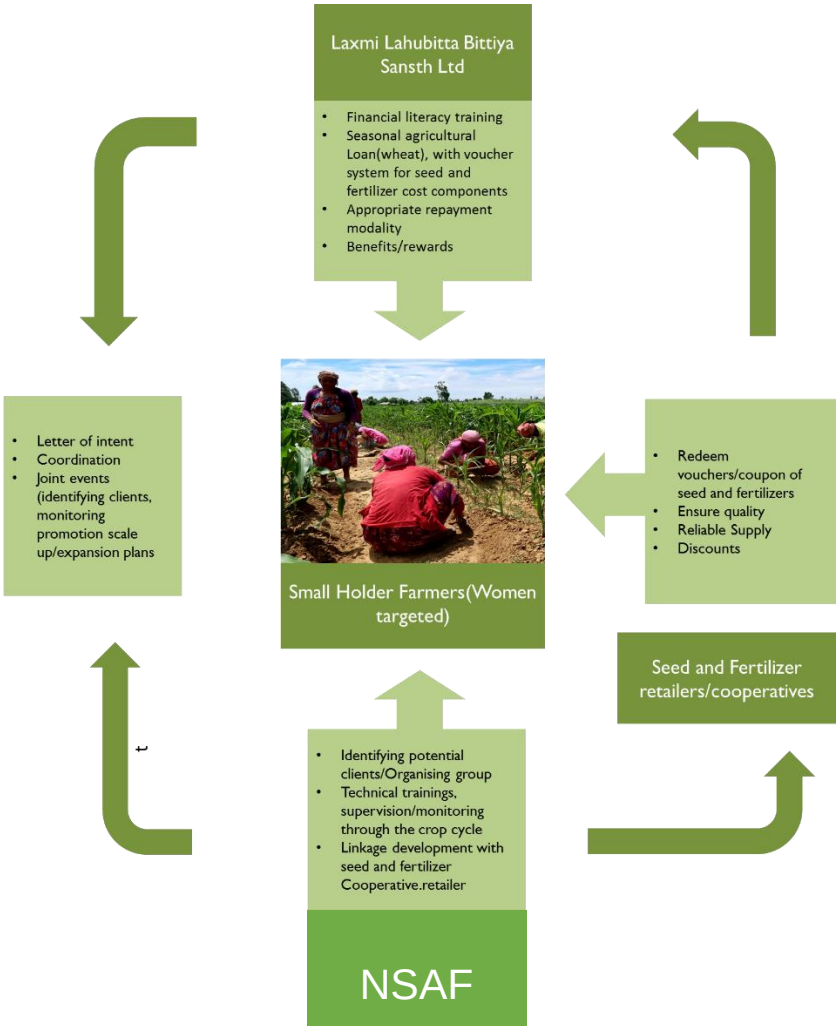


Figure12. Voucher-based NSAF-LxLB credit model

IR 2.4. Economic growth policy and performance improved

NSAF is working to improve Nepal's economic growth policy and performance. It will do this by increasing access to markets for seeds and fertilizer – working on both the supply and demand sides – and by improving private sector service delivery.

Sub-IR 2.4.1: Increased access to markets

Under this Sub-IR, NSAF will report on the indicators mentioned below.

EG.3.2-19: Value of small-holder incremental sales generated with USG assistance

The baseline survey conducted with 600 households estimated total sale of NSAF commodities by farmers to be USD 83,058 (maize USD 6,084, rice USD 34,901, lentils USD 10,938, and vegetables USD 31,134 USD). The average sale per household for each of these commodities combined is USD 138.4. Extrapolating these figures to the 87,893 project beneficiaries, total sales of USD 12,164,391 is estimated for the NSAF beneficiary households. The detailed figures and deviation narratives are presented in Annex I.

Outcome 2.4.1.1: Volume of quality seed sold by public and private sectors increased

NSAF is supporting the large-scale production of quality seeds in Nepal. As a first step, NSAF is carrying out the fine mapping of target regions to categorize the agroecological zones (AEZs) in Nepal and identify potential seed production zones and market segments for seed companies to develop their business strategies.

Baseline findings:

- 82% of farmers willing to pay a premium for a good quality and high yielding seeds.
- Most of the seed companies surveyed (70%) said that lack of R&D facilities hinders businesses growth.
- Over half (60%) said that lack of breeder and foundation seeds of newly-released varieties was a major constraint on business expansion.

Highlights

- Agroecological zones in Nepal mapped for summer and winter seasons
- Maps of potential seed production areas in Dang completed
- Maps of potential seed market areas in Sindhupalchowk completed
- NSAF is partnering with D2FTF and SSQC to set up the Seed Sector Information System (SSIS).

- NARC has agreed to provide hybrid parental lines to capable local seed companies to enhance hybrid maize seed production in Nepal.
- During the reporting period, 8 seed company partners produced and sold 1,897.4 MT of seeds of rice, maize, lentil, cauliflower, tomatoes and onions covering a total of 48,843 hectares
- Seed companies have started maintenance breeding in rice and wheat to improve the quality of source seed.

Fine Mapping of Agroecological Zones

In order to build a strong seed system in Nepal, a fine mapping exercise of Nepal's mega-environments is being conducted, in collaboration with NARC, MoAD and the seed companies. The purpose of the maps is to identify suitable areas and seasons for seed production (in terms of climatic suitability and economic competitiveness). Biophysical (climatic, soil and terrain) variables are used to delineate suitable AEZs for seed production. In order to capture the large climatic variability in Nepal and reduce the averaging effect, the data sets were divided into summer (April to September) and winter (October to March) seasons (Figure 13). The data shows that the Terai region is dominated by two AEZs and the variables are largely suitable for major crops and seed production. The hilly regions are, however, a mix of various zones with heterogeneous environmental variables. All of the information generated will be in the public domain for open use by relevant stakeholders.

Agroecological zones (AEZs) serve as fundamental geographic units providing information on the location and extent of crop-relevant resources, their capabilities, and the potential for future uses as part of strategic planning.

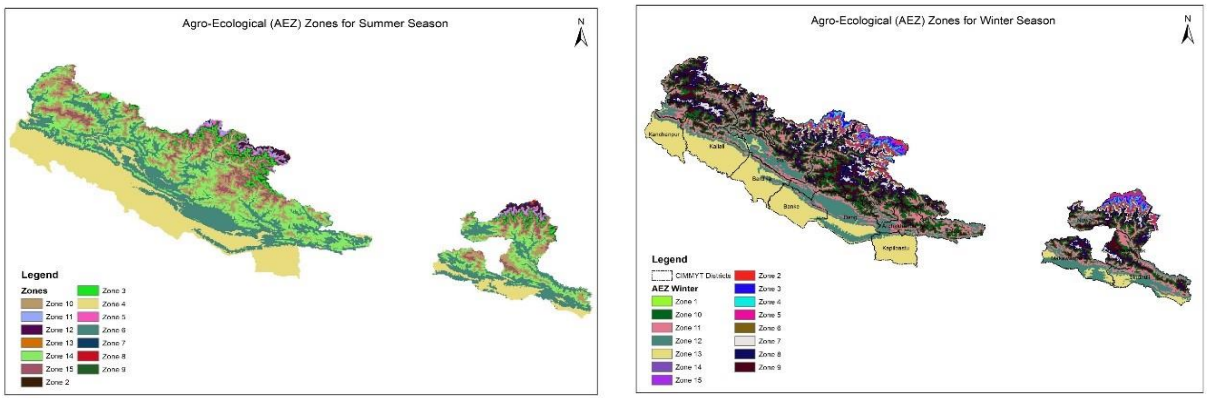


Figure 13. Map of agroecological zones in summer (a) and winter (b) seasons

Seed Production Areas

Within the AEZs, the potential for maize seed production was assessed in Dang on a pilot basis. The green coloured areas in Figure 13 are highly suitable for maize seed production. These areas are located within existing cultivated land, have high road accessibility and are close to a market centre. NSAF will explore seed production strategies in these areas with NARC and the seed companies. Mapping will be completed for all NSAF target districts by March 2018.

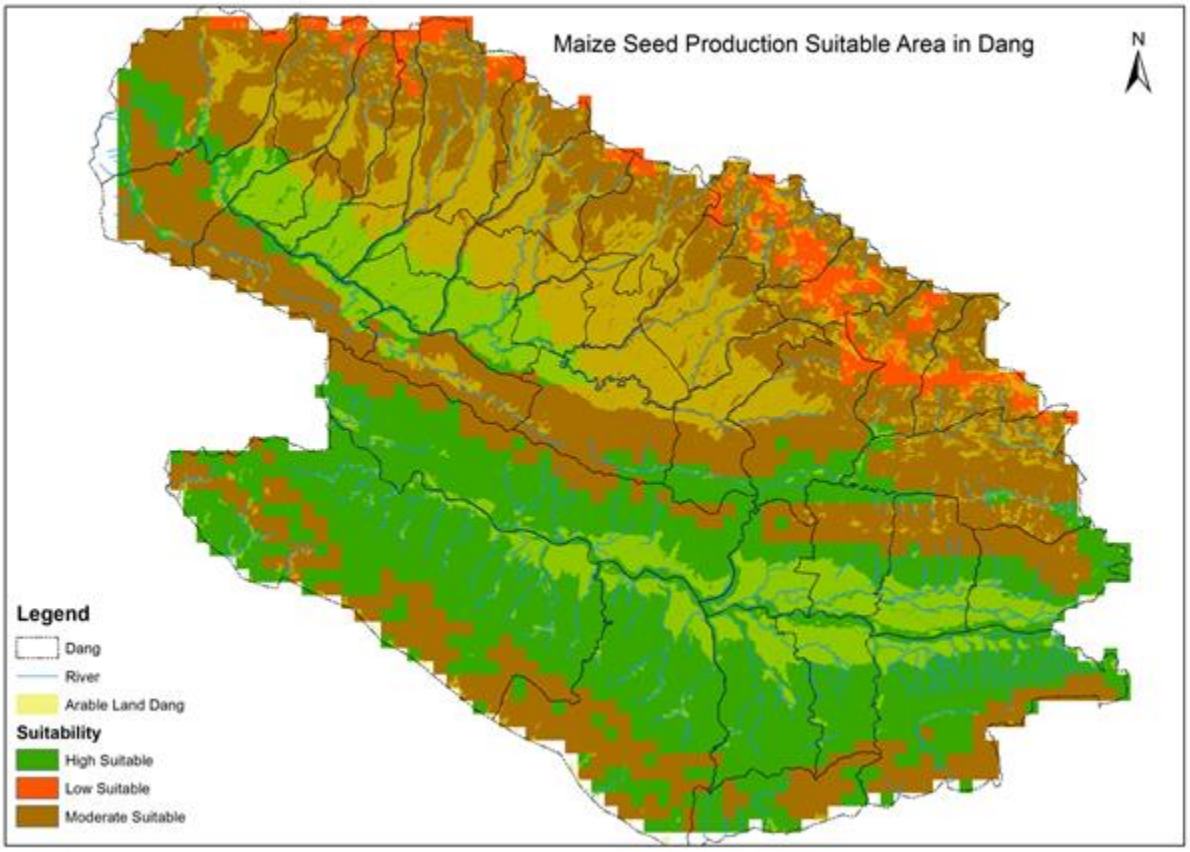


Figure14. Map of seed production areas in Dang

Seed Market Segments

Potential seed market areas were identified based on road density, farm size, population and economic data. Figure 14 shows the potential seed market areas in Sindhupalchowk district. The green areas have high seed market potential while maroon-coloured areas have the least potential. This exercise will be completed for all the NSAF target sites by June 2018.

