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NEPAL SEED AND FERTILIZER PROJECT
FIRST SEMI-ANNUAL REPORT OF PROJECT YEAR 2
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ABBREVIATIONS

4Rs	right source, right rate, right time, right place
ARS	agricultural research station
BF	bio-fortified
CEAPRED	Center for Environmental and Agricultural Policy Research, Extension and Development
CIMMYT	Centro Internacional de Mejoramiento de Maíz Y Trigo (International Maize and Wheat Improvement Center)
DoA	Department of Agriculture (Nepal)
DNA	disaggregation not available
DQA	data quality assessment
EG	Economic Growth (indicator)
FTFMS	Feed the Future Monitoring System
FY	fiscal year
GATE	GATE-Nepal (GATE)
GIS	geographic information system
ha	hectare
HB	hybrid
HTMA	Heat Tolerant Maize for Asia
ICT	information and communications technology
IR	intermediate result
ISFM	integrated soil fertility management
IVR	interactive voice response
KISAN	Knowledge Based Integrated Sustainable Agriculture and Nutrition
LSC	Lumbini Seed Company Pvt. Ltd.
M&E	monitoring and evaluation
MoALMC	Ministry of Agricultural, Land Management and Cooperatives
MSME	micro, small and medium-sized enterprises
MT	metric tonnes
NARC	Nepal Agricultural Research Council
NARES	National Agricultural Research and Extension System
NASIC	Nepal Agro Seeds and Inputs Company Pvt. Ltd
nd	not distributed
NEFEA	Nepal Fertilizer Entrepreneurs Association
NGLRP	National Grain Legume Research Programme
NGO	non-governmental organization
NMRP	National Maize Research Programme
NRRP	National Rice Research Program
NSAF	Nepal Seed and Fertilizer (project)
NSAI	National Seed Association of India
NSC	National Seed Company, Limited
OPV	open-pollinated variety
PAHAL	Promoting Agriculture Health and Alternative Livelihoods
PBC	Panchashakti Biu Company Pvt. Ltd.
PMAMP	Prime Minister Agriculture Modernization Project
PPP	public-private partnership
QED	Quantitative Engineering Design
RARS	regional agricultural research station
SA	semi-annual
SABAL	Sustainable Action for Resilience and Food Security
SEAN	Seed Entrepreneurs' Association of Nepal
SEED	Social Environmental and Economic Development (office, USAID)
SMS	subject matter specialist

SQCC	Seed Quality Control Center
STRASA	Stress-Tolerant Rice for Africa and South Asia
SWOT	strengths, weaknesses, opportunities, threats
USAID	United States Agency for International Development
USC	Unique Seed Company Pvt. Ltd.
USG	United States Government

I INTRODUCTION

The Feed the Future 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). The project began on 1 April 2016 and will run for five years until 31 March 2021. It is designed to contribute to Feed the Future's goal of sustainably reducing global poverty and hunger by aligning with the Feed the Future Nepal multi-year strategy (2011–2017) and USAID's Country Development Cooperation Strategy for Nepal (2014–2019).

The project aims to strengthen the country's 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 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 a number of public and private sector actors including the Nepal Agricultural Research Council (NARC), the Department of Agriculture (DoA), the International Fertilizer Development Center (IFDC), the Center for Environment and Agricultural Policy Research, Extension and Development (CEAPRED), Quantitative Engineering Design (QED), agro-input companies, and other in-country Feed the Future initiatives. The project is working on rice, maize, lentils, onions, cauliflower, and tomatoes in the following 26 districts which comprise the 21 districts in Feed the Future's Zone of Influence and the 5 earthquake-affected districts from Province 3 (note that Rukum was split into Rukum East and Rukum West after the project started):

- Province 7: 6 districts, 4 hill, 2 Tarai (Achham, Baitadi, Dadeldhura, Doti, Kailali and Kanchanpur)
- Province 6: 5 hills districts (Dailekh, Jajarkot, Salyan, West Rukum and Surkhet)
- Province 5: 10 districts, 6 hill, 4 Tarai (Arghakhanchi, Gulmi, Palpa, Pyuthan, Rolpa, East Rukum, Kapilvastu, Banke, Bardiya and Dang)
- Province 3: 5 earthquake-affected hill districts (Sindhuli, Kavre, Makwanpur, Nuwakot and Sindhupalchowk).

The project also benefits most of Nepal's other districts by strengthening the policy environment and the nationwide value chain.

The project has 16 outcomes (see Results Framework at Annex 1). Nine outcomes come under the seed value chain (the Seed Component), which is aimed at sustainably enhancing 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 other seven objectives come under the Fertilizer Component, which aims to sustainably catalyze the adoption of integrated soil fertility management (ISFM) practices at scale through value chain approaches that integrate innovation with market development and entrepreneurship strengthening. These outcomes are aligned with USAID's Nepal Country Development Cooperation Strategy.

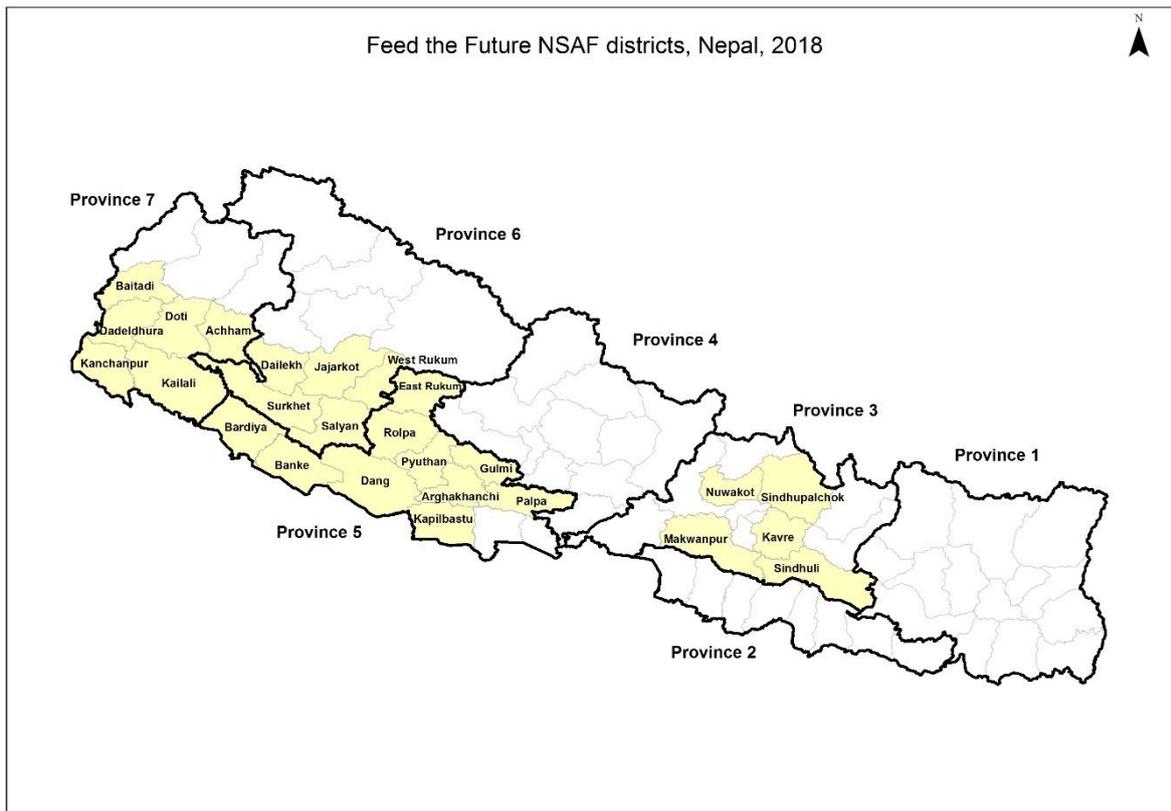


Figure I.1: The NSAF project's 26 working districts

This report is the semi-annual technical progress report of the NSAF project for the October 2017 to March 2018 period. The report describes the activities completed in relation to the work plan and assesses progress relative to performance indicator targets. It also analyses issues and problems encountered during project implementation.

Following this introduction, Chapter 2 summarizes the main strategic developments in the reporting period. Chapter 3 summarizes the main technical progress while Chapter 4 is an in-depth writeup on the progress against the project's 3 intermediate and 16 sub-intermediate results. Chapter 5 gives the progress on the cross-cutting areas including monitoring and evaluation, communication and project management. Chapters 6 and 7 describe the management issues and the planned activities in the second half of its year 2 (2017/18).

2 STRATEGIC DEVELOPMENTS

This chapter summarizes the main strategic developments achieved in the reporting period in terms of overall system strengthening and aligning the project's objectives with national and stakeholder priorities.

During the reporting period (October 2017 to March 2018), the project enhanced its strategic partnerships with the Government of Nepal and the private sector to facilitate the development of strong seed and fertilizer systems in Nepal and for the long-term sustainability of project investments. The main strategic developments are highlighted in the following writeups.

2.1 Project Governance Mechanisms

In November 2017 the project signed a collaborative agreement with the Ministry of Agricultural, Land Management and Cooperatives (MoALMC) to implement project-related activities with the government's Seed Quality Control Centre (SQCC), Crop Development Directorate (CDD) and Soil Management Directorate (SMD). Under the agreement, an NSAF Project Technical Committee was formed. The committee is chaired by the Director General of the Department of Agriculture (DoA) and monitors and advises on technical issues related to project activities.

The first full Technical Committee meeting on 28 February 2018 informed members of important recent technical developments made under the project to encourage the endorsement and deployment of the seed and fertilizer technologies it is promoting. The committee approved the setting up of a working group to discuss findings from the project's fertilizer trials and directed the project to identify how it will work with the newly elected local governments.

On 6 March 2018, the project participated in a joint USAID Projects Steering Committee meeting, which was chaired by the MoALMC Secretary. The committee suggested that the projects should facilitate joint monitoring, establish mechanisms to report on progress to the government and develop a strategy to work with local governments.

2.2 Adaptability Trials of Market Ready Hybrid Maize

Developing hybrid crop products requires time, resources and trained manpower, which are major limiting factors in Nepal's agricultural research and development sector. Conventional breeding programs take at least 8–10 years to develop market ready maize hybrids. To shorten the cycle, the project is testing the adaptability of market-ready hybrids sourced from CIMMYT's international maize breeding hubs and the International Institute of Tropical Agriculture (IITA).

2.3 Partnering with the Government

Scaling up project technologies: On 6 March 2018, the project held a meeting with government agriculture scientists and officials to share findings from the domain-specific fertilizer trials and demonstrations, and to discuss recommendations and to propose the endorsement of the project-supported wheat, maize and rice fertilizer best management practices. The meeting was attended by NARC scientists and rice, maize and wheat super-zone coordinators from the Prime Minister Agriculture Modernization Project (PMAMP). They were informed about the increased crop yields under various fertilizer doses, application methods and the application of new fertilizer products (PCU and briquetted urea). Observing the increased yields, the super-zone coordinators were keen for similar trials to be carried out in their areas. It was agreed that NARC's Soil Science Division (SSD), in

coordination with the Soil Management Directorate, DoA and the project, will validate trial results and initiate the endorsement of recommended fertilizer doses by crop and agro-ecological domain.

Collaboration with PMAMP on rice: The project is collaborating with PMAMP to strengthen PMAMP's Rice Sector Working Group. It helped organize a forum for 52 rice sector stakeholders in December 2017 that reviewed current knowledge and practices and recommended the promotion of certain varieties for certain geographical niches (see details in Section 4.3 below). The meeting also developed scaling up strategies for validated knowledge and produced an action plan on bridging knowledge gaps in the rice sector.

2.4 Public Private Partnerships

Public-private partnerships (PPP) have a good potential for enhancing seed delivery systems by the government and private sector sharing inputs, resources, markets, technologies, risks and benefits. A January 2018 meeting involving NARC, SQCC and private sector representatives discussed the potential of the private sector to test new varieties and release proven varieties. The Chief of SQCC proposed forming a working committee under NARC's public-private partnership approach to prepare guidelines for hybrid seed production, hybrid variety licensing and fast track variety release and registration for cereals and vegetables.

2.5 Coordination with Rice and Maize Regional Initiatives

USAID supports the Nepal Seed and Fertilizer (NSAF), Heat Stress Tolerant Maize for Asia (HTMA) and Stress Tolerant Rice for Africa and South Asia (STRASA) projects in Nepal and South Asia. The HTMA and STRASA projects focus on varietal research and product development while a main focus of NSAF is strengthening Nepal's seed sector for maize, rice, lentils, cauliflower, tomatoes and onions. To enhance coordination and enhance synergies, in October 2017 a meeting was convened by NSAF with heads and key professionals from these projects. It was agreed that NSAF would scale-out the results of HTMA's and STRASA's finished maize and rice products through public and private partners.

2.6 Digital Agriculture

About 85% of farmers at project sites have mobiles phones, with many having smart phones, which provides great potential as a means of reaching farmers and other agricultural stakeholders with information. In this period, in partnership with four IT companies, the project made good progress on its information and communications technology (ICT)-based agriculture development initiatives. The project is using digital data collection tools for i) collecting and processing its survey and field trial data and plant and soil samples, ii) translating agronomic recommendations from its field research into SMS and IVR-based agricultural extension messages for farmers and other value chain actors and iii) developing a smartphone-based crop calendar, iv) is using satellite imagery, crowd-sourcing and machine learning to identify rural houses to identify high impact intervention areas across the 21 Feed the Future districts.

