



## **M&E and Data Management Master Plan**

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## **N2Africa**

**Putting nitrogen fixation to work  
for smallholder farmers in Africa**



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## Master Plan - M&E and Data Management

### I. Introduction and justification

The N2Africa Master Plans are intended to foster a common approach across all the implementing countries. The plans are designed to achieve the N2Africa Vision of Success and the Research Framework results of the approved project proposal. This means all Master Plans need to ensure timely delivery of the outputs and outcomes.

The M&E and data management plan measures results from all project interventions and assesses impacts at scale through strategic M&E. It therefore overlaps with all other master plans.

#### I.1 Brief Project Description

N2Africa is to contribute to increasing biological nitrogen fixation and productivity of grain legumes among African smallholder farmers which will contribute to enhancing soil fertility, improving household nutrition and increasing income levels of smallholder farmers.

As a vision of success, N2Africa will build sustainable, long-term partnerships to enable African smallholder farmers to benefit from symbiotic N<sub>2</sub>-fixation by grain legumes through effective production technologies including inoculants and fertilizers adapted to local settings. A strong national expertise in grain legume production and N<sub>2</sub>-fixation research and development will be the legacy of the project.

The project is implemented in five core countries (Ghana, Nigeria, Tanzania, Uganda and Ethiopia) and six other countries (DR Congo, Malawi, Rwanda, Mozambique, Kenya and Zimbabwe) as Tier 1 countries.

#### I.2 Purpose and Scope of the N2Africa Master Plans

The seven N2Africa Master Plans are documents intended to foster a common approach across its Core Countries. The seven master plans are designed to achieve the N2Africa Vision of Success and the results Framework deliverables. With the M&E and Data Management plan, a more strategic framework allowing for timely feedback loops, desired level of consistency in design (of research and dissemination) and data collection to allow for meta-analyses across all N2Africa countries is emphasised. It also allows for learning across all focal areas of the project, i.e. agronomy, rhizobiology, dissemination, platforms, gender and communications. The project objectives with their specific M&E activities implemented by the M&E and data management master plan are outlined below.

##### **Objective 1: Project strategy, coordination and implementation and capacity strengthening**

- Activity 1.2: Set up systems for monitoring and evaluating project progress.

##### **Objective 2: Delivery and dissemination, sustainable input supply, and market access**

- Activity 2.9: Assess the effectiveness and efficiency of various input delivery and marketing systems especially for women.

##### **Objective 5: Enable learning and assess impacts at scale through strategic M&E**

- Activity 5.1: Develop an innovative framework for strategic M&E, allowing for timely feedback loops.
- Activity 5.2: Set-up data collection, management, and analysis infrastructure.
- Activity 5.3: Conduct situation analysis, including the overall bio-physical, socio-cultural, and political environment, and farming system and yield gap analysis for targeting legume interventions.
- Activity 5.4: Develop innovative ICT tools to collect data and provide feedback to stakeholder groups.



- Activity 5.5: Unravel  $G_L \times G_R \times E \times M$  interactions for legume production towards the development of best-fit recommendations.
- Activity 5.6: Evaluate the effectiveness and efficiency of various D&D approaches for the intensification of legumes in cropping systems.
- Activity 5.7: Conduct impact assessment studies with a specific focus on the sustainability of interventions.

Though objectives 1, 2 and 5 have specific activities for M&E, the M&E plan cuts across objectives 3 and 4 as well. Specific activities such as 5.2 and 5.3 also cut across other objectives of the project.

The plan aims to provide sufficient guidance, outline principles and allow for country teams and partners to own the process, learn lessons from monitoring experiences, and make adjustment and/or adaptations to the project implementation.

The plan will also ensure a common approach to compiling all reports (integration of the different reporting requirements), compare results, ensure timely feedback loops and facilitate (local) learning. This means integrating the M&E master plan into other project master plans.

### I.3 Lessons learned in M&E from N2Africa Phase I and the way forward in Phase II

In the first phase of N2Africa, monitoring and evaluation activities were aimed at facilitating learning within the project through feedback loops. Experiences from dissemination activities were to be monitored and assessed and findings fed back into research as well as planning for next season dissemination activities. Findings from research were also fed back into dissemination efforts of N2Africa. Based on lessons learnt in Phase I;

- Data collected were useful for planning for the next season in terms of agronomic activities, but more bleakly data was untimely. The speed with which data were collected, entered and supplied in Phase I for all indicators was slow, hence contributing to delayed feedback.
- Limited qualitative data also accompanied the quantitative data.
- Meta-analyses though proven to provide very useful insights and understanding, yet there were missing variables in data collected which made analysis difficult.

Based on the lessons above, the following characteristics have been outlined for the second phase M&E system:

- To include innovative tools to strengthen feedback loops and enable continuous learning both within N2Africa, and with stakeholders outside the project.
- The tools and methods for Phase II will have to answer specific questions related to the tailoring and adaptation of technologies, the effectiveness of different dissemination approaches, and sales of inoculants and fertilizers by the private sector.
- To create more diverse 'feedback' targeting various audiences including farmers. The use of Information and Communication Technologies (ICT) in data collection will be explored.
- Further empowerment of national teams to analyze data and contextualize results to speed up and improve learning.
- More research on the process of adoption and on dissemination.

## II. Clusters of N2Africa Monitoring and Evaluation System

The M&E and Data Management Master Plan consists of four clusters: the cluster 'Project M&E', the cluster 'Learning M&E', the cluster 'Impact Assessment' and the cluster 'Database and Data Management'. Key milestones in the results framework will be used to measure progress in the four clusters.



## II.1 Cluster 1: Project M&E

The **Project M&E** cluster focuses on the overall results framework, mainly meant to inform the project management team, staff members, the donor and other stakeholders and to support learning, management decisions and reporting. Project M&E will be implemented portfolio-wide, across all countries under direct supervision of the Leadership and Management Team. Monitoring will be done on bi-annual and annual basis for all key milestones. Activities 1.2 and 5.3 of the results framework will be implemented under the project M&E. The sub-clusters of the project M&E include:

- Monitoring of milestones and reporting and early review of project outcomes by the N2Africa leadership team and the donor.

Section V of this plan provides more details related to the Results framework for Cluster 1 – Project M&E.

## II.2 Cluster 2: Learning M&E

**Learning M&E** focuses on learning through research (agronomy and rhizobiology) and learning through adaptation and adoption with partners and beneficiaries. The two sub-clusters of the learning M&E are:

- a) **Learning M&E through research** focuses on feedback from development to research activities, informing project management, staff, and other stakeholders about the performance of various technologies and to support learning. The effectiveness of systems including input delivery and marketing systems, D&D approaches will also be assessed. This will be implemented within agronomy and rhizobiology activities and giving feedback across all countries under direct supervision of the subject matter specialist and partners involved.
- b) **Learning M&E through partner-led dissemination activities** mainly deals with the learning obtained through interaction and dissemination with project partners and beneficiaries. It focuses on the adaptation and adoption led by private and NGO partners. Learning from gender-specific activities, effectiveness of input delivery and marketing systems, D&D approaches will also be monitored. Feedback from communities and individual farmer level will be captured to determine their outcomes and behavioural changes as a result of the project interventions which will be used to refine country specific approaches. Informal planning meetings will be held to refine approaches at each of the Core Countries based on feedback as each cropping season ends and another begins.

Activities 2.9, 5.1, 5.3, 5.5 and 5.6 of the results framework will be implemented under the learning M&E. Section VI of this plan provides more details related to the Results framework for Cluster 2 - Learning M&E.

## II.3 Cluster 3: Impact Assessment

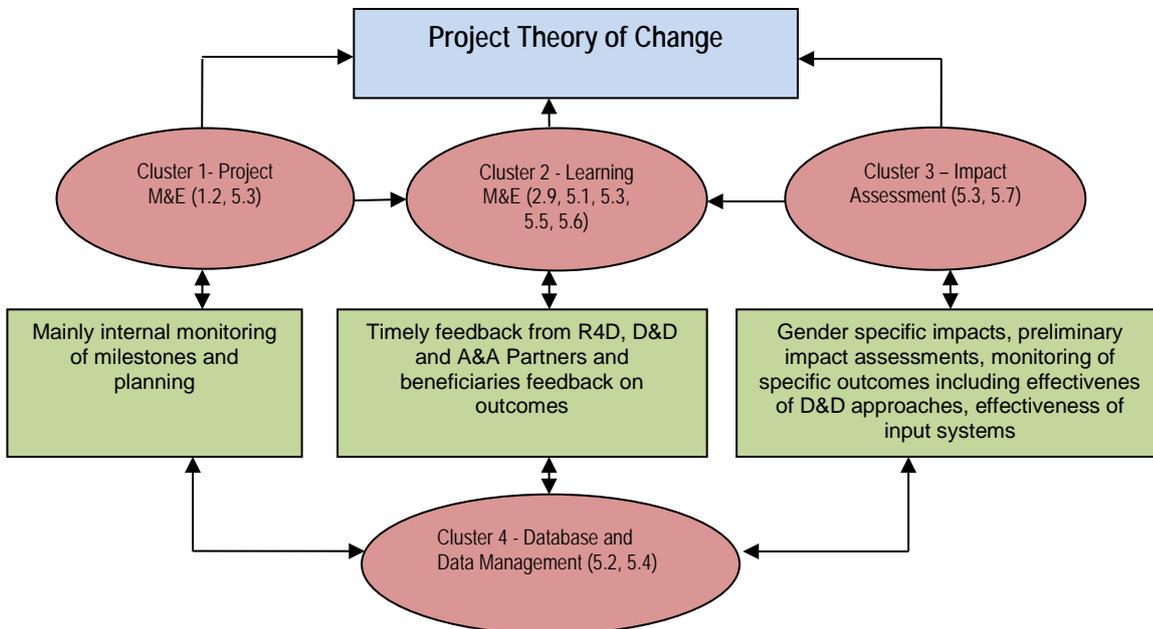
The **Impact Assessment** cluster of the M&E framework mainly deals with the assessment of changes effected by the project through its interventions. It focuses on the higher level impacts attributed to the project. Activities 5.3 and 5.7 will be implemented under the impact assessment component. The major component of the impact assessment is the impact assessment study to ascertain attribution of project impacts at various project locations. Section VII of this plan provides more details about Cluster 3 – Impact Assessment.

## II.4 Cluster 4: Database and Data Management

The **Database and Data Management** cluster of the M&E framework is focused on data collection and feedback processes, analysis of various data and reporting. It determines the various frequencies for specific data collection, data flows and the development of various tools for data collection and timely feedback. Activities 5.2 and 5.4 will be implemented under this cluster of the master plan. However, each aspect of the other three M&E clusters has specific data flows, frequencies and data collection methods and therefore will be addressed under each. A general section on the overall database and data management is presented in Section VIII.



Figure 1 indicates the relationship between the four clusters of the M&E and data management master plan, the Theory of Change which specifies the entire results of the project and the specific activities.



**Figure 1: Four clusters of N2Africa M&E System and relation to Project Theory of Change**

The project results (outputs, outcomes and impacts- herein referred to as milestones) will be measured and other learning areas from agronomy and rhizobiology, based on the project theory of change. The first three clusters of the M&E and data management plan therefore measures specific areas within the theory of change to ascertain the impact pathway of the project. The numbers in brackets are the activity numbers per the project results framework.

### III. Articulating the Theory of Change in N2Africa

In expressing the Theory of Change (ToC) in N2Africa, the overall problem framework in the supported sector (grain legumes sector) has been identified and the subsequent impacts to contribute. This is followed by sections of intermediate results (outputs, outcomes) and the specific issues (interventions) that N2Africa will address before the results are achieved. The assumptions (factors beyond the project's control or that needs further intervention apart from the planned interventions) have been included at each level of the logic. This is to enable monitoring of such assumptions to ensure attainment of the various levels of results as indicated.

However, the initial theory of change has been revised to incorporate all aspects of the results framework and to ensure that the monitoring and evaluation framework measures the agreed results.



Impact	*Increased income (gender disaggregate) of target legume smallholder farmers	*Increased productivity at national level	*Improved nutritional status of beneficiary women and children	*Gender sensitive decision-making enhanced (sales and control of productive assets for legume production)	*Sustainable use of natural resources *Improved yield of subsequent crops	National capacity to lead emerging legumes technologies for smallholder farmers developed	Sustainable input supply systems for legumes at national level
Change in investment priority							
Outcomes	*Smallholder farmers have means to adopt legume technologies *Farmers willingness to increase production areas under legume cultivation	* Target households accept and consume legume enriched food basket developed *Policy framework support for women to have control of productive assets		*Strategies to support sustainable input supply are supported by national policies and frameworks		* National Institutions are resourced e.g. (infrastructure) to research into legume technologies	
	*Farmers access and afford best-fit productivity increase options *Gender legume based constraints addressed *Less drudgery, especially for women, and greater farm productivity *Inoculant producers avail improved formulations for target legumes *Greater legume productivity and area under legumes *Quality livestock feed available	*Women actively involved in legume based activities and businesses, e.g. marketing activities *Increased productivity (at adaptation level) and production area for both men and women farmers *Increased women's productivity (on and off farm) and market engagements through the use of labour-saving technologies *Women and poor farmers use tailored technologies *Diversified nutritious diets/food basket developed and accessible to the poor		*Improved farmer access to seeds, inoculants and legume fertilizers through PPPs *Availability, accessibility and affordability of (quality) seeds, inoculants, fertilizers and other legume technologies *Women and men farmers regularly using inputs within sustainable rotations *Increased number of households engaged in legume intensification technologies *Improved linkage of farmers to local and international legume markets		*National teams leading all D2R activities *Independent national research to equitable growth and development pipelines *Partners along legume input and output VCs cooperate to develop the VCs	
Assumptions at Outcome	*Farmers have capacity to adapt the best bet productivity technologies * Gender responsive technology options available *Regulatory framework, infrastructure, etc) exists for inoculant producers to invest		* Cultural values of target households allows for women leadership *Target women adapt and accept technologies and businesses introduced to them		*Private partners invest in legume input supply & marketing *Markets available for value addition products		Acceptance and promotion of improved technologies by national institutions and other legume value chain networks
	*Gender responsive options for improved legume productivity and N fixation recommended and disseminated *Improved legume yield recommendations developed for different yields (best-fit options accessible by farmers) *Standard Operating Procedures developed to regulate the production, quality control and application of inoculants *Niches for the use of crop residue to produce quality livestock feed		*Women and men farmers access and afford varied legume intensification options and tailored legume technologies *Women specific businesses and models for gender specific disseminations identified *Women farmers equipped with efficient pre and post-harvest technologies, and businesses *Diversified nutritious diets identified for the poor *Efficient pre and post-harvest practices-technologies and value added products identified for women		*PPPs established strengthening farmer access to quality inputs *Constraints within legume input supply and marketing systems addressed in targeted areas *Increased number of farmers regularly using inputs within sustainable rotations *Farmers access improved legume technologies *Increased number of households involved in collecting marketing and value addition		*A new cadre of African D2R scientists, and development and gender specialists *Potential national networks and partners identified and mapped in each country
Assumptions at Output	*National institutions support recommendations made on technologies including SOPs developed *Private entrepreneurs available and willing to partner with N2Africa on developing appropriate tools to resolve drudgery		* Cultural values of target households allows for gender equality activities *Services (e.g. access to finance) are available to women *Legume enriched food basket developed based on context of target households		*Private partners' willingness to invest in legume value chains especially input supply systems *Produce from smallholder farmers meets market requirements		*National Research Institutions and other partners are willing to develop legume technologies *National networks for legume value chain development exist in target areas
	*Address constraints to legume productivity (including developing variety x inoculant x nutrient recommendations, recommendations to rehabilitate non-responsive soils, etc) *Explain heterogeneous yields at farm and community levels *Develop best-fit options for farmer testing Assess crop-livestock interaction		*Develop intensification options targeted poor and women farmers *Target poor and women farmers with tailored legume-based technologies *Assess business opportunities for women along the legume value chains *Sensitize partners and target households on gender inequality and mainstream approaches *Develop legume-based food basket for smallholder farmers *Develop efficient pre and post-harvest practices technologies; value added products and enterprises for women		*Establish public-private partnerships and stakeholder platforms *Assess effectiveness of legume input supply and marketing systems *Facilitate agrodealers investment in target areas *Facilitate dissemination of technologies through N2Africa and partner-led approaches *Support the establishment of agribusiness clusters around marketing and value addition		*Collaborate closely with key national partners *Provide training from technical to postgraduate level *Support national networks for D2R
Interventions							
Challenge	Poor legume productivity		Poor diets and weak support to women and very poor farmers		Lack of effective legume input supply and output market chains		Limited national capacity in legume agronomy and rhizobiology D2R



## IV. Results Framework

The N2Africa overall project results framework is stipulated in Tables 1-5 for specific objectives. Bold blue outputs and outcomes are the key milestones for donor reporting. Please note that several activities and outputs contribute to a smaller number of outcomes, such that there is no one-to-one relationship within rows of the table below.