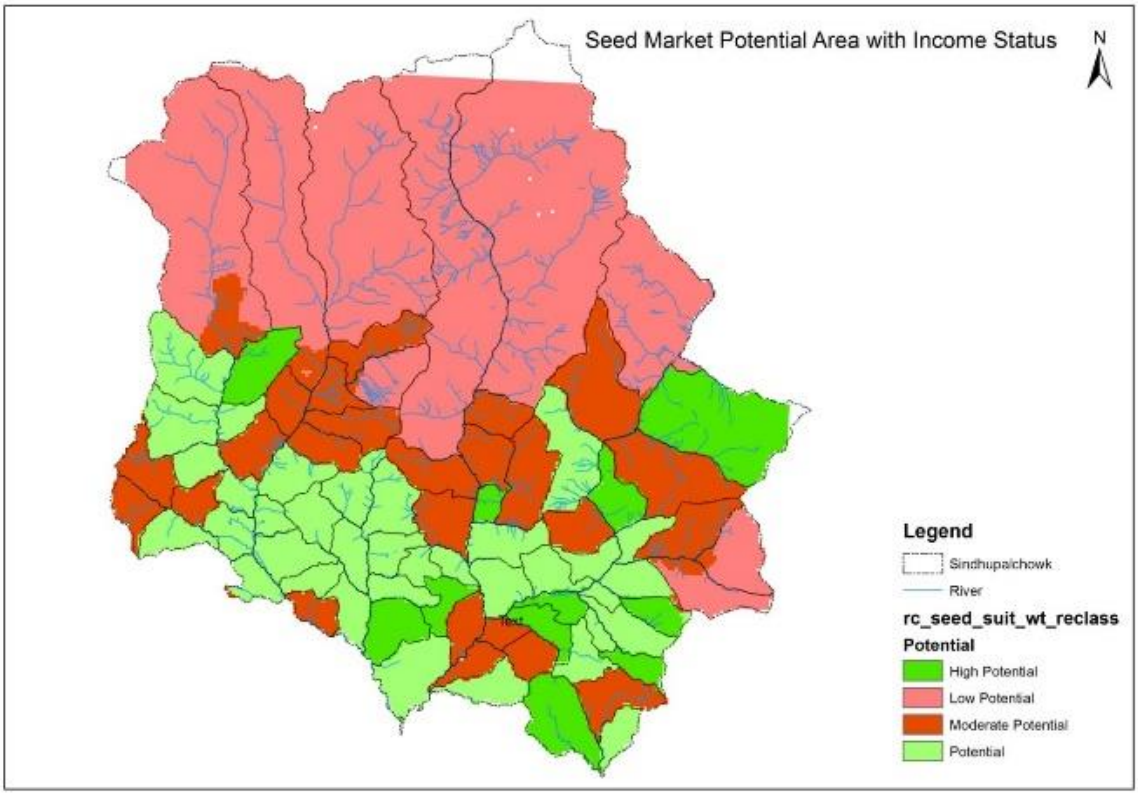


Figure 15. Seed market potential in Sindhupalchowk

The next step will be to characterize the key market segments for the target crops identified in the target agroecologies and define a product portfolio for each market segment, including varietal selection indicators.

Seed Sector Information System

NSAF will develop and set up a Seed Sub-sector Information System (SSIS) with a mechanism by which information can be collected and disseminated to all public, private and CBSP stakeholders. Currently, the CDD prepares a seed balance sheet (which shows the various seed types and quantities that need to be produced in Nepal to meet demand) at the district level, The existing system used by SQCC, NARC, CDD and the Vegetable Development Directorate will be updated to use digital tools and approaches.

USAID's Digital Development for Feed the Future (D2FTF) is promoting digital tools to enhance the SSIS in close alignment with NSAF. NSAF has already interacted with the D2FTF team to develop a collaboration framework with the MoAD, including SQCC, the CDD, and the DoA. While NSAF is responsible for providing technical support to set up the SSIS, the SQCC will implement it. The SSIS will be established within FY 2017–2018.

Seed Marketing and Distribution Systems

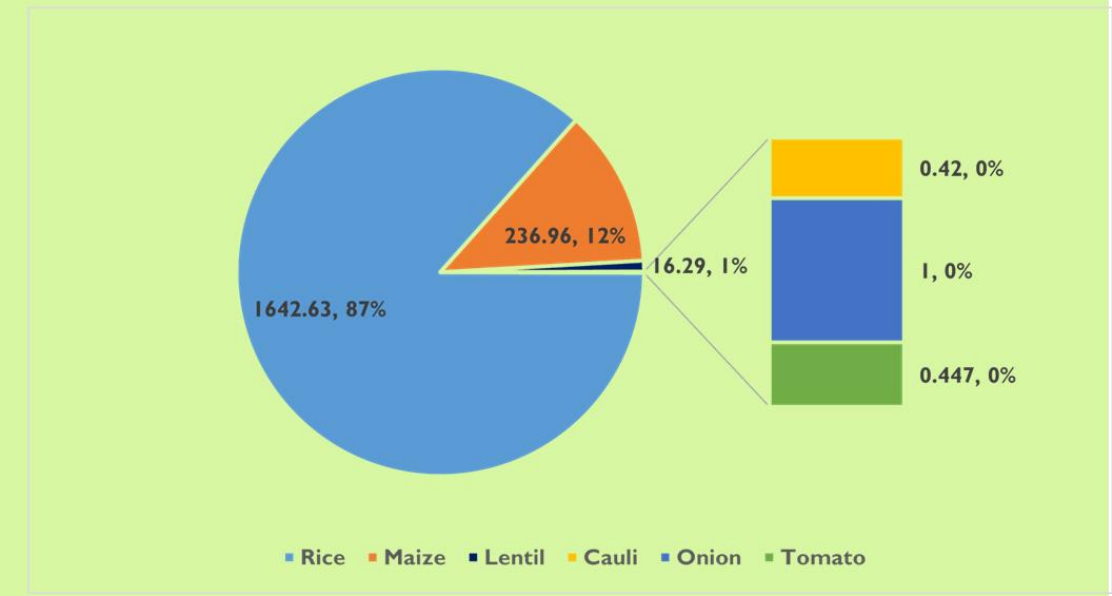
NSAF has been working closely with the seed partners and value chain actors to develop seed distribution systems in target districts to fulfil its targets as per the FTFMS. It is doing this by developing seed companies marketing systems and agro-dealer networks to capture the unmet demand for seeds, beyond the seed subsidy markets. Towards this:

- NSAF organised 39 seed production, processing, storage, marketing and seed quality assurance trainings to public and private seed company technicians as well as their seed growers.

- Seed companies were supported to establish seed production demonstrations. NSAF supported seed companies with market development and branding, and produced 3 radio jingles that were broadcasted 945 times by 12 FM radio channels to popularise seed company products in their market segments to increase their sales volume.

- Seed companies have also started maintenance breeding in rice to improve the quality of source seed.

- During the reporting period, seven seed company partners produced and sold 1,897.3 MT of seeds of rice, maize, lentil, cauliflower, tomatoes and onions covering a total of 48,843 hectares and involving 87,893 households (see Figures 16 and 17).



Note: 0% indicates less than 1%

Figure16. Volume of seed sold by seed company partners in NSAF target areas

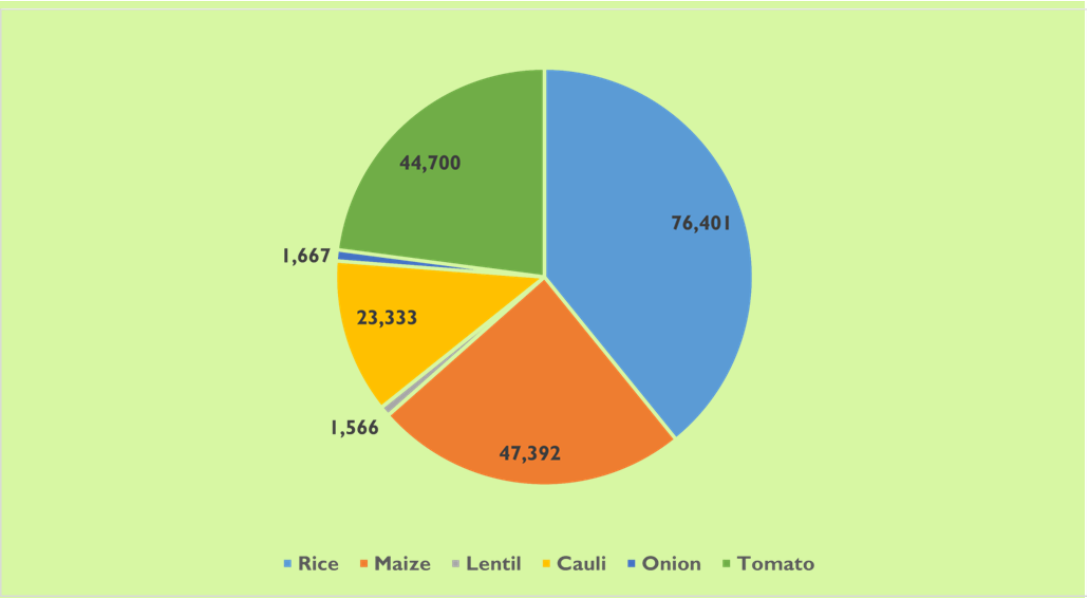


Figure17. Number of households purchasing improved seed varieties

Promoting Good Seed Practices

Good seed business practices (GSBP) and SOPs for seed production, processing and quality assurance are being implemented and widely promoted through various seed production and distribution channels. Over the years, CIMMYT through CSISA and NSAF have been working with the seed companies to build their capacity to make them business-oriented, technically-equipped, professionally-organized and strategically-linked. Significant progress have been made by seed companies over the last four years of interventions that was supported by USAID. These are summarized in the figure below:

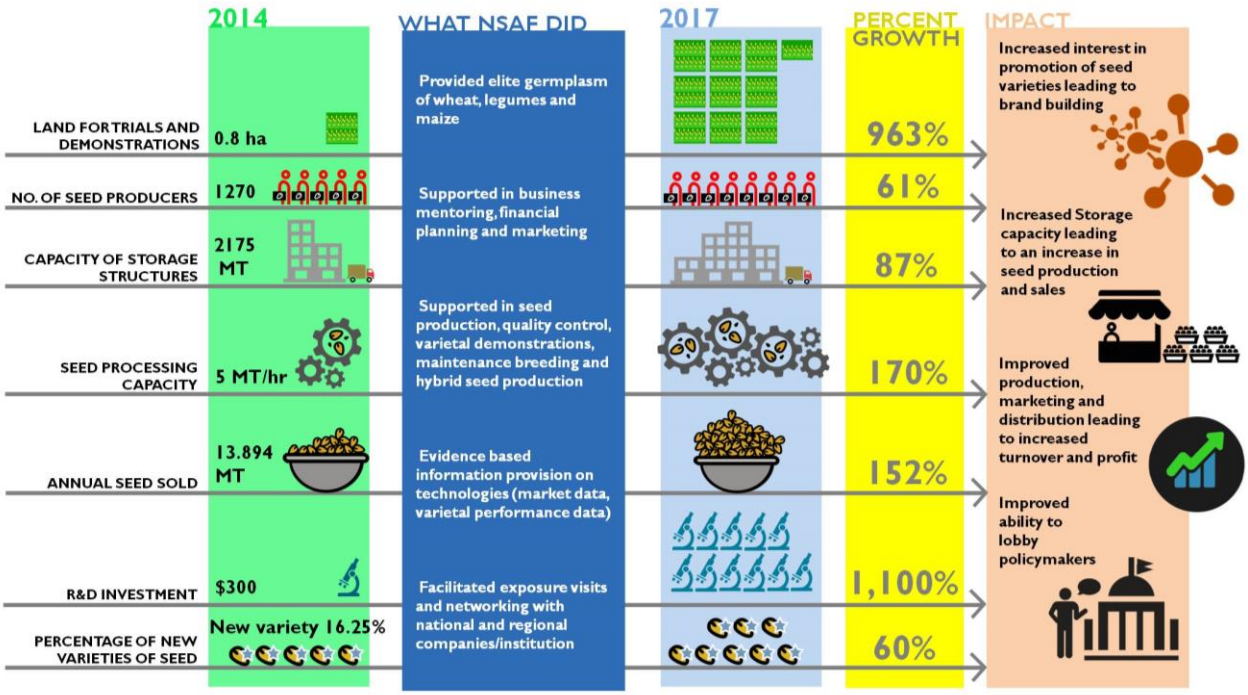


Figure18. Infographic showing growth of four seed companies in Nepal (2014-2017)

Outcome 2.4.1.2: Fertilizer demand, welfare outcome, and market characterization studies improve public and private investment

NSAF is conducting various socio-economic surveys in Nepal and has completed an expanded socio-economic baseline household survey (including farmer typology) to assess the household demand for fertilizer.

Baseline findings

- Urea is the most commonly purchased fertilizer (81% of households), followed by DAP (69% of households).
- 13% of the households that used fertilizer used more than one type of fertilizer.