3 ACTIVITY HIGHLIGHTS

3.1 Technical Progress

- Initiated winter maize hybrid evaluation to target rice fallow cropping system in the Mid-Western and Far Western Tarai.
- Eight types of trials of 196 hybrids and local checks were under evaluation by three public and five private sector project partners as the first large scale testing of finished hybrid products sourced from CIMMYT's international breeding hubs in Colombia, Mexico and Zimbabwe
- NSAF for the first time in Nepal introduced more than 50 biofortified maize hybrids enriched with zinc, provitamin A and quality protein for evaluation during the winter and spring 2017/18.
- The project introduced 21 white kernel hybrids from CIMMYT Mexico and distributed them to partner organizations for winter season evaluation. These products target maize farmers in Nepal's Midhills.
- NSAF supported partner seed companies for the first time to engage in the parental line increase of locally developed hybrids sourced from the National Maize Research Program (NMRP).
- In this reporting period the project:
 - established 693 research plots for cauliflower with farmers on their fields
 - established 385 research plots for tomatoes with farmers on their fields
 - established 297 research plots for onions with farmers on their fields
 - established 192 wheat demonstration and 480 wheat research plots
 - evaluated precision fertilizer/seed broadcasters and fertilizer/seed drills for wheat on the fields of 48 farmers.
- Prepared standard operating procedures (SOPs) for varietal and seed production demonstrations for cereals and vegetables.
- The project conducted 30 lentil varietal and 13 seed production demonstrations of lentil and rice intended to promote new varieties and good management practices.
- Digital maps of soil chemical properties were produced for the entire Tarai region at the increased resolution of 250m x 250m.
- Household and road system maps were created for the entire Feed the Future Zone of Influence.
- A willingness to pay for chemical fertilizers study got underway in eight districts.
- Supported the production of 29 metric tonnes (MT) of lentils, 227 MT of maize and 1647 of rice seeds.
- The analytics of the first year of the project's field trials showed the following results:
 - 42% increase in rice grain yield with improved practices (6.3 MT/ha) above farmer practices (4.4 MT/ha).
 - The same rice grain yields with polymer coated urea (5.9 MT/ha) or briquetted urea (6.0 MT/ha) as government fertilizer recommendations (6.0 MT/ha), while reducing fertilizer nitrogen application by 51%.
 - 95% increase in maize grain yields with improved practices (8.8 MT/ha) above farmer practices (4.5 MT/ha).
 - 32% increases in maize grain yields with improved top-dress fertilizer practices (9.0 MT/ha) above the government recommendations (6.9 MT/ha) without increasing nitrogen or fertilizer applications rates.
- Prototype spectroscopy and yield estimation digital collection tools were made ready to test in the field.

- An innovative agricultural extension program is being finalized to disseminate best management practices for rice, wheat, and maize using active learning and multimedia for scaling up through development partners, private companies and the government.
- The project worked with private-sector ICT partners Viamo and PEAT to upscale ISFM and 4Rs (right source, right rate, right time, right place) through innovative SMS, IVR and smartphone platforms.
- The project collaborated with Viamo on a competitive application to the Inspire Challenge program of the Big Data platform within the Consultative Group on International Agricultural Research (CGIAR). The successful application was awarded US\$100,000 in co-financing to enable Viamo to collaborate with the project to develop an ICT-based market engagement program.
- The project facilitated a preliminary survey of stakeholders and interacted with farmers, seed companies and agrovetts to prepare for producing a digitally enabled seed system to inform farmers, agro dealers and other value chain actors about seeds, varieties and characteristics.
- Held a preliminary meeting with the Microsoft Innovation Center on developing an app to track seed varieties which will probably use QR codes to identify the type and amount of seeds distributed to agrovetts and sold on to farmers. The project also held initial meetings with QED and Microsoft Innovation Center on developing a fertilizer information system.

3.2 Capacity Development Progress

- Four NARC scientists were trained on soil spectroscopy in March 2018 at the Soil Spectral Diagnostics Laboratory of the World Agroforestry Center in Nairobi, Kenya.
- The President of the Nepal Fertilizer Entrepreneurs Association visited Bangladesh in March 2018 hosted by the International Fertilizer Development Center to observe the manufacturing, distribution, and use of briquetted urea to inform about the potential of establishing a urea briquetting facility in Nepal. Subsequently, the project is supporting NEFEA to import a urea briquetting machine (for the first time in Nepal).
- A total of 1,420 persons including farmers, government officials, private sector actors and cooperatives were trained on 10 seeds and fertilizer topics.
- Partner seed companies organized 28 farmers field days with the participation of 1,167 farmers on lentils, rice, wheat and maize.
- Supported a hands-on training for 33 public and private partner personnel on field data recording and management.

3.3 Knowledge Dissemination Progress

- The National Coordinators for NARC's maize and rice commodity programs, the Chief of SQCC and project staff attended the fourth annual Latin American Cereals Conference (LACC) in March in Mexico City. World class scientists shared advances and scientific findings on cereal technology and how the biofortification of staple crops can improve nutrition. NARC's national rice research program presented a poster on submergence tolerant rice.
- Organized a national lentil workshop in February 2018 involving more than 40 value chain actors including farmers, processors and custom officials.
- The project supported NEFEA members to observe the performance of two new fertilizer products in the field – polymer-coated urea and urea deep placement. NEFEA is now partnering with the project to conduct demonstration trials of these products.
- A team from USAID led by the Director of the Social Environment and Economic Division visited project sites in Banke, Bardiya and Kailali.

3.4 Collaboration and Partnership Progress

- A memorandum of agreement was signed between the project and MoALMC in November 2017.
- Collaborated with the government on endorsements of the project-developed best management practices for ISFM and the 4Rs for wheat, maize, and rice.
- The project established a hybrid maize varietal evaluation and validation network among NARC and private seed companies across different agroecological zones to identify adaptable products.
- The project held planning meetings with NEFEA on creating best management practice training materials on rice, wheat, maize, and vegetables for NEFEA members.
- The project facilitated a meeting of PMAMP's Rice Sector Working Group.
- The partnerships with the seed companies were reviewed and plans for FY 2017/18 agreed.
- The project partnered with Viamo ICT company to develop a mobile phone-based market facilitation and access program for value chain actors.
- The project facilitated the formation of a technical working committee to develop hybrid seed production and licensing guidelines.
- Supported SEAN to conduct its annual general meeting.

4 DESCRIPTION OF PROGRESS

4.1 IR 2.1: Agriculture-based income increased

Under this intermediate result the project is working towards achieving sub-intermediate results (IR) 2.1.1 and 2.1.2 as measured by achievements against the economic growth (EG) indicators (which are shaded in grey) and the related six outcomes.

Sub-IR 2.1.1: Agricultural productivity increased

Under sub-intermediate result 2.1.1 the project will report against the following indicator. Most related work is planned for the second half of project Year 2.

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

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

Highlights

- Estimated the seed production of four partner seed companies.
- Six private seed companies carried out 30 varietal demonstrations of lentil carried in ten target districts.
- Six private seed companies carried out 13 demonstrations of lentils, maize and onion seed production in seven target districts.
- Eight farmers field days (lentils and maize) were conducted by four seed companies with project support.

Technical progress:

Seed production: During this reporting period, the project facilitated four seed companies to develop their business plans in order to promote the large-scale commercialization of improved varieties of seeds. Considering only open pollinated varieties (OPVs), the four partner companies now plan to produce the following amounts of seeds in the next five years: 13,161 MT (43.4%) of rice seeds, 15,151 MT (50%) of wheat seeds, 1,770 MT (5.9%) of maize seeds, 161 MT (0.5%) of lentil seeds and 50 MT (0.2%) of vegetable seeds (Figure 4.1).

The four companies are diversifying their product portfolios and increasing the share of newly released rice varieties (i.e. released after 2010) with, for example, the share of new rice varieties in their 2018 seed production planned to double from the current 23.8% (392 MT) to 46.7% (920 MT) by 2022.

Also, the project has regularly facilitated and followed up with the National Rice Research Programme (NRRP) and the National Grain Legume Research Programme (NGLRP) on the production of promising lines and foundation seeds of rice and lentils while CEAPRED and the project have facilitated NARC's Horticultural Research Department (HRD) to produce vegetable crop seeds.

NRRP and NGLRP had up to the end of March 2018 produced around 0.58 MT of paddy and 0.21 MT of lentil source seeds for trials, demonstration and seed production in FY 2017/18. Similarly, CEAPRED, in consultation with the Horticultural Research Department and Lumle Regional Agricultural Research Station, produced 23 kg of cauliflower and tomato seed for off-season vegetable production.

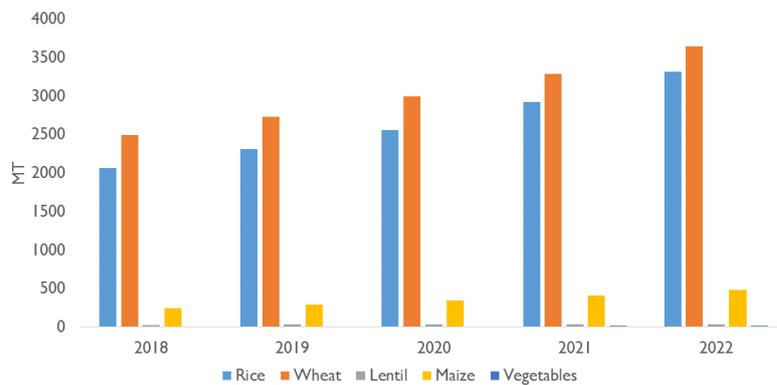


Figure 4.1: Seed production plans of the four project-supported seed companies, 2018–2022

Varietal demonstrations: The rate of adoption and diffusion of the many recently released new crop varieties is very low in Nepal with most farmers growing crop varieties that were released more than 25 years ago. This substantiates the need to enhance adoption pathways to encourage farmers to use the new varieties.

During the reporting period the project carried out a number of on-farm demonstrations of newly released and pipeline varieties in collaboration with public and private partners (see example at Photo 4.1). It also developed guidelines on how to carry out demonstrations where newly released varieties are compared with an existing variety and all of them receive the same management practices. This approach (which is mostly followed by the project’s seed company partners) helps farmers to simultaneously adopt new varieties and best crop management practices.



Photo 4.1: Lentil varietal demonstration at Unique Seed Company Pvt. Ltd, Dhangadhi, Kailali (Credit: Hari Shrestha)

The detailed achievements of the crop demonstrations during the reporting periods were as follows:

- The project conducted 30 varietal demonstrations on lentils in ten Feed the Future districts in collaboration with six private seed companies. Nine lentil varieties, including the recently released Khajura Masuro-3 were included in the demonstrations. The data are being collected and results will be shared in the next report.
- NARC's Surkhet Agricultural Research Station demonstrated five released and pre-released rice varieties (DRR-44 (Hardinath-3), DRR-42, Sukhadhan-4, Sukhadhan-6 and Hardinath-1) in different areas of Surkhet. The on-farm demonstration results showed that Hardinath-3 (DRR-44) produced the highest grain yield (4.8 MT/ha) as well as being liked by farmers not only due to its high yield but also to early ripening, good grain type, no lodging and no disease and insect infestations.
- The National Rice Research Program (NRRP) distributed 220 minikits of newly released rice varieties (Hardinath-3, Sukhadhan-3, Bahugunidhan-1 and Samba Masuli Sub-1) to farmers for promoting uptake.

Seed production demonstrations: The project developed standard operating procedures (SOPs) that specify recommended fertilizer doses, spacings and seed rates for producing seeds of target crops. These practices were then applied by six seed company partners to carry out production demonstrations on lentils (varieties: Simal, Khajura Musuro 1 & 2, Simal, Shikhar, Maheshwor Bharati), maize (Rampur Hybrid-10) and onions (Red Creole) (see scenes from a demonstration site in Photo 4.2.). This activity demonstrated seed yield and seed quality gains to seed growers towards increasing the quantity and quality of seeds produced by seed companies and seed grower groups. The results will be presented in the next reporting period.



Photo 4.2 Onion seed production demonstration of Hariyali Community Seed Co. Pvt. Ltd at Kavre (Credit: Hari Shrestha and Shaila Thapa)

Farmers' field days are held to promote innovations (see example at Photo 4.3). Showing farmers' groups successful varietal and seed production demonstrations motivates them to replace old varieties with new ones. During the reporting period the project supported the holding of eight field days by four seed company partners as a nudge tool for the adoption of new varieties and agronomic practices by farmers. A total of 453 farmers attended these days with 285 men and 168 women. The farmers observed the demo crops and ranked their preferred varieties and discussed why they were interested in some varieties and not others. These events enabled the seed companies to enhance their visibility with existing and potential clientele. The preferences of participating farmers and the yields of the demonstration varieties will be shared in the next report.



Photo 4.3: A farmers' field day at a lentil varietal demonstration of USC (Credit: Darbin Joshi)



Photo 4.4: USAID delegation and experts interacting with seed grower group at PBC (Credit: Darbin Joshi)

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

Highlights:

- Project staff completed the analysis of the first season of fertilizer field trials showing large yield increases for several improved practices.
- The project established 1,567 demonstration plots, 480 research plots and tested fertilizer and seed broadcasters and drills.
- The project evaluated the new fertilizer technologies of polymer coated urea and briquetted urea in rice. NEFEA members were shown these trails and taken to Bangladesh to observe its production.
- Digital maps were produced of the major soil chemical properties for the entire Tarai region.
- Household and road system maps were created for the entire Feed the Future Zone of Influence.

Technical progress

Results of fertilizer field trials: The completion by project staff of the analytics of the first year of the project's fertilizer field trials identified the following fertilizer technologies and management practices that significantly increase crop yields and fertilizer use efficiency:

- A 42% increase in rice grain yield with improved practices (6.3 MT/ha) above standard farmer practices (4.4 MT/ha).
- The same rice grain yields were achieved with polymer coated urea (5.9 MT/ha) and briquetted urea (6.0 MT/ha) as standard government recommendations, while reducing nitrogen application by 51%.
- A 95% increase in maize grain yields with improved practices (8.8 MT/ha) over farmer practices (4.5 MT/ha).

- A 32% increase in maize grain yields with improved top-dress fertilizer practices (9.0 MT/ha) above the government's recommendations (6.9 MT/ha) without increasing nitrogen or fertilizer applications rates.

Yield data is shown in Figures 4.2 and 4.3.