**Table 1 Results Framework for Objective 1 - Project strategy, coordination and implementation and capacity strengthening**

Activities	Outputs	Outcomes
1.1. Hire internationally and nationally recruited project staff and procurement of equipment	1.1.1. By Q2 of year 1, all project staff are engaged and the necessary equipment purchased	1.1. Effective and timely work flows and project processes and procedures generate the expected project outputs and ensure effective learning between specific project components
1.2. Set up systems for monitoring and evaluating project progress	1.2.1. By contractual deadlines, relevant technical and financial reports forwarded 1.2.2. By Q4 of year 5, a final project report submitted	
1.3. Engage research, development, private sector, and other relevant partners in each of the target countries	1.3.1. By Q2 of year 1, potential partners operating within priority legume value chains mapped 1.3.2. By Q3 of year 2, MoUs with priority partners in each of the target countries signed	<b>1.3. Partners along the legume input and output value chains cooperate actively towards achieving the overall N2Africa goals</b>
1.4. Develop and operationalize a project-wide internal and external communication strategy	<b>1.4.1. By Q3 of year 1, an internal and external communication strategy developed</b> 1.4.2. By Q4 of each year, communication products generated, including a continuously updated N2Africa website, regular Podcasters, and social media products 1.4.3. Communication to farming communities will be effected through links to Farm Radio and other media outlets (e.g. local newspapers)	1.4. Communication tools and processes generate additional interest in N2Africa activities, translated in extra dissemination, investments, etc.
1.5. Develop country-specific research and dissemination implementation plans, including a sustainable exit strategy	<b>1.5.1. By Q4 of year 1, country-specific research and dissemination implementation plans formalized, including an exit strategy.</b> 1.5.2. By Q4 of each year, implementation plans are updated based on M&E feedback	1.5. Young African professionals with increased expertise in biological N <sub>2</sub> -fixation advance the legume intensification research areas within their respective national programs



1.6. Organize seasonal/yearly project-wide and country-specific planning workshops	1.6.1. By Q4 of each year, project-wide implementation plans developed, evaluated, and revised through an annual project planning workshop 1.6.2. By Q4 of each year, 1 or 2 seasonal, in-country implementation plans developed, evaluated, and revised through in-country-planning meetings	
1.7. Develop and implement a degree (PhD and MSc)-related research plan	1.7.1. <b>By Q4 of year 1, a research plan, engaging at least 5 PhD and 10 MSc candidates, developed</b> 1.7.2. By Q4 of year 5, at least 5 PhD and 10 MSc candidates graduated	
1.8. Develop and implement a non-degree-related capacity strengthening plan for relevant partners working within legume value chains	1.8.1. By Q4 of year 1, a non-degree-related capacity strengthening plan developed 1.8.2. By Q4 of each year, at least 4 relevant and demand-driven training materials developed in cooperation with the African Soil Health Consortium (ASHC) 1.8.3. <b>By Q4 of year 5, at least 320 partners trained in N2Africa technologies and approaches</b>	1.8. Scientists and other stakeholder groups are empowered to further the N2Africa research and development

**Table 2 Results Framework for Objective 2 - Delivery and dissemination, sustainable input supply, and market access**

Activities	Outputs	Outcomes
2.1. Constitute and facilitate in-country/in-region N2Africa stakeholder platforms	2.1.1. By Q2 of year 1, N2Africa stakeholder platforms operationalized 2.1.2. By Q4 of years 1-4, stakeholders agree on specific roles and responsibilities across the various N2Africa objectives	2.1. Country-specific inoculant, seed, and fertilizer supply strategies guarantee the sustainable supply of high quality seeds and inoculants and legume-specific fertilizer
2.2. Facilitate <u>N2Africa-led</u> dissemination campaigns in the context of development-to-research learning cycles with specific attention to gender	2.2.1. By Q1 of years 1-4, specific dissemination guidelines for legume intensification assembled 2.2.2. By Q4 of years 1-4, specific dissemination guidelines evaluated by a preset (see Returns-on-Investment calculations) number of male and female farmers	<b>2.2. Dissemination partners attain/surpass the anticipated number of households targeted and continue to engage in legume intensification post-project</b>



2.3. Create widespread awareness on N2Africa technologies and interventions	<b>2.3.1. By Q4 of years 1-4, at least 2 media events (e.g., radio, newspaper articles) per country implemented</b>	<b>2.3. Local agro-dealers marketing fertilizer, seed, and inoculants are aligned with grassroots producer groups and input wholesalers and manufacturers</b>
2.4. Facilitate partner-led dissemination campaigns with specific attention to gender	2.4.1. By Q4 of years 2-4, household targets (see Returns-on-Investment calculations), dissemination approaches, and content for partner-led dissemination activities agreed and implemented, with specific attention to gender 2.4.2. By Q4 of years 3-5, feedback on the performance of the dissemination models and the demonstrated content fed back to N2Africa	<b>2.4. A preset (see Returns-on-Investment calculations) number of households engaged in the collective marketing and value addition of legume grains and value-added products</b>
2.5. Facilitate private-public partnerships towards the sustainable supply of inoculants and fertilizer	<b>2.5.1. By Q4 of years 1-4, inoculants available through public-private partnerships, through importation and/or local production, the latter facilitated by the inoculant production pilot plant</b> 2.5.2. By Q4 of years 1-4, legume-specific fertilizer made available to smallholder farmers by fertilizer companies/retailers	
2.6. Facilitate the establishment of private sector-led and/or community-based legume seed systems	2.6.1. By Q4 of years 1-4, sufficient legume foundation seed produced by private enterprises and/or government institutions 2.6.2. By Q4 of years 1-4, sufficient quality legume seed available to farming communities	
2.7. Engage agro-dealer and other last-mile delivery networks in supplying legume agro-inputs	2.7.1. By Q4 of years 1-2, a minimum number of agro-dealers and other delivery network partners trained in the storage, handling, and use of inoculants 2.7.2. By Q4 of years 2-5, agro-dealer and other last-mile delivery networks engaged in the commercial supply to farmers of agro-inputs, including inoculants	
2.8. Establish agri-business clusters around legume marketing and value addition	2.8.1. By Q4 of years 1-4, opportunities for collective marketing and value addition for smallholder farmer associations identified	



2.9 Assess the effectiveness and efficiency of various input delivery and marketing systems especially for women	2.9.1. By Q4 of year 2, inventory and analysis of input supply and marketing systems conducted across all countries 2.9.2. By Q4 of year 4, effectiveness of input supply and marketing systems evaluated in the Core Countries	
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**Table 3 Results Framework for Objective 3 - Empower women to increase benefits from legume production**

Activities	Outputs	Outcomes
3.1. Sensitize partners, farmer associations, and farming households and mainstream approaches to address gender inequity in farming and decision-making	3.1.1. By Q4 of years 1-4, all partners and households engaged in N2Africa activities that address gender inequity	3.1. Female farmers increasingly lead N2Africa promotion and dissemination activities
3.2. Assess business opportunities for women in agro-input supply and legume marketing and value addition opportunities	3.2.1. By Q4 of years 2-4, business opportunities for women identified	<b>3.2. By Q4 of years 4-5, at least 2 businesses led by women established per country</b>
3.3. Conduct dissemination campaigns targeting women farmers	3.3.1. By Q4 of years 1-4, themes and models for women-specific dissemination campaigns identified 3.3.2. By Q4 of years 2-5, at least 25% of the female farmers participating in the overall N2Africa dissemination activities are also actively engaged in the women-specific dissemination campaigns	<b>3.3. Better knowledge of and access to household-level legume processing tools improves the nutritional status of women and children in at least 2 target countries</b>
3.4. Develop labour-saving pre- and post-harvest legume tools for female farmers	3.4.1. By Q4 of year 2, prototype labour-saving pre- and post-harvest tools for female farmers validated 3.4.2. By Q4 of years 2-4, labour-saving tools included in the various dissemination campaigns	<b>3.4. Women use pre- and post-harvest labour-saving tools, resulting in higher net profits from legume production and processing</b>
3.5. Evaluate the impact of environment (E) and management (M) on nutritional quality of legume grain	<b>3.5.1. By Q4 of year 3, relationships between grain nutritional quality and management / environmental conditions quantified</b>	
3.6. Develop legume product-enriched food baskets for smallholder families	3.6.1. By Q4 of year 1, food consumption and diversity scoped for at least 2 Core Countries	



**Table 4 Results Framework for Objective 4 - Tailor and adapt legume technologies to close yield gaps and expand the area of legume production within the farm**

Activities	Outputs	Outcomes
4.1. Develop variety x inoculant x nutrient management recommendations for the target legumes and legume production areas based on yield gap analysis	4.1.1. By Q4 of years 1-4, seasonal research campaigns towards legume intensification and yield gap closure implemented 4.1.2. By Q4 of years 2-4, improved legume production recommendations integrated in the dissemination campaigns	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity
4.2. Develop recommendations for rehabilitation of non-responsive soils for legume production	4.2.1. By Q4 of year 2, major mechanisms leading to non-responsiveness understood 4.2.2. By Q4 of years 3-4, prototype rehabilitation measures for non-responsive soils validated	4.2. Inoculant producers avail improved inoculant formulations for the target legumes resulting in at least 10% increase in legume productivity and BNF
4.3. Intensify crop-livestock interactions through enhancing feed availability of legume crop residues	4.3.1. By Q4 of year 2, niches for use of legume crop residues within and between farms identified 4.3.2. By Q4 of years 3-4, feed availability and quality enhanced through appropriate use of grain legume residues	
4.4. Evaluate the medium- to long-term impact of legumes on overall farming system productivity and natural resource conditions	4.4.1. By Q4 of year 2, at least 1 long term legume monitoring site established per priority region/country 4.4.2. By Q4 of year 5, the medium- to long-term impact of legumes on overall system productivity and natural resource conditions evaluated using time series analysis and modeling approaches	4.4. Overall farming system productivity and soil fertility status is improved through increased legume productivity
4.5. Isolate, authenticate, and evaluate new strains of rhizobia for the target legumes for high symbiotic effectiveness	4.5.1. By Q4 of years 2-4, at least 50 new strains of effective rhizobia genetically characterized using molecular techniques 4.5.2. By Q4 of year 5, newly identified effective rhizobium strains for common bean, cowpea, groundnut conserved in a rhizobium gene bank and at least 5% of these used for inoculant formulation	
4.6. Identify elite rhizobium strains and inoculant	4.6.1. By Q4 of year 3, at least 5 new effective and elite	



formulations for beans, groundnut, and cowpea	rhizobia for beans, groundnut, and/or cowpea identified  <b>4.6.2. By Q4 of year 5, elite strains used for inoculant production for beans, groundnut, and/or cowpea</b>	
4.7. Evaluate competitiveness and survival of introduced rhizobium strains as affected by M x E	4.7.1. By Q4 of year 4, environmental and management conditions affecting the competitiveness and survival of introduced rhizobia elucidated	
4.8. Develop standard operating procedures for the production, quality control and application of rhizobium inoculants	<b>4.8.1. By Q4 of year 2, standard operating procedures of the production, quality control and application of inoculants used by inoculant producers and retailers</b>	

**Table 5 Results Framework for Objective 5 - Enable learning and assess impacts at scale through strategic M&E**

<b>Activities</b>	<b>Outputs</b>	<b>Outcomes</b>
5.1. Develop an innovative framework for strategic M&E, allowing for timely feedback loops	<b>5.1.1. Throughout the project, a strategic M&amp;E framework provides timely feedback to learning and future planning</b>	5.1. National system scientists use the $G_L \times G_R \times E \times M$ framework and the obtained information to advance legume research for development within their countries
5.2. Set-up data collection, management, and analysis infrastructure	5.2.1. By Q4 of year 1, data management infrastructure is in place and data population initiated	<b>5.2. Dissemination partners integrate effective and efficient dissemination approaches for legume technologies in their future development initiatives</b>
5.3. Conduct situation analysis, including the overall bio-physical, socio-cultural, and political environment and farming system and yield gap analysis for targeting legume interventions	5.3.1. By Q4 of year 1, information from the situation analysis available for the proper targeting of legume interventions	<b>5.3. Effective ICT tools provide information on legume production, management, and value addition beyond the project life</b>
5.4. Develop innovative ICT tools to collect data and provide feedback to stakeholder groups	5.4.1. By Q4 of year 2, prototype ICT tools for data collection and information provision validated 5.4.2. By Q4 of year 4, information on legume production, management, and value addition transferred to stakeholders using ICT tools	
5.5. Unravel $G_L \times G_R \times E \times M$ interactions for legume production towards the development of best-fit	<b>5.5.1. By Q4 of year 4, the relative important of <math>G_L</math>, <math>G_R</math>, <math>E</math>, and <math>M</math> understood for specific legumes and</b>	



recommendations	<b>production environments and integrated in improved recommendations</b>	
5.6. Evaluate the effectiveness and efficiency of various D&D approaches for legume intensification	5.6.1. By Q4 of year 4, information on the effectiveness and efficiency of various D&D approaches for legume intensification available to dissemination partners	
5.7. Conduct impact assessment studies with a specific focus on the sustainability of interventions	<b>5.7.1. By Q4 of year 4, the sustainability of legume interventions for smallholder farmers evaluated through impact assessment studies</b>	

## V. Results framework for Cluster 1 - Project M&E

The Project M&E is based on the overall results framework and focusing on the monitoring of selected key milestones to enable reporting on the progress of project implementation to the project management team, staff members, the donor and other stakeholders. The setting up of systems for monitoring and evaluating project progress is the main focus of the project M&E activity 1.2. It is mainly concerned with the close supervision of on-going project activities, and monitoring progress against milestones (output and outcome levels). It also includes early review of project outcomes by the donor to ensure its contribution to wider rural development issues. The key milestones at outcome and output level with related indicators are presented in Table 6.

**Table 6 Key milestones at outcome and output level and indicators for Cluster 1 - Project M&E**

Objective	Key milestones at outcome level	Indicator	Focus Area in relation to Theory of Change
1	1.3. Partners along the legume input and output value chains cooperate actively towards achieving the overall N2Africa goals	# of partnerships (by type) developed and active # of partners (by category) actively cooperating within the partnerships developed	Lack of effective legume input supply and output market chains, limited national capacity in legume agronomy and rhizobiology D2R
1	1.4. By Q4 of year 5, at least 320 partners trained in N2Africa technologies and approaches	# of persons trained (gender disaggregated) in N2Africa technologies and approaches # of N2Africa technologies (by type) in which the persons were trained	Lack of effective legume input supply and output market chains
2	2.2. Dissemination partners attain/surpass the anticipated number of households targeted and continue to engage in legume intensification post-project	# of target households (men/women) reached by dissemination partners	Lack of effective legume input supply and output market chains
2	2.4. A preset (see Returns-on-Investment calculations) number of households engaged in the collective marketing and value addition of legume grains and value-added products	# of individual households (men/women) engaged in collective marketing, value addition of legumes and value added products Volume of produce sold through collective marketing, volume of value addition products and types of value added product	Lack of effective legume input supply and output market chains



Objective	Key milestones at output level	Indicator	Focus Area in relation to Theory of Change
1	1.4.1. By Q3 of year 1, an internal and external communication strategy developed	Project wide internal communication strategy developed	Lack of effective legume input supply and output market chains
1	1.5.1. By Q4 of year 1, country-specific research and dissemination implementation plans formalized, including an exit strategy	# of specific research and dissemination plans formalized	Lack of effective legume input supply and output market chains
1	1.7.1. By Q4 of year 1, a research plan, engaging at least 5 PhD and 10 MSc candidates, developed	# of project wide research plans to engage PhD and MSc students developed	Poor legume productivity
		# of PhD and MSc students (men/women)engaged	Poor legume productivity
2	2.3.1. By Q4 of years 1-4, at least 2 media events (e.g., radio, newspaper articles) per country implemented	# of media events implemented	Lack of effective legume input supply and output market chains
2	2.5.1. By Q4 of years 1-4, inoculants available through public-private partnerships, through importation and/or local production, the latter facilitated by the inoculant production pilot plant	# of inoculant outlets made available in the target areas	Lack of effective legume input supply and output market chains
		Volume of inoculants imported and /or produced with the identified outlets	
3	3.2.2. By Q4 of years 4-5, at least 2 businesses led by women established per country	# of businesses established and led by women	Poor diets and weak support to women and very poor farmers
		# of women involved in the businesses established	
4	4.1.2. By Q4 of years 2-4, improved legume production recommendations integrated in the dissemination campaigns	# of improved legume production recommendations integrated in dissemination campaigns	Poor legume productivity
4	4.6.2. By Q4 of year 5, elite strains used for inoculant production for beans, groundnut, and/or cowpea	# of elite strains used for inoculant production (disaggregate by crop type)	Poor legume productivity

## V.1 Data collection, Analysis and Management

This aspect of the project M&E indicates the process of data collection, analysis and data management structures which is represented by Activity 5.2 of Objective 5.

Regarding core countries, project key milestones with related indicators and other project milestones will be monitored by all project staff per country with related responsibilities in project management, agronomy, rhizobiology and dissemination. Data on these indicators will be collected and compiled at the country level by country teams with overall responsibility by the Country Coordinator. Designed data collection templates will be used for data collection through partner systems or field visit by project staff and partners. These data will be collected throughout the year and fed into the central database in Wageningen through the intranet.

With respect to Tier 1 countries, milestones related to Tier 1 country specific activities as agreed during initial planning session with their related indicators will be monitored in each Tier 1 country mainly by partners. Data on these indicators will be collected and compiled at the country level with overall responsibility of the Country Coordinator. Designed data collection templates will be used for data collection (based on required information of the specific milestones) through partner systems or field visit by Country Coordinator and partners. These data will be collected throughout the year, collated and fed into the central database in Wageningen through the intranet.



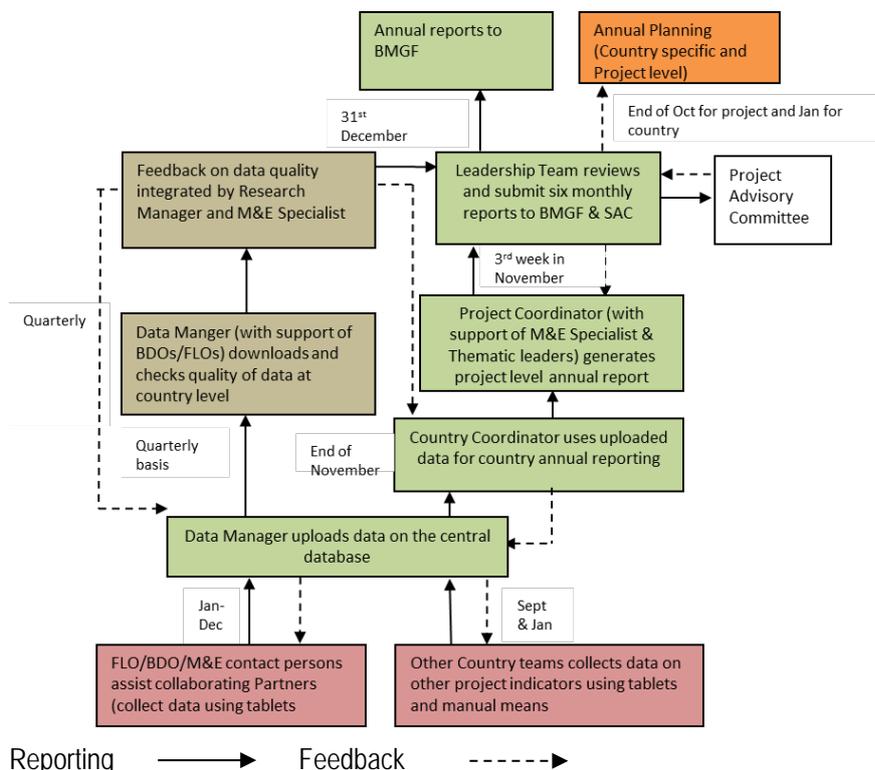
Data analysis regarding all data from both core and Tier 1 countries will be on two levels; country level data analysis and project level data analysis. Data collected on milestones will be analysed initially at country levels (led by Country Coordinator) for reporting and also forward raw data into the database through the intranet. The project level analysis will largely be the responsibility of the M&E Specialist and Data analyst with inputs from other project team members. Various data analysis methods will be used to demonstrate the success or otherwise of project interventions, reasons leading to these outcomes to document for future best practices and satisfy indicators for the project results logic. These analyses will be done as regularly as required according to the performance monitoring matrix.

