ILRI
2015 Annual Report

Jan 2016

Food security and better livelihoods
for rural dryland communities

RESEARCH PROGRAM ON
Dryland Systems

CGIAR

The CGIAR Research Program on Dryland Systems aims to improve the lives of 1.6 billion people and mitigate land and resource degradation in 3 billion hectares covering the world's dry areas. Dryland Systems engages in integrated agricultural systems research to address key socioeconomic and biophysical constraints that affect food security, equitable and sustainable land and natural resource management, and the livelihoods of poor and marginalized dryland communities. The program unifies eight CGIAR Centres and uses unique partnership platforms to bind together scientific research results with the skills and capacities of national agricultural research systems (NARS), advanced research institutes (ARIs), non-governmental and civil society organizations, the private sector, and other actors to test and develop practical innovative solutions for rural dryland communities.

The program is led by the International Centre for Agricultural Research in the Dry Areas (ICARDA), a member of the CGIAR Consortium. CGIAR is a global agriculture research partnership for a food secure future.

For more information please visit:

drylandsystems.cgiar.org

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DISCLAIMER

This document was prepared by Douglas Merrey (Team Leader), Judit Szonyi (member) and Ross McLeod (member) of the CRP-Commissioned External Evaluation team for the CGIAR Research Program on Dryland System. The views expressed in this document do not necessarily reflect the views of the Dryland Systems program.

RESEARCH PROGRAM ON
Dryland Systems

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Table of Contents

RESEARCH PROGRAM ON
Dryland Systems

CGIAR

List of Acronyms


CGIAR
RESEARCH
PROGRAM ON
Dryland Systems

RESEARCH PROGRAM ON Dryland Systems

CGIAR

SECTION I – Key MESSAGES

a. Synthesis of Progress and Challenges (1 ½ page)

In this section, please provide:

I. Synthesis of progress (1 page) and Synthesis of challenges (1/2 page) in implementing 2015 Dryland Systems activities, including their significance for the IDOs that characterize the CRP and a brief description of any noteworthy re- orientation/shifts in activities, if any. Where applicable, please include links to clear research evidence, publications and other materials supporting your narrative.

II. For your reference purposes, here is the list of Dryland Systems IDOs and Cross-Cutting IDOs:

Poverty related IDOs

1.1 Increased resilience of the poor to climate change and other shocks

1.2 Enhanced smallholder market access

1.3 Increased incomes and employment

1.4 Increased productivity

Food, Nutrition and Health related IDOS

2.1 Improved diets for poor and vulnerable people

2.2 Improved food safety

2.3 Improved human and animal health through better agricultural practices

Natural Resource Management –related IDOs

3.1 Natural Capital enhanced and protected especially from climate change

3.2 Enhanced benefit from ecosystem goods and services.

Commented [PE1]: Still to do.

3.3 More sustainably managed agro-ecosystems

Cross-cutting issues –related IDOS

A.1 Mitigation and adaption achieved

B.1 Equity and inclusion achieved

C.1 Enabling environment improved

D.1 National partner and beneficiaries enabled

b. Significant Research Achievements (1 page)

From 2012, the development of a cutting-edge econometric response model by the IBLI team at ILRI enabled expansion into new areas by identifying the relationship between the Normalized Difference Vegetation Index (NDVI) and livestock mortality. In this way, IBLI was designed to protect to pastoralists' from the risk of drought related forage scarcity. It is a market-mediated product that is sold to pastoralists by private sector insurance companies. Since it's inception, over 10,000 pastoralists in Kenya have insured livestock worth over $5 million and these pastoralists have received indemnities totaling $120,000. In Ethiopia, over 3,000 pastoralists have insured livestock worth $1.2 million and have received indemnities totaling $30,000. In 2015, IBLI underwent a shift from an asset replacement to an asset protection contract, as the program scaled up to areas without sufficient livestock mortality data to estimate a statistical response function. Furthermore, the Government of Kenya launched the Kenya Livestock Insurance Programme in August/September 2015, which will offer limited livestock insurance contracts to targeted individuals in Northern Kenya with possible subsidies to the general public in later years.

ILRI has been supporting governments in Tanzania and Ethiopia to map livestock route in order to service and protect them. A national map of livestock routes was supported in Tanzania, which is

already being used in land use and development planning processes. In Ethiopia an international meeting was held to share experiences from other countries, and to raise awareness and commitment for developing a national strategy to develop and protect livestock routes. The process did not only collect useful information, but it also build capacity and strategically built an improved enabling environment for further development of activities.