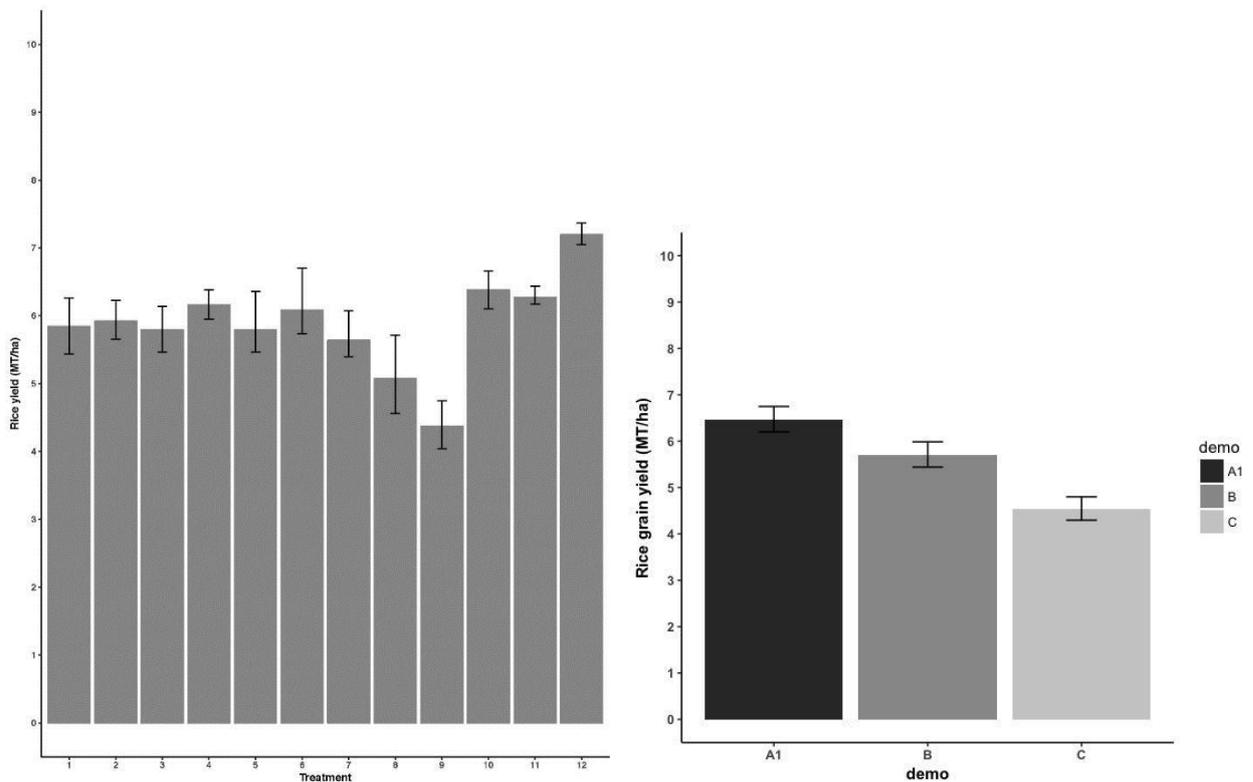


Figure 4.2: Rice grain yields from i) research treatment plots (left) and ii) demonstration plots (right) from first season NSAF field research

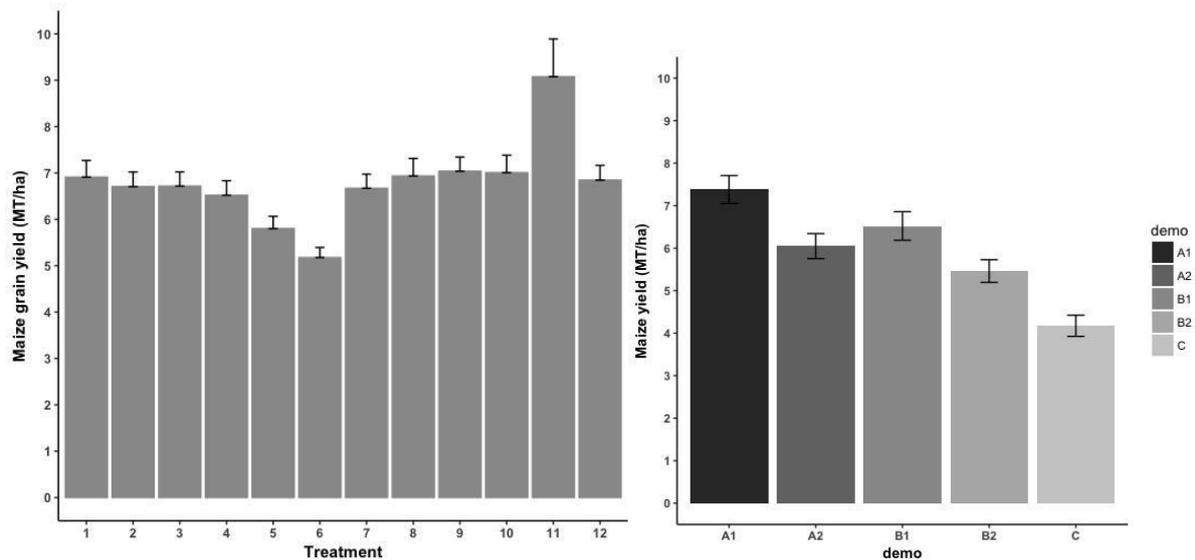


Figure 4.3: Maize grain yields from i) research treatment plots (left) and ii) demonstration plots (right) from the first season of NSAF field research.

Demonstration plots and technologies: In this reporting period the project:

- established 693 cauliflower research plots with farmers on their fields
- established 385 tomato research plots with farmers on their fields
- established 297 onion research plots with farmers on their fields
- established 192 demonstration and 480 research plots for wheat
- evaluated precision fertilizer and seed broadcasters and fertilizer and seed drills for wheat on 48 farmers' fields.

New fertilizer technologies: For the first time in Nepal, the project evaluated the two new fertilizer technologies of polymer coated urea and briquetted urea in rice. Both polymer coated urea and briquetted urea (as shown in Photo 4.5) maintained rice grain yields while reducing the nitrogen application rate by 51%.

In maize, improved nitrogen fertilizer management strategies increased grain yields by 32% above the current government recommendations. Simple best management practices (ISFM and the 4Rs) increased maize grain yields by 95% and rice grain yields by 42% above current farmer practices.



Photo 4.5: Polymer coated urea (left) and briquetted urea (right) (Credit: David Guarena)

Facilitating the introduction of new fertilizers: NEFEA members visited the project-supported fertilizer trial and demonstration sites and showed much interest in the potential of polymer-coated urea and briquetted urea. In support of this the project supported the president of NEFEA to travel to Bangladesh to tour International Fertilizer Development Center-supported briquetted urea manufacturing facilities and farms using briquetted urea (Photo 4.6).



Photo 4.6: NEFEA's president visiting a urea briquetting operation, Bangladesh (left) and visiting the Fertilizer Association of Bangladesh (Credit: Yam Gaihre)

He also discussed the value of these fertilizers with the Bangladesh Fertilizer Association. This also gave the recently formed NEFEA the chance to learn how they can operate and represent their members. Subsequently, the project decided to support NEFEA to import a urea briquetting machine into Nepal (for the first time) for field trials and for a more in-depth assessment of the business potential. Discussions have started with NEFEA members to conduct joint demo trials of urea deep placement and polymer-coated urea.

Best management practices: The project held a series of planning meetings with NEFEA on the production of a series of best management practices training guides for rice, wheat, maize and vegetable farmers. NEFEA welcomed the initiative and agreed to integrate the guides into their programs.

Digital soil maps: This reporting period saw advances in the production of the digital soil maps. The project originally intended to produce soil maps just for the Feed the Future Zone of Influence. The acquisition of additional data assets from MoALMC’s National Land Use Project (NLUP) enabled the production of digital soil maps for Nepal’s entire Tarai region (Figure 4.4). The project also used new satellite imagery for the maps that enabled the resolution to be increased from 1 km x 1 km to 250m x 250m pixels. It is planned to map the whole country by the end of 2018.

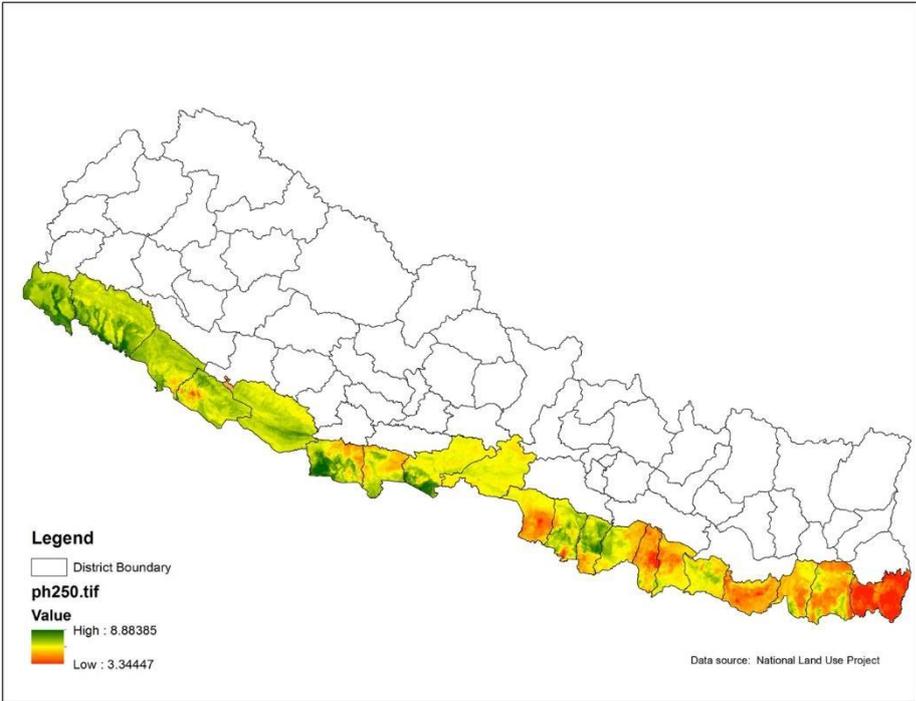


Figure 4.4: Soil pH map of the Tarai, 250m x 250m resolution

Digital data collection tools: In its first year the project signed a sub-agreement with the QED IT company to produce integrated digital data collection systems for the project and its partners.

During this reporting period QED finished one round of household and road network mapping using cutting-edge techniques of combining crowd-sourcing with artificial intelligence to automatically produce maps from satellite imagery (see Figures 4.5 and 4.6). The maps will help identify where project interventions could have the best returns on investment.

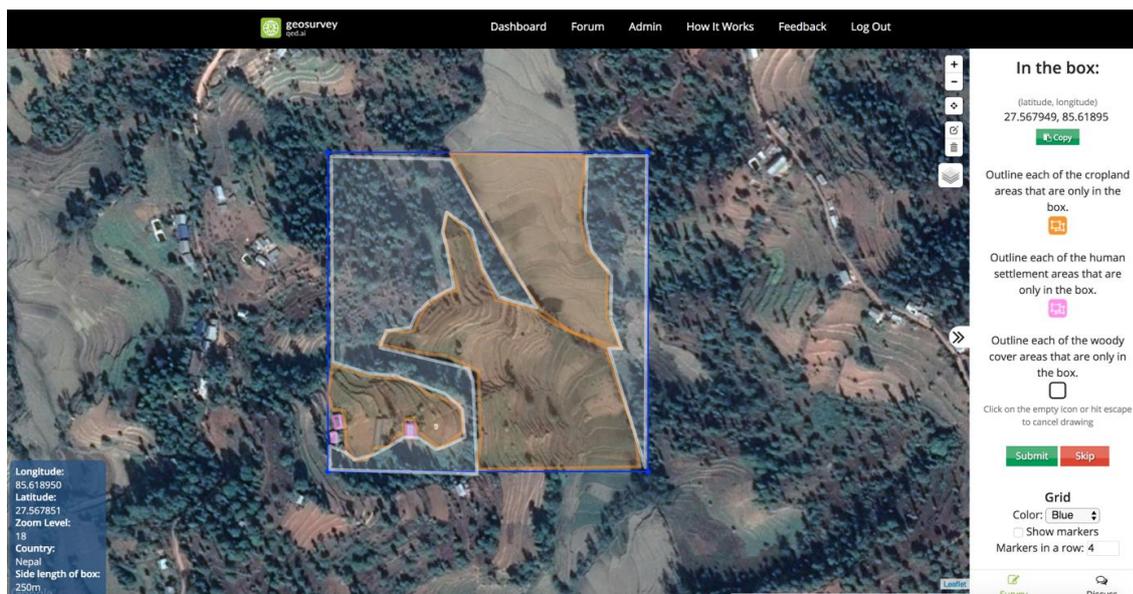


Figure 4.5: Screenshot from QED crowd-sourcing online app showing how the maps were made.

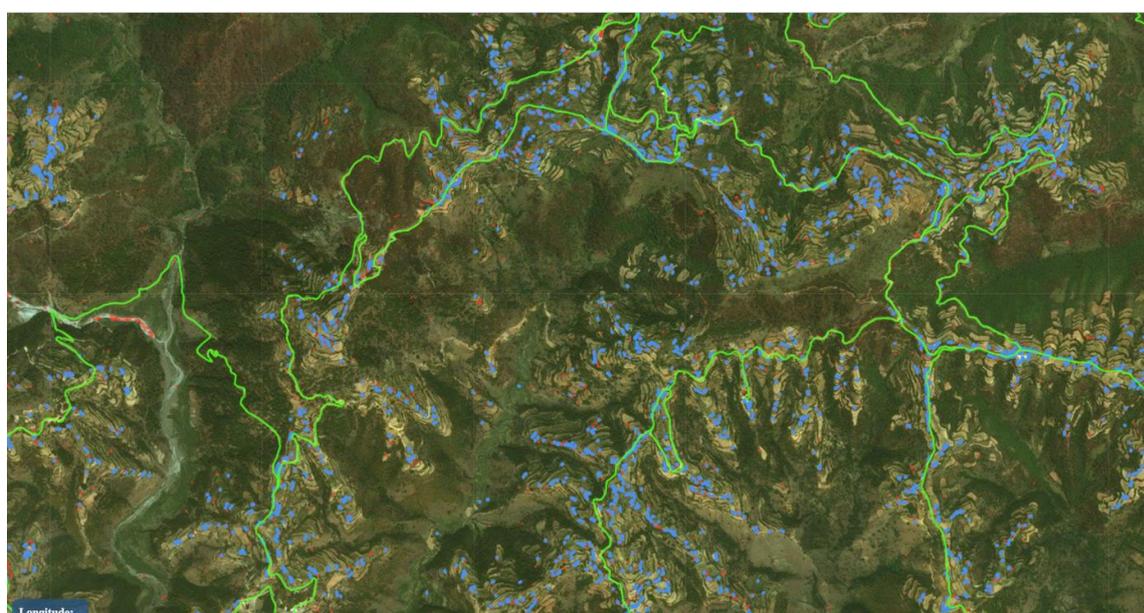


Figure 4.6: Section of first generation QED-produced map. Blue and red rectangles are individual houses, green lines are roads.

The project also fully integrated QED’s digital data collection, storage, and management tools into its field activities including every step of data collection processes from field surveys to crop yield measurements. By using the QED digital data collection tools across its data collection processes, all the project’s data is now housed in a well curated and accessible database.

The project also i) collaborated with QED on developing a low-cost hand-held spectrometer to measure plant and soil properties in the field (Photo 4.7), with field testing starting in April 2018 and ii) saw the creation of the project’s database of results from its fertilizer component, including visualization software for public consumption.



Photo 4.7: Initial prototype of low-cost hand-held near-infrared spectrometer (Credit: William Wu)

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

Highlights

- The project conducted demonstration trials in wheat for seed/fertilizer drills as well as precision broadcast fertilizer spreaders to assess demand potential.

Technical progress:

During this reporting period, the project drew from previous Cereal Systems Initiative for South Asia (CSISA) activities to run demonstration trials for fertilizer/seed drills and precision broadcast fertilizer spreaders in wheat. The purpose was to evaluate the existing fertilizer application technologies that are in use to judge their quality and to assess farmer acceptance of them and yield responses.