### V.2 Reporting and Dissemination of information

Reporting formats will be developed to facilitate country level reporting from partners. All Country coordinators will submit sixth monthly reports (January to June, July to December) to the Project coordinator for compilation and onward forwarding to the Project leadership team. An annual report will be summarized based on the two six-monthly reports and submitted to Bill and Melinda Gates Foundation (BMGF). Raw data will also be forwarded into the central database in WU through the intranet for further analysis. The leadership team will put the report into perspective and submit to BMGF on annual basis and also share with other key stakeholders.

### V.3 Situational Analysis and Baseline Data

This aspect of the project M&E focuses on the situational analysis and baseline data regarding the selected milestones. A review of the end line survey data for 2013 will be done and data extrapolated to serve as baseline data for all countries supported in Phase I. Baseline for new countries (Uganda, Tanzania and Ethiopia) will also be established by the 4th quarter of 2014. Below is the data flow for project M&E.



**Figure 2 Project M&E Data collection, reporting and feedback flow chart**

With regards to Tier 1 countries where FLO and BDOs are non-existent, an M&E contact person will be used to assist the country coordinator to gather such data.



## VI. Results framework for Cluster 2 - Learning M&E

Learning M&E monitors results and feedback from research (D2R) interventions (learning from R4D activities, demonstrations and adaptations led by N2Africa) and also learning from adaptation and adoption (A&A) through dissemination and delivery activities led by partners. A number of learning questions identified as critical for project learning are outlined below:

- In terms of **technologies**: What works where, why and for whom? To what extent are technologies tailored to the needs of households? (degree of tailoring) To what extent are technologies adapted by households? (degree of adaptation) What is the best-fit for households in terms of yield gaps?
- In terms of **dissemination approaches/methods**: Which of the approaches is effective (in terms of getting smallholder farmers to adapt and adopt),
- What are the recommendation domains for different legumes in different AEZ
- **Partnerships**: What determines/contributes to an effective partnership especially including the private sector?
- To what extent are private sector actors involved in inoculant production and sales? How can the private sector be incorporated in inoculant production and sales? and also for other inputs such as fertilizers? What makes commercial inoculant production feasible?
- What are the incentives for private sector to work with smallholder farmers? What incentives does private sector need in order to engage with smallholder farmers?

Figure 3 indicates the focal areas of feedback and project learning based on subject matters (e.g. diagnostics, demonstrations, adaptations, etc).

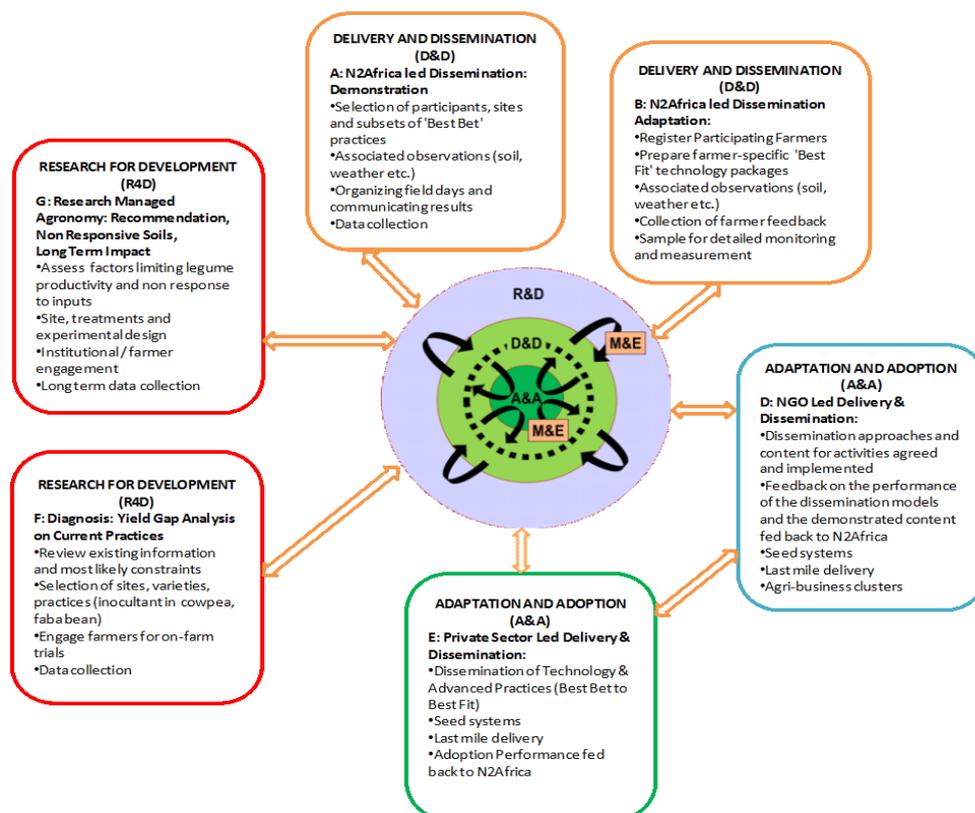


Figure 3 Focal areas to obtain learning based on subject matters



Activities under R4D as indicated in Figure 3 will be monitored through the constant data collection and feedback provided on best bet technologies and making recommendations for dissemination of best technology option. Implementing activity 5.5, unravelling  $G_L * G_R \times E \times M$  interactions will prove the best-fit technology for legume production and feedback from this will be monitored and provided for decision making on technologies. Monitoring for this aspects of the learning M&E cluster will be done per season and as and when demonstrations and dissemination activities take place. Feedback will be obtained at various levels including beneficiary, country and project levels and with different content (Table 7).

**Table 7 Levels of feedback**

Level of Feedback	Content of feedback	How feedback will be obtained and used
Beneficiary level (Farmers and other value chain actors)	Beneficiary feedback on performance of technologies, why specific tailoring of technologies is needed, adoption perception and other factors affecting adoption, effectiveness of dissemination methods used to reach out to them, etc	Through constant interaction with beneficiaries, e.g. field days, mid/end season sessions with selected beneficiaries, planning sessions, etc  Feedback will be documented and aggregated at beneficiary levels and integrated into country plans/actions
Partner level (Implementing partners, donor, etc)	Partner feedback on performance of technologies, adoption perception and other factors affecting adoption, effectiveness and efficiency of dissemination methods used to achieve results, feedback on project activities, etc	Through constant interaction with partners, e.g. planning sessions, mid/end season sessions with partners at country and project levels, partnership levels etc  Feedback will be documented and aggregated at beneficiary levels and integrated into country plans/actions
Country level (Beneficiaries and implementing partners within specific countries)	Feedback on performance of technologies, why specific tailoring of technologies is needed, adoption perception and other factors affecting adoption, effectiveness and efficiency of dissemination methods used, feedback on project activities, effectiveness of partnerships, etc	Summation of feedback at beneficiary and partner levels within specific countries. Feedback from country level planning sessions  Feedback will be synthesized and integrated at country level activities
Project Level (Summation of countries' feedback from beneficiaries and partners)	Feedback on performance of technologies, why specific tailoring of technologies is needed, adoption perception and other factors affecting adoption, effectiveness and efficiency of dissemination methods used, feedback on acceptance of project activities, effectiveness of partnerships, etc	Summation of feedback from country level and at project planning sessions with partners  This will be used for decision making at project level and integrated at country level activities to also reflect feedback from beneficiaries and partners.

Such feedback will be fed into the N2Africa–led dissemination activities for farmer demonstrations and adaptations, influencing the planning for seasons. These activities will as well be monitored and feedback provided on the results of demonstrations and adaptation trials which will as well be fed into the partner-led dissemination activities. Partners and beneficiaries will also be monitored including results from farmers own fields. This will aid comparison of learning from D&D and A&A, hence sustainability of results. Common milestones and data needs will be used for the monitoring and comparison purposes. Loop feedback from participating households will be captured to determine their views and behavioural changes as a result of the project interventions which will be used to refine country specific approaches. Both aspects of the learning M&E will also integrate lessons from gender



interventions implemented. This feedback will inform project management team, staff members, and other stakeholders about the performance of various technologies, levels of learning of partners and beneficiaries.

Activity 5.1 ‘Develop an innovative framework for strategic M&E, allowing for timely feedback loops’ is about developing an innovative M&E framework for timely feedback and continuous learning. With this, all feedback loops needed for the above outlined process will be identified and appropriate tools designed for timely delivery of such feedback. Informal planning meetings will be held to refine approaches at each of the Core Countries based on feedback as each cropping season ends and another begins.

Activity 5.3 ‘Conduct situation analysis, including the overall bio-physical, socio-cultural, and political environment, and farming system and yield gap analysis for targeting legume interventions’ is the situational analysis to be conducted for all results envisaged. These include situational analysis about the specific research results planned to be obtained and also the learning outcomes expected from partners and beneficiaries. This will also include baseline data for all indicators and research questions expected to be answered.

Activities 2.9 ‘Assess the effectiveness and efficiency of various input delivery and marketing systems especially for women’ and 5.6 ‘Evaluate the effectiveness and efficiency of various D&D approaches for the intensification of legumes in cropping systems’ are assessing the effectiveness and efficiency of input and market systems and dissemination approaches being used to disseminate technologies and approaches. Dissemination approaches are the main entry points to determine the project’s attribution of impacts at beneficiary levels. Assessing and evaluating their effectiveness and efficiency will provide learnings, as to which approach gives greater results.

In addition to the specific research data needed to provide feedback on best-bet technologies and other results, indicators in Table 8 will also be used to provide learning answers to the above identified questions. These indicators are part of the key milestones of the project proposal.

**Table 8 Key milestones and indicators for Component 2 - Learning M&E**

Objective	Key Milestones at outcome level	Indicator	Focus Area in relation to Theory of Change
2	2.3. Local agro-dealers marketing fertilizer, seed, and inoculants are aligned with grassroot producer groups and input wholesalers and manufacturers	Volume of seeds, fertilizers and inoculants used per targeted producer groups per land area and volume sold by agro dealers % of targeted local agro-dealers aligned with grass root producer groups, input wholesalers, and manufacturers	Lack of effective legume input supply and output market chains
3	3.3. Better knowledge of and access to household-level legume processing tools improves the nutritional status of women and children in at least 2 target countries	# of women using household level-legume processing technologies	Poor diets and weak support to women and very poor farmers
3	3.4. Women use pre- and post-harvest labour-saving tools	# of women using pre- and post-harvest labour-saving tools	Poor diets and weak support to women and very poor farmers
4	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity	% change in legume productivity among target households participating in adaptation trials # (or %) of target households (men/women) with 50% increased productivity through adaptation trials	Poor legume productivity
4	4.2. Inoculant producers avail improved inoculant formulations for the target legumes resulting in at least 10% increase in legume productivity and BNF	# of inoculant formulations applied/used by inoculant producers for target legumes in core countries (Productivity will be measured by milestone 4.1)	Poor legume productivity



Objective	Key Milestones at outcome level	Indicator	Focus Area in relation to Theory of Change
	5.2. Dissemination partners integrate effective and efficient dissemination approaches for legume technologies in their future development initiatives	# of dissemination partners integrating effective and efficient dissemination approaches in their programmes across target countries. (Effectiveness and efficiency of dissemination approaches will be measured by milestone 5.6)	Lack of effective legume input supply and output market chains
Objective	Key Milestones at output level	Indicator	Focus Area in relation to Theory of Change
2	2.9.1. By Q4 of year 2, inventory and analysis of input supply and marketing systems conducted across all countries	Report of inventory and Analysis indicating strengths and weaknesses of the input supply & marketing system	Lack of effective legume input supply and output market chains
2	2.9.2. By Q4 of year 4, effectiveness of input supply and marketing systems evaluated in the Core Countries	Evaluation reports indicating effectiveness of the systems identified in core countries	
3	3.5.1. By Q4 of year 3, relationships between grain nutritional quality and management / environmental conditions quantified	# of relationship equations quantified	Poor legume productivity
4	4.8.1. By Q4 of year 2, standard operating procedures of quality control (storage), product registration and application of inoculants used by inoculant producers and retailers	# of inoculant producers and retailers (public private suppliers) using standard operating procedures (disaggregate by type of SOP)	Lack of effective legume input supply and output market chains
5	5.1.1. Throughout the project, a strategic M&E framework provides timely feedback to learning and future planning	Existence of M&E framework that outlines the types of feedback for planning, and provides timely data	All four area of the Theory of Change
		# and types of feedback provide through the M&E framework	
5	5.6.1. By Q4 of year 4, information on the effectiveness and efficiency of various D&D approaches for legume intensification available to dissemination partners	# of evaluation studies conducted	Lack of effective legume input supply and output market chains
		Effectiveness and efficiency of different D&D approaches identified, documented and shared with partners	

**Table 9 Specific agronomic and rhizobiology data requirements**

Type of data	Frequency
Farm typology and agronomic data from <b>diagnostic</b> trials	1 or 2 times per year after harvest for 2014 and 2015(depending on country specific seasons)
Farm typology and agronomic data from <b>demonstration</b> trials	1 or 2 times per year after harvest for 2014-2017(depending on country specific seasons)
Feedback on yield, performance and farmer practice from <b>adaptation</b> trials	1 or 2 times per year after harvest for 2014- 2017
Data from specialized <b>agronomy</b> trials	1 or 2 times per year after harvest for 2014- 2017



## VI.1 Data collection, Analysis and Management

This aspect of the learning M&E indicates the data collection methods, processes, analysis and feedback. These are represented by activities 5.2 and 5.4 of objective 5. Specific data required under agronomy and rhizobiology trials and demonstrations (**diagnostic** trials, **demonstration** trials and **adaptation** trials) will be collected with specified field books and templates and will be monitored by all project data analysts per country with related responsibilities in these areas. This means data concerning  $G_L \times G_R \times E \times M$  equation will be collected for analysis. Field books will be administered per farmer per season and data collected for analysis and subsequent feedback.

In addition, other learning indicators as listed in Table 8 to measure results and provide feedback on partner and beneficiary outcomes will be monitored under this section and feedback provided to respective stakeholders and users for learning purposes.

Methods of data collection vary per indicator type, however, currently identified methods include interviews with data collection guides and tools, focus group discussions, field observations, etc. With this also, M&E will be an integral part of all partnership agreements (both N2Africa-led and partner-led dissemination interventions) specifying the results areas to be measured, targets, roles and responsibilities, etc. Specific data will be collected with agreed tools from partners and beneficiaries and analysed to provide needed feedback especially at outcome results level. Other qualitative data such as behavioural changes among beneficiaries, beneficiary opinion on project interventions will be collected occasionally through methods such as focus group discussions and outcome mapping at selected communities and from sampled farmers.

Specific variables (to be proposed) will be used for the assessment of the input and marketing systems as well as the D&D approaches. Concerning the assessment of the various D&D approaches, specific data collection templates will be developed to assess the effectiveness and the efficiency of such approaches. Students and other resource persons will be engaged in the data collection and analysis. Data will be based on the indicators for effectiveness and efficiency developed with project staff and partners.

Monitoring will be done per season and as and when trials and demonstrations take place in various core countries. Situational analysis will be done per target area for all aspects of learning M&E. This will enable proper targeting of legume interventions and to obtain the magnitude of project results. Refer to Table 8 and Table 9 for specific indicators and data requirements to be monitored under the Learning M&E cluster.

With regards to data validation, partners will be assisted by project staff during data collection periods to check the validity of the data and to ensure the quality. Beneficiary groups will also validate data collected from them and provide feedback for the use of the data. Platforms such as field days end of season meetings with selected beneficiaries will be used for such validations. Data collated at the country level will be validated and quality assurance done by the country data analyst before uploading onto the project database.

## VI.2 Reporting and Dissemination of information (Feedback)

Reporting under research learning will involve providing timely feedback to operationalize the development-to-research learning loops and informing planning for next season. This will mainly be done in the core countries. The reporting will also help to decide on the best-fit technology options for target areas. Feedback platforms identified include;

- Planning and review meetings with country specific stakeholders serving as *reflection learning planning cycle*;
- Partnership platforms (emanating from partnership agreements);
- Pre- and Mid-season training sessions;
- Field days with farmers (including other actors);
- End of season (feedback to/from extension agents and farmers);
- Community Mobilization.



With the above platforms, the following must be observed:

- Set objective
- Time of activity
- Facilitation to obtain emerging issues
- Documentation and synthesis of feedback
- Integrate into next action

This implies continuous data collection during trials (demonstrations and adaptations) to understand the performance of legume technologies and more specifically to understand best-fit options for various target areas. Feedback from beneficiaries and partners is paramount in this regard. Reports will be obtained from partners indicating the various results achieved and lessons learnt including the effectiveness of dissemination approaches and evaluation of technologies. Refer to section 8 for detailed timing for all M&E activities.

Reports per country specific assessment of systems and approaches will be submitted after each study and a final report for project level. These reports will be reviewed and disseminated to project stakeholders. Data will be analysed and uploaded onto the central repository.