Highlights:

- Typological and recurrent use surveys currently being conducted across NSAF target districts zones

Fertilizer Use

The baseline survey (completed in September) show that 100% (n=600) of the surveyed farmers have used one or more fertilizers in the past 12 months. Urea is the most commonly purchased fertilizer (81% of households) and 52% households purchased urea twice a year. DAP is the second most commonly used fertilizer (69% of households), with an average quantity of 67 kg per household and 55% households purchased DAP twice a year. Only 12% of households had purchased MOP in the past year and 62% purchased MOP only once a year).

The average quantity of each of the three main fertilizers (urea, DAP and MOP) was higher for households in the Terai, while the price paid for all three fertilizers was higher for households in hills (Table 4). The government-imported urea, DAP and MOP are subsidized and priced at NPR 14.45 and NPR 31 per kg, respectively, at the point of import entry. However, the final retail price, which is fixed by the cooperatives, is determined after accounting for transportation and other overhead costs, which differ from district to district. The demand for fertilizers peaks around paddy transplanting time and again just after the paddy harvest (Figure 19). Detailed analysis of the demand for fertilizer by each of the NSAF crops will be provided in the baseline report, which will be finalized in November, 2017.

Table 4. Quantity of fertilizer purchased per household (from baseline survey)

Agroecology	Urea		DAP		MOP	
	Quantity (kg)	Price (NPR/kg)	Quantity (kg)	DAP price (NPR/kg)	Quantity (kg)	Price (NPR/ kg)
Hills	54	28	46	53	23	46
Terai	114	23	83	48	31	38
Average	85	25	67	50	26	43

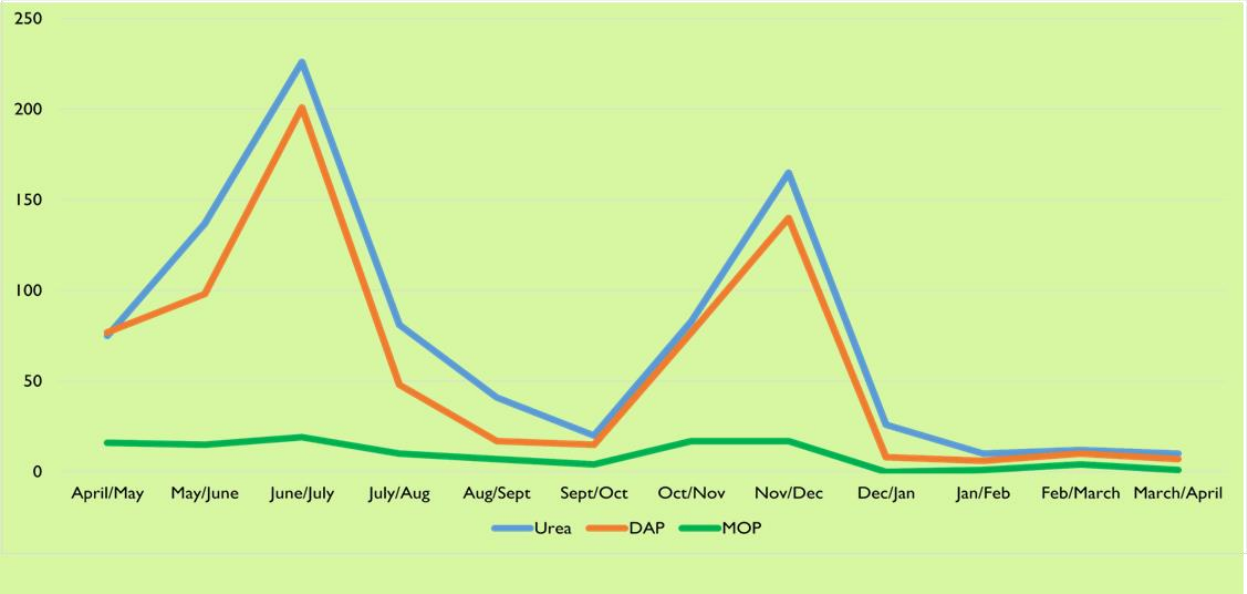


Figure19. Number of households purchasing fertilizers in different months in 2016/17

Expanded Baseline (Typology and Recurrent) Survey

The expanded baseline) survey completed in September, 2017 will serve as a foundation for the data collection component, which will inform the rest of the programming. We anticipate that this survey and analytics will be completed by November 2017. A study to assess the willingness and capacity to invest in ISFM technologies and incentives/capacity for the intensification of maize, rice and wheat production will be designed and implemented based on the initial learning from this baseline study.

Fertilizer Information System

No advances have been made on the fertilizer information system (FIS) within this reporting period, which was to be funded through the G2G mechanism. Although the G2G mechanism is now defunct, CIMMYT would still like to work on this component using existing NSAF financial and staff resources. NSAF is already collecting the requisite data and staff have the necessary skills in web design. At a minimum, NSAF could publish the FIS on CIMMYT's web portal. However, NSAF will still approach MoAD to see if they would be willing to engage with the FIS using existing NSAF resources; this option would be ideal. The NSAF baseline survey has collected information on the quantity, price, place and fertilizer products bought by farmers.

Sub-IR 2.4.2: Private sector service delivery improved

Under this Sub-IR, NSAF will report on the indicators mentioned below.

EG 3.2-5: Number of public-private partnerships formed as a result of USG assistance

NSAF is working with NARC and private seed companies to promote new varieties of maize using inbred line from CIMMYT. A public-private partnership approach involving a tripartite arrangement between NARC/SQCC, CIMMYT and seed companies has been proposed and accepted by NARC. Similarly, NARC has provided inbred lines of hybrid maize to four seed companies. The detailed figures and deviation narratives are presented in Annex I.

EG 5.2-2: Number of private sector firms that have improved management practices or technologies as a result of USG assistance

During the reporting period, NSAF provided improved management practices in human resource development, seed production technologies and seed business expansion to eight private sector (seed companies) firms. The detailed figures and deviation narratives are presented in Annex I.

Outcome 2.4.2.1: SEAN lobbies Government of Nepal for effective seed policy implementation

NSAF is fostering the transition of Nepal's seed sector towards a private-sector led industry, in line with the National Seed Vision 2013–2025, by providing domestic seed associations with opportunities to learn from experts within the project and by strengthening their networks with regional counterparts

Highlights:

- Business linkages developed between the National Seed Association of India (NSAI) and the Seed Entrepreneurs Association of Nepal (SEAN)
- One-day meeting organized between large Indian seed companies, representatives from the Indian Seed Congress Technical Committee, and representatives of Nepali seed companies to share experiences and learn about good implementation approaches for better seed business growth.
- Joint meeting held between the managing director of the National Seed Company, Under Secretary level officer of SQCC and SEAN, and Joint Secretary of the Ministry of Agriculture, Government of India to explore potential collaboration for seed sector development

Strengthening Seed Associations

SEAN and other seed associations are being strengthened to provide their members with better services related to business development, links to finance, policy, administration and quality seed production. SEAN office bearers were supported to attend the Seed Congress in India, which is an annual seed industry meeting organized by the NSAI. The NSAI and SEAN signed a memorandum of understanding (MoU) in June 2015 to improve collaboration between the seed companies of the two countries. Participation in the meeting helped the seed associations of the two countries to discuss business opportunities as well as strengthen relationships. As per discussions with SEAN, it was learnt that Nepali seed companies are also negotiating with Indian companies for dealership to distribute and market hybrid rice, maize and vegetable seeds in Nepal.

Photograph 5. Discussion on collaborations with Nepali and Indian Seed Companies (Photo: Bandana Pradhan)

Supporting SEAN Communications

NSAF has facilitated SEAN to revise their website and prepare an organizational brochure, which was distributed at the Indian Seed Congress. NSAF has also been providing technical support to SEAN in developing and publishing seed bulletins. Furthermore, NSAF is supporting SEAN to enhance their skills in policy lobbying for a conducive seed sector working environment. As an example of SEAN's policy lobbying, the modality of seed subsidies is being modified to benefit almost all those involved in the seed business in Nepal (the previous system favoured the public sector as the sole seed provider to the subsidy scheme).

Regional Seed Cooperation Agreement

A regional seed cooperation agreement involving India, Bangladesh and Nepal, facilitated by IRRI, is speeding up the release and dissemination of rice varieties to benefit farmers in the region. With this seed cooperation system, which was signed on 18 October 2014, a rice variety that is tested, approved, and released in one country can also be released simultaneously in another, provided that they have the same agro-climatic conditions. Recently under the Seam Reap agreement, the mechanism has been extended to other crops involving five countries. NSAF is working with authorities in the SQCC and MoAD to identify how Nepal can access suitable varieties of maize, rice and lentils to scale up seed production and distribution through the private sector. NSAF is also discussing with IRRI how to further stimulate such regional germplasm exchanges among neighbouring countries.

Outcome 2.4.2.2: Local government service delivery improved

Nepal has a new decentralized governance structure that will involve the devolution of power to the local government level (provinces). Provinces will have their own agriculture policies, which will be implemented by local government bodies. NSAF will have to align its programming to this new structure in order to be relevant to the local policies and extension mechanisms. NSAF and its partners are closely monitoring developments and will link and support local governments to development and implement seed and ISFM sectors.

Outcome 2.4.2.3: Fertilizer supply chain and market strengthened through policy experiments, industry associations and public-private partnerships

NSAF is working to define fertilizer policy experimentation policies to strengthen the fertilizer market.

Highlights:

- NSAF held a fertilizer policy experimentation training workshop for NARC, the MoAD and the DoA
- NSAF obtained government approval and authorization to conduct a pilot fertilizer policy experiment in 2018
- Nepal Fertilizer Entrepreneurs Association (NeFEA) reformed
- NSAF sent NeFEA president to attend an international meeting on the global production and market demand for phosphate fertilizer organized by the International Fertilizer Development Center (IFDC) and the International Fertilizer Association (IFA) in Marrakech, Morocco

Fertilizer Policy Experimentation Training Workshop

In August 2017, NSAF held a fertilizer policy experimentation training workshop with members of NARC, the MoAD, and the DoA. In this workshop the government partners, in collaboration with NSAF staff, outlined several fertilizer policy experimentation priorities. The following questions were raised:

- Given the current fertilizer subsidy policy, what is the optimum subsidized price point per unit of fertilizer to maximize the number of farmers who will receive the fertilizer and to ensure a balanced use of different fertilizer types (DAP and urea) in order to maximize economic returns?
- What is the lowest proportion of subsidy at which the maximum number of farmers would be willing to pay for fertilizer?
- Would a voucher-based fertilizer subsidy scheme be more effective than the current scheme?
- What is the role of the private sector in any future fertilizer subsidy policy?

Since the workshop, NSAF has obtained government approval and authorization to conduct a pilot fertilizer policy experiment, which is being planned in conjunction with the Government of Nepal and the NeFEA for the monsoon season of 2018.

Nepal Fertilizer Entrepreneurs Association

Rapid advancements have been made in the reformation of the fertilizer association as NeFEA in Nepal. Since its formation, NeFEA has received endorsement from the Government of Nepal. NSAF and key members of the NeFEA have had high-level discussions with the Secretary, Ministry of Agriculture, regarding the national fertilizer policy.

In September, NeFEA held its first general assembly meeting. This meeting was attended by over 100 individual private fertilizer entrepreneurs and representatives of the Government of Nepal working in the agricultural sector, including the Secretary of Agriculture and the Minister of Agriculture. At the end of September, NSAF sent the President of NeFEA to attend an international meeting on the global production and market demand for phosphate fertilizer. This meeting was organized by the International Fertilizer

Development Center (IFDC) and the International Fertilizer Association (IFA) in Marrakech, Morocco, at the global headquarters of Office chérifien des phosphates (OCP) which is the largest phosphate fertilizer company in the world. In this meeting the representative of NeFEA was able to network with representatives from many of the major fertilizer production companies as well as gain critical information on the technical aspects of phosphate fertilizer production.

Crosscutting Activities

A number of important activities cut across both the seed and fertilizer components of the project. These include monitoring, evaluation and learning, communication and outreach, and project management.

Monitoring and Evaluation

The NSAF draft monitoring and evaluation (M&E) plan prepared in August 2016 has been approved by USAID. This plan identifies 12 performance indicators. In November 2016, the Performance Indicator Tracking Table (PITT) was updated with the addition of two indicators:

- EG 3-1: Number of households benefiting directly from USG assistance under Feed the Future
- EG 11-6: Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by United States Government assistance.