The results showed that the quality of drills and spreaders is inconsistent, farmers are responsive to quality applicators and the use of quality applicators increases grain production. The project is now assessing the various fertilizer applicator suppliers and import chains to draft business development plans for the private sector to sell such technologies.

Sub-IR 2.1.2: Value chains strengthened

Under this sub-intermediate result, the project reports against the following indicator:

EG 3.2-7: Number of technologies or management practices under research (Phase 1), under field testing (Phase 2), or made available for transfer (Phase 3) as a result of USG assistance

During the reporting period, the project made the following progress across the three phases referred to in the indicator:

- Phase 1: Researched 395 technologies (more than the 380 targeted), with research conducted on 196 varieties of winter maize, 159 varieties of spring maize and 40 treatments of wheat, tomato, onion and cauliflower (10 treatments per crop).
- Phase 2: Carried out 17 trials and demos of crop varieties against the target of 14. Three technologies (line sowing, using earthway spreaders for fertilizer application and use of seed drills)

were tested in farmers' field for productivity, effectiveness and resistance to physical stress in multi locational trials.

- Phase 3: Four technologies were made available for transfer – seed/fertilizer drills, precision broadcast fertilizer equipment, fertilizer best management practices for wheat and alternative urea products (polymer-coated urea and urea deep placement).

The detailed progress is presented in Table A2.1 of Annex 2.

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

Highlights:

- A Technical Working Committee was formed under NARC's objective of promoting public-private partnerships, to prepare guidelines for hybrid seed production, hybrid variety licensing and fast track variety release and registration. The committee held meetings and field visits to get inputs for the preparation of the guidelines.
- 338 market ready hybrids, open pollinated varieties and bio-fortified maize from CIMMYT's international hubs foreign countries were planted for testing by NARC and private seed companies. The hybrids are now undergoing multi-location trials run by seed companies.

Technical progress

Technical working group: In August 2017, the project and NARC agreed to strengthen NARC's coordination with the private sector and other stakeholders to enhance germplasm access and capacity building activities. Since then formal and informal meetings were held among stakeholders to develop the working modality on promoting public-private partnerships. On 26 January 2018, a follow up meeting was held involving HRD, SQCC, CEAPRED, NMRP and NSAF team. The meeting agreed to form a technical working committee to design/prepare a guideline for hybrid seed production, the licensing of hybrids/OPVs from NARC to local seed companies, and fast track variety release and registration of cereals and vegetable varieties. NSAF is a member of this technical committee and its role is to facilitate exchange of information and to share local and global experiences in hybrid parent licensing, hybrid seed production, among others. The committee has started its functions by meeting relevant stakeholders and by reviewing existing policy documents.

Testing new varieties of market-ready maize: In winter and spring 2017/18 the project supported the testing of new market-ready hybrid, open pollinated and biofortified varieties of maize in Nepal in partnership with NARC and local seed companies (see Table A3.1 in Annex 3 for details and Photos 4.8 and 4.9 for sites). Seven field technicians from the partner companies were supported for designing field trials and capturing data. Three hundred and thirty-eight lines of maize from CIMMYT in Zimbabwe, Mexico and Colombia were tested of which 204 were hybrids, 76 open pollinated and 48 bio-fortified varieties. The local checks were from Nepal.

The fields will be monitored by the project and other stakeholders to validate performance data in the second half of project Year 2. The project intends for at least 5–10 new products to be identified for further testing and variety registration from these tests.



Photo 4.8: NSAF project maize trials: A. Surkhet Agricultural Research Station and private seed companies; B. LSC (Rupandehi); C. PBC (Kanchanpur) and D. USC (Kailali) in 2017/18 (Credit: Darbin, Gangaram, Rajendra and Laxmi)



Photo 4.9: Delegates from USAID's SEED office and project implementing partners visiting NSAF's field activities at Khajura, Banke (Credit: Darbin Joshi)

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

Highlights:

- 40 market-ready biofortified maize varieties, including 32 quality protein maize and 8 zinc enriched hybrid varieties were tested in Nepal in 2017 for the first time.
- In winter 2017, the National Maize Research Programme and two seed company partners tested quality protein maize and in spring 2018 one seed company partner tested a zinc enriched maize hybrid.

Technical progress

To increase the availability of and access to more nutritious foods in Nepal, particularly in the Feed the Future districts, in 2017 the project received 40 market ready hybrids of bio-fortified maize from CIMMYT Colombia for adaptability testing. These hybrids comprised 32 lines of quality protein maize yellow and 8 of zinc-enriched hybrid maize (see Table A3.2).

In winter 2017, seed company partners LSC and USC and NARC's National Maize Research Programme evaluated quality protein maize against locally adapted protein maize (QPM) checks. The National Maize Research Programme (NMRP) Rampur, the Khajura Regional Agricultural Research Station and GATE seed company trialed zinc enriched hybrid maize using four local adapted checks (see Photo 4.10). In Spring 2018 LSC is testing quality protein maize against two local checks.

The project intends for at least two bio-fortified hybrids to be identified by public and private seed company partners for further testing.



Photo 4.10: Bio-fortified maize trials: A. Surkhet Agricultural Research Station, NARC and B. GATE-Nepal in 2017/18 (Credit: Jeewan Shrestha)

Outcome 2.1.2.3: The National Agricultural Research and Extension System (NARES) develops and deploys ISFM technologies

Highlights:

- Project staff and NARC and MoALMC decision makers met to discuss points arising from the first year of project field activities.
- Four NARC scientists were supported to attend an advanced soil spectroscopy methods workshop in Nairobi, Kenya.

Technical progress

Review of achievements: On 6 March 2018 the project met high level project stakeholders to review the outputs from the first year's field activities under the project's fertilizer component. The chiefs of NARC's Soil Science Division and PMAMP's maize, rice, and wheat super-zones, and the chief of Khajura Regional Agricultural Research Station participated in the meeting. They critically reviewed technical progress, implications for the coming season of field activities and developed an action plan to secure government endorsement of the new fertilizer technologies and recommended management practices. A major output of this meeting was an agreement to collaborate on field evaluations of polymer coated urea products within the PMAMP maize and rice platforms in the coming season, which is an important step towards commercializing polymer-coated urea in Nepal.

Soil spectroscopy workshop: In mid-March, the project supported four NARC scientists to attend a week-long hands-on soil spectroscopy training workshop at the soil spectroscopy diagnostic laboratory of the World Agroforestry Centre (see Photo 4.11). The participants received practical and theoretical instruction on digitizing soil data management and using advanced spectral methods to convert soil information into fertilizer recommendations. This workshop supplemented the four scientists' attendance at the April 2017 digital soil mapping workshop in Kathmandu and strengthens NARC's capacity to use soil spectroscopy and digital soil mapping to convert soil data into usable, up-to-date, domain-specific ISFM technologies.



Photo 4.11: Participants in soil spectroscopy training at the soil spectroscopy diagnostic laboratory of the World Agroforestry Centre, Nairobi, Kenya (Credit: Grace Ndege)

4.2 IR 2.2. Small enterprise opportunities expanded

The project is implementing a number of training programs to expand business opportunities for stakeholders across the agriculture value chain of the target crops. It is also supporting the development of standard operating procedures for seed value chain actors, strengthening the entrepreneurial skills of private sector enterprises and working to improve the access of seed companies and fertilizer entrepreneurs to financial and business services.

The project reports against the following indicator for the achievement of intermediate result 2.2:

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

In this reporting period the project supported the training of 20 private sector firms (8 seed companies and 12 fertilizer importers, traders or input suppliers) to improve their business performance. These trainings improved their knowledge and practices around seed business management and accounting, marketing and product branding. Nine of the 20 firms trained in this period newly received training support (see Table A2.2 in Annex 2).

Sub-IR 2.2.1: Entrepreneurial skills strengthened

The project reports against two indicators for sub-intermediate result 2.2.1.

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, 1,420 persons were trained on short-term agricultural sector productivity or food security related topics:

- The President of NEFEA attended a fertilizer technology exposure visit in Bangladesh, 3 personnel from NARC and MoALMC participated in the Latin American Cereal Conference and 4 NARC scientists participated in a soil spectroscopy training in Kenya.
- 4 personnel from seed companies were trained on vegetable production technology.
- 10 NEFEA members were trained on fertilizer marketing.
- 23 technical personnel were trained on maize trial data collection and orientated on running demonstration trials.
- 43 stakeholders participated in the National Lentil Workshop.
- 165 farmers and agrovet, cooperative and district agriculture office representatives took part in seven 4R ISFM trainings.
- 1,167 farmers attended 28 farmer field days (seed and fertilizer components) on the ISFM best management practices of wheat and rice and lentil and maize seeds.

Amongst the 1,420 trainees were:

- 729 males and 691 females
- 1,139 farmers, 135 private sector individuals, 98 government personnel and 48 civil society persons
- 23.8% youth, 60% non-youth and 16% not known
- 48.1% Janajati (ethnic group) and 45.2% Brahmin-Chhetri, 5.1% Dalit, 0.7% Newar, 0.2% Muslim and 0.6% other.

Note that this data represents unique individual participants with no double counting in the data where individuals attended more than one event. See detailed figures and deviation narratives in Table A2.3 in Annex 2.

The second indicator under intermediate result 2.2.1 concerns organizational development assistance to local food security 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

During the reporting period, the project provided organizational development assistance to 93 companies, groups and community-based organizations against the target of supporting 91. Among them were 8 seed companies, 12 agrovets and other private sector firms, 27 seed producers groups and cooperatives, 44 fertilizer cooperatives and two SEAN and NEFEA member firms. Among the 93 organizations 38 received support from the project for the first time. The assistance they received included on improved varieties of maize seeds, seed production technologies, field demonstrations and business planning. See details and deviation narrative at Table A2.4 in Annex 2.

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

Highlights:

- Reviewed standard operating procedures for lentils, cauliflower, onion and tomato.

Technical progress

Review of standard operating procedures: The project supported the development of standard operating procedures for varietal and seed production demonstrations of lentil, cauliflowers, onions and tomatoes to facilitate the dissemination of project supported technologies. This was done in consultation with the SQCC, NARC's Entomology Division, NARC's Plant Pathology Division, the National Grain Legume Research Programme (NGRLP) and DoA's Directorate of Agricultural Extension (DAE) and Plant Protection Directorate (PPD).

- The draft standard operating procedures on lentils was prepared and finalized after review by the Coordinator of NGLRP, Khajura.
- The vegetable standard operating procedures were prepared and discussed with CEAPRED and NARC's Horticulture Research Division. A pre-validation meeting was held on 29 March 2018 at the Horticulture Research Division attended by government and private sector representatives (SQCC, DoA Vegetable Development Division, DoA Soil Management Directorate, NARC DAE, NARC Policy and Planning Division and NARC Soil Science Division, SEAN and CEAPRED).

These will be finalized after one round of individual consultations with SQCC; NARC and DoA entities and a validation meeting will be held. Standard operating procedures for rice and maize will be finalized in the second half of project Year 2.

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

Highlights:

- Partner seed companies engaged in multiplying maize parental lines sourced from NMRP.

Technical progress

Maize parental lines increase: During the reporting period the seed company partners were involved in multiplying the seeds of hybrid maize parental lines. This is the first time in Nepal where hybrid products have been handed over to private companies for seed multiplication. The GATE and USC companies increased the parental lines of Rampur Hybrid 4 and 10 respectively. This will help them to produce the seeds of the maize hybrids and strengthen their research and development capacity.

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

Highlights:

- The project worked with private-sector ICT partners to scale up ISFM and the 4Rs through innovative SMS, IVR, and smartphone platforms.
- The project collaborated with the government to endorse the project-developed best management practices for ISFM and 4Rs for wheat, maize and rice.
- An agricultural extension program is being finalized on the best management practices of rice, wheat, and maize to scale up through development partners, private companies and the government.
- The project conducted trainings on ISFM and the 4Rs for 1,193 individuals.

Technical progress

Digital technologies: During this period, the project partnered with three private ICT companies to integrate the outputs from the project’s field research on ISFM and the 4Rs (i.e. best management practices) into innovative phone-based digital extension platforms.

- **Viamo:** The project worked with Viamo Ltd (formerly VotoMobile) i) to translate the agronomic recommendations from its field research into a series of SMS and IVR-based agricultural extension messages on maize fertilizer timing, and ii) to set up an ICT-based market information program for value chain actors.
- **PEAT:** The project is working with PEAT Ltd., to adapt the Plantix plant doctor smartphone app to Nepal’s agroecological zones, calendar and language. The app allows users to submit photos of infected plants and receive pest, disease, or nutrient deficiency diagnosis and recommendation. The calibration and the development of the crop calendar should be finalized ready for rollout in May 2018. (Figure 4.7).
- **Spero:** The project collaborated with Spero Analytics Ltd to field test their low-cost soil moisture sensors for informing irrigation scheduling by installing them across the Feed the Future Zone of Influence (Figure 4.8). The end product will support irrigation scheduling and other agro-environmental decisions.

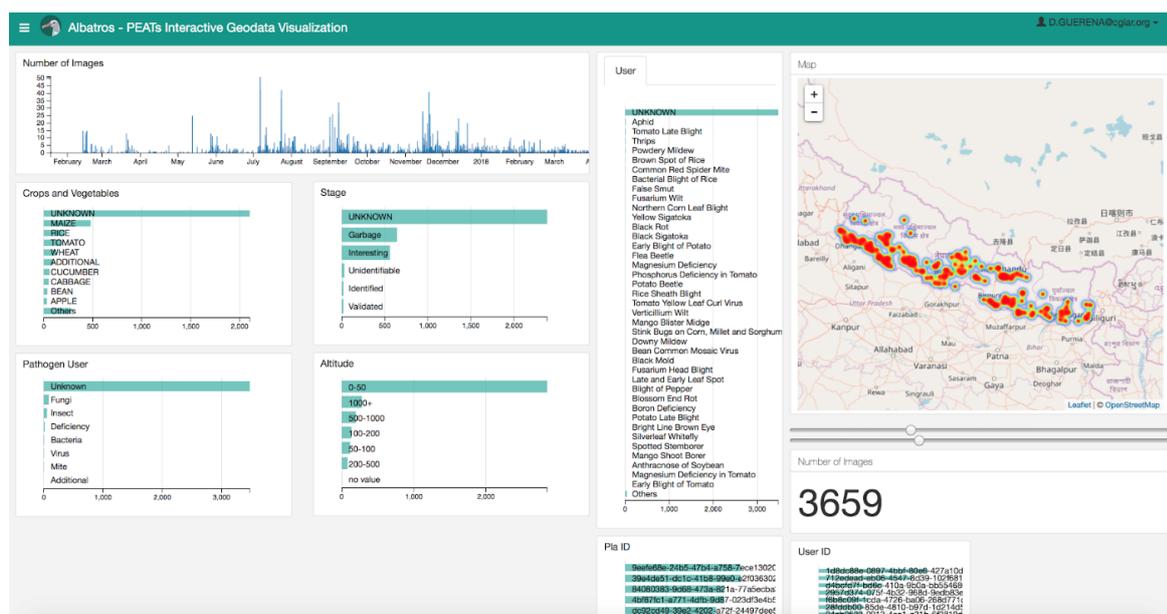


Figure 4.7 Plantix image and diagnostics dashboard for Nepal, showing seasonal and geographic distribution of crop health data across Nepal

All three partners companies won prizes for their work in in the reporting period. The project collaborated with Viamo on a competitive application to the Inspire Challenge Program of the Big Data platform within the Consultative Group on International Agricultural Research (CGIAR). The successful application was awarded US\$100,000 in co-financing to enable Viamo to collaborate with the project to develop an ICT-based market engagement program. PEAT and Spero were winners of the USAID Data Driven Farming prize in 2017 for digital-based innovations in agriculture.