**Table 10 Feedback type, frequency and reporting formats**

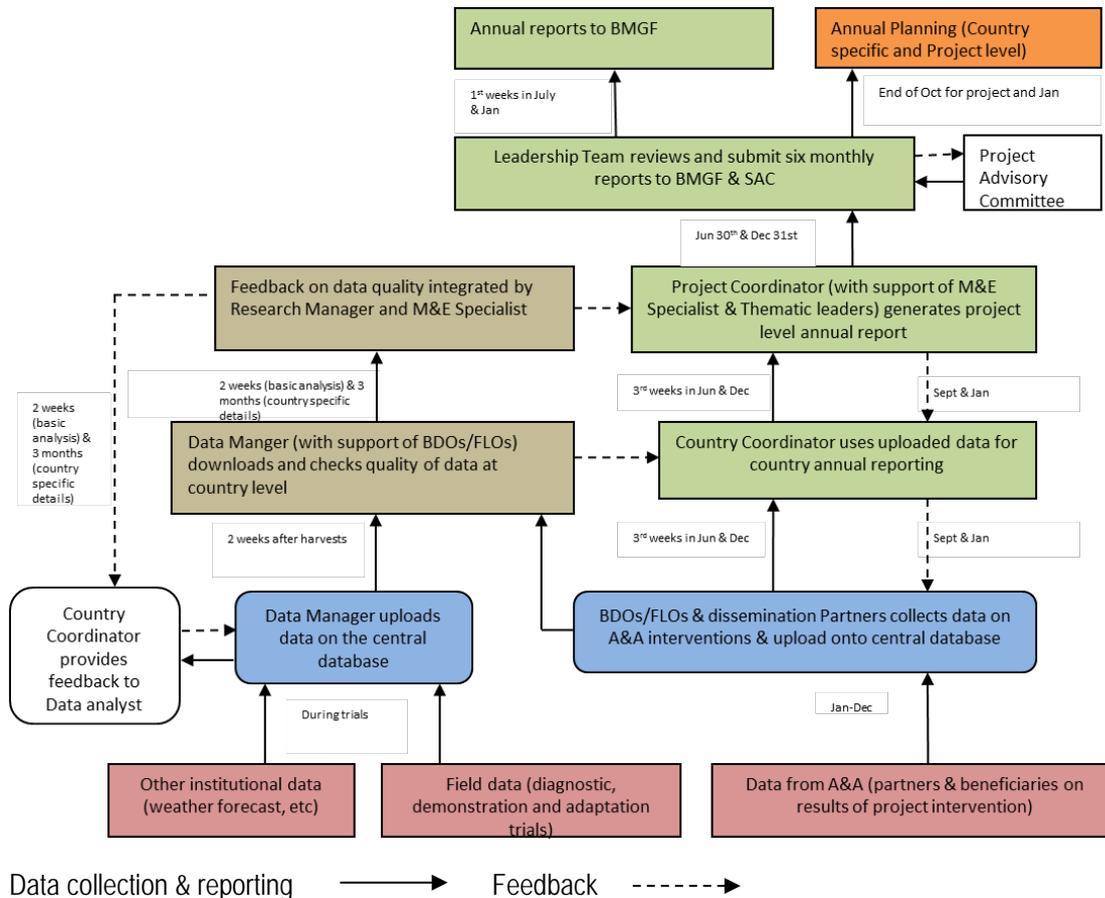
Type of output	Format	Distribution	Timing
Basic analysis of agronomy data	Concise reports on efficacy of treatments and experimental/data quality	Intranet	within 2 weeks after uploading of data (typically each season)
Summaries of the agronomic trials per country	Concise documents describing location, characteristics and basic outcomes of different trials	Internet	within 3 months after uploading of data (typically each season)
Summaries of dissemination activities per country	Concise documents mapping the dissemination progress for different technologies	Internet	within 3 months after uploading of data (typically each season)
Advanced (meta) analysis of agronomy data	Extended reports on treatment effects and their most probable biophysical and agronomic determinants	Intranet, scientific papers internet	Within 6 months after uploading of data.
Selected data subsets	Purpose specific data products derived from the database	Internet	Upon request

### VI.3 Situational Analysis and Baseline Data

Situational analysis will be conducted for both research and partner outcome learning. Regarding research learning, situational analysis will be conducted per core country for all agronomic and rhizobiology data requirements. This will establish the baseline data per country. For other learning areas, an end line survey of the project was conducted in 2013 for all Phase I countries from which baseline data will be obtained for these countries. Baseline data is also being collected for all new countries. Situational analysis will also be conducted for all other learning indicators without existing baseline data to establish the relevant reference point data before project intervention starts.



Figure 4 shows the data flow regarding learning M&E.



**Figure 4 Learning M&E Data collection, reporting and feedback flow chart**

Regarding Tier 1 countries, dissemination partners will mainly provide data.

## VII. Results framework for Cluster 3 - Impact Assessment

The impact of a project is the difference between the observed long term results with the interventions of the project and the long term results that would have been without the interventions. In other words, a precise causality needs to be established between the project's activities and potential outcomes and impacts, i.e. tracking the impact pathway of the project. With regards to N2Africa, project impact assessment will investigate if and to what extent the project activities actually benefited the intended recipients, and if these benefits can be attributed to the project activities or contributions by the project can be traced to such benefits.

The following criteria will be used for the assessment of the project results:

**Efficiency:** (the extent to which activities were implemented on schedule and within budget, the extent to which outputs were delivered economically)

**Effectiveness:** (the extent to which project objectives were achieved, the extent to which outputs lead to the intended outcomes)

**Relevance:** (the extent to which project objectives consistent with beneficiaries' needs)

**Impact:** (changes resulting from project interventions, any unplanned, or unintended changes)

**Sustainability:** (possibility of benefits to be maintained for an extended period after project intervention ends)



### VII.1.1 *Design of the impact assessment*

The impact assessment for N2Africa will be conducted based on selected project areas in different ecological zones across all countries. The design will focus on specific expected effects/areas (called impact domains) and consider changes in those areas. These expected effects and impacts of the project on beneficiaries have been identified together with the donor based on the Theory of Change. The specific impact domains and learning areas are outlined below:

### VII.1.2 *Learning areas, impact assessment domains and related indicators*

- Change in income earned from increased legume production and use of such additional income
- Gender inclusion and empowerment: Changes in gender disparities in targeted value chains
- Sustainability of interventions related to marketing (does collaboration with private sector continues after project ends?)
- Best-fit business model (What kind of business models work?)
- Soil fertility and other benefits to other crops (What are the rotational effects and/or broader benefits of legume crops in farming system?)
- Benefits/value generated to male and female farmers including health and nutritional benefits specifically change in nutritional aspects of selected women and children benefiting from project interventions (legume-based protein intake).
- Sustainability of input supply and market systems, best-fit D&D approaches in terms of effectiveness and efficiency
- Sustainability of national institutions to lead and develop improved legume technologies; capacity of partners to take up dissemination after project ends and capacity of households to adopt technologies introduced. (To what extent has the project contributed to institutional, partners and individuals (farmers' capacity) capacity building?)

### VII.1.3 *Key impact assessment questions*

In terms of developing a strategy to assess the impact of the project, the below key questions will be asked based on the impact assessment domains identified in section 6.1.2 and the indicators in Table 5.

1. What has changed since the project began?
2. How much change has occurred since the project began?
3. Who experienced the change most and least?
4. How and why did the change occur or not?
5. How much of the change can be attributed to the project itself rather than to external factors (to know if the project contributed to the observed effect or was there some other reason)?



**Table 11 Key milestones and indicators for Cluster 3 – Impact assessment**

Objective	Key milestones at outcome level	Indicator	Focus Area in relation to Theory of Change
2	2.5. N2Africa research and development is institutionalized at the national level and integrated in country-level agricultural transformation agendas	# of national institutions leading development of emerging legume technologies	Limited national capacity in legume agronomy and rhizobiology D2R
		# of dissemination partners with additional programs to disseminate legume technologies beyond the partnership with N2Africa	
3	3.2. Increased income (gender disaggregated) of targeted legume smallholder farmers	% change in farmers' (men/ women) net household income	Poor diets and weak support to women and very poor farmers, poor legume productivity
		% of farmers (men/women) with increased income	
3	3.3. Improved nutritional status (focusing on legume-based protein intake) of beneficiary women and children	% legume-based protein intake per woman & child	Poor diets and weak support to women and very poor farmers
		# of women & children with at least 25% legume-based protein intake	
4	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity	% increase in legume productivity on target households main fields	Poor legume productivity
4	4.3. Overall farming system productivity and soil fertility status is improved through increased legume productivity	% target households using inputs within sustainable rotations (target households using improved farming systems)	Lack of effective legume input supply and output market chains
5	5.6. Evaluate the effectiveness and efficiency of various D&D approaches for legume intensification	% of individual beneficiary farmers applying any of the N2Africa components on their main fields	Poor legume productivity
Objective	Key milestones at output level	Indicator	Focus Area in relation to Theory of Change
2	2.7.2. By Q4 of years 2-5, agro-dealer and other last-mile delivery networks engaged in the commercial supply to farmers of agro-inputs, including inoculants	Volume of seeds, fertilizers and inoculants used per target producer groups per land area	Lack of effective legume input supply and output market chains
		Volume sold by agro dealers. Continuous supply of inputs by input producers as needed by producer	
5	5.7.1. By Q4 of year 4, the sustainability of legume interventions for smallholder farmers evaluated through impact assessment studies	Project wide impact assessment conducted with available report indicating level of sustainability of project interventions	All four area of the TOC

#### VII.1.4 *Impact Assessment Methodology*

In terms of methodology, the main approach to be employed is a non-experiment approach focused on tracing the impact pathway of the project using the project theory of change (impact pathway evaluation) for implementation and impact development. This means establishing project attribution based on the causal relationship within the project logic (Theory of Change). Critical questions based on the proposed impact assessment domains will be used to trace the impact pathway during the impact assessment.

This approach is devoid of counterfactuals using exact experiments to measure attribution of the project. N2Africa's approach of non-randomisation of interventions, reaching out to majority households in all target areas and introducing legume technologies to such households limits the use of experiments. Control groups can easily be contaminated in the few months of project implementation when actual results are not yet achieved to enable impact measurement.



With this methodology, baseline and endline evidence based assessment will be done to sum up the worth or value of the project interventions at its conclusion and to mainly determine contributions made by N2Africa, where it makes that difference and for whom, and less concerned with counterfactuals to establish attributions. Also Return on Investment (RoI) analysis will be done to ascertain the returns at the beneficiary level due to N2Africa interventions. Such as value created as a results of using improved inputs, access to inputs, linkage to markets due to N2Africa and its partners.

In this instance, the assessment will be combined with case studies focusing on specific issues to determine some of the unique contributions of N2Africa, i.e. some impact assessment domains as identified above will be assessed through case studies before the end of the project, (e.g. case study on gender integration in legume value chain). Such case studies and other project outcome data will contribute to the final impact assessment of the project. At the end of the project, impact assessment will be conducted to compare the before and after situation.

In addition to the above methodology and **where appropriate**, quasi-experimental designs will be used with counterfactuals (e.g. contributions of a specific N2Africa technology to increased yield) to determine project contribution and attribution. The difference-in-differences (DiD) method will be used to estimate the effect of the project interventions between treated and non-treated groups.

In this case, treatment and comparison groups will be measured for before and after situations (introduction of the technology). Target households will be sampled with appropriate control groups (reasonable comparison group for those situations) in selected countries and target areas. Baselines will be constructed for both groups in a baseline study (when such situations are identified). The opinions of stakeholders will also be captured through participatory discussions for correction and confirmation purposes. Detail impact assessment design will be done together with a selected organization for the assessment and agreed upon with BMGF.

#### VII.1.5 *Data collection, Analysis and Management of the impact assessment*

This aspect of the impact assessment indicates the process of data collection, analysis and data management structures which are represented by Activities 5.2 and 5.4 of Objective 5. Indicators in Table 11 will be used for the impact assessments.

Data on impact assessment will be collected through household survey with sampled beneficiaries. Agreed structured and semi-structured tools will be developed and used for data gathering. Case studies will be used for specific issues. Data will be analysed per project ecological zone and overall project level.

#### VII.1.6 *Situational Analysis and Baseline Data*

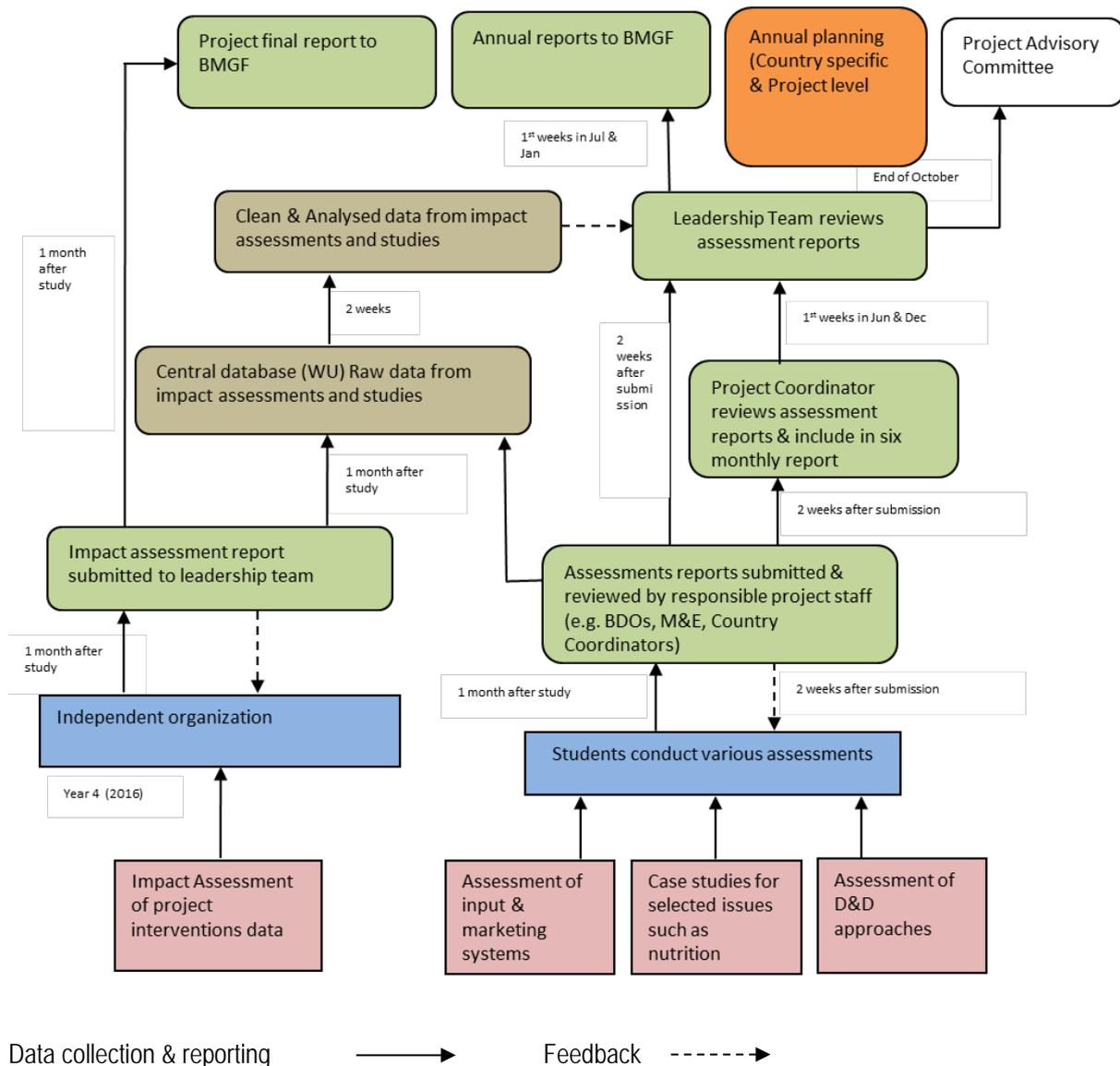
An end survey of the project was conducted in 2013 for all Tier 1 countries and a baseline is being conducted for new countries. Baseline data will be extrapolated from these data to represent the “before intervention” reference point. In year 4, a final impact assessment will be conducted to compare the two situations.

#### VII.1.7 *Reporting and Dissemination of information (Feedback)*

Data will be analysed and an impact assessment report submitted by the lead organization. Data from the assessment will also be uploaded onto the central repository for reference and further analysis. Reports will be developed and disseminated to project stakeholders.



Figure 5 indicates the flow of data, responsible persons and feedback systems within the impact assessment and assessment of the various systems and approaches.



**Figure 5 M&E Data collection, reporting and feedback flow chart for impact assessment cluster**



## VIII. Results framework for Cluster 4 – Database and Data Management

### VIII.1 General Data flows within N2Africa

Continuous learning from dissemination and research activities is one of the defining aspects of N2Africa's D2R approach. The need for timely feedback from on-going activities requires an efficient system of data flow and data management. In addition, information and knowledge generated by N2Africa should be accessible to research and development professionals outside the project and to the public at large in a way that allows accountability and learning for the underlying data.

All data generated within N2Africa will be compiled, curated, stored and distributed by Wageningen University (WU). This will ensure long-term availability, consistency and accessibility of the data. Responsibility for data at the level of individual countries lies with the country coordinators. Country coordinators and their staff will continuously compile and check all data from research and dissemination partners and communicate it to WU.

To ensure smooth data flows, standard data collection forms and associated electronic data entry sheets will be provided for the main types of data (agronomy specific data and project level data). Country coordinators will make sure that data is collected in the correct format.

### VIII.2 Overview of data flow structure

All data will be entered through N2Africa's **Intranet**, hosted by WU. Country coordinators can use the integrated data upload facility to upload files or folders and provide meta-data. After uploading, raw data will be automatically stored on a central server (WU) with daily backups. This data is then converted, checked for quality issues and read into the **Central database**. The central database is the main point of storage, access and reference for N2Africa data. Country and research coordinators will have unlimited read-only access while M&E and research & data coordinators will have editing rights to ensure that data remains up-to date and accurate.

All products (including reports and publications) and analyses based on N2Africa data will use the data stored in the central database, with explicit reference of the date on which it was accessed. Important changes to the data related to data quality should be communicated to the data coordinator (WU) so that these changes may be incorporated in the database. Upon request of the country coordinators, intermediate results and reports may be generated from data in the database, to ensure timely feedback on methods and approaches. These preliminary, internal reports will be communicated internally to the coordinators through the **Intranet**. Data subsets and reports suitable for distribution to project partners and the general public will be accessible through the **Internet**. There is scope for eventually making the aspects of the data base publically available, after removing privacy sensitive information.