Subsequently, the PITT was updated and indicator-wise targets for the upcoming years were set. NSAF indicator-wise targets were uploaded in the FTFMS for 2016–17 and 2017–18.

In February 2017, NSAF incorporated one standard indicator and one custom indicator in the PITT:

- EG 5.2-2: Number of private sector firms that have improved management practices or technologies as a result of USG assistance
- Custom-1: Total quantity of targeted value chain commodities produced by direct beneficiaries with USG assistance that is set aside for home consumption

With these updates, NSAF's PITT now includes 16 performance indicators: 15 from USAID's foreign assistance framework (EG indicators) and one custom indicator. Of the 16 performance indicators, 7 are semi-annual indicators and 9 are annual indicators. The final FTFMS for NSAF indicators covered during the reporting period and the list of indicators are provided in Annexes 3 and 4.

With a change in operational modality of NSAF, the targets for each indicator have changed and the M&E plan has been revised. The revised M&E plan includes NSAF's logical framework and theory of change. It provides NSAFs approach for monitoring project progress including beneficiary based surveys, organization surveys, mid-term review and regular data collection from ongoing work. Open Data Kit (ODK) was used for baseline and organization surveys and NSAF data collection work is fully digitized with paperless data collection.

Other M&E activities include:

- Two NSAF staff attended an orientation on the TrainNet database system, in which NSAF supported training data is being regularly updated. NSAF has received access to AidTracker+ to update progress data into the Aid Tracker+ system. The system is being updated on a semi-annual basis.

- NSAF is actively participating in the FTF agriculture partner's meetings, in which recent M&E updates and future plans are shared regularly. Through these M&E agriculture partner's forum, NSAF has incorporated learning into its baseline survey.

- M&E staff from NSAF also participated in an Evaluation Planning Workshop organized by USAID's Monitoring, Evaluation and Learning project on March 16–17, 2017; Data 101 organized by USAID (May 30–31, 2017); and an annual reporting and target setting workshop on September 13, 2017.

In addition, M&E staff have:

- Conducted an organization survey of 35 agricultural cooperatives in ODK

- Shared learning from M&E with NSAF staff in a work planning session

- Conducted field monitoring of ongoing seed production and varietal demos, fertilizer trials and demos, and farmers field trials

- Conducted monitoring of ongoing data collection from organization survey and baseline survey

Photograph 6. Monitoring team from NSAF and Panchashakti Biu Co, Dhangadhi visiting demonstration field in Kanchanpur (Photo: Darbin Joshi)

NSAF Baseline

Baseline data collection was completed in September by the Institute for Integrated Development Studies (IIDS), as per the methodology agreed between NSAF and USAID, and the data analysis and preparation of the report is underway. A total of 600 households, 95 agrovets, 13 seed companies, and 13 DADO's were surveyed using structured questionnaires, the data collection was done digitally, and each household was geo-coded. The baseline will not only provide information on the USAID FTF indicators, but will also provide the basis for generating farmers' typologies for NSAF interventions. Baseline data for the crop value chains were also collected to provide information on trends in market development, volume of sales, value chain actors' status and preferences, and emerging opportunities. The information generated will be used to develop crop-wise and market-segment focused value chain upgrading strategies to deliver integrated seed and fertilizer packages. The main findings of the baseline survey are presented against each of the outcomes (in the section on 'Description of Progress). A baseline report is being prepared and will be submitted by end of November.

Data Management Plan

NSAF has entered into a sub-agreement with QED to develop NASF's digital data infrastructure. Within this infrastructure, all aspects of data collection and storage will be digitized. This has several advantages:

- **Increased efficiency:** By using smartphones and tablets, our surveys and data collection tools can run through a centralized digital infrastructure (open data kit – ODK). This eliminates the need for staff to spend time on digitizing paper forms, allowing them to devote more time to programme implementation. As all digital devices have built-in location capture (i.e., GPS), we can use navigation software to improve the efficiency of movement in the field. In addition, digital data collection enables a more rapid analytical processing turnaround time.

- **Increased data quality:** Digital data collection tools have standardized data templates that have built-in double data entry capacity. This can reduce the occurrence of data entry errors.

- **Increased data and analytical transparency:** Digital data collection and storage processes provide a unique and traceable record of all data processes. Harmonized data collection processes allow the creation of publicly-accessible databases, in which the data is made available as it is collected. These allow for open access to data and open monitoring of data analysis.

We have integrated the majority of our data collection efforts into the digital data system. Our first major data collection effort, the baseline household survey, fully utilized the digital data system architecture.

Communicating for Impact

Locally-appropriate extension materials and tools on best management practices for maize were developed to support ISFM trainings for DADOs, agrovets and cooperatives. These include an interactive job aid (Flip Files) for trainers, pictorial poster, flex banners, board game, activity cards and tools to demonstrate theoretical sessions which were considered a highly-effective method for transferring knowledge by the participants. The Flip Files contain illustrations and images for the audience (trainees), accompanied by instructions for the trainer on the back side of the tool, which serve as a trainers' guide. Topics covered include information on essential plant nutrients, yield and the economic value of ISFM technologies including the '4Rs' of soil nutrient management, thereby building demand for high-quality

fertilizers and the capacity of the private sector to deliver them. A pictorial poster on deficiency symptoms for maize plants was distributed to the participants for display at their outlets. Physical tools were customized and used to explain the concept of yield limiting factors for plant growth. The tools were also tested with farmers (both literate and illiterate) to assess whether the information is clear, easily communicable and relevant. The assessment results indicated that there is a high demand for similar interactive and engaging tools for easy learning.

Photograph 7. Locally-appropriate tools and activity cards used during ISFM training in Dhangadhi and Nepalgunj

To ensure proper project branding and marking of products and events, standard templates of PowerPoint presentations, information boards for trial and demonstration fields, event banners, and training certificates have been designed and marked appropriately with the USAID and FTF logos. All programme and field staff were oriented on branding and marking guidelines during NSAF's Annual Review and Programme Meeting held in September.

A two-page infographics presenting an overview of NSAF's strategy and key approaches to increase adoption of quality seed and ISFM technologies by smallholder farmers in the project districts was designed and distributed to donors, partners and stakeholders at the project launch event. Social media was also used, with multiple posts on NSAF activities, accompanied by photographs depicting stories from the field.

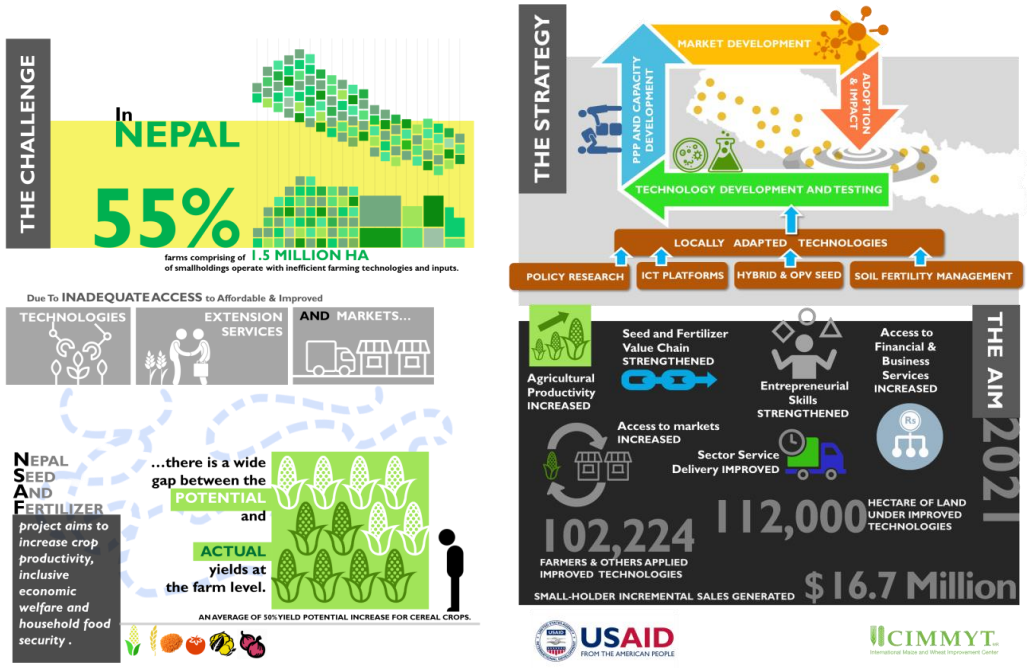


Figure 20. Infographic showing NSAF's strategy and key approaches

The Communications and Outreach Strategy has been revised for the second year of project implementation (i.e., October 2017 to September 2018). The strategy aims to increase the visibility of NSAF activities using various traditional and digital communication platforms in close coordination with NARC and to strengthen branding and marking activities to ensure consistency, as well as conformity with donor guidelines.

Gender Equity and Social Inclusion Progress

As per the baseline conducted in August 2017, about 50% of the population in NSAF sites are comprised of Dalits, Janjatis, Newars and Muslims. NSAF is working to ensure that women, disadvantaged castes, ethnic and religious minorities access and use improved seed and integrated soil fertility management technologies. This is done by promoting participatory technology evaluation, inclusive capacity building programmes, using mass media for information dissemination, and designing market development activities to ensure that women and disadvantaged group's needs, preferences and constraints are addressed. To ensure NSAF technologies and capacity building activities reach women and disadvantaged groups as targeted, each of the relevant indicators will be disaggregated by gender and disadvantaged groups and tracked accordingly. NSAFs contribution to GESI during the reporting period are summarized in Table 5.

Table 5. NSAF's contribution to GESI

Area	Details
Outreach to beneficiaries	• Various mapping, assessment studies, baseline surveys undertaken in the project ensures that data is disaggregated and also collected from female, male and disadvantaged groups. • 51,838 (57% of the total beneficiaries) households from Dalit, Janjatis, Newars, Muslims categories and others purchased improved varieties of seeds and applied integrated soil fertility management practices during the project period. • 46,853 women farmers applied improved varieties and soil fertility management during the project period. • NSAF is using mobile apps, which have been pilot tested with Dalit households in Surkhet to ensure that NSAF technologies reach all beneficiaries irrespective of caste, class, ethnicity and gender. • NSAF is piloting an agriculture microcredit lending package with women's groups in Banke, Dang and Kanchanpur. This contributes to supporting women farmers to use seed and IFSM packages to improve crop productivity.
Capacity development	• 38% (1,028 persons) of all people trained during the project period were women. • 47% (1,239 persons) of all people trained during the project period were Janjatis. • 52% of the NSAF trails and demonstrations were managed by Dalits and Janjatis.

Strategic staffing	• Of the total 35 community volunteers engaged by NSAF, 75% (26 volunteers) were women. • Of the total NSAF staff, 60% (12 staff) are women.

Project Management

NSAF adopts a science-driven, holistic and integrated approach to the development of smallholder agriculture in the target zones. To achieve this, partnerships will be forged with the GoN, the private sector and the development sector (USAID projects) to take the NSAF technologies to scale.

Collaborating with the Government

NSAF has been collaborating with various government and non-governmental agencies to achieve its goals. The status of these collaborations are summarized in Table 6.

Table 6. Engagement with government partners

Government partner	Collaboration areas	Recent activities
NARC	• NARC is a major research collaborator with NSAF. Through its commodity programmes, research stations and divisions, it is a carrying-out research activities in several locations in Nepal.	• Focal person appointed: Dr Dhurba Bahadur Thapa, Wheat Breeder, Agriculture Botany Division, NARC, has been appointed as the NARC focal person for NSAF. • Planning meeting held: NSAF participated in NARC's regional planning meetings to harmonize activities. In this regard, NSAF and NARC jointly organized a Program Review and Planning meeting on 18 August 2017, in Kathmandu to discuss progress and a develop plan for 2017–18. Accordingly, NSAF's agreement with NARC was updated to facilitate smooth operations on the ground.