Figure 4.8: Real-time data dashboard from a Spero Analytics soil moisture sensor

Innovative agricultural extension materials: The project developed innovative agricultural extension materials and programs to disseminate the best management practices for maize (see Figure 4.9), wheat and rice. The project finalized pictorial guides on best agronomic practices for maize and rice. It is also producing games and other instructional aids. These materials will be adapted to the needs of the private sector (NEFEA) and development partners (the KISAN-2 project). As a part of this process the project collaborated with NARC and MoALMC officials towards their endorsement of the best management practices. Once officially endorsed, the practices will be scaled up through the ICT and traditional extension channels, which are being developed by the project.

The project conducted trainings on ISFM and the 4Rs for 165 farmers and other stakeholders with 109 men and 56 women trained on best management practices. These trainings involved discussions on farmers' preferred ways of growing crops and responses to new techniques.



Figure 4.9: The traditional extension approach: The project-produced best management practices brochure on maize cropping (left) and farmers practicing fertilizer application techniques at an ISFM training event. (Credit: R. Gupta)

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

Under sub-intermediate result 2.2.2, the project reports on the following indicator, with most related activities in Year 2 planned for the second half of the year:

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

Highlights

- Supported seven seed companies to prepare their business plans.
- Facilitated links between seed partners and financial institutions.

Technical progress

Business plans: The project facilitated seven seed company partners to prepare five-year business plans. This included carrying out strengths, weaknesses, opportunities, threats (SWOT) and competition analyses, market segment assessments, product portfolio positioning, and by developing marketing, production and financial plans. The Unique Seed Company, Gate Nepal, Panchashakti Biu Company and Lumbini Seed Company have so far developed their five-year business plans and started preparing their operational plans, while the other three companies are still collecting data. The preparation of these plans gave the companies the opportunity to reflect on the health of their businesses and identify improvement measures.

Links to finance: The project organized 10 meetings individually with seven commercial banks (Nepal Bangladesh Bank, Everest Bank, Nepal SBI Bank, Laxmi Bank, Muktinath Bank, Global IME Bank and Century Bank) to highlight opportunities for seed value chain financing and modalities for piloting a low interest rate scheme (5% subsidy) for seed growers and companies. The project also organized field trips for four commercial banks (Laxmi, Bangladesh, Global IME and SBI) and two insurance companies (United and Everest) that increased their understanding of seed growers and seed companies' financial needs. The financial institutions also examined the companies' assets, interacted with their contract growers, discussed the modality for agriculture insurance for the seed sector, and learnt about the ongoing activities of the companies. This has led to six seed company partners starting discussions with banks to access low interest rate loans. Two have already submitted their business plans and other documents for accessing bank loans for the main rice production season of 2018.

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

Highlights

- The project is supporting NEFEA to develop a business plan for selling and producing briquetted urea and polymer-coated urea in Nepal.

Technical progress

Last season's research demonstrated the potential of briquetted urea and polymer-coated urea and now NEFEA is very interested in commercializing these two fertilizer products in Nepal. However, as this would represent a new financial risk for NEFEA members the project's business development specialists are working with NEFEA to develop a cost-benefit analysis and a business assessment on the two new products.

4.3 IR 2.4. Economic growth policy and performance improved

The project is working to improve Nepal’s economic growth policy and performance by increasing the supply of and the demand for quality seeds and fertilizers and by improving private sector service delivery.

Sub-IR 2.4.1: Increased access to markets

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

Highlights:

- Mapped crop production and market segments.
- The production of a digitally enabled seed information system began.
- Preparations made to study the impact of seed subsidies on farming practices.
- The project supported PMAMP’s Rice Sector Working Group.
- The project and the National Grain Legume Research Programme organized a national workshop on lentils in February 2018 to identify challenges and opportunities of the lentil value chain
- The project supported its partner seed companies to produce and sell seeds of the project’s target crops including the sale of 29 MT of lentils and 227 MT of four open pollination and one hybrid maize variety, and the production and stocking of 1,647 MT of rice.

Technical progress

Mapping crop production and market segments:

The project started the identification of agroecological data-based seed production and market domains in the Tarai and Midhills to delineate market segments and assist companies with product positioning. The approach uses climatic, soil and terrain information to delineate suitable agroecological domains using GIS extrapolation and multivariate geographic clustering.

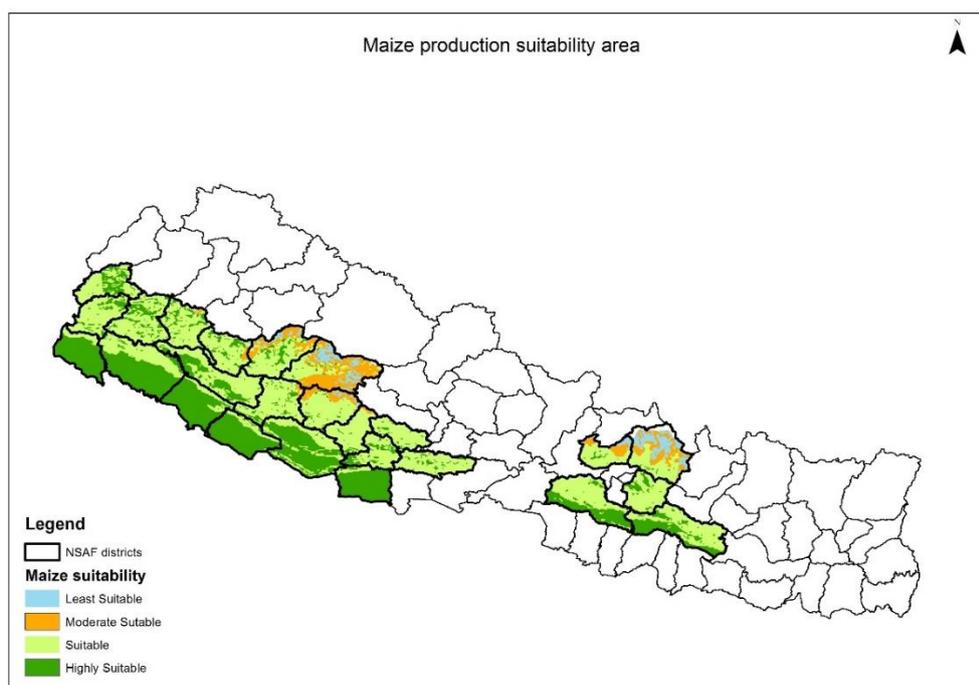


Figure 4.10: Maize production suitability area using climatic, soil and terrain analysis

The project first identified suitable maize production zones and seasons based on growing degree days, length of growing period and other agro-climatic information. It also delineated potential maize seed market segments based on suitability for production, road density, population, farm size and other indicators (Figure 4.10). The project will next validate the findings and develop maps with location specific information to assist seed companies to select suitable maize varieties and target markets.

Digitally enabled seed information system: The project initiated the production of a digitally enabled National Seed Information System, which will be an interactive and dynamic national database on different categories of seeds based on time and original source. International consultants conducted a preliminary needs assessment for the proposed system in consultation with SQCC and seed value chain actors. In addition, the project discussed the possibility of developing an app to track seed and varieties sold from seed companies and agrovets to farmers with the Microsoft Innovation Center. This QR code-based app will help farmers trace the source of seed and their agronomic performance via their smartphones.

Seed subsidy study: The government provides subsidies to farmers to buy seeds of cereals and other crops. The project in consultation with SQCC, DoA's Crop Development Directorate and SEAN developed a plan to study the impact of seed subsidies on farmers' adoption of improved varieties and related yields and incomes. The methodology is being discussed and farmers who obtained subsidized seed in the 2012–2016 period) are being identified as the basis of the study's sample households. The households that received subsidized seed will be compared with those who did not to assess the impact of seed subsidies. The study is designed to inform the government's seed subsidy policies and programs.

PMAMP Rice Sector Working Group: The project is collaborating with PMAMP to strengthen the program's Rice Sector Working Group. The project supported the organization of a forum on 14 December 2017 for rice sector stakeholders to review rice cropping knowledge and practices and identify research and development priorities. The 52 participants from the national rice research program, regional agriculture stations, seed companies, PMAMP, millers, farmers, CIMMYT, the International Rice Research Institute, SQCC, and the Crop Development Directorate recommended the promotion of the following rice varieties for particular geographical niches:

- Drought prone areas in the main season – Sukhadhan 1-6 and Hardinath 3
- Submergence areas – Swarna Sub-1, Sambha Mansuli sub-1 and Ciherang sub-1
- Drought and submergence tolerance – Bahugunidhan-1 and 2 Ciherang sub-1
- Fine and aromatic rice varieties: Lalka Basmati and Sugandhitdhan-1

The working group also came up with scaling strategies for the validated knowledge and developed an action plan to bridge knowledge gaps in the rice sub-sector.

National lentil workshop: The project in collaboration with the National Grain Legume Research Programme (NGLRP) organized a national workshop on lentil productivity and profitability from 20-21 February 2018 in Nepalgunj (see Photo 4.12). The workshop was the first of its kind involving all value chain actors and major lentils stakeholders. The participants reviewed crop genetics, seed production and crop husbandry technologies. They discussed market forces and how to unlock the export potential and profitability of lentils. The forum enabled farmers, millers, exporters, customs officers, researchers and seed companies to share experiences, lessons and challenges and develop a road map. The workshop also formed a working group to follow up on workshop decisions. The proceedings are being prepared to communicate the recommendations.



Photo 4.12: Participants of the national lentil workshop in discussion and field visits to NGLRP and NSAF's seed multiplication fields in Khajura, Banke (Credit: Darbin Joshi)

Seed sold in reporting period: During the reporting period the project's seed company partners sold the following quantities of seed:

- Lentils – 29 MT of lentils with the major varieties being Khajura 1, Khajura 2, Sindur, Maheshwor Bharati, ILL 7723, Simal, Sikhhar, Sindur, Black Masuro and Khajura 3.
- Maize — The seven seed company partners produced and stocked 304 MT seed of four open pollinated maize varieties and one hybrid. Rampur composite made up 50% (152 MT) of stocked seed followed by Arun 2 (30.5%, 93.5 MT), Manakamana 3 (16%, 48.7 MT), Deuti (2.5%, 7.46 MT), and Khumal Hybrid 2 (0.9%, 2.7 MT). About 75% (227 MT) of the stocked seed was sold during the reporting period to agrovets (60%), cooperatives (20%) and development projects (20%).
- Rice – Five partner seed companies produced and stocked 1,647 MT of improved seed of 13 rice varieties of which 8 were released within the last 10 years including Sawa Mansuli Sub-I, Sukkha 3, 5 & 6, Ciherang Sub-I, Hardinath-3, Ramdhan and Swarna Sub-I.

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

Highlight:

- A willingness to pay study on chemical fertilizers is underway in eight districts.

Technical progress

Chemical fertilizer study: There is a large unfulfilled demand for chemical fertilizers for Nepal's farmers. Fertilizer that is sold at a subsidized price is procured and distributed by the government through farmer cooperatives. A nationally representative study is being carried out on farmers' willingness to pay for chemical fertilizers (focusing on urea and diammonium phosphate [DAP]). It is

being carried out in four randomly selected hill and four Tarai districts. The study was designed in consultation with MoALMC and NEFEA officials to improve Nepal’s fertilizer policies. It aims to economically characterize and quantify the latent demand for chemical fertilizers. It is likely to justify private sector entry into importing and distributing chemical fertilizers and provide evidence to revisit the national fertilizer subsidy and distribution policy. It should also provide useful information on fertilizer use and sources (formal and informal) including the quantity and types of fertilizer that are brought in informally from India.

Fertilizer information system: Project staff held initial scoping meetings with the Microsoft Innovation Center and QED on the development of a fertilizer information system for Nepal. See Figure 4.11 for such a system that QED has already worked on.

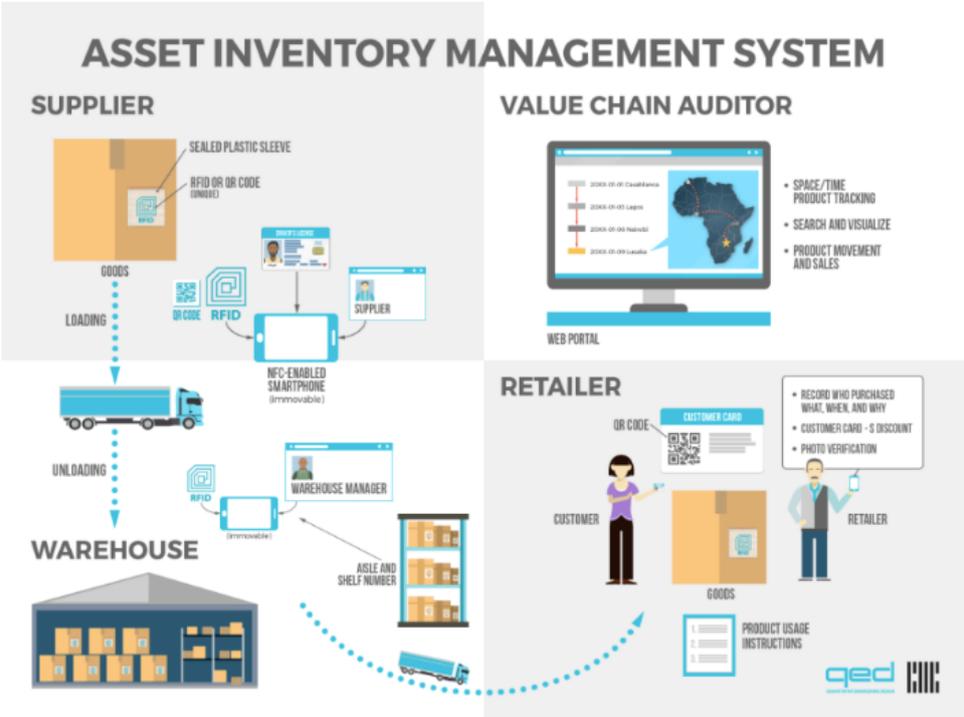


Figure 4.11: Diagram of a fertilizer information system previously developed by QED for several African governments

Sub-IR 2.4.2: Private sector service delivery improved

Under sub-intermediate result 2.4.2, the project reports on the following indicator, with most related activities in Year 2 planned for the second half of the year:

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

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

Highlights:

- Technical support on maize hybrid seed development provided to the Seed Entrepreneurs’ Association of Nepal (SEAN).
- SEAN become a member of the technical working committee to develop hybrid seed production and licensing guidelines under the PPP arrangement of NARC, SQCC and NSAF.