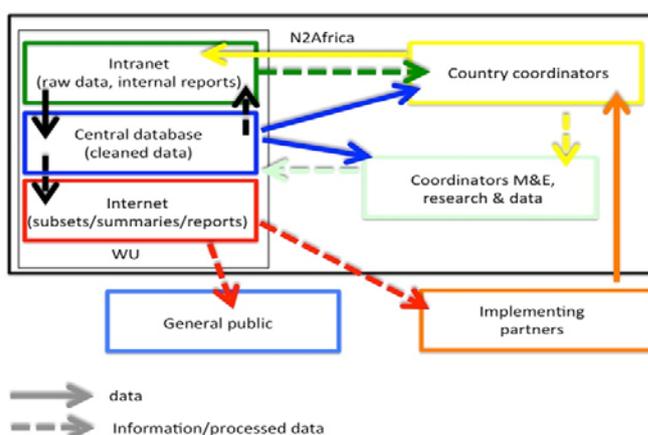


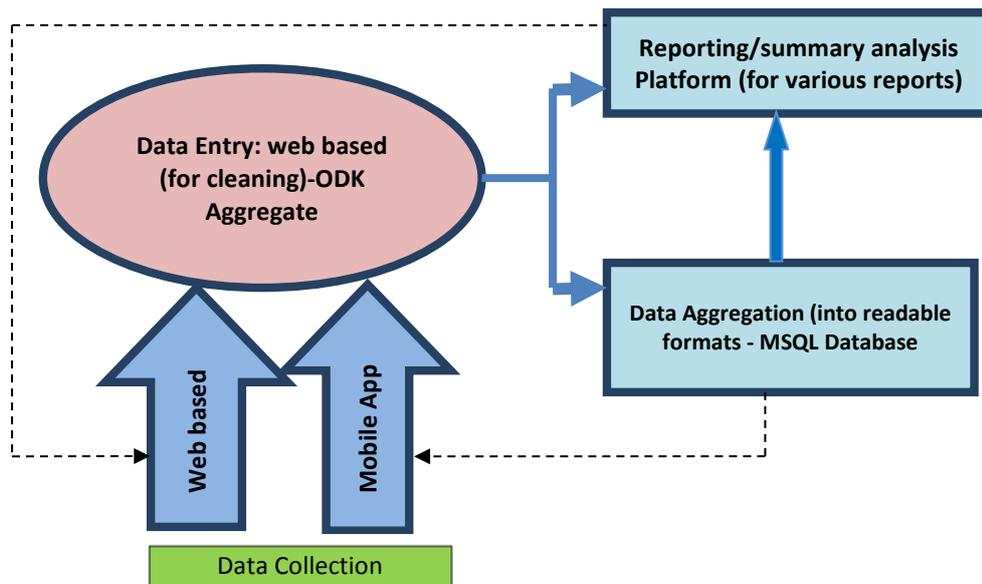
Figure 6 Data flows and data management structure within N2Africa



### VIII.3 Exploring ICT tools for data collection, analysis and feedback

This section of the plan implements activity 5.4 of the results framework. Information and Communication Technologies (ICT) tools are to strengthen feedback loops and foster continuous learning in all aspects of the project. It is also to enable information sharing with partners and stakeholders. This means an ICT tool to enable data collection, analysis and reporting and sending feedback within a stipulated timeframe.

Based on the above role, a proposed ICT tool will assist in data collection, analyse and reports on all project indicators and also data from trials and demonstrations. A sketch of a proposed tool is presented in Figure 7.



**Figure 7 Sketch of ICT tool for data collection, analysis and feedback**

Data will be collected by project staff and partners using both web and mobile phone based applications on all project indicators. At partner level, data will be collected on dissemination activities and any other data relevant. The database (at WU) will be the main avenue for data entry by selected partners and staff. These data will be uploaded directly onto the database for data cleaning and subsequent analysis and reporting. Selected partners will be registered to have access to the reports. The database will also be accessible to 3rd party systems (i.e., for integration of surveys – farmer survey) through appropriate interfaces. Feedback on trials and demonstrations will be sent through the mobile app to needed persons.

Data will be analysed using simple charts and tables. Indicator calculations methods will be integrated into the system to aid the analysis of the data. Project reports will be written and shared with stakeholders using the analysed data from the database.

This will be developed and piloted in selected countries for feedback and then disseminated to all core countries.



## IX. Overall implementation plan for M&E activities

Monitoring and Evaluation Activities	FY 2014				FY 2015				FY 2016				FY 2017			
	Q1	Q2	Q3	Q4												
<b>A. Collect M&amp;E data &amp; reporting by country teams, other project staff and partners</b>		X		X		X		X		X		X		X		X
<b>B. Submit annual report to BMGF</b>				X				X				X				X
<b>C. Collect data on agronomy/rhizobiology &amp; feedback (by data analysts &amp; data manager)</b>		X	X			X	X			X	X		X	X		
Organise baseline data from phase I		X														
<b>D. Conduct Impact Assessment, Case Studies &amp; other Assessment Studies</b>																
Conduct Assessments on D&D approaches					X			X								
Conduct case studies on specific issues (e.g. nutrition)																
Conduct early and end of project impact assessments								X						X		
<b>E. Review Performance Information</b>																
Bi-annual review with country coordinators		X		X		X		X		X		X		X		
Annual review of Performance & Planning				X				X						X		
<b>F. Review &amp; Update M&amp;E Plan</b>																
Update indicator matrix & M&E plan to reflect any changes in project strategy	X	X	X	X	X	X	X	X	X	X			X	X		



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## Abbreviations

A&A	Adaptation and Adoption
BDO	Business Development Officer
BMGF	Bill and Melinda Gates Foundation
D&D	Delivery and Dissemination
D2R	Development to Research
FLO	Field Liaison Officer
$G_L \times G_R \times E \times M$	Genotype of legume ( $G_L$ ) by genotype of rhizobium ( $G_R$ ) by environment (E) by management (M) interactions
ICT	Information Communication Technology
M&E	Monitoring and Evaluation
N2Africa	Putting nitrogen fixation to work for Smallholder farmers in Africa
SAC	Scientific Advisory Committee
TOC	Theory of Change
WU	Wageningen University



## ANNEXES

### Annex I Operationalizing the Milestones and Indicators<sup>1</sup>

Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2, 3, 4	Increased income (gender disaggregated) of targeted legume smallholder farmers	% change in farmers' (men/ women) net household income	Additional net farm income, % change in the net income from farm activities supported by N2Africa and others with direct link to N2Africa activity (per capita expenditures as a proxy for net farm income targeted farmers based on the assumption that increased expenditures is strongly correlated to increased income). Disaggregated by gender to also capture the gender dimension of impact/inequality. The definition assumes that the value of home consumption of self-produced food and non-cash household expenses are not influenced by the intervention.	Count (total expenditure on all household items of selected beneficiaries in year 2 minus year 1/year 1)*100	Percentage reported per country	Survey of selected beneficiaries	Household survey (through impact assessment)	Farmer (sample both male and female)	Beginning of project and end of project-5th year)	External organization for impact evaluation with supervision from Leadership team
		% of farmers (men/women) with increased income	The % of target households with increased income and at least 25% of whom should be women. The use of such income will be assessed as well.	Count (total sampled households with increased income/ the total sampled household) *100. Disaggregate by gender	Percentage reported per country	Sampled targeted households	Household survey (Through impact assessment)	Targeted Household	Baseline and end of project	External org. for impact evaluation with supervision from Leadership team

<sup>1</sup> Milestones and indicators colored blue are key ones used for reporting to the donor. Others are additional ones to assist a wider monitoring of the project.



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	Improved nutritional status (focused on legume-based protein intake) of beneficiary women and children	% increase legume-based protein intake per woman & child	Note: Improvement of legume-based protein intake of at least 25% among women and children within the targeted households in 2 countries	Food patterns and diversity is based on the types and frequency of foods consumed, and major sources of energy and selected nutrients using agreed weighted records for specific days/seasons. This will be done for selected women and children among participating households	Percentage reported per 2 countries	Sampled targeted women and children	Case study	Sampled women and children from targeted household	Baseline and end of project	External org. for impact evaluation with supervision from Leadership team
		# of women & children with at least 25% legume-based protein intake	Women and children whose legume-based protein intake is 25% or more	Count total number of women and children with legume-based protein intake of 25% and beyond. These should be people participating in the survey	Number reported per country	Survey report	Case study	Sampled households involving women and children	First and last year of project implementation	Gender team
2,4	Sustainable use of natural resources (as a measure of soil fertility)	% target households using inputs within sustainable rotations (target households using improved farming systems)	The indicator measures the % beneficiaries who adopt improved farming systems (as a measure of soil fertility). A greater % of beneficiaries adopting improved farming systems presupposes that the soil fertility of such beneficiaries improves as well. Checklist of improved practices: improved seeds, applying inoculants, fertilizers, rotation, feeding livestock with legume residue, applying legume residue in the field, minimum tillage, seed treatment.	Count (total number of target households using inputs within sustainable rotations/total target households)*100	Percentage reported per country	Impact assessment report	Survey of target households. Analyse differences between both men & women households in natural resource management	Target household	First and last year of project implementation	External organization selected for impact evaluation with supervision from Leadership team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
1, 2	National capacity to pipeline (lead) emerging legumes technologies to smallholder farmers developed	# of national institutions leading development of emerging legume technologies	National institutions (public & private) involved in legume technology development are leading the development of new technologies at least in target countries. (What are the emerging technologies? What are the institutions? N2Africa Legume technology=improved seed, fertilizer, inoculants combined with fertilizer.	Count total number of national institutions per country leading new legume technology development for smallholders	Number reported per country	List of partners involved in legume technology dissemination and their related programs in legume technologies dissemination per country	Survey	Target countries national institutions	Beginning and end of project	External organization selected for impact evaluation with supervision from Leadership team
		# of dissemination partners with additional programs to disseminate legume technologies beyond the partnership with N2Africa	Partners go beyond the partnership agreement with N2Africa to include dissemination of legume technologies in other programs. This is a measure of partner capacity in relation to disseminating legume technologies beyond the project.	Count total number of partners per country having integrated dissemination of legume technologies in additional programs apart from the agreement with N2Africa. Disaggregate data by gender to measure the level of inclusion between men and women	Number reported per country	List of national institutes involved in legume technology development and their related technologies developed per country	Survey	Target countries partners for dissemination activities	Beginning and end of project	BDO & Country teams responsible for technology development
3, 4	Productivity at farmer main fields (as a measure of sustainability of technologies)	% increase in legume productivity on target households main fields	% change in yield of targeted legumes per specific land area(main fields) of target households. % Change in area under production	Count (total yield in terms of tons/ha Year 2 or 4- total yield in terms of tons/ha Year 1 or 3)*100 Count total tons/ha at individual household (main fields) level. Aggregated at household level sampled. Disaggregate by crop, gender and household type	Percentage reported per country	Sampled households from targeted households	Survey	Targeted households	Year 2, Year 4	M&E Team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2, 4	Adoption of technologies by target beneficiaries	% of individual beneficiary farmers adopting any of the N2Africa components on their main fields	A farm household is considered as an 'adopter' if, for (at least 2 seasons), it uses at least two of the N2Africa components. % land allocation per technology. Components could include: new variety, additional legume, fertilizer, inoculums, and improved agronomic practices. This will be used as a measure of individual farmer's capacity	Count (total number of individual beneficiary farmers adopting N2Africa components in year 4 /total number of beneficiary farmers in year 4)*100	Percentage reported per country	Survey report	Survey	Target beneficiary farmers	Q4 , Year 4	M&E Team
2	Sustainable input supply systems for legumes at national level	* Volume of seeds, fertilizers and inoculants used per target producer groups * Volume of seeds, fertilizers and inoculants sold by agro-dealers (at least 50% of target farmers access and afford 75% inputs needed)	Specific inputs (inoculants, fertilizers and seeds) as supported by N2Africa and needed by producers are produced and supplied by input producers and suppliers in the target countries beyond N2Africa interventions.	Report on milestone 2.3 will be used as a measure. In addition, the effectiveness of the input supply systems (e.g. existence of MIS to provide information on demand and supply, existence of viable input businesses at target areas, etc)	Tons/ha reported per country	Survey report of input producers & producer groups	Survey	Target input producers and suppliers at national levels, producer groups	Beginning and end of project	External organization selected for impact evaluation with supervision from Leadership team
<b>OUTCOME MILESTONES AND INDICATORS</b>										
1	1.1. Effective and timely work flows and project processes and procedures generate the expected project outputs and ensure effective learning between specific project components	% of milestones achieved by their expected timelines	Project outputs measured by achieved milestones and as a consequence of project processes and workflows.	Count (total milestones achieved per year/total milestones to be achieved by the year) *100	Percentage reported per country	Progress report on milestones achieved	Desk review of project milestones	Project level	Annually	M&E Team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
1	1.2. Communication tools and processes generate additional interest in N2Africa activities, translated in extra dissemination, investments, etc.	# additional dissemination activities by partners not funded by N2Africa (# additional farmers to be reached through indirect dissemination)	Additional N2Africa related dissemination activities/initiatives and investments implemented by partners that are not funded by N2Africa.	Count total number of dissemination activities and investments by partners related to N2Africa dissemination areas, but not funded by N2Africa	Number reported per country	Dissemination partners plan and reports	Review and interview	Dissemination partners	Annually	BDO and Tier 1 Country coordinator
1	1.3. Partners along the legume input and output value chains cooperate actively towards achieving the overall N2Africa goals	# of partnerships (by type) developed and active,  # of partners (by category) actively cooperating within the partnerships developed	A partnership is considered developed and active if there is a binding documentation of roles and responsibilities to disseminate technologies including N2Africa technologies with activities focusing on at least one of the following: capacity building (partner capacity building), market, dissemination and input supply system. It should also indicate the number of target beneficiaries to be reached (80% in 2 years) and gender inclusive activities. Partnerships should include National teams/organizations involved in D2R activities). A partner is considered to cooperative actively with N2Africa when a partnership agreement with above qualities pertains.	Count total number of partnerships developed every six months in each country. Project aggregation is done by summation for all countries.	Number reported per country	Partnership Agreements	Desk review	Country level	Annually	BDO
1	1.5. Young African professionals with increased expertise in biological N fixation advance the legume intensification research areas within their respective national	# Young African professionals with increased expertise in BNF	Graduated MSc and PhD students supported by N2Africa in the area of BNF	Count total number of graduated students with research on BNF	Number reported per country	Graduated students	Review list of graduated students	Country level	Q4 of Year 4 & Year 5	Country coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
	programs									
		# Young African professionals with additional research in legume intensification in their national programs	National programs are research programs in the students target countries related to legume intensification. Also to be indicated is the specific research areas and the final report submitted to the project	Count total number of graduated students with additional research in legume intensification	Number reported per country	Graduated students	Interview with graduated students	Graduated students	Q4 of Year 4 and Year 6	Country coordinator
1	1.6 Scientists and other stakeholder groups are empowered to further the N2Africa research and development	# Scientist and stakeholder groups leading implementation of activities in N2Africa yearly plans	Scientists and stakeholder groups will be empowered through their full participation in plan implementations and taking responsibilities of results.	Count total number of stakeholder groups & Scientists leading implementation of specific plan activities in all N2Africa plans	Number reported per country	Country plans	Review of country plans	Country level	Annually	Country Coordinators
2	2.1. Country-specific inoculant, seed, and fertilizer supply strategies guarantee the sustainable supply of high quality seeds and inoculants and legume-specific fertilizer	# and types of input supply strategies related to seed, fertilizers and inoculants	Strategies (plan of action or policy designed to achieve continuous and unfailing) supply of inputs by farmers	Count total number of strategies used for seed, fertilizer & inoculant supply	Number reported per country	Country annual reports	Review of reports	Country level	Annually	Country Coordinator & BDO
		Performance of various strategies identified in relation to sustainable input supply (demand meets supply)	Farmer must have reliable (consistent and unfailing) source of high quality inputs, such as quality seeds, fertilizer, inoculants. The link between the strategies and the sustainability must be documented.	Documentation of the qualitative assessment of the performance of the strategies	Narrative reported per country	Country reports (indicating strategy performances)	Review of reports	Country level	Annually	Country Coordinator & BDO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.2. Dissemination partners attain / surpass the anticipated number of households targeted and continue to engage in legume intensification post-project	# of target households (men/women/youth) reached by dissemination partners	Number of households (farmers) who have been introduced to N2Africa technologies and use two of the N2Africa components. Use of such 'improved legume cultivation' on a minimum surface of 100 m <sup>2</sup> . Define to include all farmers at demo level. The continued use of the technologies will be measured by productivity under milestone 4.1. This means, target household will have to continue to engage in legume intensification post project as well as dissemination partners.	Count total number of households targeted by dissemination partners every year in each country. Figures are tracked every six months. Aggregation is done by summation for all countries.	Number reported per country	Partners Reports	Desk review	Dissemination Partners	Seasonal	BDOs and FLO
2	2.3. Local agro-dealers marketing fertilizer, seed, and inoculants are aligned with grassroots producer groups and input wholesalers and manufacturers	* Volume of seeds, fertilizers and inoculants used per targeted producer groups per land area * Volume of seeds, fertilizers and inoculants sold by agro-dealers % of targeted local agro-dealers aligned with grass root producer groups, input wholesalers, and manufacturers	Quantities of inputs (fertilizers, inoculants & seeds) that are needed by producer groups and are supplied by local agro-dealers. Note: 12 kg of seeds, 20 kg fertilizer, and 500 g (should be 120 g of inoculant instead of 500 g). Figures given are ton seed; ton fertilizer; ton inoculant (Put number of target household used for calculations). The figures must concentrate on adopters and not all households targeted by the project. The effectiveness and efficiency of the alignment will be assessed.	Count (total volume of listed inputs from producer groups/ the total area used). Inquire if all were obtained from local agro-dealers.	Tons/ha reported per country	Members of selected producer groups,	Market research (Survey of sampled farmers, survey of sampled agro-dealers)	Targeted farmer groups – agro-dealers survey	Start, mid, end project	Country coordinator & Partners



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.4. A preset (see Returns-on-Investment calculations) number of households engaged in the collective marketing and value addition of legume grains and value-added products	# of individual households (men/women) engaged in collective marketing, value addition of legumes and value added products	Collective marketing is where farmers come together to sell their produce as a group allowing for better prices and lower transaction costs. The effects of engaging (being part of) in collective marketing, value addition and value added products will be analysed. To avoid double counting, a household's involvement will be based on time spent in a particular activity.	Count total number of households (gender disaggregated) involved in collective marketing and value addition in each country. Aggregation is done by summation for all countries. Also indicate households involved in individual marketing	Number reported per country	Partners reports, records of producer groups	Desk review of report	Target households/ FBOs	Seasonal	BDOs & Partners
		* Volume of produce sold through collective marketing * Volume of value addition products and types of value added products		Count total volume per crop for collective marketing Count total volume for value addition and the actual value volume for the value added products. Indicate the types of value added products	Tons/ha reported per country	Partners reports	Desk review of report	Target households/ FBOs	Seasonal	BDOs & Partners
3	3.1. Female farmers increasingly lead N2Africa promotion and dissemination activities	# Female farmers leading N2Africa promotion and dissemination activities	Female farmers as lead farmers for technology adaptation and also other females who lead other N2Africa promotional activities (e.g. media events, women farmers demonstrating use of processing technologies, etc)	Count total number of female farmers leading any promotional and dissemination activities led by N2Africa	Number reported per country	Partners Reports	Desk review	Target household	Seasonal	BDOs & Partners