MoAD (DoA, SQCC, and DADOs)	Extension programmes: MoAD (and the DoA) are critical partners of NSAF, as they formally lead the government extension programmes.	• NSAF has finalised a collaborative agreement with MoAD to implement key activities with institutions such as SQCC, the CDD and the SMD. This agreement will facilitate the integration of NSAF activities with the MoAD and the rapid deployment of technologies. The agreement is expected to be effective from November 2017. • Discussions held with KUBK: NSAF and KUBK will collaborate on business plan development and in developing the marketing capacities of seed companies. • Interaction with DoA and NARC on using ICT tools for extension in August 2017.
PMAMP	• NSAF is collaborating with PMAMP on technology transfer, especially in the seed production zones, and to strengthen the planned training and learning centres.	• Meetings with PMAMP: NSAF held meetings with the secretariat PMAMP to identify areas for collaboration and the transfer of technologies, especially in the seed production zones, and to strengthen the planned training and learning centres. • Strengthening PMAMP's maize section working group: CIMMYT is facilitating strengthening of the maize sector working group of the PMAMP.

Private Sector and NGO Partnerships

NSAF is working closely with the private sector. Sub-grant agreements have been made with nine seed companies. Apart from the activities outlined in the sub-grants section, NSAF is working with seed companies in market segmentation, estimating market size and developing marketing strategies. In addition, the fertilizer component is developing and strengthening the NeFEA and an MoU has been signed with the Agro-Enterprise Centre (AEC) to strengthen the influence of NeFEA. NSAF is also partnering with a few technology firms to help bring digital innovations into traditional agricultural development programmes. These firms include: the Robotics Association of Nepal, PEAT, QED, and VotoMobile (see section on 'Strategic Development Year 1). NSAF is partnering with CEAPRED for research and development of vegetables seeds and IFDC for the fertilizer component.

Coordinating with USAID Projects

NSAF organized a meeting with major USAID project partners in the CIMMYT office in Khumaltar on 22 February 2017. The purpose of the meeting was to share project activities, especially in relation to agriculture and to find complementarities in these activities. In addition to this, the following activities were undertaken (Table 7).

Table 7. Engagement with USAID projects

Activity	Details
Stakeholders meeting, 'Availability and Use of Seeds and Fertilizers', April 7, 2017, Hotel Himalaya, Kathmandu	The main objective of the meeting was to discuss issues and share experiences of stakeholders from the public, private, research and development sectors on seed and fertilizer availability and use in Nepal. A total of 37 participants from 11 institutions including the Government of Nepal participated in the half-day meeting. During the meeting, access to improved crop varieties and quality seeds, application of evidence based fertilizer recommendations and water management were identified as central to increasing and sustaining agricultural productivity and production in Nepal. The meeting concluded that improved seed and fertilizer value chain coordination mechanisms that involve private public and people partnerships was required for enhancing profitability of smallholder agriculture in Nepal.
USAID visit to NSAF sites in Banke and Bardiya on January 17–18, 2017	A team from USAID, led by the Director, Social Environment & Economic Development Office (SEED), visited the NSAF sites in Banke and Bardiya to observe the NSAF field implementation progress, meet partners and suggest improvements.
NSAF launch, 'Better Harvests: Higher Incomes, More Food and a Brighter Future for Nepal', August 1, 2017	An event was organized to launch NSAF, in conjunction with the launch of KISAN II and closing of KISAN I. The event highlighted private sector investment and engagement in Nepal's agriculture sector using modern farming technologies to boost crops and provide more food to Nepali communities. An overview of the project's overarching strategy, key approaches and innovative interventions to fulfil the project goals were presented in an animated PowerPoint presentation. The event was attended by MoAD Secretary and programme Chair Suroj Pokharel and Deputy Chief of Mission to the United States Embassy in Nepal Michal C Gonzales. Other event invitees included government representatives, the US Embassy, USAID, partner organizations, local media, project beneficiaries and other private stakeholders.

Sub-grants

Over the course of this reporting period NSAF has engaged in sub-agreements with several key institutions and organizations involved in coordinating and implementing activities in the seed and fertilizer value chains in Nepal:

- **Government:** Nepal Agricultural Research Council (NARC)
- **Non-government:** Center for Environment and Agricultural Policy Research, Extension and Development (CEAPRED) and 9 private seed companies. The sub-agreement with Shree Suryodaya Krishak Multipurpose Cooperative, Dang was not advanced further due to lack of research capability and infrastructure to conduct MLTs.
- **International:** International Fertilizer Development Center (IFDC), and International Soil Reference and Information Centre (ISRIC) & QED

The component-wise grantees and the purpose of the grants are provided in this section.

NARC

As the lead research centre for agriculture development in the country, NARC handles the germplasm sourcing, seed supplies, and trial monitoring component of NSAF. NARC will also conduct multi-locational trials, farmer field trials, and on-farm demonstrations of new technologies. Under the sub-agreement, NARC will support capacity development for three scientists to complete PhDs in plant breeding (focusing on breeding hybrids) and two scientists to complete MSc degrees in seed technology (focused on hybrid seed production).

CEAPRED

With its expertise in the development of the vegetable (crops and seeds) value chain in Nepal, CEAPRED will source improved, pre-commercial/released hybrids/OPVs of tomato, onion and cauliflower; conduct multi-locational trials, farmer field trials and on-farm demonstrations; and select the hybrids, produce breeder seeds and facilitate deployment after release and registration. CEAPRED will also work on the training of subject-matter specialists and developing technical advisory services.

ISRIC

ISRIC was contracted to lead a training on digital soil mapping. This occurred from 27 to 31 March 2017 in Kathmandu. This activity is covered in the above sections Fertilizer Objective 2.1.2.2.

Seed companies

NSAF has developed sub-grant agreements with nine seed companies. Under the sub-grant agreements, seed companies will conduct multi-locational trials and farmer field trials to select the best hybrids and OPVs for the target crops. Seed companies will also source improved, pre-commercial, released hybrids and OPVs for the selected crops. These companies will participate in market development activities and will prepare business plans to improve the seed business. The nine seed companies are:

- Everest Seed Company Pvt Ltd
- Global Agri-Tech Nepal (GATE) Pvt Ltd
- Gorkha Seed & Agro Traders Pvt Ltd
- Hariyali Samudayik Biu (Hariyali Community Seed Company) Ltd
- Lumbini Seed Company (Pvt) Ltd
- Rastriya Biyu Bijan Company (National Seed Company)
- Panchasakti Biu Company Pvt Ltd
- SEAN Seed Service Center Ltd
- Unique Seed Company Pvt Ltd

QED

A new sub-grant application for QED has been approved by USAID in July 2017. QED and NSAF will create integrated digital data collection systems for the project and project partners (NARC and the DoA). This will lead to greater efficiency in programing and update the capacity for NARC scientists to collect data, which will vastly improve the quality and quantity of their work.

Management Challenges and Responses

NSAF's roadmap guides project management (see section on Strategic Developments Year 1 for more on this). During the project period, certain challenges arose. Table 8 summarizes the challenges faced during the reporting period.

Table 8. Management challenges and responses

Challenge	Impact on the project	Mitigation measures
Lack of information on new varieties and integrated soil management practices by farmers	Incremental sales, gross margins, and yields will not reach targets	Hold large-scale demonstrations and farmer meetings; design effective communication materials; and share reinforcing information through commonly-used media such as FM radio and ICT based platforms
Unavailability of sufficient quantity of seeds of new varieties	Incremental sales, gross margins, and yields will not reach targets	Motivate and mobilize seed companies by training, creating awareness, linking with banks for finance, making available quality source seed and conducting varietal and seed production demonstrations to produce seeds of new varieties, as market development activities will increase the demand pull from farmers
Insufficient skills and awareness among seed company staff and sub-grantees on market facilitation approach	Takes a long time to make progress on planned activities and requires several reminders to follow up	Deploy project staff to proactively pursue market development activities with the sub grantees like business planning, branding, market development and other value addition activities targeted to specific market opportunities
Subsidized seeds and fertilizers	Distorts markets and dis-incentivizes the private sector to scale up business	Lobby the DoA/MoAD to reconsider subsidy decisions on old seed varieties; pilot innovative ideas such as vouchers for seed and fertilizer distribution
Changes in staffing	Project coordinator and Seed system lead leaving leads to delays in implementation	New coordinator appointed from existing staff to ensure that hiring time is minimized and fits well into the project expectations. New seed system lead also appointed from CIMMYT Maize team to reduce the time taken adjust and deliver as per the project requirements.

Slow response and action to the NSAF project with NARC has led to delays in procuring necessary project soil analytical equipment	Potential delays in the execution of soil analytics and capacity development programmes	Continued lobbying of NARC to expedite the procurement of equipment. NARC has initiated the procurement procedures through the SSD. The project agreement with NARC has been updated to facilitate initiation of the activities.
Breakdown of the G2G mechanisms for funding engagement with MoAD	No funds for purchasing soil analytical equipment for engagement of SMD with NSAF; several seed component activities has to be cancelled	CIMMYT will move analytical equipment from other programmes in Bangladesh to fill the gap for the SMD; CIMMYT will soon sign an agreement with the MoAD foster its linkages and collaborations with the MoAD/DoA, SQCC, CDD and SMD.
Unprecedented proposals for trainings and technical assistance from partners	Change in plans and reallocation of budget	NSAF will plan the activities in advance with partners to avoid large deviation of targets. Planning for 2017-18 has already taken note of such deviations.

Anticipated Challenges, Risks and Mitigation Measures

Table 9 summarizes the risks facing the project and the mitigation measures put in place.

Table 9. Risks, potential impact and mitigation measures

Anticipated challenges	Potential implementation impacts	Mitigation measures
Earthquake, floods and other natural disasters	Disruption of crop cycles and services in rural areas; difficult access to project sites; delayed training schedules and project activities; staff endangerment	Updated emergency preparedness plan with identified security focal person; stockpile food, tents, lanterns, and other supplies in the office for staff; update staff lists and phone tree
Weather-related challenges such as delayed or reduced winter rain or monsoon	Disruption of crop cycles and ability to plant; delayed training schedules; reduced household gross margin	Strong focus on ISFM principles to build resilience into systems

Upcoming elections and political unrest	Disruption to transportation and other key services; protests; change in priorities and possible change in adoption behaviour as a result of engagement in political activities	Carefully monitor situation at central and local levels; plan interventions well in advance to reduce potential overlaps; maintain communication with local partners to plan and implement activities

Security

The NSAF team works under the overall corporate governance of CIMMYT. Security issues are taken very seriously at the corporate level in CIMMYT. In consultation with our Mexico-based Risk Management Unit, the CIMMYT Country Representative is responsible for all security issues with delegated authority to the Finance and Administration Manager at the CIMMYT office in Kathmandu as the security focal person. The Finance and Administration Manager reviews and monitors security issues in the country and the project regions in collaboration with the CIMMYT regional and hub offices and national, regional, and local institutions. CIMMYT identity card have been issued to all staff to solicit necessary assistance in case of emergency. Communications on security are made to all staff as needed. USAID, through the AOR, also shares necessary security guidelines with CIMMYT.

Environmental Compliance

NSAF staff and partners continue to reinforce the importance of safe environment practices and of using seeds and fertilizers that are approved by the Government of Nepal. The project does not deal with genetically modified organisms (GMOs). Seed varieties appropriate for specific agroecological conditions are being promoted and best practices on the use and application of fertilizers and ISFM practices are being applied.

Prospects for FY 2017–18

NSAF will follow the project roadmaps for project planning and implementation. The NSAF baseline has been completed and the target for the following years will be established accordingly. This will mean changes in the overall targets of some key outcome figures such as gross margins, value of sales etc. Some significant changes in the sub-grant activities under the seed component, especially related to the seed companies will be made. This is to accommodate market development activities as well as research and development priorities in their activities, which were not included earlier. NSAF has already submitted its annual work plan to USAID. The major highlights of the updated plan will be:

- Research with NARC, seed companies on hybrid development for maize
- Work with IRRI on market development of new and upcoming rice varieties
- Work with NARC, ICARDA and seed companies on promoting new lentil products
- Commercialization of ISFM technologies with the private sector

- An operational strategy for extension activities to promote seed and fertilizer packages using digital tools
- Upgrading of the NSAF crop value chains
- Signing of an agreement with the MoAD and establishment of NSAF project governing bodies
- The marketing and promotion of seed to meet the maize, rice and vegetable targets
- Conducting fertilizer trials and recommendations
- Development of communications for NSAF
- Production of the semi-annual and annual report for year II
- Production of the annual plan and budget for October 2017 to September 2018

Indicators vs Target – Tables and Deviation Narratives

IR 2.1: Agriculture-based income increased

EG 3-1: Number of households benefiting directly from USG interventions

Disaggregates	FY 2017 target (HH)	FY 2017 actual (HH)	Percentage of target
Overall	84,100	89,892	107
Rural	84,100	26,968	32
Urban/peri-urban	0	62,924	Increase
Caste/ethnicity	84,100	89,892	107
Bahun/Chhetri		38,054	Increase
Dalit		16,930	Increase
Janajati		27,867	Increase
Newar		599	Increase
Muslim		300	Increase
Other		6,142	Increase

New/continuing	84,100	89,892	107
New	84,100	89,892	107
Continuing			

Deviation Narrative

Due to the recent state restructuring of Nepal into a federal system, many households that were previously considered to be rural (VDC) are now categorized as urban/peri-urban (municipalities/sub-municipalities). Hence, a lot of households that were previously rural has now shifted to urban/peri-urban areas. The figures under caste and ethnicity are derived from the baseline.