Smallholder farmers in Sub-saharan Africa, experience seasonal food insecurity resulting from deficits in staple crops due to low yield potential emanating from poor crop varieties, soils and management practises. Owing to climate challenges, crops and livestock contribute negligible income to household economic food security. The situation is exacerbated by poor livestock feed quality and quantity especially during the drier months. Lack of consistent markets with viable prices also contributes significantly to production constraints. Results of the ZimCLIFS project in Zimbabwe indicate that sustainable intensification of integrated cereal–legume–livestock systems coupled with livestock market development systems have the potential to increase the participation and market share value of smallholder farmers. The project demonstrated that overall farming efficiency can increased (income, labour, water use etc.) when the system components are well integrated. Through participatory research, households increased their income and nutritional status on existing land, when crops and livestock are integrated and symbiotic relations yield significant agro-ecological and economic margins.

Over the last four years, the Technical Consortium has been engaged in research focusing on analytics, metrics and appropriate data to enhance resilience for vulnerable populations. There has been a surge of interest in resilience as a core concept on which strategic planning for development assistance and humanitarian aid might be based. Initially introduced as concept to drive policies and programmes, more recent activity has been focused on measurement. Questions raised about resilience measurement are motivated by the need to assess the impacts of the growing number of policies and programs that are meant to promote resilience. From an analytical vantage point, addressing questions about measurement will underwrite efforts to understand and model the dynamics that account for varied outcomes following shock exposure. Why do some households and/communities manage shocks better than other? How can programmes and policies be best targeted to meet the needs of populations that live in shock-prone contexts? Measurement that is well-tailored to such resilience-oriented questions sets the stage for constructing data-based

inferences to guide and evaluate investment decisions. A series of reports have been published addressing these issues.

c. Financial Summary (1/2 page)

This section will be updated once your center closes the accounting books in 2016.

SECTION II– IMPACT PATHWAY AND INTERMEDIATE DEVELOPMENT OUTCOMES (IDOS)

a. Progress Along the Impact Pathway (1/2 page)

- Each Centre should complete Table 1, in Annex 1 and provide a narrative (C.1 to C.3), referring to those indicators from the table in Annex 1 that are relevant to the CRP.

Meanwhile,

- The narrative of progress towards outputs, towards achievement of research outcomes and IDOs and by Region/ALS and towards impact should be structured by Region/Agriclutural Livelihood systems as indicated below and include links to clear research evidence, publications and other supporting materials.

b. Progress in WAS/AgroPastoral

RESEARCH PROGRAM ON Dryland Systems

CGIAR

I. Progress towards outputs (2 pages)

- Training in sheep fattening based on least cost rations using the locally available feed resources was conducted in Fakara, Niger in June and July 2015 involving 16 young men and 12 women. The improved feed rations used led to higher net benefit for the participating farmers compared to the traditional fattening practices characterized by unregulated feeding of available feed resources and waste. A report on this study has been prepared. Results showed that least cost rations with cowpea hay and cotton seed cake are more profitable than the farmers' practice of unregulated feeding of the supplements because the feed cost in the latter was significantly higher than in the other two rations. Each farmer made a net profit of about 60 USD with the least cost rations.
- A practical guidelines on least cost feed rations for profitable sheep fattening in West African Sahel for smallholder livestock farmers and extension workers was developed. The guidelines provide information on what to look for in animals to be used for fattening, the health treatments that are necessary, feeding practices, housing and tips for general management of sheep being fattened.
    - Two papers are accepted for publications from the evaluation of feed resources conducted in DS sites in Burkina Faso and Niger.
      1. Amole T. A and Ayantunde A.A. (2016). Assessment of existing and potential feed resources for improving livestock productivity in Sahel Agro-ecological zone of Niger Republic. International Journal of Agricultural Research (Accepted).

      2. Amole T. A and Ayantunde A.A. (2016). Assessment of livestock feed resources and management practices in Sudan-Savanna zones of West Africa. African Journal of Agricultural Research (Accepted).
- A journal paper was published summarizing research from 2013 and 2014:
  Ayantunde, A.A., Turner, M.D. and Kalilou, A. 2015. Participatory analysis of vulnerability to drought in three agro-pastoral communities in the West African Sahel. Pastoralism: Research, Policy and Practice, 5:13. DOI 10.1186/s13570-015-0033-x.

II. Progress towards the achievement of research outcomes and IDOs (2 pages)

- From the sheep fattening based on least cost rations, each participating farmer made a net profit of at least 12,000 FCFA (about 20 USD) per animal fattened. For the 3 animals fattened, this implies increase in household income by about 60 USD. This has contributed to IDO 1.3, Increased incomes and employment.