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	3.2.2. By Q4 of years 4-5, at least 2 businesses led by women established per country	# of businesses established and led by women # of women involved in the businesses established	Businesses led by women are same as businesses owned by women. Businesses can focus on any aspect of the selected legume value chains, from input supply through to processing and marketing. Businesses led by individual or group of women will be counted based on the viability and scale. Viability in terms of income generation and scale in terms of main source of employment for owner and if possible others.	Identify the businesses established through the interventions and interactions of N2Africa and its partners. Count the total number of such businesses led by women. Use the viability and scale parameters to count.	Number reported per country	List of businesses (along the selected legume value chains) established through N2Africa and its partners	Interview/Case studies in selected countries	Women business owners	Q4 of Year 4 and Year 5	Gender team (Checking through partnership)
3	3.3. Better knowledge, access and use of household-level legume processing tools improves the nutritional status of women and children in at least 2 target countries	# of women using household level-legume processing technologies	Targeted women in at least 2 countries are using household level-processing technologies introduced to them by N2Africa & its partners. The effectiveness (being able to resolve processing constraints at the household level) and efficiency (cost) of such tools will be assessed. the level of knowledge of the tools by the target women will be evaluated (Checklist of household level tools)	Count total number of targeted women using household processing technologies or sample women for interview.	Number reported per country	Survey report	Interview (Survey)	Women among targeted households	Year 2 and Year 4	Ilse de Jager (conducting PhD study in two countries) to advise on general indicator to be collected across all countries



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	3.4. Women use pre- and post-harvest labour-saving tools	# of women using pre- and post-harvest labour saving tools	The use of the tools is the extent to which the tools are used by the target women for labour saving purposes in terms of effectiveness, efficiency and satisfaction in a specified context(of before & after harvesting). The tools must be made available by N2Africa and/or its partners. These tools are developed and tested in the agronomy trials first and evaluated. Tools can include planters, threshers, tractors hire services, spray teams, etc)	Count total number of women among the targeted households sampled using pre and post harvest labour saving tools. Include reasons why women use or not the labour saving tools and their immediate effects	Number reported per country	Survey report indicating # of women and tools being used	Interview (Survey)	Women among target households	Start, mid, end project	Dissemination Partners
4	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity	% change in legume productivity among target households participating in adaptation trials (this will be considered as early adoption). Can look at progressive farmers)	% change in yield of targeted legumes per specific land area (Measure area under cultivation)	Count total yield in year 2 or 4 and 1 or 3 in terms of tons/ha/household Count (Yield difference tons/ha/household/total yield year 2 or 4 tons/ha/household)*100 Aggregated at household level sampled	Percentage reported per country	Sampled households from targeted households	Survey	Targeted households	Year 2, Year 4	M&E Team
		# of target households (men/women headed) with 50% increased productivity through adaptation trials	Households with 50% increase in productivity through adaptation trials. Note: at least 50% of the target households (see RoI calculations) reach at least 50% increase in legume productivity. To be measured at the adaptation level.	Count total number of surveyed households in adaptation trials with 50% increase in yield. Extrapolate the total figure from the surveyed sample to obtain total target beneficiaries with 50% increase in productivity	Number reported per country	Sampled households from adaptation trials	Survey of sampled households	Target households	Year 2, Year 4	M&E team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
4	4.2. Inoculant producers avail improved inoculant formulations for the target legumes resulting in at least 10% increase in legume productivity and BNF	# of inoculant formulations applied/used by inoculant producers for target legumes in core countries (Productivity will be measured by milestone 4.1)	Inoculant producers make use of improved inoculant formulations for target legumes. Note: At least 1 formulation per core country for cowpea, beans, and groundnut	Count total number of inoculant formulations used by producers for target households	Number reported per country	Inoculant producers	Observation and testing of inoculants produced	Inoculant producers sites	Annually	Project Rhizobiologist
4	4.4. Overall farming system productivity and soil fertility status is improved through increased legume productivity	% increase in overall productivity and soil fertility of various farming systems as a function of increased legume productivity	An increase in legume productivity will contribute to increased overall productivity of farming systems and soil fertility. % change in yield of all crops intercropped with legumes per specific land area	Additional yield increase (tons/ha) of crops intercropped with legumes as a percentage of totals. Sum of (production at individual household / individual land area planted). Aggregated at household level sampled	Percentage reported per country	Survey report of the analysis of overall farming systems productivity and soil fertility as a function of increased legume productivity	Survey of sampled target household	Target household	Q4 of Year 4	M&E Team
5	5.1. National system scientists use the G <sub>L</sub> x G <sub>R</sub> x E x M framework and the obtained information to advance legume research for development within their countries	# of national institutions partnering N2Africa in D2R activities (Also # of participating scientists in those institutions)	National institutions are to partner N2Africa in its D2R activities in all countries. Roles of such institutions in the D2R activities will be assessed for sustainability purposes. National institutions are the research institutions working in the legume value chains	Count total number of national institutions participating in D2R activities together with N2Africa.	Number reported per country	Country level partner list	Desk review of partner list, interview of partner national institutions	National institutions among N2Africa partners involved in D2R centres	Bi-Annual	Country Coordinator
		# of national institutions in target countries using G <sub>L</sub> x G <sub>R</sub> x E x M for research	The National institutions should also use the G <sub>L</sub> x G <sub>R</sub> x E x M framework for their research activities.	Count total number of National Institutions using G <sub>L</sub> x G <sub>R</sub> x E x M framework for research	Number reported per country	Research programs of national institutions	Survey of National institutions	National institutions among N2Africa partners involved in D2R centres	Annual	Country Coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
5	5.2 Dissemination partners integrate effective and efficient dissemination approaches for legume technologies	# of dissemination partners integrating effective and efficient dissemination approaches in their programmes across target countries.	Partners (including National institutions) take forward effective and efficient dissemination approaches to disseminate N2Africa technologies within their respective dissemination programs across the target countries. (Effectiveness and efficiency of dissemination approaches will be measured by milestone 5.6.)	Count total number of partners who have integrated effective and efficient dissemination approaches in their programmes	Number reported per country	Copies of partners implementation plans	Desk review and Direct observation	Dissemination Partners	Annually	BDOs and Tier 1 Country coordinator
<b>OUTPUT MILESTONES AND INDICATORS</b>										
1	1.1.1. By Q2 of year 1, all project staff are engaged and the necessary equipment purchased	# required project staff recruited with necessary equipment	All required staff for specified positions are hired and necessary equipment purchased		Number reported per country				First Year	Project leadership team
1	1.2.1. By contractual deadlines, relevant technical and financial reports forwarded	Annual technical reports submitted to BMGF by end of December every year. Financial reports submitted bi-annually to BMGF	N2Africa will submit 4 technical reports (1 per year) to BMGF during the period of project implementation. Financial reports will be submitted bi-annually to BMGF	Count number of reports(technical & financial) submitted to BMGF	Number project	Project reports submitted	Review # of reports	Project level	Annually	Project leadership team
1	1.2.2. By Q4 of year 5, a final project report submitted	A final project report submitted to BMGF by Q4 of 2016	A final report of the project that indicates the total performance/achievement of milestone targets and other additional results achieved. This report will also indicate what worked well in terms of strategies, and what did not	Report submitted to BMGF by the said date	Number total project	Project reports submitted		Project level	End of project	Project leadership team
1	1.3.1. By Q2 of year 1, potential partners operating within priority legume value chains mapped	# partners within N2Africa legume value chains mapped	Partners supporting the development of the various N2Africa legume value chains are mapped indicating their locations, roles in the value chains, services being provided, expertise (capacity),	Count number of partners mapped	Number reported per country	mapping report of the various country	Survey of partners	Country level	Annually	BDO and Tier 1 Country Coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
			etc.							
1	1.3.2. By Q3 of year 2, MoUs with priority partners in each of the target countries signed	# MoUs signed with priority legume partners	MoUs with partners should indicate the roles and responsibilities of all partners including N2Africa. Focus of the partnership should be in line with N2Africa interventions	Count number of MoUs signed	Number reported per country		Review of MoUs signed	Partner level per Country level	Annually	BDO and Tier 1 Country Coordinator
1	1.4.1. By Q3 of year 1, an internal and external communication strategy developed	* Project wide internal communication strategy developed  *Project wide external communication strategy developed	Note: 1 project-wide strategy, to be delivered in year 1. The communication strategy will indicate how the project will communicate		Number total project	Project progress report	Observation & desk review	Project management	1st year only	Project Management team
1	1.4. By Q4 of year 5, at least 320 persons trained in N2Africa technologies and approaches	# of persons trained (gender disaggregated) in N2Africa technologies and approaches # of N2Africa technologies (by type) in which the persons were trained	Trained persons will be selected from partners involved in dissemination of N2Africa technologies and approaches. Note: 10 persons per partner (see line 13). Effectiveness of the training will be assessed through case studies in selected countries and through the dissemination results of trained partners. (Details of other trainings should be done)	Count total number of persons trained from the collaborating partners for dissemination. Disaggregate data by gender (ensure 50% of participants are women and 50% are men). Aggregation is done by summation for all countries.	Number reported per country	Training reports, list of participating partners from organizations	Desk review of reports	Partner organizations	Annually	BDO and Tier 1 Country Coordinator
1	1.4.2. By Q4 of each year, communication products generated, including a continuously updated N2Africa website, regular Podcasters, and social media products	# communication products generated	Communication products are ones used to communicate the outputs/outcomes of the project interventions to partners, beneficiaries and other stakeholders. Examples include, Project Podcasters, updated project websites, etc	Count number of communication products, disaggregate by type (i.e. Podcaster, social media event, etc)	Number reported per country	Country reports & Project level reports on specific milestones	Desk review of communication products	Country level	Annually	Country Coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
1	1.4.3 Communication to farming communities will be effected through links to Farm Radio and other media outlets (e.g. local newspapers)	# communication events organized for farming communities Types of outlets used for the communication (e.g. Farm Radio, local news papers, etc)	Communication to farming communities will be done using various links and outlets and among them should include Farm Radio, local news papers	Count number of communication events conducted in farming communities. Indicate the outlets used for the communication including Farm Radio, local news papers, etc	Number reported per country	Country reports	Review communication activities conducted	Country level	Annually	Country Coordinator
1	1.5.1. By Q4 of year 1, country-specific research and dissemination implementation plans formalized, including an exit strategy.	# of specific research and dissemination plans formalized	The plans will contain a sustainable exist strategy for each country. It will also indicate how research and dissemination will be conducted. Note: 1 plan per core country to be delivered in year 1.	Count the formalized research and dissemination plans per country	Number reported per country	Plans	Desk review of the plans	Country level	First year	Country Coordinator
1	1.5.2. By Q4 of each year, implementation plans are updated based on M&E feedback	# implementation plans updated with M&E feedback	Each country by Q4 of each year will have an updated implementation plan. The updates must be based on feedback from M&E	Count updated plans for target countries	Number reported per country	Country level implementation plans	Desk review	Country level	Annually	Country Coordinator
1	1.6.1. By Q4 of each year, project-wide implementation plans developed, evaluated, and revised through an annual project planning workshop	# project wide implementation plans developed	The project must have one plan developed and reviewed on annual basis through an organized planning workshop. The plan will be a summary of interventions to be implemented within the following year in all countries.	Count project-wide plan	Number total project	Project level plan	Desk review of the project plan	Project level	Annually	Project leadership team
1	1.6.2. By Q4 of each year, 1 or 2 seasonal, in-country implementation plans developed, evaluated, and revised through in-country- planning meetings	# Seasonal in-country plans developed	The Plans should be developed at the country level through in-country planning meetings with partners.	Count number of seasonal plans per country	Number reported per country	Seasonal country plans	Desk review	Country level	Seasonally	Country Coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
1	1.7.1. By Q4 of year 1, a research plan, engaging at least 5 PhD and 10 MSc candidates, developed	a Project wide research plan to engage PhD and MSc students developed	Note: 1 project-wide plan to be delivered in year 1	1 project wide plan	Number total project	Project plan	Desk review of project plan	Project Management Level	First year	Project Management team
		# of PhD and MSc students (men/women)engaged	These students must base their research activities on the project wide plan for research. Focus of researches should be based on entire project areas; agronomy, dissemination, gender issues, nutrition	Count total number of students (PhD and MSc), disaggregate by gender in each project country. At least 3 PhD candidates are women, and 5 Msc candidates are women	Number reported per country	Country six monthly progress reports	Desk review	Country level	First year	Country Coordinator
1	1.7.2. By Q4 of year 5, at least 5 PhD and 10 MSc candidates graduated	# of PhD and MSc students (men/women) graduated	These students must base their research activities on the project wide plan for research	Count total number of students (PhD and MSc), disaggregate by gender in each project country who have graduated. At least 3 PhD candidates are women, and 5 Msc candidates are women	Number reported per country	Project final report		Country level	Q4, Year 5	Country Coordinator
1	1.8.1. By Q4 of year 1, a non-degree-related capacity strengthening plan developed	Project-wide capacity strengthening plan	Capacity strengthening plan must contain all capacity strengthening issues from research and dissemination partners and focal areas of capacity strengthening should be indicated	Count	Number reported per country	Capacity strengthening plan	Review of the plan	Project level	Annually	Country Coordinator, DMO, BDO & FLO
1	1.8.2. By Q4 of each year, at least 4 relevant and demand-driven training materials developed in cooperation with the African Soil Health Consortium (ASHC)	# training materials developed with ASHC	The training materials must be developed together with ASHC and partner organizations. The materials must be demanded by partners and beneficiaries and must be related to the intervention areas.	Count total number of training materials developed with focus on intervention areas and demanded by beneficiaries and partners	Number reported per country	Training materials	Review	Country level	Annually	Country Coordinator