Technical progress

Support for SEAN: Improving the capacity of SEAN is a must to enable it to influence the seed policy environment and practices. In January 2018 the project held discussions with executive members to identify joint activities for 2017/18 and plans a partnership agreement, which should be signed soon. SEAN is also a member of the SQCC's public-private partnership committee and the project supports the association on seed-related technical matters and on its communication materials including its Seed Bulletins. NSAF also supported SEAN's annual general meeting that was held in Biratnagar on 10th March 2018.

Outcome 2.4.2.2: Local government service delivery improved

Highlights:

- Engagement with local governments discussed with project Technical Committee members.

Technical progress

A 28 February 2018 meeting of the project's Technical Committee recommended that the project identify ways of engaging with the newly elected local governments. The project is subsequently striving to engage with local governments during its training, visits and field day events.

As per the recommendations of the joint Steering Committee, the project is planning to collaborate with USAID's KISAN II, SABAL and PAHAL projects to develop a joint framework for engaging with local governments.

5 CROSS CUTTING ACTIVITIES

A number of important activities cut across both the project's seed and fertilizer components. These include monitoring, evaluation and learning; communication and outreach, gender equity and social inclusion and project management.

5.1 Monitoring, Evaluation and Learning

The project's revised M&E plan (September 2017) has 16 performance indicators. To comply with the latest Global Food Security Strategy (GFSS) guidelines, the project added the following four new performance indicators starting from this reporting period:

- GFSS-12: Yield of targeted agricultural commodities within target area (MT/ha).
- GNDR-2: Percentage of female participants in USG-assisted programs designed to increase access to productive economic resources.
- STIR-10: Number of innovations supported through USG assistance.
- STIR-11: Number of innovations supported through USG assistance with demonstrated uptake by the public and/or private sectors.

This means that the project now has 20 performance indicators of which 7 are to be reported on semi-annually and 13 annually. The final Feed the Future Monitoring System (FTFMS) for the project indicators covered during this reporting period and the list of indicators are provided in Annexes 4 and 5.

The project's main M&E activities in the first half of the second year of the project were as follows:

- Presentation of the preliminary findings of the project baseline survey to the Agriculture M&E Group meeting on 5 December 2017.
- Project M&E staff participated in the 30 January 2018 Agriculture M&E Group meeting.
- Project M&E staff participated in a knowledge management and learning training (21–22 February 2018) and a learning summit (5–6 March 2018) organized by USAID's Monitoring, Evaluation and Learning Project. These events helped the project's M&E team better understand USAID's knowledge management framework for generating, capturing, applying and sharing knowledge that results from project interventions. The knowledge gained from these workshops was shared with other project technical staff who are involved in planning and reporting on project activities.
- A data quality assessment (DQA) field verification and findings sharing and debriefing meeting was held on 18 January 2018 with USAID's M&E team. The assessment focused on two performance indicators (EG 3.2-4 organizations supported and EG 11-6 Number of people using climate information). The project has adopted the measures recommended by USAID's DQA report by standardizing seed data collection, the verification (beyond email records) and documentation process, and by updating the performance indicator reference sheet (PIRS) to reflect specific data sources, assumptions and calculations used to calculate indicator values.
- A project team participated in the SEED partners meeting on 23 February 2018 where the USAID SEED team presented the findings from its portfolio review of USAID supported agriculture projects in Nepal. The team learned from other projects' experiences.
- An assessment of the project's M&E processes and capacity was conducted by USAID's Monitoring, Evaluation and Learning Project on 21 December 2017. The assessment used the Monitoring, Evaluation and Learning Wheel tool and recommended that the project i) prepare an M&E and learning plan and a data collection and management plan with sub-awardees, ii) conduct data quality assessments at sub-awardee level, iii) limit the annual project report to a maximum of 45 pages

(excluding annexes), and iv) encourage project M&E and non-M&E staff who are involved in data collection and reporting to attend knowledge management trainings.

In addition, M&E staff:

- shared USAID’s data quality assessment recommendations and the findings of the Monitoring, Evaluation and Learning Project’s capacity assessment with project staff;
- carried out regular technical backstopping of the project field team on M&E indicator changes and related reporting requirements;
- oriented seed company and project personnel on the updated tools to collect data on seed sales, technologies and best management practice use and adoption; and
- carried out the regular monitoring of seed production and varietal demos, fertilizer trials and demos and farmers field trials.

5.2 Communicating for Impact

The following activities were carried out by the project to communicate for impact.

- Supplementary materials such as handouts, pictorial posters and brochures were developed on best management practices for maize and wheat.
- The project’s new agricultural extension materials on ISFM and best management practices were tested with 22 women training participants in November 2017. This provided important feedback that was used for improving the materials.
- Workshops were held with farmers on 31 January 2018 and agro dealers on 15 March 2018 to determine the depth of content needed in trainings and how best to formulate the structure and content of a training of trainers module on training farmers (see Photo 5.1). The workshop focused on creating an actionable and pedagogical framework to communicate useful information to farmers. The module is segmented as per the cropping cycle (e.g. land preparation, seed and fertilizer selection, planting, top dressing, post-harvest), to be imparted throughout the seasons.



Photo 5.1: Developing the content of the training of trainers module at the January and March 2018 workshops (Credit: Bandana Pradhan)

- Infographics were produced to summarize the project’s ICT strategy (2017) (Figure 5.1). The strategy highlights the project-supported crop advisory platform (Plantix), interactive voice responsive market facilitation system (Viamo) and the Seed and Fertilizer Information System to communicate site-specific personalized recommendations and messages to farmers and agricultural networks.

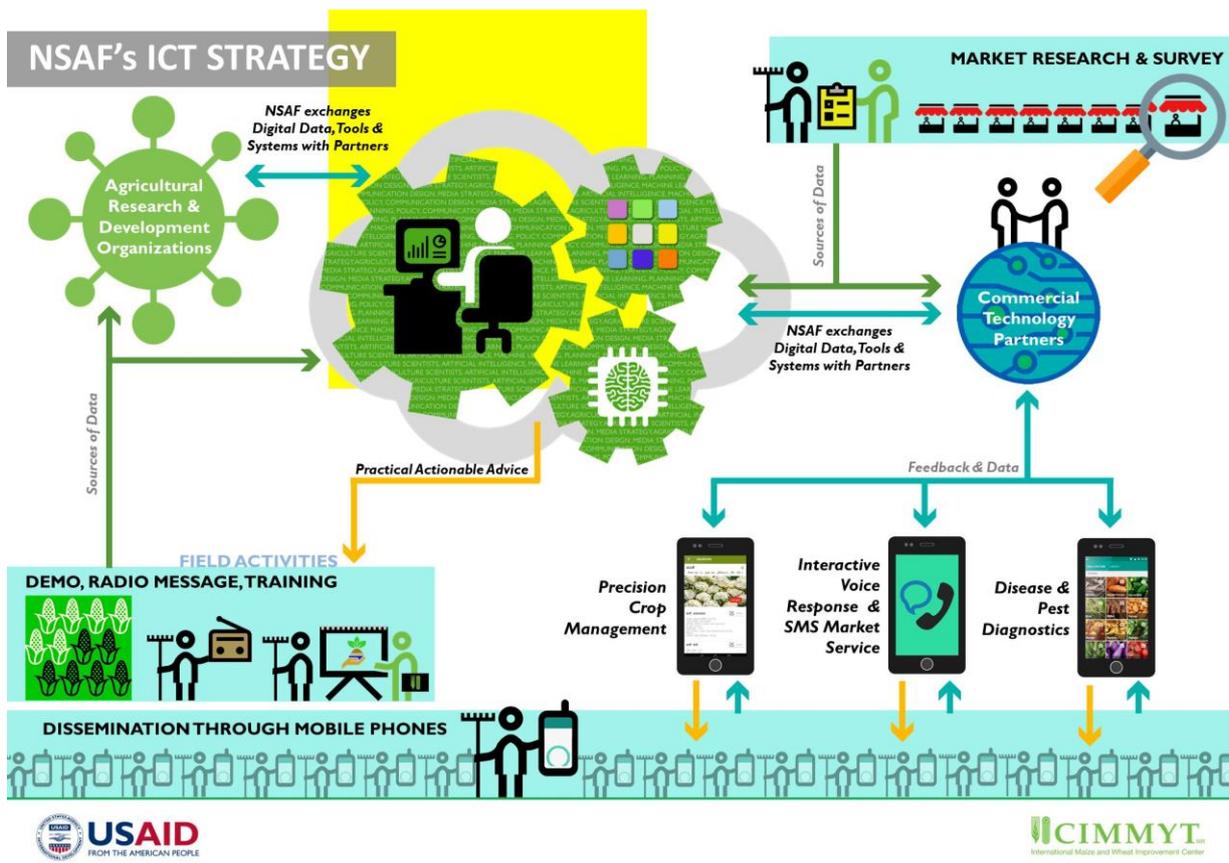


Figure 5.1: An infographic of the NSAF project's ICT strategy for communicating recommendations and messages to farmers and agricultural networks

- A logo was produced to establish NEFEA's brand identity in the fertilizer value chain market, nationally and internationally. The logo will also be used to assure the credibility of business products and services (i.e. fertilizer distribution). Logo user guidelines were produced to guide its proper use.
- Program specific communication materials were designed and disseminated to stakeholders at national level workshops, trainings and events including program brochures, fact sheets, banners, regional media coverage in local newspapers, press releases and articles on web portals (see example at Photo 5.2).



The brochure is titled "National Workshop and Expert Elicitation on Lentil Productivity and Profitability in Nepal" and is dated "20-21 Feb, 2018 | Nepalgunj". It features the logos of USAID and CIMMYT. The content includes:

- Background:** A text block explaining the workshop's purpose, mentioning the need to address yield gaps and improve profitability for lentil producers in Nepal.
- Objectives:** A list of goals such as "Review existing technologies in lentil production and identify gaps", "Identify and disseminate best practices", and "Develop a strategy to improve lentil productivity and profitability in Nepal".

 The brochure also includes a photograph of a green lentil field.

Photo 5.2: Seed system stakeholders observing a lentil trial plot (left) and a lentil productivity guide produced by the project (right). The observation took place at, and the guide was produced for, the National Level Lentil Workshop at RARS, Khajura, Banke.

5.3 Gender Equity and Social Inclusion

The project is working to ensure that women; disadvantaged castes, ethnic and religious minorities access and use the improved seed and integrated soil fertility management technologies it is promoting. To measure how far the project's technologies and capacity building activities reach women and disadvantaged groups, the results of each relevant indicators are disaggregated by gender and ethnic and caste groups and tracked accordingly.

This reporting period saw the following participation by targeted groups in short training programs:

- 68% (30 volunteers) of the 44 community volunteers engaged by the project were women
- 49% (691 persons) of all people trained were women
- 48% (681 persons) of all people trained were Janajatis (ethnic groups)
- 23.8% (338 persons) of all people trained were youth (16-29 years of age)
- 5.2% (74 persons) of all people trained were Dalits.

5.4 Project Management

The project takes a science-driven, holistic, integrated approach to the development of smallholder agriculture in its target areas. To enable this approach, the project works in close partnership with the government, the private sector and the development sector (other USAID projects) to take project-promoted technologies to scale.

Collaboration with the Government

NARC – The project's research for development activities are being implemented in collaboration with NARC's maize, rice, and horticulture commodity programs and its Soil Science Division. NARC is testing market-ready maize products and researching pipeline varieties of rice, lentils and tomatoes for release and commercialization. The project has helped build the capacity of scientists from NARC's Soil Science Division on soil spectrometry and is processing the purchase of soil spectrometry equipment. NARC scientists were engaged in various forums such as the seed sector's public-private partnership committee, in validating project trial results, and in the project's technical and steering committees.

MoALMC – In November 2017, the project signed a collaborative agreement with the Ministry of Agricultural, Land Management and Cooperatives to implement activities with SQCC, the Crop Development Directorate, the Soil Management Directorate and other government institutions. This agreement is facilitating the integration of project activities within MoALMC and should facilitate the more rapid deployment of technologies. The several follow up meetings have been held on planning the public-private partnership approach, Nepal's fertilizer manufacturing policy, the willingness-to-pay studies, the endorsement and validation of project technologies and the development of the Seed Sector Information System.

The project's Technical Committee was established under the collaborative agreement and first met on 28 February 2018 chaired by the Director General of DoA to introduce the project to committee members. The committee praised the project's efforts and recommended the validation of project-promoted technologies.

Joint Steering Committee – The Joint National Steering Committee (JNSC) for USAID’s four agriculture-related projects in Nepal (NSAF, KISAN 2, PAHAL, and SABAL) was held on 5 March 2018 chaired by MoALMC secretary Dr. Suroj Pokhrel and attended by 36 members and stakeholder representatives. The participants were from MoALMC, the Ministry of Finance (MoF), the National Planning Commission, NARC, DoA, the Department of Livestock Services, the Department of Food Technology and Quality Control, SQCC, the National Farmers' Commission, USAID and the projects. The committee recommended that the four projects prepare a joint framework to align with all tiers of the government and to periodically submit progress reports to MoALMC and MoF as per their collaborative agreements.

Participation in Mega Maize Programme Meeting – The project participated in the Mega Maize planning meeting organized by DoA’s Crop Development Directorate on 11–12 March 2018 in Nawalparasi. The discussions focused on developing a mechanism to deliver new maize varieties to farmers and harmonizing seed subsidies so as not to distort private sector markets. The major recommendation was to link the government’s seed subsidy program to new maize varieties to accelerate the dissemination of new varieties without distorting market chains.