- Progress towards Impact (1/2 page)

If/when relevant major contributions towards understanding impact and impact per se should be summarized, with a web link to more detailed documents or specific indicator you may have defined and measured.

- Unexpected Outputs, Outcomes and or Impact

Please summarise any unexpected outputs and outcomes that contributed to impact and progress towards IDOs and Impact. Please include links to relevant documents, research evidence and/or specific indicator you may have defined and measured.

c. Progress in WAS/Rainfed

I. Progress towards outputs (2 pages)

- Analysis and documentation of existing local conventions governing natural resource management in mixed crop-livestock systems of Sudano-Sahelian zone of Mali was conducted and a reported has been prepared. Results of the preliminary analysis of the existing local conventions in 6 Africa RISING intervention communities in Bougouni and Koutiala Districts showed that the local conventions are oral and informal, which essentially renders them largely ineffective. To address this major weakness, we developed and formalized the existing oral conventions in 3 Africa RISING communities namely, Dieba in Bougouni District, Sirakele and Zanzoni in Koutiala District. The development and formalization of the local conventions provided necessary administrative recognition and support at the local government authority ("Commune rurale"). Besides, this will facilitate the use of local conventions for land use planning in the communities.

II. Progress towards the achievement of research outcomes and IDOs (2 pages)

- Oral conventions in 3 communities (2 in Koutiala and 1 in Bougouni) in Southern Mali were documented and validated with the communities, and formalized through approval by the local and regional government authorities. See the link for a story on formalization of local conventions in Zanzoni in Koutiala district. http://africa-rising.net/2015/06/29/a-new-dawn-in-zanzoni-mali-as-natural-resource-management-conventions-are-formalized/. This has contributed to IDO 3.1, Natural Capital enhanced.

III. Progress towards Impact (1/2 page)

If/when relevant major contributions towards understanding impact and impact per se should be summarized, with a web link to more detailed documents.

IV. Unexpected Outputs, Outcomes and or Impact

Please summarise any unexpected outputs and outcomes that contributed to impact and progress towards IDOs and Impact. Please include links to relevant documents and research evidence.

d. ESA/AgroPastoral

I. Progress towards outputs (2 pages)

In 2015, under the Rangeland Governance and Land Tenure activity, three case study reports were produced as well as one Master's thesis, representing three different case studies. The findings

from all three highlight that while emphasizing landscape level governance for pastoral rangeland resources, the importance of addressing institutional design and governance at other levels and of connections between the levels must not be overlooked. All four documents provide practical advice for governance design appropriate to dryland pastoralist settings. This work also yielded two conference presentations in 2015 and one conference panel. Several journal papers are expected out of this work, three of which are in draft stage and are expected to be submitted by the end of February 2016.

The Systems Analysis and Modelling activity funded by Window 1 / 2, resulted in one manual on the *Influence Diagrams* methodology for participatory systems analysis. The methodology was applied in 2015 at both the Yabello and Chinyanja Triangle sites. At the Yabello Action Site, work through both of the above-mentioned activities and the "Assessment of Rangeland Ecosystem Services and Health" activity has come together to feed into stakeholder engagement activities around land use planning, natural resources management, and the need in both of these to address complexity interactions from systems perspective. These may result in 2016 in in a publication on land use and natural resource management policy and governance frameworks in Ethiopia, as well as further stakeholder interaction to use Netlogo simulation modelling for decision-support.

The bilateral project "Enhancing Community Resilience to Drought through Innovative Market Based System Approaches, ended in November 2015. ILRI's contributions to this project in 2015 included a mapping of livestock migratory routes in Samburu County, establishing a process and protocol that can be used in other ASAL counties. ILRI also undertook an outcome pathway evaluation to document the successes and failures of the project in relation to the theory of change initially outlined, and its ability to enhance pastoralist livelihoods resilience. Finally three MSc studies were completed, evaluating three separate case studies: fodder production in Baringo county; Market interventions in Lolkuliani Market; and the Women's camel Milk Cooperative in Isiolo.

The bilaterally-funded Index-Based Livestock Insurance project is also mapped to Dryland Systems. Five years after its inception, IBLI does have a better-informed pastoralist base, who are purchasing IBLI products from a capacitated insurance industry within a supportive policy and institutional environment. This is supported by the Government of Kenya launch of the Kenya Livestock Insurance Program (KLIP), in partnership with ILRI and The World Bank Group.

- So far, over 13,000 households having purchased IBLI to date. In 2015, we surpassed our goal of 4000 policies sold (5363 currently, with some sales data still pending)
- We have 2 main insurers on board, Takaful Insurance of Africa and APA Insurance Ltd but have more NGO partners in 2015 on board, including Solidarite and Adeso.