Sub-IR 2.1.1: Agricultural productivity increased

EG.3-6: Farmer's gross margin per hectare, obtained with USG assistance

Disaggregates	FY 2017 target (USD/ha)	FY 2017 actual (USD/ha)	Percentage of target
Rice	371.18	371.18	
Rice – hybrid	468.68	468.68	
Rice – local/improved	342.88	342.88	
Maize	251.06	251.06	
Maize – hybrid	540.87	540.87	
Maize – local/improved	239.55	239.55	
Lentil	493.90	493.90	
Vegetable	1,802.33	1,802.33	

Cauliflower	1,731.74	1,731.74	
Onion	678.08	678.08	
Tomato	2,542.54	2,542.54	

Narrative

Gross margin targets were not set for the reporting period. Therefore, actual figures, as per the findings of the baseline (conducted in 2017) are reported. The baseline gross margin figures will be used for setting targets for the upcoming years.

EG.3.2-2: Number of individuals who have received USG supported degree-grant in agricultural sector productivity or food security training

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Sex			4	4	4	4
Male			3	4	3	4
Female			1	0	1	0
New/continuing			4		4	4
New			4		4	4
Continuing			0		0	

Deviation Narrative

Despite NSAF's efforts to secure one female candidate for post graduate studies all male candidates were selected based on NARC's selection criteria. NSAF will leverage its relationship with NARC to select women candidates to fill some of the remaining post-graduate study slots in 2017-18.

EG.3.2-17: Number of farmers and others who have applied improved technologies or management practices with USG assistance

Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Overall	84,200	87,997	107
Producer	84,100	87,893	105
Sex	84,100	87,893	105
Male	46,255	41,310	89
Female	37,845	46,583	123
Technology type			
Crop genetics	84,100	87,893	105
Soil related fertility and conservation	2,000	140	7
Commodity			
Maize	65,000	47,392	73
Lentil	49,000	1,566	3
Rice	54,000	76,401	141
Vegetable	26,600	41,500	156

Other	100	104	104
Sex	100	104	104
Male	70	102	136
Female	30	2	7

Deviation Narrative

The total number of technology adopters was calculated based on the actual amount of seed sold by the NSAF seed company partners. Sex disaggregation, of the technology adopters was calculated based on the baseline survey sex ratio, which is 53:47 (female:male), compared to the 55:45 male: female ratio used when setting the targets. This resulted in the number of male beneficiaries being less than targeted. NSAF will use the baseline value for all future sex disaggregated data collection.

The underachievement in the number of farmers using IFSM technologies can be attributed to the time it took NSAF to team-up qualified technical staff. In addition, the development and reviewing process for integrated soil management practices (ISFM) training modules by the stakeholders was time consuming due to frequent changes in staff and responsibilities at NARC. NSAF will take these unforeseen reasons into account to make-up the shortfall in 2018.

The reduction in the number of people applying improved maize and lentil technologies was primarily due to the limited supply of source seeds from NARC due to a change in the staff holding responsibilities at key positions in NARC. NSAF has organized a joint planning meeting with NARC and the seed companies on source seed production and distribution to resolve this issue. The increase in the number of people applying improved rice technologies was mainly due to the availability of seeds of farmer preferred improved varieties, which were produced by NSAF partner seed companies. In addition, the presence of most of NSAF's seed partners in the rice belt improved access to seed for many rice farmers.

In the case of vegetables, NSAF partner seed companies produced and sold a higher volume of improved vegetable seed than planned. Partner seed companies were able to increase their sales, due to the availability of sufficient quality source seed and market development support from NSAF.

The reduction in the number of women applying improved technologies among the value chain actors was due to the fact that the majority of agro-dealerships are owned and operated by men, resulting in lower actual attendance by women. The high target set for female participation at the time of planning was not appropriate. A more realistic approach will be taken when setting sex disaggregation targets in the future.

EG 3.2-18: Number of hectares of land under improved technologies or management practices with USG assistance

Disaggregates	FY 2017 target (ha)	FY 2017 actual (ha)	Percentage of target
Overall	81,600	48,863	60
Technology type			
Crop genetics	79,600	48,843	61
Soil related fertility and conservation	2,000	20	1
Sex			
Male	44,880	20,361	45
Female	36,720	17,102	47
Joint	0	10,911	Increase
Association applied			
DNA	0	489	increase
Commodity			
Maize	13,000	11,848	91

Lentil	9,800	407.25	4
Rice	54,000	32,852.6	60
Vegetable	2,660	3,735	133
DNA	400	20	5

Deviation Narrative

The deviation in the land areas covered by improved technologies is mainly due to the use of 1 ha/household (HH) as the average holding for rice (assuming more farmers cultivate rice in the Terai where the size of rice farms is larger than in the hills) when setting the target for areas under rice, compared to the baseline finding of 0.43 ha/HH (which is an overestimation of 0.57 ha/HH). NSAF will use the baseline values for more realistic target setting in the future. In addition, a shortage of lentil source seed from NARC resulted in less area covered by lentils. This is partly because of a delay in signing the collaborative agreement with NARC due to frequent changes in the NARC leadership.

During the reporting period, NSAF partner seed companies could sell seeds in 17 out of 25 target districts. NSAF will partner with three additional seed companies to cover the remaining eight districts. In the case of vegetables, due to the availability of sufficient quality of source seed and market development support from NSAF, partner seed companies were able to increase their sales. The underachievement in gender disaggregated targets is also attributed to the shortfall in the achievement of physical targets.

The deviation in the uptake of IFSM technologies is due to limited extension and promotion activities for ISFM technologies. NSAF set an ambitious target for the adoption of IFSM technologies in the first year of implementation, when the focus was mainly on field testing. This learning will be used for realistic planning and target setting in the future.

EG.11-6: Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by USG assistance

Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Sex	680	16,480	2,423.53
Male	476	7,746	1,627.031

Female	204	8,734	4,281.37
Other			

Narrative

Initially, a target of 680 households was set, but after an extensive review of the NSAF roadmap and work plan, it was agreed with USAID to establish the baseline value as the actual for 2017. In the baseline, 18.75% of the population used climate information or implemented risk-reducing actions to improve resilience to climate change. NSAF determined the new target of 16,480 people, which is 18.75% of the total beneficiaries.

Custom-1: Total quantity of target value chain commodities produced by direct beneficiaries with USG assistance that is set aside for home consumption

Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Overall			
Total volume of consumption (MT)		745.65	
Total number of direct beneficiaries		600	
Maize			
Total volume of consumption (MT)		178.492	
Total number of direct beneficiaries		405	
Pulses			
Total volume of consumption (MT)		18.13	
Total Number of Beneficiaries		158	

Rice			
Total volume of consumption (MT)		520.17	
Total number of direct beneficiaries		419	
Cauliflower			
Total volume of consumption (MT)		13.84	
Total number of direct beneficiaries		118	
Tomato			
Total volume of consumption (MT)		8.82	
Total number of direct beneficiaries		104	
Onion			
Total volume of consumption (MT)		8.205	
Total number of direct beneficiaries		80	
Vegetables			
Total volume of consumption (MT)		30.86	
Total number of direct beneficiaries		177	

Narrative

The figure for 2017 actuals is calculated for 87,893 NSAF beneficiary households, using an average of 1.25 MT of value chain commodities set aside for consumption by each household, as per the baseline findings. As this indicator was included in May 2017 (when the roadmap and annual plan was revised), NSAF has not set any targets. The targets for upcoming years will be set using the values as determined by the NSAF baseline.

Sub-IR 2.1.2: Value chains strengthened

EG 3.2-7: Number of technologies or management practices under research, under field testing, or made available for transfer as a result of USG assistance

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Phase I: Number of new technologies or management practices under research as a result of USG assistance	43	42	0	24	43	66
Phase II: Number of new technologies or management practices under field testing as a result of USG assistance	92	102	274	538	366	640
Phase III: Number of new technologies or management practices made available for transfer as a result of USG assistance	0		30	0	30	0

Deviation Narrative

This deviation is due to the six-month extension of the annual work plan from March, 2017 to September, 2017. During the extension period, NSAF conducted 24 new fertilizer research trials in rice and maize to capture the maize and rice season. As NSAF did not anticipate the extension at the time of annual planning, no target was set for the reporting period. In addition to the six-month extension, NSAF accessed additional maize hybrids, including biofortified maize, from international breeding hubs, which was considered a positive move to accelerate the achievement of the project's hybrid maize development target.

EG 3.2-20: Number of for-profit private enterprises, producers' organizations, water users associations, women's groups, trade and business associations and community-

based organizations (CBOs) that applied improved organization-level technologies or management practices with USG assistance

Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Type of organization	49	64	131
For-profit private enterprises	10	8	80
Producers' organizations	22	20	91
Trade and business associations	1	1	100
Community-based organizations	16	35	219
New/continuing	49	64	131
New	49	64	131
Continuing			

Deviation Narrative

This deviation is due to the six-month extension of the annual work plan from March, 2017 to September, 2017. During the extension period, NSAF had set a target to work on rice and maize nutrient management trials, for which 19 additional cooperatives were engaged.

The reduction in the number of for-profit private enterprises is due to the lack of technical competence on the part of two seed companies in the production and marketing of NSAF target crops. These companies were later dropped from the list of seed company partners. Therefore, only eight seed companies collaborated with NSAF during the reporting period. NSAF will be partnering with three additional companies in 2018.

IR 2.2: Small enterprise opportunities expanded

EG 5.2-1: Number of firms receiving USG-funded technical assistance for improving business performance

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Type of firm	8	11	0	3	8	14
Formal firms	8	11		3	8	14
Informal firms						
Duration	8	11	0	3	8	14
New	8	11	0	3	8	14
Continuing						

Deviation Narrative

Three additional seed companies received technical assistance from NSAF on standard operating procedures (SOP) for seed production with seed growers during Semi Annual 2. This activity was done during the six-month extension added to the reporting period, for which no target was set at the time of annual planning.

Sub-IR 2.2.1: Entrepreneurial skills strengthened

EG 3.2-1: Number of individuals who have received USG supported short-term agricultural sector productivity or food security training.

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Type of Individual	417	1,383	416	1,257	833	2,640

Producers	0	1,181	0	777	0	1,958
Male	0	512	0	552	0	1,064
Female	0	669	0	225	0	894
People in government	235	76	236	121	471	197
Female	70	14	71	17	141	31
Male	165	62	165	104	330	166
People in private sector firms	166	63	166	209	332	272
Female	50	3	50	8	100	11
Male	116	60	116	201	232	261
People in civil society	16	63	14	150	30	213
Female	5	25	4	67	9	92
Male	11	38	10	83	21	121
Gender	417	1,383	416	1,257	833	2,640
Female	125	711	125	317	250	1,028
Male	292	672	291	940	583	1,612
Caste/ethnicity		1,383		1,257		2,640
Bahun/Chhetri		474		649		1,123
Dalit		115		51		166
Janajati		765		474		1,239
Muslim		3		40		43
Newar		11		25		36
Other		7		6		13

Deviation Narrative

This deviation is due to the six-month extension of the annual work plan period from March, 2017 to September, 2017, which covered an additional rice and maize seed production season, during which partner seed companies provided training to their contract seed growers on quality seed production. Despite no set target, partner seed companies trained seed growers on quality seed production to ensure a sufficient quantity and quality of improved maize and rice seed to meet next-year's seed demand. The costs of these trainings were managed from the budget under research that was saved from closing the TRPs.