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.1.1. By Q2 of year 1, N2Africa stakeholder platforms operationalize	# N2Africa stakeholder platforms operational	Operational stakeholder platforms are those where partners meet on regular basis to discuss issues concerning specific value chains' development. N2Africa should not establish its own platforms where they exist; the project should participate in existing ones.	Count total number of stakeholder platforms that are operational	Number reported per country	Copies of minutes of platform meetings	Desk review of the meeting minutes	Identified platform	Annually	BDO & FLO
2	2.1.2. By Q4 of years 1-4, stakeholders agree on specific roles and responsibilities across the various N2Africa objectives	# N2Africa stakeholders with agreed roles and responsibilities	The agreed roles and responsibilities must be documented and shared with all other partners	Count total number of stakeholder with documented agreed roles and responsibilities across the N2Africa objectives	Number reported per country	Documentation of roles and responsibilities	Desk review	Identified stakeholders	Annually	BDO & FLO
2	2.2.1. By Q1 of years 1-4, specific dissemination guidelines for legume intensification assembled	Document indicating specific dissemination guidelines for legume intensification	A document indicating specific dissemination guidelines for the different dissemination approaches identified for legume intensification. An exit strategy after demonstration and adaptation should be integrated into the research and dissemination		Number reported per country and total project	Dissemination guidelines document	Review & documentation of existing dissemination guidelines	Country level & Project level	Annually	DMO
2	2.2.2. By Q4 of years 1-4, specific dissemination guidelines evaluated by a preset (see Returns-on-Investment calculations) number of male and female farmers	# farmers (men/women) who evaluate the guidelines Types of dissemination guidelines evaluated	Dissemination guidelines documented will be evaluated based on the number of farmers reached (men/women).		Number reported per country	Partners Reports	review of approaches	Country level	Annually	DMO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.3.1. By Q4 of years 1-4, at least 2 media events (e.g., radio, newspaper articles, field days, etc) per country implemented	# of media events implemented	Media events are those events organized for the purposes of dissemination activities. The number counted should be disaggregated by types of media events. The nature and purpose of the events will also be assessed. Note: 10 media events per year across the core countries.	Count total number of media events implemented per country and sum up the total. The effects of such events will be assessed through case studies of selected target population.	Number reported per country	Country six monthly progress reports	Desk review	Country level	Annually	Country Coordinator
2	2.4.1. By Q4 of years 2-4, household targets (see Returns-on-Investment calculations), dissemination approaches, and content for partner-led dissemination activities agreed and implemented, with specific attention to gender	# of partner-led agreements/ partnerships with agreed target households, dissemination approaches & activities focusing on gender	Agreements with partners should have household targets, dissemination approaches to be used and activities for implementation and focusing on gender.	Count total number of partner agreements with the agreed attributes as indicated.	Number reported per country	Partner agreements with N2Africa & end of year partner reports (to ensure implementation of planned activities)	Desk review	Partner level per Country	Annually	Country Coordinator, BDO & FLO
2	2.4.2. By Q4 of years 3-5, feedback on the performance of the dissemination models and the demonstrated content fed back to N2Africa	* Performance reports of dissemination models * Type of performance feedback fed back into N2Africa	The performance of each dissemination model will be documented each year and the results fed back into N2Africa.	N2Africa dissemination models will be evaluated after the feedback on the performance of the dissemination models has been reported	Narrative reported per country	Contents of N2Africa dissemination models	Review	Project level	Bi-annually	BDOs & FLO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.5.1. By Q4 of years 1-4, inoculants available through public-private partnerships, through importation and/or local production, the latter facilitated by the inoculant production pilot plant	# of inoculant outlets made available in the target areas	Inoculant outlets (source) should be disaggregated by PPP, pilot production or importation). Note: Number of public-private suppliers in total, starting from MEA limited (Kenya) and Grasslands (Zimbabwe)	Count total number of inoculant outlets in each target area (PPP, importation or local production)	Number reported per country	Survey report of agro dealers in target areas, partners database of target agro dealers	Survey of agro dealers in target areas	Country level	Annually	BDO
		Volume of inoculants imported and /or produced with the identified outlets	Available means outlets meet the quantity demanded by producers. The target is based on total tons of inoculant needed by producer groups calculated based on RoI.	Total of individual inoculant outlet's volume produced or exported. Aggregate (Sum up) the total inoculants available for all outlet	Tons/country	Survey report of agro dealers in target areas, partners database of target agro dealers	Survey of agro dealers in target areas	Country level	Annually	BDOs team
2	2.5.2. By Q4 of years 1-4, legume-specific fertilizer made available to smallholder farmers by fertilizer companies/retailers	# of fertilizer outlets in the smallholder target areas	The fertilizer outlets (agro dealers& last mile delivery networks) should be dealing in legume-specific fertilizer as well. The number of outlets can be used to measure the proximity of these outlets to the smallholder farmers, hence affecting distribution systems & availability. Outlets are fertilizer retailers in the target areas. Outlets can also be fertilizer companies who supplies to retailers in the target areas.	Count total number of fertilizer outlets in each target area (disaggregate by legume-specific fertilizer and other fertilizers)	Number reported per country	Survey report of retailers & companies in target areas,	Survey of agro dealers in target areas	Country level	Annually	BDO & FLO
		Volume of legume-specific fertilizer at the retail shops	Available means outlets meet the quantity demanded by producers. The target is based on total tons of fertilizers needed by producer groups calculated based on RoI.	Total volume of individual retail/company production of legume-specific fertilizer. Aggregate(sum up) the total legume-specific fertilizer available for all outlet	Tons/country	Survey report of retailers & companies in target areas,	Survey of retailers & companies in target areas	Country level	Annually	BDO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.6.1. By Q4 of years 1-4, sufficient legume foundation seed produced by private enterprises and/or government institutions	# of private enterprises & government institutions producing legume foundation seed in the target countries	The foundation seeds should be done under the control and procedures of recognized private enterprises and government institutions in the target countries.	Count total number of private enterprises and government institutions in each target country that are producing foundation seeds. (disaggregate the institutions by those producing other crop foundation seeds and those producing legume foundation seed or both)	Number reported per country	Survey report of private enterprises & government institutions in target areas,	Survey of private enterprises & government institutions in target areas,	Country level	Annually	FLO & BDO
		Volume of legume foundation seed produced by private enterprises & government institutions in the target countries	Sufficient legume foundation seed is the quantity of foundation seed needed to produce quality seed to be used by farmers. In this case, sufficient foundation seed will be quantity needed to produce 11,100 tons of quality seed needed by the target households calculated based on ROI.	Count total volume of foundation seed of individual institutions production. Aggregate the total legume foundation seed for all institutions identified	Tons/country	Survey report of private enterprises & government institutions in target areas,	Survey of private enterprises & government institutions in target areas,	Country level	Annually	FLO & BDO
2	2.6.2. By Q4 of years 1-4, sufficient quality legume seed available to farming communities	Volume of quality legume seed available to target farming communities in the target countries	Sufficient quality legume seed is the quantity of legume seed needed by producer groups. In this case, sufficient quality seed will be 11,100 tons of quality seed needed by the target households calculated based on ROI. Quality seed is defined as one which is genetically pure and should have required level of physical purity. Available means outlets meet the quantity demanded by producers	Total of volume of seed individual agro dealers and last mile networks. Aggregate the total quality seed for all agro dealers & last mile networks	Tons/country	Survey report of agro dealers and last mile delivery networks in target areas, partners database of target agro dealers	Survey of agro dealers & last mile delivery networks in target areas,	Country level	Annually	BDOs team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
2	2.7.1. By Q4 of years 1-2, a minimum number of agro-dealers and other delivery network partners trained in the storage, handling, and use of inoculants	# of agro dealers & other delivery network partners trained in storage, handling and use of inoculants	A minimum number of agro dealers and other delivery networks is the number required per target area for delivery of agro-inputs.	Count total number of agro dealers and other delivery network partners who have been trained in storage, handling and use of inoculants.	Number reported per country	Training report	Desk review of training report	Country level	Annually	BDO
2	2.7.2. By Q4 of years 2-5, agro-dealer and other last-mile delivery networks engaged in the commercial supply to farmers of agro-inputs, including inoculants	# of agro dealers & other last mile delivery networks in full business of supplying agro-inputs to target farmers including inoculants	Agro dealers and other last mile networks who are engaged in full business of supplying agro inputs to farmers.	Count total number of agro dealers and other last mile delivery networks who are in full business of supplying agro-inputs to farmers including inoculants.	Number reported per country	Report of agro dealers	Survey of agro dealers and last mile delivery networks	Country level	Annually	BDOs team/Partners (also for tier 1)
2	2.8.1. By Q4 of years 1-4, opportunities for collective marketing and value addition for smallholder farmer associations identified	# of collective marketing and value addition opportunities identified for smallholder farmer associations	The documentation should indicate identified opportunities in the various target areas for collective marketing for farmer groups and value addition (processing)	Count total number of opportunities identified per core country for collective marketing and value addition. Indicate the level of gender participation of each type of opportunity	Number reported per country	Stakeholder platforms, Producer associations	Interview of producer associations, Discussion at stakeholder platforms	Country level	Annually	BDOs/Partners (also for tier 1)
2	2.9.1. By Q4 of year 2, inventory and analysis of input supply and marketing systems conducted across all countries	Report of inventory and Analysis of the input supply & marketing systems in target countries	The target can be more than 5 if any Tier 1 country implements activity 2.9	The report will indicate types of input supply & marketing systems in the countries and the strengths and weaknesses of the systems in target countries	Number reported per country	Selected target VC actors (input suppliers, marketers, producers)	Case Study, Desk review of partners reports	Country level	Q4, Year 2	Students/BDOs/Country Coordinator
2	2.9.2. By Q4 of year 4, effectiveness of input supply and marketing systems evaluated in the Core Countries	Evaluation reports indicating effectiveness of the systems identified in core countries	The evaluation report will indicate the effectiveness of the various systems identified.	An evaluation report of each core country that gives analysis of the various systems identified	Number reported per core country	Evaluation reports	Case Study, Desk review of partners reports	Country level	Q4 of Year 4 and Year 5	Country Coordinators/BD Os



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	3.1.1. By Q4 of years 1-4, all partners and households engaged in N2Africa activities that address gender inequity	# of Partner agreements with gender specific activities	Partners, both N2Africa-led and Partner-led will have to have specific gender activities in their agreements. With this, it is presupposes that all households being reached by all partners are also engaged in the gender specific activities of these partners.	Count number of partner agreements with gender specific activities. Types and details of the activities and their ultimate results will also be indicated.	Number reported per country	Partner agreements	Review of Agreements	Country level	Annually	FLO/BDO/M&E contact person(Tier 1)
3	3.2.1. By Q4 of years 2-4, business opportunities for women identified	# business opportunities identified with focus on women	Business opportunities along the priority legume value chains should be identified with focus on women being in the lead/ownership of such businesses. Businesses can be at any part of the value chain segment (input supply, marketing, processing, etc). The possibility of the opportunity providing source of livelihood for a household will be assessed. Difficult to identify such businesses	Count number of business opportunities that can be led/established by women and with the probability of being source of livelihood for target households	Number reported per country	Survey report of opportunities identified	Survey of business opportunities that exist for women within the legume value chains	Country level	Annually	FLO/BDO/M&E contact person(Tier 1)
3	3.3.1. By Q4 of years 1-4, themes and models for women-specific dissemination campaigns identified	# and types of women specific dissemination campaign themes and models identified.	Specific women topics and replica of dissemination campaigns must be identified and used as focus of dissemination campaigns for women. There should be documentation of these specific dissemination campaigns for women. (campaigns for value added products, value addition, nutrition purposes)	Count total number of women specific dissemination campaigns. Include in the count, types of the campaigns. Aggregation at project level is by summation	Number reported per country	Assessment report of dissemination campaigns	Assessment report	Country level	Annually	FLO&BDO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	3.3.2. By Q4 of years 2-5, at least 25% of the female farmers participating in the overall N2Africa dissemination activities are also actively engaged in the women-specific dissemination campaigns	% female farmers participating in women specific dissemination campaigns	Women specific dissemination campaigns will be women subject focused and it is expected that 25% of all women participating in all N2Africa activities are also involved in the women specific dissemination campaigns.	Count (total number of women participating in women specific dissemination campaigns/total number of women participating in all N2Africa dissemination activities)*100. Aggregation at project level is by summation	Percentage reported per country	Women specific dissemination campaign report	Review of report	Country level	Annually	BDO & FLO
3	3.4.1. By Q4 of year 2, prototype labour-saving pre- and post-harvest tools for female farmers validated	# and type of prototype labour-saving pre- and post-harvest tools for female farmers validated	Labour saving pre and post harvest tools for female farmers have been validated. Tools for both pre harvesting and post harvesting activities must be validated. The types should be based on whether is pre or post harvest tool	Count total number of prototype labour saving tools for women that have been validated. The types of these tools should be indicated as pre or post harvest tools	Number reported per country	Validation report	Review/direct observation	Country level	Q4, Year 2	FLO&BDO
3	3.4.2. By Q4 of years 2-4, labour-saving tools included in the various dissemination campaigns	# pre and post-labour saving tools included in dissemination campaigns	Validated labour saving tools should be included in the dissemination campaigns especially the female dissemination campaigns.	Count total number of pre and post-labour saving tools included in various dissemination campaigns in each country. Aggregate at project level by summation	Number reported per country	Dissemination campaign reports		Country level	Annually	BDO
3	3.5.1. By Q4 of year 3, relationships between grain nutritional quality and management / environmental conditions quantified	# of relationship equations quantified	Relationship equations will be based on grain nutritional quality, management and environmental conditions. Note: 1 set of equations per country per legume for 16 legume x country combinations (see Table 1 of the proposal)	Count total number of quantified relationships equations based on nutritional quality, management/environment	Number reported per country	Meta-analysis report of trials and demos per country	Desk review of meta-analysis report & observation of quantification process	Country level	Per season in each country	Gender team/Nutrition



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
3	3.6.1 Food consumption and diversity scoped for at least 2 Core Countries	Food consumption and diversity patterns for women and children identified	Food patterns and diversity of foods consumed by participating women and children will be identified and documented	Food patterns and diversity is based on the number, and frequency of foods consumed, and major sources of energy and selected nutrients using agreed weighted records for specific days/seasons. This will be done for selected women among participating households and beneficiary children	Number reported per (2) core country	Survey report	Survey of selected women and children from target areas and the desk study of the report to identify the patterns per country	Selected target women and children.	First year	Gender team
4	4.1.1. By Q4 of years 1-4, seasonal research campaigns towards legume intensification and yield gap closure implemented	# and type of Diagnostic trials conducted by N2Africa	focus of the campaigns and content should e towards legume intensification and yield gap closure	Count total number of diagnostic trials conducted by N2Africa in each country.	Number reported per country	Diagnostic, demonstrations & adaptation trials in each country	Direct observation	Country level	Annually	DMO & FLO
4	4.1.2. By Q4 of years 2-4, improved legume production recommendations integrated in the dissemination campaigns	# of improved legume production recommendations (based on diagnostic trials) integrated in dissemination campaigns	Note: 2 extra production recommendations per core country, starting from a total of 5 generated in phase I	Count total number of improved legume production recommendations integrated in dissemination campaigns	Number reported per country	Agronomy data analysed	Direct observation of dissemination campaign programs	N2Africa country dissemination campaign plans	Annually	DMO
4	4.2.1. By Q4 of year 2, major mechanisms leading to non-responsiveness understood	Major mechanisms contributing to non-responsiveness identified, analysed & documented	Mechanisms that lead to non-responsiveness will be identified, analysed and results documented. This will assist to understand the reasons and mechanisms that contribute to non-responsiveness	Documentation of mechanism contributing to non-responsiveness and analysed	Narrative reported per country	Agronomy data analysed	Reports analysing the mechanisms causing non-responsiveness	Country level	Q4, Year 2	DMO
4	4.2.2. By Q4 of years 3-4, prototype rehabilitation measures for non-responsive soils validated	Validated measures(Prototype) for non-responsive soils	Prototype rehabilitation measures for non-responsive soils must be validated and documented before recommendation is made for use	Documented validated measures to rehabilitate non-responsive soils	Narrative reported per country	Documentation of the validated measures	Review of the documented validation report	Country level	Annually(depending which country has completed validation)	DMO



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
4	4.3.1. By Q4 of year 2, niches for use of legume crop residues within and between farms identified	# niches for use of legume crop residues documented	The position/role (niche) for use of legume crop residue for livestock should be identified and documented. The role should be looked at within farms and between farms.	Count total number of uses for legume crop residue that has been documented	Number reported per country	Documentations/Reports of niche identification	Direct observation, interview of producers	Target household farms & Producers	Year 2	Country Coordinator/FLO/ Student Intern
4	4.3.2. By Q4 of years 3-4, feed availability and quality enhanced through appropriate use of grain legume residues	% of livestock feed quality dependent on appropriate use of legume residues	Quality livestock feed and its availability improves through the use of grain legumes	Percentage of micronutrients in livestock feed that are crop based residue	Percentage reported per country	Survey report of feed analysis	Survey	Country level	Year 3 and Year 4	Country Coordinator/FLO/ Student Intern
4	4.4.1. By Q4 of year 2, at least 1 long term legume monitoring site established per priority region/country	# long term monitoring sites established	Long term monitoring sites are trial sites established for continues and long time trials of legume intensification technologies	How the site is being used will be indicated.	Number reported per country	Country reports	Review of report and direct observation of site	Country level	Once	Country Data Analyst
4	4.4.2. By Q4 of year 5, the medium- to long-term impact of legumes on overall system productivity and natural resource conditions evaluated using time series analysis and modelling approaches	% contribution of legumes production on overall productivity and natural resources evaluated	The overall system productivity is a function of legume production. Legume production will contribute to overall productivity of farming systems and natural.	An evaluation of overall system productivity based on legume production	Percentage reported per country	Evaluation report of Analysis of overall systems and legume production	Survey	Country level	Q4, Year 5	Country Data Analyst
4	4.5.1. By Q4 of years 2-4, at least 50 new strains of effective rhizobia genetically characterized using molecular techniques	# new effective strains of rhizobia genetically characterized using molecular techniques	Identified effective strains of rhizobia (Including imported and indigenous strains) will be characterized genetically using molecular techniques.	Count number of new strains which have been characterized genetically using molecular techniques	Number reported per country	Students' progress reports and/ or thesis	Academic report from project capacity building	Country level/ synthesis at the project level	Annually	Country level/ Project Rhizobiologist



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
4	4.5.2. By Q4 of year 5, newly identified effective rhizobium strains for common bean, cowpea, groundnut conserved in a rhizobium gene bank and at least 5% of these used for inoculant formulation	# Newly identified rhizobium strains conserved in a gene bank	The identified effective rhizobium strains should be conserved in a gene bank and a minimum of 5% used for inoculant production	Count number of identified effective rhizobium strains conserved in gene banks	Number reported per country	Rhizobium Gene Bank	Gene bank report/listing	Country level/ synthesis at the project level	Annually	Country level/ Project Rhizobiologist
		% of identified effective rhizobium strains used for inoculant production		Count (total number of identified effective rhizobium strains used for inoculant production/total number effective rhizobium strains conserved in gene banks)*100	Percentage reported per country and total project	Inoculant production centre	Direct observation	Project level	Annually	Country level/ Project Rhizobiologist
4	4.6.1. By Q4 of year 3, at least 5 new effective and elite rhizobia for beans, groundnut, and/or cowpea identified	# new effective and elite rhizobia identified	Effective and elite rhizobia refer to good and superior potentials, respectively, to be used as inoculant. The rhizobia should be identified for beans, groundnuts and/or cowpea.	Count total number of only new effective and elite rhizobia for beans, groundnut & cowpea. Indicators for its effectiveness will also be documented	Number reported per country and total project	Analysed results of performance of selected rhizobium	comparing responses to selected candidates strains	Country level	Annually	Country level/ Project Rhizobiologist
4	4.6.2. By Q4 of year 5, elite strains used for inoculant production for beans, groundnut, and/or cowpea	# of elite strains used for inoculant production	Note: At least 2 strains per target legume and should focus on beans, groundnut and/or cowpea	Count total number of elite strains used for inoculant production per country	Number reported per country and total project	Inoculant production strains used per country	Observation and texting	Country level	Annually	Country level/ synthesis at the project level
4	4.7.1. By Q4 of year 4, environmental and management conditions affecting the competitiveness and survival of introduced rhizobia elucidated	Documented explanation of MxE on introduced rhizobium strains	The influence of environment and management conditions on rhizobium strains introduced will be documented and explained	Tracing rhizobia using molecular tools	Number reported per country	Report /thesis	Review of report	Country level/	Annually	Country level/ Project Rhizobiologist



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
4	4.8.1. By Q4 of year 2, standard operating procedures of quality control (storage), product registration and application of inoculants used by inoculant producers and retailers	# of inoculant producers and retailers (public private suppliers) using standard operating procedures (disaggregate by type of SOP)	The operating procedures must include quality control, product registration and application. Note: Number of public-private suppliers in total, starting from MEA limited (Kenya) and Grasslands (Zimbabwe)	Count the number of inoculant producers and retailers using the SOPs	Number reported per country	Records of inoculant producers and retailers, samples of inoculants produced and sold by retailers, observation of inoculant stocks	Desk review of production protocols of producers, test samples of inoculants, observation of practices in retail shops	Inoculant producers and retailers	Annually	Project Rhizobiologist with assistance from Country Coordinators
5	5.1.1. Throughout the project, a strategic M&E framework provides timely feedback to learning and future planning	Existence of M&E framework that outlines the types of feedback for planning, and provides timely data. # and types of feedback provide through the M&E framework	Strategic M&E is where feedback is provided as and when needed to inform project decision at each level	The M&E framework will identify & specify various feedback loops, indicate specific timeframe to deliver feedback information. Note: 1 project-wide M&E framework operationalize by year 1 across all target countries	Number total project	Project wide M&E framework	desk study of the M&E framework and possible review	Project wide	Annually (after planning)	M&E Specialist
5	5.2.1. By Q4 of year 1, data management infrastructure is in place and data population initiated	Data Management System established with all project data	Data Management System is where all project data are stored, retrieved and analysed. These data include agronomic specific data and M&E data	-	Number total project	Data Management system		Project level	First year	Data Analyst
5	5.3.1. By Q4 of year 1, information from the situation analysis available for the proper targeting of legume interventions	Legume interventions targeted based on situation analysis	The situation analysis must indicate the differences in the various variables in the different target areas. It also includes the baseline for the entire milestone per country. The Situation analysis report giving analysis of the various agronomic variables and also baselines of selected indicators.	-	Number reported per country	Situation analysis report	review of the report	Country level	Year 1	Data Analyst
5	5.4.1. By Q4 of year 2, prototype ICT tools for data collection and information provision validated	ICT tools validated	The ICT tools will be used for data collection and also provision of information to partners & beneficiaries	Count number of ICT tools validated and the purpose of the tools	Number total project	ICT tools developed	Review of tools	Project level	Year 2	M&E team