In 2015 we expanded from 3 counties in Kenya to 6. In 2016, we plan on expanding to 2 more.

In 2015, the GoK will provide 5,000 households in Turkana and Wajir with IBLI-type policies covering 5 TLU (or 5 cattle). This represents a very significant and important moment for IBLI and its expansion.

In Tanzania, ILRI supported the Tanzania Livestock Research Institute to produce a national map on 'major' livestock routes. The process was led by Dr Maria Mashingo (at the time a director of research at TALRI but now Permanent Secretary of Livestock in the new Ministry of Agriculture, Livestock and Fisheries), and supported by ILRI with funds from Dryland Systems (namely Mohammed Said, Shem Kifugo and Fiona Flintan plus two Masters students). A series of meetings was organised bringing together government livestock experts from the different regions of Tanzania, and who mapped major routes and services on topographic maps. The information was then transferred to GIS and regional maps and a national map (of all regions) was produced (see attached). Dr Maria has made several presentations of the mapping process in meetings in Tanzania and one in Ethiopia (see below). In addition the map and process was a key input to the development of Tanzania's Livestock Modernisation Initiative by the Ministry of Livestock and Fisheries Tanzania, which specifically mentions the need to map and protect livestock routes in the Initiative's publication. The work also contributed to a Manual on Participatory Rangeland Resource Mapping in Pastoral Areas in Tanzania, that is also available in Swahili and will be printed and distributed in the next two months with funding from IFAD and the International Land Coalition.

The experiences of Tanzania and the mapping process undertaken there was shared with the then State Ministry of Livestock Development (MoA) (now the Ministry of Livestock and Fisheries) in Ethiopia including through an international meeting on livestock routes, held in Addis Ababa in September 2015. At this meeting the State Minister stated his commitment to mapping and protecting livestock routes in the country (see attached report). This is used as a basis for developing activities with the Ministry and other actors over the next year.

These activities have been further developed into a four-country concept note on mapping, valuing, servicing and protecting livestock routes currently in the pipeline with IFAD.

The Drylands Restoration to Scale project, funded by IFAD/ European Community and led by ICRAF was launched in 2015. ILRI leads activities in Ethiopia. Outputs in 2015 include:

- Planning meetings held with State Ministers of Natural Resources, Livestock, and Agriculture to establish linkages and identify implementation partners among Ethiopian government agencies implementing IFAD(+)-funded programs — PASIDP, CBReMP, and SLMP — that is, directorates under Ministry of Agriculture (especially Natural Resources), Regional Bureaus of Agriculture
- Experience review of land restoration: Key stakeholder groups in relevant focal regions and zones of Ethiopia in process of identification; initial efforts focus on Ministry of Agriculture and Ministry of Livestock partners who provide nationwide coordination
- Literature review of land restoration: Success and failure of government land restoration efforts assessed through review of published and un-published literature; draft report completed for Ethiopia (other, non-ILRI-lead countries not complete)

The Technical Consortium for Resilience in the Horn of Africa (funded by USAID) ended in 2015. The Technical Consortium has produced significant research papers and publications on Monitoring and Evaluation metrics and analytics to determine impact and the transformational potential of development projects, designed to enhance resilience. These can be found on our website: technicalconsortium.org. The subject matter of forthcoming publications include papers on:

- Theories of change and the empirical demands of evidence-based decision-making,
- Assessment and classification of indicators for monitoring for impact,
- Impact assessment methodologies for enhanced resilience,
- The relationship between social capital, psychosocial perceptions of wellbeing, and
- Income diversification and access to financial instruments such as insurance, credit and others.

II. Progress towards the achievement of research outcomes and IDOs (2 pages)

As a result of research activities and stakeholder engagement at the Yabello site, diverse stakeholders have produced joint action plans around rangeland management and livestock markets. Also as a result of these activities, Woreda (District) level land use planning may be piloted in Yabello Woreda. This contributes to IDO 3.1

Findings from case studies carried out in Marsabit and Il'Ngwesi have contributed to the thinking entailed in new development project taking place in five counties in northern Kenya, which was launched in October 2015 and funded by USAID. This contributes to IDO 3.1

The Enhancing Community Resilience Project (funded by SNV) has contributed to IDO 1.2, improved smallholder access. The project targeted supported 25 Livestock Market Associations, 42 fodder groups, 1 women's milk cooperative (25,000 households in all).