The shortfall in the number of government officials trained is due to a delay in the signing of the MoU with MoAD, and a change in responsibilities at key positions within SQCC and DOA. This affected participation from district-level government agencies. In addition, the local election and code of conduct restricted the participation of government employees. There were several repeat participants at the central-level trainings, but these were counted only once. The MoU with MoAD has now been finalized

and a sub-agreement contract with NARC has been revised. This will encourage more participation from these agencies in the upcoming years.

The deviation in the number of private sector actors trained is due to the carry-over of some training programmes from Semi-Annual I to Semi-Annual II. As many of the trainings were on strategic issues, the heads of seed companies participated several times, but were counted only once. The number of private sector actors trained could not be increased due to limited field level staff to conduct the trainings.

The over achievement in the number of civil society people trained is due to additional people from cooperatives showing interest in receiving training on best management practices for crops. Despite the low target for number of people trained from cooperatives, NSAF accommodated this unforeseen demand, as it entailed no significant cost implications. NSAF considers this to be a lesson to plan realistic targets in future.

This deviation in the targets for men and women trained is mainly due to the improved seed production training organized by the seed partners for their contract growers and cooperative members during the extended reporting period. Most of the seed producers were men.

EG 3.2-4: Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG food security related organizational development assistance

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Type of organization	27	27	22	39	49	66
For-profit private enterprises	10	10	0	0	10	10
Producers organizations	0		22	20	22	20
Trade and business associations	1	1			1	1
Community-based organizations (CBOs)	16	16	0	19	16	35
New/continuing	27	27	22	39	49	66
New	27	27	22	39	49	66
Continuing						

This deviation is due to the six-month extension of the annual work plan from March, 2017 to September, 2017. During the extension period, NSAF had set a target to work on rice and maize nutrient management trials, for which 19 additional cooperatives were engaged. During the same period, two seed producer groups discontinued their partnership with NSAF.

The deviation in the CBOs targets is due to the six-month extension of the annual work plan from March, 2017 to September, 2017, during which NSAF had set a target to work on rice and maize nutrient management trials, for which 19 additional cooperatives were engaged.

Sub-IR 2.2.2: Access to financial and business services increased

EG 3.2-3: Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance.

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Size of MSME			6	0	6	0
Micro (1-10 employees)			3	0	3	0
Small (11-50 employees)			1	0	1	0
Medium (51-100 employees)			2	0	2	0
Disaggregates not available						
Sex of owner/producer			6	0	6	0
Male						
Female						
Joint						
Disaggregates Not Available			6	0	6	0

Deviation Narrative

NSAF did not comprehend the complexities involved in accessing finance from commercial banks for seed companies and fertilizer traders. This led to a delay in laying the groundwork for private entrepreneurs to be able to present a credible business plan and data keeping system to the banks to reflect their need for credit. On the part of financial institutions, there was a lack of understanding about the prospects of agri-businesses. Even though no lending occurred during this reporting period, four commercial banks are prepared to finance NSAF partner seed companies under a tripartite arrangement involving the seed companies, banks and farmers groups (seed producers). The modality is being worked out and progress will be made in 2018.

IR 2.4: Economic growth policy and performance improved

Sub-IR 2.4.1: Increased access to markets

EG.3.2-19: Value of small-holder incremental sales generated with USG assistance

Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Overall			
Total baseline sales (USD)	138,240	12,166,959	8,701%
Total volume of sales (MT)		46,752	
Total number of direct beneficiaries		165,825	
Maize			
Total baseline sales (USD)		891,247	
Total volume of sales (MT)		3,330	
Total number of direct beneficiaries		60,353	
Pulses			
Total baseline sales (USD)		1,602,248	
Total volume of sales (MT)		2,174	
Total number of direct beneficiaries		23,731	
Rice			
Total baseline sales (USD)		5,112,628	

Total volume of sales (MT)		24,518	
Total number of direct beneficiaries		62,551	
Cauliflower			
Total baseline sales (USD)		14,632.77	
Total volume of sales (MT)		44.15	
Total number of direct beneficiaries		119	
Tomato			
Total baseline sales (USD)		12,739.32	
Total volume of sales (MT)		48.31	
Total number of direct beneficiaries		107	
Onion			
Total baseline sales (USD)		3,762.38	
Total volume of sales (MT)		14.13	
Total number of direct beneficiaries		80	

Vegetables			
Total baseline sales (USD)		4,560,836	
Total volume of sales (MT)		16,730	
Total number of direct beneficiaries		19,190	

Narrative

The baseline survey conducted with 600 household concluded that total annual sale of NSAF supported commodities by farmers amounted to USD 83,058 (maize USD 6,084, rice USD 34,901, lentil USD 10,938, and vegetables USD 31,134).
Average sales per household were found to be USD 138.4. Extrapolating these figures to the 87,893 project beneficiaries, total sales of USD 12,164,391 are estimated for the NSAF sites. Total baseline sales, by crop categories calculated to be for cereals USD 6,003,874, for pulses USD 1,602,248, and for Vegetables USD 4,560,836. The deviation in total baseline sales is due to improper target setting as baseline was not available.

Sub-IR 2.4.2 Private sector service delivery improved

EG 3.2-5: Number of public-private partnerships formed as a result of USG assistance

Disaggregates	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
	Target	Actual	Target	Actual	Target	Actual
Partnership focus			4		4	0
Agricultural production			4		4	0
Agricultural post-harvest transformation						
Nutrition						
Multi-focus						

Narrative

NSAF achieved the targets set under this indicator during the reporting period.

EG 5.2-2: Number of private sector firms that have improved management practices or technologies as a result of USG assistance

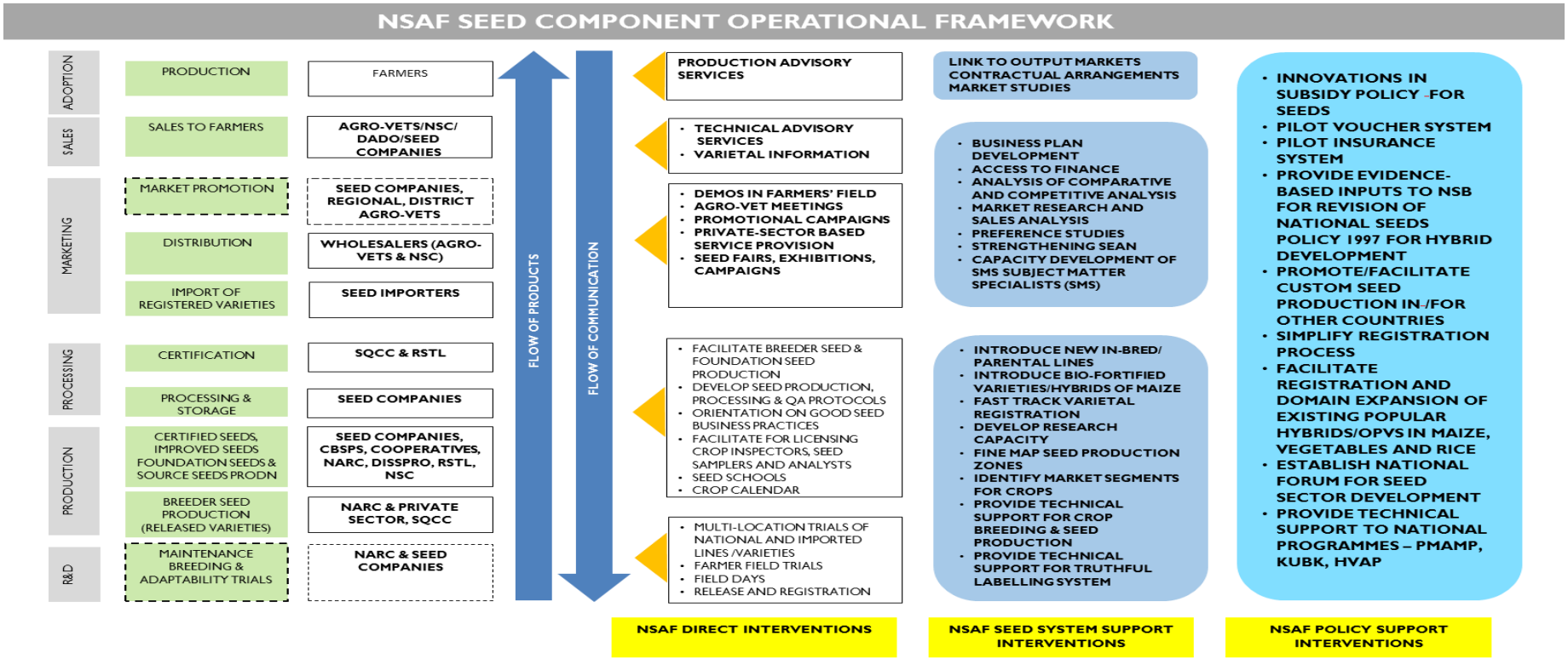
Disaggregates	FY 2017 target	FY 2017 actual	Percentage of target
Type of firm	8	8	100
Formal firms*	8	8	100
Informal firms			
Duration	8	8	100
New	8	8	100
Continuing			

Narrative

NSAF achieved the targets set under this indicator for the reporting period.

ANNEX II

NSAF seed component operational framework



FTFMS Disaggregated Data Tables

Data for FTFMS reporting as of Oct 30, 2017	
Current selection	
Operating unit :	**Nepal**
Implementing mechanism :	**Nepal Seed and Fertilizer (NSAF) project**
Data status :	**Semi-annual (October 2016–March 2017)**
Indicator type :	**Outputs/outcomes**

Indicator/ disaggregation	**Baseline year**	**Baseline value**	**SA1 (Oct 2016–Mar 2017)**		**SA2 (Apr 2017–Sep 2017)**		**Annual (FY 2017)**	
			Target	**Actual**	**Target**	**Actual**	**Target**	**Actual**
Nepal Seed And Fertilizer Project (NSAF)								
EG.3-1: (4.5.2-13) Number of households benefiting directly from USG interventions	2016	0					84,100	89,892
New/continuing	2016	0					84,100	89,892
New	2016	0					84,100	89,892
Continuing		0					0	0
Disaggregates not available		0					0	
Location	2016	0					84,100	89,892

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Rural	2016	0					84,100	26,968
Urban/peri-urban		0					0	62,924
Disaggregates not available								
EG.3-6, -7, -8: (4.5-16,17,18) Farmer's gross margin per hectare, per animal, or per cage obtained with USG assistance*								
Maize	2017							**251.06**
Male	2017							
Female	2017							
Joint	2017							
Association-applied	2017							
Disaggregates not available	2017							
Number of direct beneficiaries								412.00
Male								164
Female								152
Joint								93
Association-applied								
Disaggregates not available								3
Hectares planted (for crops)								102.74
Male								45.63
Female								34.92

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Joint								21.53
Association-applied								
Disaggregates not available								0.65
Total production (MT)								201.22
Male								85.12
Female								79.74
Joint								35.38
Association-applied								
Disaggregates not available								0.98
Value of sales (USD)								
Male								2,609.32
Female								1,848.54
Joint								1,577.67
Association-applied								
Disaggregates not available								48.54
Quantity of sales (MT)								22.73
Male								9.88
Female								7.15
Joint								5.50
Association-applied								
Disaggregates not available								0.20
Purchased input costs (USD)								28,067.29

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Male								12,163.78
Female								10,998.45
Joint								4,775.74
Association-applied								
Disaggregates not available								129.32
Pulses	2017							**493.90**
Male	2017							
Female	2017							
Joint	2017							
Association-applied	2017							
Disaggregates not available	2017							
Number of direct beneficiaries								162.00
Male								91
Female								40
Joint								30
Association-applied								
Disaggregates not available								1
Hectares planted (for crops)								42.63
Male								24.86
Female								9.09
Joint								8.09
Association-applied								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Disaggregates not available								0.59
Total production (MT)								32.97
Male								18.44
Female								5.29
Joint								9.13
Association-applied								
Disaggregates not available								0.10
Value of sales (USD)								10,937.72
Male								5,741.46
Female								1,209.47
Joint								3,986.80
Association-applied								
Disaggregates not available								
Quantity of sales (MT)								14.84
Male								8.27
Female								1.60
Joint								4.97
Association-applied								
Disaggregates not available								0.00
Purchased input costs (USD)								3,244.03
Male								1,959.35
Female								890.40
Joint								384.57