Private sector, cooperative and NGO partnerships – The project works closely with the private sector. Sub-grant agreements have been entered into with seven seed companies based on their strategic business needs. The project’s fertilizer component is conducting domain-specific fertilizer trials in partnership with more than 50 agricultural cooperatives. In addition, it is developing and strengthening the Nepal Fertilizer Entrepreneurs Association (NEFEA) and partnering with ICT firms to develop and introduce digital innovations for agricultural development (see more on this in Chapter 2 above). The project also partners with CEAPRED for research and development on vegetables seeds and the International Fertilizer Development Center for the fertilizer component.

Teamwork – The project recently adopted the web-based project management application ‘Teamwork’ to place the project team’s tasks in one place for the more efficient and effective delivery of its activities.

Coordination with Other USAID Projects

HTMA and STRASA: A 17 October 2017 coordination meeting between the USAID supported Heat Stress Tolerant Maize (HTMA) project, the Stress-Tolerant Rice for Africa and South Asia (STRASA) project and the project (NSAF) was held at the CIMMYT office in Kathmandu to build synergies and collaboration for maize and rice sub-sector development in Nepal. It was agreed to give the NSAF project access to high yielding climate resilient maize varieties developed by HTMA and rice varieties developed by STRASA and to develop a right scaling pathway.

SEED field visit: The project organized a field visit to Banke, Bardiya and Kailali on 7–9 March 2018 for a USAID team led by the Director of USAID’s Social Environmental and Economic Development (SEED) office. The team visited the project’s cauliflower and wheat trials with two cooperatives that are developing domain-specific nutrient management recommendations and economic optimization from variable rates of nutrient addition. The team also visited Panchashakti Seed Company, Unique Seed Company and GATE Nepal Seed Company to see location-specific best performing varieties of lentils, the parental line maintenance of locally released hybrid maize varieties and the testing of hybrid maize products. The team also observed market-ready hybrid maize trials and the breeder seed production of recently released lentil varieties at Khajura Regional Agricultural Research Station, Banke.

The USAID SEED team provided valuable guidance to the project on better integrating the activities of the project’s seed and fertilizer component, popularizing the use of digital tools and scaling out results to farmers fields. The project has included these recommendations in its plans for subsequent periods.



Photo 5.3: The USAID SEED team visiting project maize hybrid and lentil variety trials, March 2018 (Credit: Darbin Joshi)

Joint USAID projects field visit: USAID’s SEED office facilitated field visits by its project partners in Nepal each other’s sites for cross-learning and to encourage collaboration. The NSAF project identified collaboration mechanisms with the KISAN 2, PAHAL and SABAL projects. Several meetings were held with KISAN 2 to identify common intervention areas in the input and output markets of the project’s target crops, especially maize and rice. The project subsequently agreed to:

- collaborate with KISAN 2 on strengthening the supply of quality Hardinath 3 and Ciherang Sub I rice seeds in the next rice planting season;
- provide KISAN staff with its training materials on ISFM and to conduct a training of trainers on IFSM for KISAN staff; and
- support research on the use of polymer-coated urea in KISAN 2 farmers’ rice fields to further validate its potential to increase yields.



Photo 5.4: USAID’s SEED office and project implementing partners visiting NSAF field activities at Khajura, Banke (Credit: Darbin Joshi)

Sub-grants

During this reporting period the project entered into sub-agreements with government and non-government organizations, seven private seed companies, the International Fertilizer Development Center and two international ICT companies (QED and Viamo):

- **NARC:** As the lead research center for agricultural development in Nepal, NARC is responsible for the project's germplasm sourcing, seed supplies and trial monitoring components. NARC also conducts multi-locational trials, farmer field trials and on-farm demonstrations of new technologies. Under this sub-agreement, in 2017/18, NARC is supporting two scientists to complete soil science PhDs (focusing on integrated soil fertility management) and one scientist to complete an MSc degree on seed technology focusing on hybrid seed production.
- **CEAPRED:** With its expertise in developing the vegetable crop and seed value chain in Nepal, the project has tasked CEAPRED to source improved, pre-commercial and released hybrid and open pollinated varieties of tomatoes, onions and cauliflowers; conduct on-farm demonstrations, produce improved seeds through farmer groups and provide agro advisory services for farmers on improved vegetable production.
- **Seed companies:** The project entered into agreements with seven Nepalese seed companies to conduct varietal and seed production demonstrations, seed production, maize trials and parent line multiplication and to conduct farmer training and field days and promotional campaigns. These companies are tasked to participate in market development activities and prepare business plans to improve their businesses. The seven companies are:
 - Global Agri-Tech Nepal (GATE) Pvt. Ltd.
 - Gorkha Seed & Agro Traders Pvt. Ltd.
 - Hariyali Samudayik Biu (Hariyali Community Seed) Company Pvt. Ltd.
 - Lumbini Seed Company Pvt. Ltd.
 - Panchashakti Biu Company Pvt. Ltd.
 - SEAN Seed Service Center Ltd.
 - Unique Seed Company Pvt. Ltd.

QED: A sub-grant application for QED was approved by USAID in July 2017 to work with the project to create integrated digital data collection systems for the project and its partners (NARC and DoA). The aim is more efficient programming and to update the capacity of NARC scientists to collect data to improve the quality and quantity of their work.

Status of Finances

During the reporting period, the project spent USD 1,024,906. Since inception the project has spent USD 3,430,294 (47.4%) of the total obligation of USD 7,230,874. A balance of USD 3,800,580 remains to cover expenditure up to February 2019.

6 MANAGEMENT CHALLENGES AND RESPONSES

6.1 Anticipated Challenges, Risks and Mitigation Measures

The main management challenges faced by the project during this reporting period and the mitigating measures employed are detailed in Table 6.1. Table 6.2 summarizes the external risks to the project and the mitigation measures put in place.

Table 6.1: NSAF project management challenges and responses, October 2017–March 2018

Challenges	Impact on the project	Mitigation measures
Farmers' lack information on new varieties of crops and integrated soil management practices	Incremental sales, gross margins and yields do not reach targets and result in low seed replacement rates.	<ul style="list-style-type: none"> • Hold large-scale demonstrations • Develop ICT approaches for scaling up ISFM information • Organize farmer field days • Share information on varieties via farmer-friendly media like FM radio • Improve seed distribution channels (agrovets, cooperatives, seed companies).
Insufficient skills and awareness among seed company staff and sub-grantees on hybrid seed management	The project's hybrid seed deployment and scaling strategies will be difficult to achieve without a strong private sector.	<ul style="list-style-type: none"> • Deploy project breeders to proactively pursue hybrid varietal testing, parental line seed production, hybrid seed production and training on good seed business management practices • Provide hands-on training to project partners on field related technical issues
Subsidized seeds and fertilizers	The subsidies distort markets and disincentivize the private sector to scale up their businesses.	<ul style="list-style-type: none"> • Lobby DoA and MoALMC to reconsider subsidy decisions on old seed varieties • Pilot innovative ideas such as vouchers for seed and fertilizer distribution
The frequent transfer of government staff	It can take a long time to make progress on planned activities if decision makers and focal people change.	<ul style="list-style-type: none"> • Develop good working relations with multiple specialists and officers within departments, organize follow-up visits and send reminders.
Falling demand for lentil seeds	Low varietal adoption rates and the low interest of farmers to use improved management practices make it difficult for the project to meet its targets for the number of hectares under improved lentil varieties.	<ul style="list-style-type: none"> • Evaluate and popularize new lentil varieties that are resilient to biotic and abiotic stresses. • Ensure linkages between lentil processors and importers. • Release and commercialize varieties that are favored by the private sector. • Large scale dissemination and awareness creation on lentil management practices to farmers.

Table 6.2: Risks facing the NSAF project and planned mitigation measures

Anticipated challenges	Potential implementation impacts	Mitigation measures
Earthquakes, floods and other natural disasters	<ul style="list-style-type: none"> Disrupt crop cycles and services in rural areas Hinders access to project sites Delays training schedules and project activities Staff endangerment. 	<ul style="list-style-type: none"> The project's emergency preparedness plan was updated and a security focal person identified Food, tents, lanterns and other supplies are stockpiled in the office for staff Staff lists and a WhatsApp group have been created.
Weather-related challenges such as delayed or reduced monsoons	<ul style="list-style-type: none"> Disrupt crop cycles and the ability to plant Delay training schedules Reduce household gross margins. 	<ul style="list-style-type: none"> Focus on promoting ISFM principles to build resilience into systems Evaluate drought stress tolerant varieties for project target crops and promote early maturing varieties in moisture stress-prone areas Promote multi-year, multi-site programs to diffuse the risks from one bad season.
Change in the structure of the Ministry of Agriculture	<ul style="list-style-type: none"> The changeover to a federal system of governance is leading to changes in the structure of the ministry and its entities at all levels. These changes have yet to be finalized and are affecting the project's work with nodal agencies, endorsements from government agencies and the functioning and composition of the project's Technical Committee. 	<ul style="list-style-type: none"> Maintain regular collaboration with MoALMC Develop a framework to engage with the different tiers of government. Engage with the newly elected local and provincial governments on project updates and planning.

6.2 Security

The project team works under the overall corporate governance of CIMMYT and security issues are taken very seriously. In consultation with CIMMYT's Mexico-based Risk Management Unit, the CIMMYT Country Representative is responsible for all security issues with authority delegated to the Finance and Administration Manager in the Nepal office as the security focal person. The manager reviews and monitors security issues in country and in the project's regions in collaboration with the CIMMYT regional and hub offices and national, regional and local institutions. CIMMYT identity cards were issued to all staff to solicit assistance in case of emergencies. Security-related communications are made to all staff as per need. USAID, through the Agreement Officer Representative (AOR), shares relevant security guidelines with CIMMYT.

6.3 Environmental Compliance

Project 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.

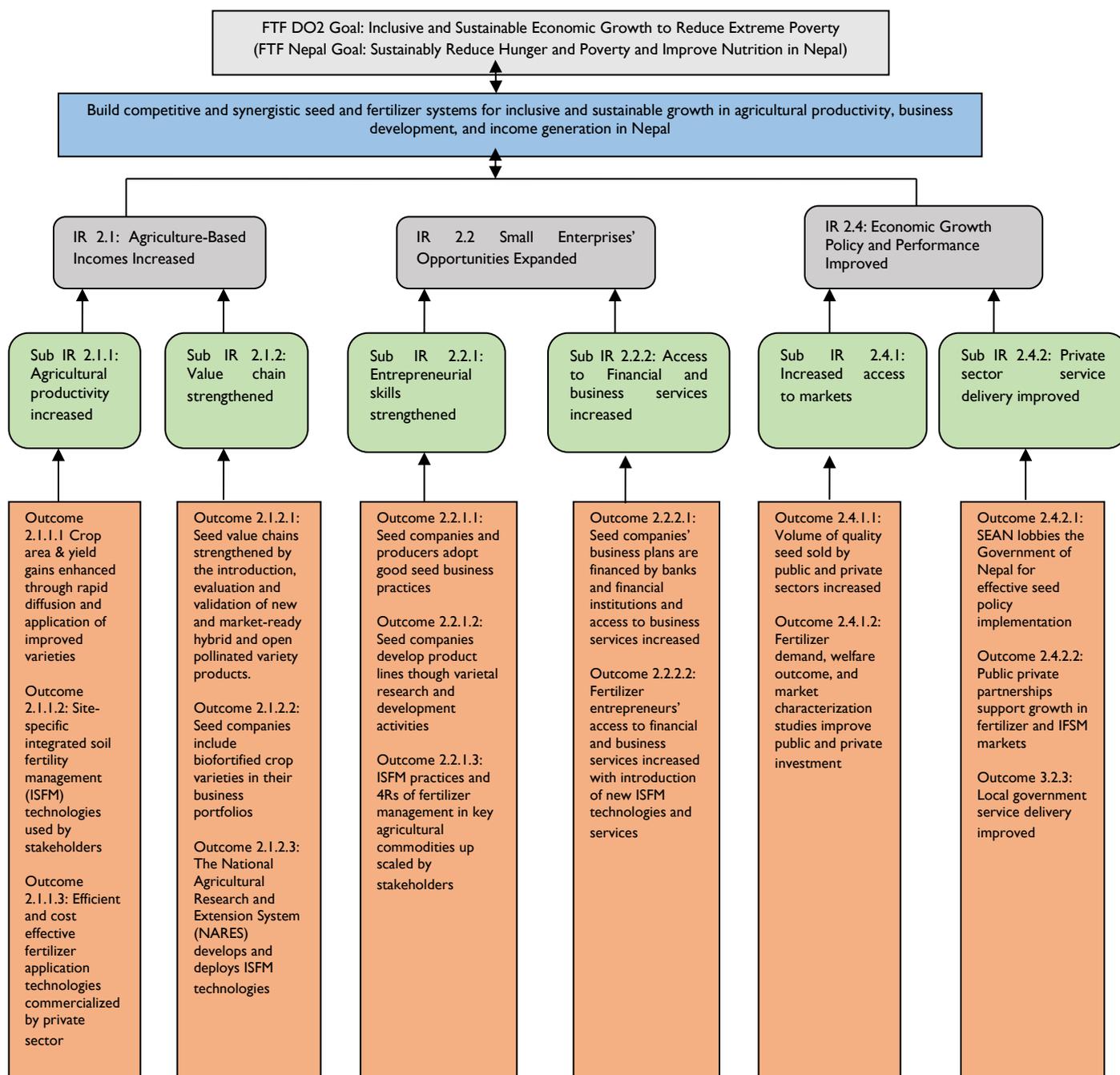
7 PLANS FOR THE SECOND PART OF 2017/18

The project will continue to follow its roadmap for planning and implementation in the second half of project year 2. The project will articulate its strategies on digital agriculture, develop markets for ISFM technologies, support seed companies to develop their business plans, evaluate the performances of the maize hybrids, develop roadmaps for their release and commercialization and develop partnerships with other related USAID projects.

The following are highlights of the project's updated plan:

- Research with NARC and seed companies on promoting new varieties of rice.
- Analyze field data to identify well adapted crop varieties (like hybrid maize and lentil) and crop management practices.
- Work with NARC, the International Center for Agricultural Research in the Dry Areas (ICARDA) and seed companies on promoting new lentil products.
- Commercialize ISFM technologies with the Nepal Fertilizer Entrepreneurs Association.
- Promote ISFM training packages among USAID projects and the private sector.
- Identify critical factors for successfully upgrading project crop value chains.
- The endorsement of project technologies by MoALMC and NARC.
- Strengthen public-private partnership arrangements for hybrid seed production and fast track varietal release and registration.
- Conduct fertilizer trials on maize and rice.
- Conduct varietal trials and demonstrations.
- Produce the second annual report.
- Produce the annual plan and budget for October 2018 to September 2019 (Year 3).
- Work with USAID to conduct the mid-term evaluation.