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
5	5.4.2. By Q4 of year 4, information on legume production, management, and value addition transferred to stakeholders using ICT tools	# ICT tools used to transfer information to stakeholders	Information on legume production, management and value addition will be sent from N2Africa to project stakeholders using ICT tools.	Count number of ICT tools used to send information to stakeholders. Also indicate the content of the information being sent and the target audience for each ICT tool	Number reported per country	Methods used to disseminate information to stakeholders with N2Africa	Review of methods used	Project level	Year 4	BDO
5	5.5.1. By Q4 of year 4, the relative importance of G <sub>L</sub> , G <sub>R</sub> , E, and M understood for specific legumes and production environments and integrated in improved recommendations	# of quantified relationships (based on legume types)	Note: 1 set of recommendations for the 16 legume x country combinations (see Table 1 of the proposal). Partners to understand are dissemination partners and beneficiaries (farmers)	Count the number of improved recommendations available in each country	Number reported per country	Country reports and dissemination materials	Desk review	Documents on improved recommendations	End of project	Project Rhizobiologist
		# of quantified relationships integrated in improved recommendations			Number reported per country					
5	5.6.1. By Q4 of year 4, information on the effectiveness and efficiency of various D&D approaches for legume intensification available to dissemination partners	# of evaluation studies conducted	The usefulness and the capabilities of the different D&D approaches to obtain intended results from partners and beneficiaries identified and results used to decide on appropriate dissemination approach.	Evaluations should be conducted three times(beginning, mid-term and end) to provide learning and design for improvement	Number total project	Evaluation reports	Desk review	Project level	Q4, Year 2 & Q4, Year 4	Students/BDOs
		Effectiveness and efficiency of different D&D approaches identified, documented and shared with partners	Effective dissemination approach is defined as being able to get farmers to adopt N2Africa legume technologies. Efficient dissemination approach is defined as doing things right in terms of minimizing costs involving dissemination activities yet reaching out to agreed targets of beneficiaries	All D&D approaches will be evaluated with specific indicators including gender on their effectiveness and efficiency levels	Number reported per country	Evaluation reports	Survey of partners, target households and project staff	Country level (Aggregated at project level)	Q4, Year 2 & Q4, Year 4	BDOs



Obj. #	Key Milestones	Indicator	Definition of indicator(s) / Interpretation	Calculation method	Measurement Unit	Data source	Method	Measurement notes		
								Level of collection	Frequency	Responsible for data & reporting
5	5.7.1. By Q4 of year 4, the sustainability of legume interventions for smallholder farmers evaluated through impact assessment studies	Project wide impact assessment conducted with available report indicating level of sustainability of project interventions.	Note: 1 project-wide study to be delivered by the end of year 5	Impact assessment will be based on the project focal areas of intervention (e.g. gender, improved yields, etc).	Number total project	Sampled target households	Interview, Observations, focus group discussions	Project level (dis-aggregated by ecological zones)	2015 and 2016	Project leadership team



## Annex II Operationalizing the Specific Data needs for agronomy and rhizobiology

Type of data	Data collection format (paper)	Data entry format (excel)	Frequency
Farm typology and agronomic data from <b>diagnostic</b> trials	Field book (diagnostic/focal trials)	Standardized data entry workbooks (1 file/trial)	1 or 2 times per year after harvest for 2014 and 2015 (depending on country specific seasons)
Farm typology and agronomic data from <b>demonstration</b> trials	Field book (demonstrations)	Standardized data entry workbooks (1 file/trial)	1 or 2 times per year after harvest for 2014-2017 (depending on country specific seasons)
Feedback on yield, performance and farmer practice from <b>adaptation</b> trials	Feedback form	Standardized data entry workbook	1 or 2 times per year after harvest for 2014-2017
Data from specialized <b>agronomy</b> trials	Standardized agronomy trial form	Standardized data entry workbook	1 or 2 times per year after harvest for 2014-2017



### Annex III Project Key Milestones and related Targets

Objective	Key Milestones	Baseline (if relevant and available)	Period One	Period Two	Period Three	Period Four	Period Five	Grant End	
			Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Jan - Dec 2017	Jan - Dec 2018	Dec 2018	
			Target at period end	Cumulative target at grant end					
1	1.3. Partners along the legume input and output value chains cooperate actively towards achieving the overall N2Africa goals	None	11	21	32	32	32	32	Note: At least 4 partnerships per country by year 4 for the core countries and 2 for the Tier-1 countries
1	1.4.1. By Q3 of year 1, an internal and external communication strategy developed	None	1	1	1	1	1	1	Note: 1 project-wide strategy, to be delivered in year 1
1	1.4. By Q4 of year 5, at least 320 partners trained in N2Africa technologies and approaches	None	110	210	320	320	320	320	Note: 10 persons per partner (see line 13)
1	1.5.1. By Q4 of year 1, country-specific research and dissemination implementation plans formalized, including an exit strategy	None	5	5	5	5	5	5	Note: 1 plan per core country to be delivered in year 1
1	1.7.1. By Q4 of year 1, a research plan, engaging at least 5 PhD and 10 MSc candidates, developed	None	1	1	1	1	1	1	Note: 1 project-wide plan f to be delivered in year 1
2	2.2. Dissemination partners attain/surpass the anticipated number of households targeted and continue to engage in legume intensification post-project	None	71,250	157,500	253,750	385,000	555,000	555,000	Note: Directly related to the ROI calculations (considering both direct and indirect beneficiaries in the core and Tier-1 countries)
2	2.3.1. By Q4 of years 1-4, at least 2 media events (e.g., radio, newspaper	None	10	20	30	40	50	50	Note: 10 media events per year across the core countries



Objective	Key Milestones	Baseline (if relevant and available)	Period One	Period Two	Period Three	Period Four	Period Five	Grant End	
			Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Jan - Dec 2017	Jan - Dec 2018	Dec 2018	
			Target at period end	Cumulative target at grant end					
	articles) per country implemented								
2	2.3. Local agro-dealers marketing fertilizer, seed, and inoculants are aligned with grassroot producer groups and input wholesalers and manufacturers	Limited	885; 1425; 7	1890; 3150; 16	3045; 5075; 25	4620; 7700; 39	6660; 11,100; 56	6660; 11,100; 56	Note: 12 kg of seeds, 20 kg fertilizer, and 500 g of inoculant for half an acre per household; figures given are ton seed; ton fertilizer; ton inoculant
2	2.4. A preset (see Returns-on-Investment calculations) number of households engaged in the collective marketing and value addition of legume grains and value-added products	None	35,000	75,000	125,000	195,000	275,000	275,000	Note: At least half of the 555,000 households reached (refer to impact on households in the RoI calculations)
2	2.5.1. By Q4 of years 1-4, inoculants available through public-private partnerships, through importation and/or local production, the latter facilitated by the inoculant production pilot plant	2	2	3	4	5	5	5	Note: Number of public-private suppliers in total, starting from MEA limited (Kenya) and Grasslands (Zimbabwe)
3	3.2.2. By Q4 of years 4-5, at least 2 businesses led by women established per country	None	0	4	7	10	10	10	Note: At least 2 per core county gives 10 in total
3	3.2. Women improved their income from legume production and have a greater say in the use of such income	None	0	15,000	30,000	60,000	100,000	100,000	Note: At least 25% of households targeted with a delay of 1 year



Objective	Key Milestones	Baseline (if relevant and available)	Period One	Period Two	Period Three	Period Four	Period Five	Grant End	
			Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Jan - Dec 2017	Jan - Dec 2018	Dec 2018	
			Target at period end	Cumulative target at grant end					
3	3.3. Better knowledge of and access to household-level legume processing tools improves the nutritional status of women and children in at least 2 target countries	None	1,000	2,000	3,000	4,000	5,000	5000	Note: Improvement of legume-based protein intake of at least 25% among women and children within the targeted households in 2 countries
3	3.4. Women use pre- and post-harvest labour-saving tools, resulting in higher net profits from legume production and processing	None	7,125	15,750	25,375	30,500	55,500	55,500	Note: At least 10% of the households targeted (see RoI calculations)
3	3.5.1. By Q4 of year 3, relationships between grain nutritional quality and management / environmental conditions quantified	None	0	2	5	5	5	5	Note: 1 set of equations per country per legume for 16 legume x country combinations (see Table 1 of the proposal)
4	4.1.2. By Q4 of years 2-4, improved legume production recommendations integrated in the dissemination campaigns	5	5	10	15	15	15	15	Note: 2 extra production recommendations per core country, starting from a total of 5 generated in phase I
4	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity	None	35,000	75,000	125,000	195,000	275,000	275,000	Note: at least 50% of the target households (see RoI calculations) reach at least 50% increase in legume productivity
4	4.2. Inoculant producers avail improved inoculant formulations for the target legumes resulting in at least 10% increase in legume productivity	None	0	1	2	3	3	3	Note: At least 1 formulation per core country for cowpea, beans, and groundnut



Objective	Key Milestones	Baseline (if relevant and available)	Period One	Period Two	Period Three	Period Four	Period Five	Grant End	
			Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Jan - Dec 2017	Jan - Dec 2018	Dec 2018	
			Target at period end	Cumulative target at grant end					
	and BNF								
4	4.6.2. By Q4 of year 5, elite strains used for inoculant production for beans, groundnut, and/or cowpea	None	0	3	6	6	6	6	Note: At least 2 strains per target legume
4	4.8.1. By Q4 of year 2, standard operating procedures of the production, quality control and application of inoculants used by inoculant producers and retailers	2	2	3	4	5	5	5	Note: Number of public-private suppliers in total, starting from MEA limited (Kenya) and Grasslands (Zimbabwe)
5	5.1.1. Throughout the project, a strategic M&E framework provides timely feedback to learning and future planning	None	1	1	1	1	1	1	Note: 1 project-wide M&E framework operationalized by year 1 across all target countries
5	5.2. Dissemination partners integrate effective and efficient dissemination approaches for legume technologies in their future development initiatives	None	0	0	0	0	16	16	Note: Number of partners taking forward N2Africa technologies within their respective dissemination programs across the target countries
5	5.3. Effective ICT tools provide information on legume production, management, and value addition beyond the project life	None	0	0	2	4	4	4	Note: At least 4 ICT tools by the end of the project



Objective	Key Milestones	Baseline (if relevant and available)	Period One	Period Two	Period Three	Period Four	Period Five	Grant End	
			Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Jan - Dec 2017	Jan - Dec 2018	Dec 2018	
			Target at period end	Cumulative target at grant end					
5	5.5.1. By Q4 of year 4, the relative important of G <sub>L</sub> , G <sub>R</sub> , E, and M understood for specific legumes and production environments and integrated in improved recommendations	None	0	4	8	16	16	16	Note: 1set of recommendations for the 16 legume x country combinations (see Table 1 of the proposal)
5	5.7.1. By Q4 of year 4, the sustainability of legume interventions for smallholder farmers evaluated through impact assessment studies	None	0	0	0	0	1	1	Note: 1 project-wide study to be delivered by the end of year 5



## Annex IV Definitions of Terminologies

Terminology	Definition
Adaptation	Adaptation in N2Africa is tailoring of legume technologies to the needs of rural households to support local adaptation. This is done through adaptation trials with selected farmers in target communities.
Adoption	A farm household is considered as an 'adopter' if, for three seasons, it uses at least two of the N2Africa components. Components could include: new variety, additional legume, fertilizer, inoculums, and improved agronomic practices.
Agri-business cluster	An agribusiness cluster is a partnership between public and private sector actors that collaborate to build profitable agricultural commodity-based value chains. Actors within such clusters comprise producers and their organizations, input suppliers, financial services, processors, collection point and warehouse managers, traders, business development services, etc.
Awareness creation campaigns	Awareness creation campaigns are the use of local radio, newspapers, posters and pamphlets to publicize and build on the dissemination activities in countries.
Business led by women	A business is a commercial (viable and scale of a business) activity engaged in as a means of livelihood or profit. Businesses led by women (in N2Africa) are considered as commercial activities focusing on any aspect of the selected legume value chains, from input supply through to processing and marketing. Businesses led by women are same as businesses owned by women. Viability in terms of income generation and scale in terms of main source of employment for owner and if possible others. Businesses led by individual or group of women will be considered based on the viability and scale.
Business opportunities	A business opportunity is a proven business concept/idea within any of the N2Africa legume crops that can generate livelihoods for a household or an individual. A business opportunity for women is where such business concepts or ideas have been proven to thrive with women being in the lead. Contribution of incomes generated from such businesses to household incomes
Collective marketing	Collective marketing is where farmers come together to sell their produce as a group allowing for better prices and lower transaction costs.
	Communication products are goods, information gathered, object or services created to serve communication purposes. Communication products such as Podcasters, updated project website, etc will be used.
	Communication products
Community-based seed production	Communication tools
Development-to-research learning cycle(s)	The N2Africa 'development to research' model has Delivery and dissemination (D&D) as core activities that take technologies to farmers, whereas monitoring and evaluation (M&E) provide the learning of what works where, and why for whom, and research learning loops analyse and iteratively improve the technologies and their targeting within D&D.
Direct beneficiaries	Direct beneficiaries are those that will interact directly with the dissemination investments of Phase II of N2Africa. Beneficiaries reached through N2Africa-led dissemination.
Direct Dissemination	<b>Direct dissemination</b> is where N2Africa facilitates testing and refining of best technologies developed by the project (n2Africa-led dissemination)
Dissemination approach	Dissemination in N2Africa is the process of communicating proven and locally-adoptable legume technologies to beneficiaries at all levels. Dissemination approach is the way and manner in which proven technologies are communicated to users (beneficiaries). In N2Africa, there are 2 types of dissemination approaches: Direct and Indirect <b>Direct dissemination</b> is where N2Africa facilitates testing and refining of best technologies developed by the project (n2Africa-led dissemination) <b>Indirect dissemination</b> is where the tested technologies are passed on to other development organizations for inclusion within their programmes (Partner-led dissemination)
Dissemination campaigns	Dissemination campaigns are series of organized processes and events to



Terminology	Definition
	communicate proven and locally-adoptable legume technologies to beneficiaries at all levels to enable such beneficiaries adapt and eventually adopt such technologies. In N2Africa, there are three processes with which technological campaigns can be done: N2Africa-led dissemination campaigns, Partner-led dissemination campaigns and Awareness creation.
Effective and efficient dissemination approaches	<b>Effective dissemination</b> approach is defined as being able to get agreed number of farmers to adapt N2Africa legume technologies introduced to them (e.g. through appropriate demonstrations). <b>Efficient dissemination</b> approach can be defined as minimizing the costs involved in dissemination activities yet reaching out to agreed targets of farmers to adapt the technologies.
Effective ICT tools	Effective Information and Communication Technologies (ICT) tools are those that enable rapid feedback on data collected in the field and allow for adaptation of legume technologies in the following seasons.
Effectiveness of input supply and marketing systems	Effectiveness of input supply system is measured by the volume of inputs needed by agricultural producers and that supplied by agro input dealers. Input supply system is effective when supply for inputs meet its demand and actors are connected.
Indirect beneficiaries	Indirect beneficiaries are those that are exposed to N2Africa products through partner organizations, with a cost sharing element between N2Africa and partner organization for the dissemination campaigns. N2Africa will work with partner organizations to ensure that households are properly trained on legume agronomy and agro-input use.
Indirect dissemination	Indirect dissemination is where the tested technologies are passed on to other development organizations for inclusion within their programmes (Partner-led dissemination)
Innovative ICT tools for M&E	Innovative ICT tools and methods for M&E are ones which will answer specific questions and provide learning related to tailoring and adaptation of technologies, the effectiveness of different dissemination approaches, and sales of inoculants and fertilizers by the private sector.
Last-mile delivery networks	Last mile delivery networks are the final input delivery networks segment of the input supply chain that delivers inputs to local farmers and ensure access to inputs by local farmers. The part of the input supply system that actually reaches the farmers to have access to inputs.
N2Africa technology/ies	Technologies related to the N2Africa promoted legumes that are being developed and disseminated by N2Africa and its partners.
Number of households engage in legume intensification post-project	Households who still uses (adopt) the legume technologies introduced to them by N2Africa and its partners. This will be measured by productivity
Partners / partner organization	An organization is considered a partner to cooperative actively with N2Africa when a partnership agreement with above qualities pertains. Partnerships should include National teams/organizations involved in D2R activities
Partnerships Developed	A partnership is considered developed and active if there is a binding documentation of roles and responsibilities to disseminate N2Africa technologies and focusing on one of the following: capacity building, market, dissemination and input supply system. It should also indicate the results to be achieved through the partnership. A partner is considered to cooperative actively with N2Africa when a partnership agreement with above qualities pertains.
Pre- and post-harvest labour - saving tools	Labour-saving tools are those that decrease labour intensive work.
Public-Private Partnerships	A Public Private Partnership (PPP) is a form of cooperation in which parties belonging to the public and private sector are jointly accountable for activities carried out under their common objective, using their pooled resources and personnel and sharing risks. IITA/N2Africa is considered a public organization under any PPP within N2Africa.
Stakeholders platforms	A stakeholder platform is described as a forum established to foster interaction among a group of <b>relevant</b> stakeholders around a shared interest. In N2Africa, stakeholder platforms will be established with key stakeholders (farmers,



Terminology	Definition
	researchers, private sector actors, development partners, etc) to facilitate and coordinate dissemination of legume technologies and other relevant issues affecting the priority value chains. An operational stakeholder platform is where all stakeholders have agreed to roles and responsibilities to address the reasons for the establishment of the platform.
Summative impact assessment	An assessment of learning that provides information on an interventions' efficacy (its ability to do what it was designed to do)
Sustainable supply of inputs	Sustainable supply of inputs is where farmers have a reliable (consistent and unfailing) source of high quality agricultural inputs, such as quality seeds, fertilizer, inoculants, farm equipment, and general agricultural services, including extension services.
Timely feedback loops/learning	Timely feedback is where M&E data is used to inform D&D and research (e.g. allow for adaptation of legume technologies in following seasons). It's also referred to as when information is provided as and when needed to inform project decision at each level
Value addition	Value addition is the process of changing or altering a product from its original state to a more valuable state preferred by the market. <b>Value addition of legume grains</b> is to economically add value to legume grains (such as soybeans) by processing it into a product (such as soya milk) desired by soybean consumers.
Value-added products	Agricultural products (such as Legume grain) that have increased in value due to processing. An example is soybean meal.