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Association-applied								
Disaggregates not available								9.71
Rice	2017							**371.18**
Male	2017							
Female	2017							
Joint	2017							
Association-applied	2017							
Disaggregates not available	2017							
Number of direct beneficiaries								427.00
Male								195
Female								134
Joint								94
Association-applied								
Disaggregates not available								4
Hectares planted (for crops)								181.78
Male								99.35
Female								44.17
Joint								37.07
Association-applied								
Disaggregates not available								1.19
Total production (MT)								687.54
Male								384.18
Female								154.41

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Joint								145.11
Association-applied								
Disaggregates not available								3.84
Value of sales (USD)								34,901.26
Male								22,215.53
Female								4,641.26
Joint								7,995.53
Association-applied								
Disaggregates not available								48.93
Quantity of sales (MT)								167.37
Male								108.75
Female								21.90
Joint								36.44
Association-applied								
Disaggregates not available								0.28
Purchased input costs (USD)								75,897.12
Male								36,708.15
Female								22,397.34
Joint								16,406.95
Association-applied								
Disaggregates not available								384.68
Vegetables	2017							**1,802.33**
Male	2017							

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Female	2017							
Joint	2017							
Association-applied	2017							
Disaggregates not available	2017							
Number of direct beneficiaries								177.00
Male								76
Female								60
Joint								40
Association-applied								
Disaggregates not available								1
Hectares planted (for crops)								16.76
Male								6.50
Female								4.57
Joint								5.64
Association-applied								
Disaggregates not available								0.05
Total production (MT)								136.96
Male								59.74
Female								33.81
Joint								43.11
Association-applied								
Disaggregates not available								0.30
Value of sales (USD)								31,119.90

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Male								15,507.04
Female								7,929.61
Joint								7,607.52
Association-applied								
Disaggregates not available								75.73
Quantity of sales (MT)								106.60
Male								44.19
Female								26.62
Joint								35.54
Association-applied								
Disaggregates not available								0.26
Purchased input costs (USD)								9,774.81
Male								4,415.82
Female								3,238.31
Joint								2,072.28
Association-applied								
Disaggregates not available								48.40
EG.3.2-1: (4.5.2-7) Number of individuals who have received USG-supported short-term agricultural sector productivity or food security training	2016	0	417	1,383	416	1,257	833	2,640
Type of Individual	2016	0	417	1,383	416	1,257	833	2,640

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Producers	2016	0	0	1,181	0	777	0	1,958
Male	2016	0	0	512	0	552	0	1,064
Female	2016	0	0	669	0	225	0	894
Disaggregates not available							0	0
People in government	2016	0	235	76	236	121	471	197
Male	2016	0	165	62	165	104	330	166
Female	2016	0	70	14	71	17	141	31
Disaggregates not available								
People in private sector firms	2016	0	166	63	166	209	332	272
Male	2016	0	116	60	116	201	232	261
Female	2016	0	50	3	50	8	100	11
Disaggregates not available						0		
People in civil society	2016	0	16	63	14	150	30	213
Male	2016	0	11	38	10	83	21	121
Female	2016	0	5	25	4	67	9	92
Disaggregates not available								
EG.3.2-2: (4.5.2-6) Number of individuals who have received USG supported degree-granting agricultural sector productivity or food security training	2016	0			4		4	4
Sex	2016	0			4	4	4	4

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Male	2016	0			3	4	3	4
Female	2016	0			1	0	1	0
Disaggregates not available								
New/continuing	2016	0			4		4	4
New	2016	0			4		4	4
Continuing	2016							
Disaggregates not available								
EG.3.2-3: (4.5.2-30) Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance	2016	0			6	0	6	0
Size of MSME	2016	0			6	0	6	0
Micro (1-10 employees)	2016	0			3	0	3	0
Small (11-50 employees)	2016	0			1	0	1	0
Medium (51-100 employees)	2016	0			2	0	2	0
Disaggregates not available								
Sex of owner/producer	2016	0			6	0	6	0
Male								
Female								
Joint								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
n/a								
Disaggregates not available	2016	0			6	0	6	0
EG.3.2-4: (4.5.2-11) Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community based organizations (CBOs) receiving USG food security related organizational development assistance								
Type of organization	2016	0	27	27	22	39	49	66
For-profit private enterprises	2016	0	10	10	0	0	10	10
Producers organizations	2016	0	0		22	20	22	20
Trade and business associations	2016	0	1	1			1	1
Community-based organizations (CBOs)	2016	0	16	16	0	19	16	35
Disaggregates not available								
New/continuing	2016	0	27		22		49	66
New	2016	0	27		22		49	66

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Continuing								
Disaggregates not available								
EG.3.2-5: (4.5.2-12) Number of public-private partnerships formed as a result of USG assistance	2016	0			4	0	4	0
Partnership focus	2016	0			4	0	4	0
Agricultural production	2016	0			4	0	4	0
Agricultural post-harvest transformation								
Nutrition								
Multi-focus								
Disaggregates not available								
EG.3.2-7: (4.5.2-39) Number of technologies or management practices under research, under field testing, or made available for transfer as a result of USG assistance								
Number of new technologies or management practices under research as a result of USG assistance	2015	0	43	42	0	24	43	66

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Number of new technologies or management practices under field testing as a result of USG assistance	2015	0	92	102	274	538	366	640
Number of new technologies or management practices made available for transfer as a result of USG assistance	2016	0	0		30	0	30	0
EG.3.2-17: (4.5.2-5) Number of farmers and others who have applied improved technologies or management practices with USG assistance*	2016	0					84,200	87,997
Producers	2016	0					84,100	87,893
Sex	2016	0					84,100	87,893
Male	2016	0					46,255	41,310
Female	2016	0					37,845	46,583
Disaggregates not available								
Technology type	2016	0						
crop genetics	2016	0					84,100	87,893
soil-related fertility and	2016	0					2,000	140

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
conservation								
climate mitigation								
climate adaptation								
Commodity	2016	0						
Maize	2016	0					65,000	47392
Pulses	2016	0					49,000	1,566
Rice	2016	0					54,000	76,401
Vegetables	2016	0					26,600	41,500
Others	2016	0					100	104
Sex	2016	0					100	104
Male	2016	0					70	102
Female	2016	0					30	2
Disaggregates not available								
Technology type	2016	0						
Crop genetics	2016	0					100	91
Soil-related fertility and conservation								
Climate mitigation								
Climate adaptation								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Commodity	2016	0						
Maize	2016	0					75	70
Pulses	2016	0					50	10
Rice	2016	0					75	91
Vegetables							75	81
Disaggregates not available or other								
EG.3.2-18: (4.5.2-2) Number of hectares of land under improved technologies or management practices with USG assistance*	2016	0					81,600	48,863
Technology type	2016	0						
Crop genetics	2016	0					79,600	48,843
Soil-related fertility and conservation	2016	0					2,000	20
Climate mitigation								
Other								
Disaggregates not available								
Sex	2016	0					81,600	48863.25
Male	2016	0					44,880	20,361
Female	2016	0					36,720	17,102
Joint							0	11,400
Association-applied								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Disaggregates not available								
Commodity								
Maize			2016	0.00			13,000	11,848
Pulses			2016	0.00			9,800	407
Rice			2016	0.00			54,400	32,853
Vegetables			2016	0.00			2,800	3,735
Disaggregates not available or other			2016	0.00			400	20
EG.3.2-19: (4.5.2-23) Value of small-holder incremental sales generated with USG assistance*	2017							
Total adjusted baseline sales								
Total baseline sales								83,058
Total reporting year sales								
Total volume of sales (MT)								319
Total number of direct beneficiaries								600
Maize								
Adjusted baseline sales								
Baseline sales								6,084
Reporting year sales								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Volume of sales (MT)								23
Number of direct beneficiaries								412
Pulses								
Adjusted baseline sales								
Baseline sales								10,938
Reporting year sales								
Volume of sales (MT)								15
Number of direct beneficiaries								162
Rice								
Adjusted baseline sales								
Baseline sales								34,901
Reporting year sales								
Volume of sales (MT)								168
Number of direct beneficiaries								427
Vegetables								
Adjusted baseline sales								
Baseline sales								31,134
Reporting year sales								

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Volume of sales (MT)								114
Number of direct beneficiaries								131
EG.3.2-20: (4.5.2-42) Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied improved organization-level technologies or management practices with USG assistance	2016	0					49	64
Type of organization	2016	0					49	64
For-profit private enterprises	2016	0					10	8
Producers organizations	2016	0					22	20
Trade and business associations	2016	0					1	1
Community-based organizations (CBOs)	2016	0					16	35

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
Disaggregates not available								
EG.5.2-1: Number of firms receiving USG-funded technical assistance for improving business performance	2016	0	8	11	0	3	8	14
Type of firm	2016	0	8	11	0	3	8	14
Formal	2016	0	8	11		3	8	14
Informal	2016	0	0	0				
Disaggregates not available								
Duration	2016	0	8	11	0	3	8	14
New	2016		8	11	0	3	8	14
Continuing	2016	0	0	0				
Disaggregates not available								
EG.5.2-2: Number of private sector firms that have improved management practices or technologies as a result of USG assistance	2016	0					8	8
Type of firm	2016	0					8	8
Formal	2016	0					8	8
Informal	2016	0						
Disaggregates not available								
Duration	2016	0					8	8

Indicator/ disaggregation	Baseline year	Baseline value	SA1 (Oct 2016–Mar 2017)		SA2 (Apr 2017–Sep 2017)		Annual (FY 2017)	
			Target	Actual	Target	Actual	Target	Actual
New	2016							
Continuing	2016	0						
EG.11-6: Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by USG assistance*		0					680	16,480
Male	Baseline	0					476	7,746
Female	Baseline	0					204	8,734
Disaggregates not available	Baseline	0						

Note: * Baseline survey of 2017 August has been used to establish baseline value for 2017.

NSAF Indicators

The following is a list of NSAF's 16 indicators, showing full indicator titles and cross-referencing Economic Growth (EG) indicator numbers, Standardized Programme Structure (SPS) location and USAID/Nepal Performance Management Plan (PMP). Indicators are grouped following the USAID's PMP Economic Growth subtitles.

Table A6. NSAF performance indicators FY 2016–FY2021

Indicator number	Indicators
DO2	Inclusive and Sustainable Economic Growth to Reduce Extreme Poverty
EG.3	Agriculture
IR 2.1	Agriculture-Based Income Increased
EG.3-1	Number of households benefiting directly from USG assistance under Feed the Future
EG.3.2-19	Value of small-holder incremental sales generated with USG assistance
EG.3.6	Farmers gross margin per hectare obtained through USG assistance (RAA)
Outcome 1	Farmers receive improved and increased agricultural inputs
EG.3.2-3	Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance
Outcome 2	Improved capacity of agriculture extension workers, service providers, and farmers
EG.3.2-1	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training
EG.3.2-2	Number of individuals who have received USG-supported degree-granting agricultural sector productivity or food security training
Outcome 3	Improved and sustainable agriculture production and post-harvest technologies and practices adopted at farm level
EG.3.2-17	Number of farmers and others who have applied improved technologies or management practices with USG assistance
EG.3.2-18	Number of hectares of land under improved technologies or management practices with USG assistance
EG.3.2-7	Number of technologies or management practices under research, under field testing, or made available for transfer as a result of USG assistance
IR 2.2	Small Enterprise Opportunities Expanded
EG.5	Private Sector Productivity
EG.5.2-1	Number of firms receiving USG-funded technical assistance for improving business performance

Indicator number	Indicators
EG.5.2-2 (NSAF Custom 1)	Number of private sector firms that have improved management practices or technologies as a result of USG assistance
Outcome 5	Increased capacity of GoN and local organizations
EG.3.2-4	Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG food security related organizational development assistance
EG.3.2-5	Number of public-private partnerships formed as a result of USG assistance
EG.3.2-20	Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied improved organization-level technologies or management practices with USG assistance
DO3	Increased Human Capital
IR 3.2	A Healthier and Well-Nourished Population
EG.3.3-11 (NSAF Custom 2)	Total quantity of targeted value chain commodities produced by direct beneficiaries with USG assistance that is set aside for home consumption
EG.11	Climate Change-Adaptation
EG.11-6	Number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by United States Government assistance