ANNEX I: NEPAL SEED AND FERTILIZER PROJECT RESULTS FRAMEWORK, 2018



ANNEX 2: ACHIEVEMENT OF INDICATORS VS TARGETS

IR 2.1: Agriculture-based income increased

Sub-IR 2.1.2: Value chains strengthened

Table A2.1: Progress on indicator 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 2017–Mar 2018)		SA2 (Apr 2018–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
Phase 1: Number of new technologies or management practices under research as a result of USG assistance	380	395	90			
Phase 2: Number of new technologies or management practices under field testing as a result of USG assistance	16	17	48			
Phase 3: Number of new technologies or management practices made available for transfer as a result of USG assistance	4	4	9			

IR 2.2: Small enterprise opportunities expanded

Table A2.2: Progress on indicator EG 5.2-1: Number of firms receiving USG-funded technical assistance for improving business performance

Disaggregates	SA1 (Oct 2017–Mar 2018)		SA2 (Apr 2018–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
Type of firm:	19	20	39			
Formal firms	19	20	39			
Informal firms						
Duration:						
New	12	11	35			
Continuing	7	9	4			

Deviation narrative for indicator EG 5.2-1: The deviation in the continuing private firms (achieved 9 against targeted 7) is due to the continuation of two firms (Dallakoti Group and Laxmi Laghubitta) during the reporting period. The work with Laxmi Laghubitta on designing a financial loan package for purchasing fertilizer and seeds was continued throughout the wheat season. This happened because the activity showed the potential to increase the productivity of field crops through access to quality inputs. The partnership with the Dallakoti group was continued as it is a key private sector partner to import and increase the availability of new fertilizer blends in Nepal.

Sub-IR 2.2.1: Entrepreneurial skills strengthened

Table A2.3: Progress on indicator EG 3.2-1: Number of individuals who have received USG supported short-term agricultural sector productivity or food security training

Disaggregates	SA1 (Oct 2017–Mar 2018)		SA2 (Apr–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
Total	1,413	1,420	3,316			
Type of individuals:						
Producers (farmers)	1,068	1,139	2,894			
People in government	91	98	136			
People in private sector firms	209	135	210			
People in civil society	45	48	76			
Gender:						
Male	771	729	1,632			
Female	642	691	1,648			
Caste and ethnicity:						
Brahmin-Chhetri		642				
Dalit		74				
Janajati		684				
Muslim		2				
Newar		10				
Other		8				

Disaggregates	SA1 (Oct 2017–Mar 2018)		SA2 (Apr–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
Age group:						
Young (<16 years)		3				
Youth (16-29 years)		338				
Adults (30+years)		857				
Disaggregation not available		222				

Deviation narrative for Indicator EG 3.2-1: The deviation in the number of people in private sector firms trained (35% underachievement of the target) is due to three reasons:

- Some personnel from private seed companies participated in more than one of the project's activities in the period (field days, workshops, data collection training, etc.), while some NEFEA members (input suppliers) participated in both ISFM intermediaries training and farmers' field days. This reduces the number counted as the project only counts individual unique participants overall in the period with no double counting.
- The postponing of the seed business management training planned for March due to the unavailability of the trainer led to fewer stakeholders trained in the period.
- A planned training on access to credit for farmers was not held due to the low demand from farmers for the loan and voucher-based fertilizer and seed purchase package initiated with Laxmi Laghubitta in 2016/17. It has now been realized that access to credit for field crops is not a priority for farmers. The project has therefore decided to widen the package of loans to also include vegetables and will ensure that this deficiency is corrected in the next reporting period.

Table A2.4: Progress on indicator EG 3.2-4: Number of for-profit private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and CBOs receiving USG food security related organizational development assistance

Disaggregates	SA1 (Oct 2017–Mar 2018)		SA2 (Apr 2018–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
Type of organization:	91	93	12			
For profit private enterprises	20	20	12			
Producers' organizations	25	27	12			
Trade and business associations	2	2				
Community-based organizations	44	44				

Disaggregates	SA1 (Oct 2017–Mar 2018)		SA2 (Apr 2018–Sep 2018)		Annual (FY 2018)	
	Target	Actual	Target	Actual	Target	Actual
New or continuing:						
New	25	30	12			
Continuing	66	63				

Deviation narrative for indicator EG 3.2-4: There was a 20% overachievement of the number of new organizations receiving support in this period. The reason for this was because the seed company partners engaged with nine new seed producer groups because of the increased demand from buyers for newly released varieties of rice especially for Hadinath and Sukha-3.

ANNEX 3: FURTHER DETAILS OF ACHIEVEMENTS

Table A3.1: Market-ready maize varieties received from abroad in winter and spring 2017/18

	Trial names	Sets	HB	OPV	BF	Check	Total	Winter 2017	Spring 2018
A. Zimbabwe									
1	Early and extra early maturity experimental, pre-release and commercial hybrid trial	5	48	-	-	2	50	NASIC (1 set)	nd
2	Early and extra early experimental population trial	3	7	27		2	36	NASIC (1 set)	GATE (1 set)
3	Intermediate maturity experimental, pre-release and commercial hybrid trial	4	48	-	-	2	50	nd	PBC (1 set)
4	Intermediate and late experimental population trial	3	-	30	-	2	32	nd	nd
5	Advanced quality protein maize hybrid	1	58	-	-	2	60	nd	nd
B. Mexico									
1	Tropical three-way cross white maize	4	-	19	-	2	21	NMRP, USC, LSC ARS-Surkhet	USC, LSC
2	Tropical three-way cross yellow maize	4	17	-	-	1	18	LSC, GATE, NMRP, RARS-Khajura	GATE, LSC
C. Colombia									
1	Quality protein maize yellow	3	-	-	32	2	34	LSC, USC, NMRP	LSC
2	Zinc enriched hybrid	3	-	-	8	1	9	NMRP, RARS-Khajura, GATE	nd
3	Yellow kernel normal maize single cross hybrids	6	26	-	-	2	28	GATE, NASIC, PBC, NMRP, RARS-Khajura, USC	nd
	Total	36	204	76	48	18	338		

Note: HB = hybrid, OPV = open pollinated variety, BF = biofortified. Blank cells = not distributed (nd)

ANNEX 4: FEED THE FUTURE MONITORING SYSTEM (FTFMS) AND AID TRACKER+ DISAGGREGATED DATA TABLES

Data for AT+ as of 30 April 2018	
Current selection:	
Operating unit:	Nepal
Implementing mechanism:	Nepal Seed and Fertilizer (NSAF) project
Data status:	Semi-annual (October 2017–March 2018)
Indicator type:	Outputs and outcomes

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			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								
Duration:	2016	0					107,806	
New	2016	0					17,914	
Continuing		0					89,892	
Location:								
Rural	2016	0					32,342	
Urban/peri-urban		0					75,464	
EG 3-6, -7, -8: (4.5-16,17,18) Farmers' gross margins per hectare, per animal, or per cage obtained with USG assistance*								
Maize	2017	251.06					264.5	
Male	2017	226.10						
Female	2017	275.39						
Joint	2017	249						
Association	2017	0						

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Rice	2017	371.19					389.46	
Male	2017	420.48						
Female	2017	233.77						
Joint	2017	416.32						
Association	2017							
Pulses	2017	493.9					517.18	
Male	2017	435.95						
Female	2017	342.24						
Joint	2017	858.99						
Association	2017	0						
Vegetables	2017	1,802.22					1,865.58	
Male	2017	2,546.13						
Female	2017	1,495.56						
Joint	2017	1,268.54						
Association	2017							
DNA	2017	779.68						
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								
Types of individuals	2016	0	1,413	1,420	3,316			
Producers	2016	0	1,068	1,139	2,894			
Male	2016	0	470	501	1,273			
Female	2016	0	598	638	1,621			
DNA								
People in government	2016	0	91	98	136			
Male	2016	0	77	83	116			

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Female	2016	0	14	15	20			
DNA								
People in private sector firms	2016	0	209	135	210			
Male	2016	0	199	111	200			
Female	2016	0	10	24	10			
DNA								
Civil society people	2016	0	45	48	76			
Male	2016	0	25	34	43			
Female	2016	0	20	14	33			
DNA								
Gender	2016	0						
Male	2016	0	771	729	1,632			
Female	2016	0	642	691	1,684			
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								
Gender	2016	0			7			
Male	2016	0			6			
Female	2016	0			1			
DNA								
Duration	2016	0			7			
New	2016	0			3			
Continuing	2016				4			
DNA								

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
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								
Size of MSME enterprise	2016	0			91			
Micro (1–10 employees)	2016	0			91			
Small (11–50 employees)	2016	0			0			
Medium (51–100 employees)	2016	0			0			
DNA								
Gender of owners and producers	2016	0			91			
Male								
Female					90			
Joint					1			
n/a								
DNA	2016	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	91	93	12			
For-profit private enterprises	2016	0	20	20	12			
Producers organizations	2016	0	25	27	0			
Trade and business associations	2016	0	2	2	0			
Community-based organizations (CBOs)	2016	0	44	44	0			
DNA								
Duration	2016	0						
New	2016	0	25	30	12			

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Continuing	2016	0	66	63	0			
DNA								
EG 3.2-5: (4.5.2-12) Number of public-private partnerships formed as a result of USG assistance								
Partnership focus	2016	0			5			
Agricultural production	2016	0			5			
Agricultural post-harvest transformation								
Nutrition								
Multi-focus								
DNA								
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	380	395	90			
Number of new technologies or management practices under field testing as a result of USG assistance	2015	0	16	17	48			
Number of new technologies or management practices made available for transfer as a result of USG assistance	2016	0	4	4	9			
EG 3.2-17: (4.5.2-5) Number of farmers and others who have applied improved technologies or management practices with USG assistance*								
Producers	2016	0					106,506	
Male	2016	0					50,058	
Female	2016	0					56,448	
DNA								

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Technology type	2016	0						
Crop genetics	2016	0					106,506	
Soil-related fertility and conservation	2016	0					800	
Commodity	2016	0						
Maize	2016	0					54,600	
Pulses	2016	0					2,404	
Rice	2016	0					97,551	
Vegetables	2016	0					42,000	
Others	2016	0					150	
Gender	2016	0					150	
Male	2016	0					135	
Female	2016	0					15	
DNA								
EG 3.2-18: (4.5.2-2) Number of hectares of land under improved technologies or management practices with USG assistance*								
Technology type:								
Crop genetics	2016	0					59,222	
Cultural practices								
Pest management								
Disease management								
Soil-related fertility and conservation	2016	0					1,500	
Irrigation								
Water management								
Climate mitigation								

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Climate adaptation								
Gender	2016	0					60,722	
Male	2016	0					25,321	
Female	2016	0					21,253	
Joint							13,541	
Association								
DNA							607	
EG 3.2-19: (4.5.2-23) Value of smallholder incremental sales generated with USG assistance*							741,753	
Commodities								
Animal Products	2017							
Cereals	2017						428,161	
Dry grain pulses & legumes	2017						5,619	
Horticulture	2017						307,972	
Oil seeds								
Roots, tubers & other staples								
Other								
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 that applied improved organization-level technologies or management practices with USG assistance								
Type of organization	2016	0					91	
For-profit private enterprises	2016	0					20	
Producer organizations	2016	0					25	
Trade and business associations	2016	0					2	

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
Community-based organizations	2016	0					44	
DNA								
EG 5.2-1: Number of firms receiving USG-funded technical assistance for improving business performance								
Type of firm	2016	0	19		39		58	
Formal	2016	0	19	20	39		58	
Informal	2016	0					0	
DNA								
Duration	2016	0	19	20	39		58	
New	2016		12	11	35		47	
Continuing	2016	0	7	9	4		11	
DNA								
EG 5.2-2: Number of private sector firms that have improved management practices or technologies as a result of USG assistance								
Type of firm	2016	0					19	
Formal	2016	0					19	
Informal	2016	0						
DNA								
Duration	2016	0					19	
New	2016						12	
Continuing	2016	0					7	
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*							18,128	
Male	2016	0					9,970	
Female	2016	0					8,158	
DNA	2016	0						

Indicator/ disaggregation	Baseline year	Baseline value	FY 2018 SA 1 (Oct 2017–Mar 2018)		FY 2018 SA 2 (Apr–Sep 2018)		Annual ** (FY 2018)	
			Target	Actual	Target	Actual	Target	Actual
4.5.2-Z14: Total quantity of targeted value chain commodities (MT) produced by direct beneficiaries with USG assistance that is set aside for home consumption** (custom indicator)								
	2016	0					137,774	

Notes:

- * Baseline survey of August 2017 used to establish baseline values for 2017.
- ** Annual achievement figures will only be given for the indicators that are measured on an annual basis.
- DNA = disaggregation not available

ANNEX 5: NSAF PROJECT INDICATORS

The following are the NSAF project's 20 indicators and the related Economic Growth (EG) indicator numbers. This relates to USAID's standardized programme structure (SPS) location and its Nepal Performance Management Plan (PMP). The indicators are grouped according to NSAF's Result Framework.

Table A5: NSAF performance indicators FY 2016– FY 2021

Indicator number	Indicator
DO2	Inclusive and sustainable economic growth to reduce extreme poverty
GOAL:	Build competitive and synergistic seed and fertilizer value chains for inclusive and sustainable growth in agricultural productivity, business development, and income generation in Nepal
IR 2.1	Agriculture-based incomes increased
EG 3-1	Number of households benefiting directly from United States Government (USG) assistance under Feed the Future
Sub-IR 2.1.1	Agricultural productivity increased
EG 3.6	Farmers' gross margins per hectare obtained through USG assistance (RAA)
EG 3.2-2	Number of individuals who have received USG-supported degree-granting agricultural sector productivity or food security training
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 3.3-11 (NSAF Custom 1)	Total quantity of targeted value chain commodities produced by direct beneficiaries with USG assistance that is set aside for home consumption
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
STIR-10:	Number of innovations supported through USG assistance
STIR-11	Number of innovations supported through USG assistance with demonstrated uptake by the public and/or private sector
Sub-IR 2.1.2	Value chain 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
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
IR 2.2	Small enterprise opportunities expanded
EG 5.2-1	Number of firms receiving USG-funded technical assistance for improving business performance
Sub IR 2.2.1	Entrepreneurial skills strengthened

Indicator number	Indicator
EG 3.2-1	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training
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
GFSS -12	Yield of targeted agricultural commodities within target areas [IM-level] [MT/ha]
Sub IR 2.2.2	Access to financial and business services expanded
EG 3.2-3	Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance
GNDR-2	Percentage of female participants in USG-assisted programs designed to increase access to productive economic resources [IM-level]
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
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
EG 5.2-2	Number of private sector firms that have improved management practices or technologies as a result of USG assistance