The IBLI success in supporting the role out of the KLIP in Kenya, which will reach thousands of pastoralists across northern Kenya contributes to IDO 1.1, increased resilience to climate change and other shocks. KLIP is a national policy which will be rolled out across northern Kenya.

III. Progress towards Impact (1/2 page)

If/when relevant major contributions towards understanding impact and impact per se should be summarized, with a web link to more detailed documents.

IV. Unexpected Outputs, Outcomes and or Impact

Please summarise any unexpected outputs and outcomes that contributed to impact and progress towards IDOs and Impact. Please include links to relevant documents and research evidence.

e. ESA/Rainfed

I. Progress towards outputs (2 pages)

Summarize major successes in producing outputs; provide links to additional descriptions of these achievements. Refer to indicators from Table 1, as relevant.

All the progress below pertains to the ACIAR funded ZIMCLIFS project.

- Godfrey Manyawu assisted ICRAF (Malawi) in a DS project to develop a questionnaire to investigate livestock production constraints in the Ntcheu Region. Analysis of survey results is in progress.
- A Modelling Finishing Workshop was held in Brisbane (Australia) from 23 – 30 July 2015, to list priority interventions suitable for integrated crop-livestock systems on smallholder farmers in Zimbabwe. A draft report was compiled by associate researchers from CSIRO and is available for circulation. Additional funding was obtained from ACIAR in November

2015 to out-scale the agreed priority interventions to other wards and districts within Zimbabwe until 2017.

- Analyses of whole-farm budgets were conducted for the different farmer types (in different agro-ecological regions) and the most suitable cereal-legume-livestock systems were identified for out-scaling in Zimbabwe and Chinyanja Triangle.
- A draft scientific paper on beef value chain analysis, indicating technical and institutional interventions that can improve farmers' access to inputs, services and markets in Mashonaland East Province, was produced.
- The ILRI Associate Researcher (NRS) in Harare (Mrs I. Chakoma) has registered for a PhD course with the University of KwaZulu Natal, to develop sustainable systems of improving forage seed production and distribution in smallholder communities. Outputs on this research will be useful in the Chinyanja Triangle.
- Produced five draft brochures and advisory notes on *Mucuna prupriens*, *Lablab purpureus,* silage-making, hay making and live-beef cattle classification and grading, which can be used in the Chinyanja Triangle to improve integrated crop-livestock farming
-

II. Progress towards the achievement of research outcomes and IDOs (2 pages)

Summarise major successes in the progress towards research outcomes and IDOs. Refer to relevant indicators from Table 1, where relevant and to the indicators of progress towards the CRP's IDOs

- The ZIMCLIFS project engaged about 5000 farmers directly, using a Lead-Farmer Approach.
- About 505 farmers benefited from improved capacity building initiatives relating to market access and practising negotiation skills in dealing with private sector buyers. Value chain members from different IPs are now aware of their role in the different value chains and are willing to contribute to the development of the same value chains.
- In Mashonaland East province, adoption of CA practices doubled maize productivity in 70% of the project's farming household
- Increased crop and livestock productivity by farmers adopting improved technologies and management decisions added to household food security and resilience in adverse agro-climatic conditions.
- Average household gross income from livestock sales of adopting farmers raised to $650 per annum and gross margin to $124 after pen-feeding livestock using home-grown feeds for 60 days, leading potentially to a reduction in poverty levels. Pen-feeding increased the average market value of beef animal from $316 to $638 in 60 days.

III. Progress towards Impact (1/2 page)

If/when relevant major contributions towards understanding impact and impact per se should be summarized, with a web link to more detailed documents.

- IAT modelling for a typical household in Nkayi Province (ave annual rainfall 450mm) estimated that maize yields increase from 0.7t/ha to 1.5t/ha using cereal-legume rotations, improved varieties, liming and other improved management practices introduced by ZimCLIFS. Subsequently, improved nutrition and fertility and reduced mortality of goats reduces losses from 30% to 15%, A typical household will therefore produce about 2.0 tonnes of extra maize and two additional goats for sale or home consumption each year (i.e. doubling of animal off-take). Given current maize and goat prices (US$$390/t and $40/head), annual farm revenue will increase by about

US$$860/household/year. Assuming that 50% gross margin, total household income will be US$430/year. The farmer, therefore, attains both economic and nutritional food security if the surplus money is used to buy other foods to attain a balanced diet.

IV. Unexpected Outputs, Outcomes and or Impact

Please summarise any unexpected outputs and outcomes that contributed to impact and progress towards IDOs and Impact. Please include links to relevant documents and research evidence.

f. South Asia/ AgroPastoral

I. Progress towards outputs (2 pages)

Summarize major successes in producing outputs; provide links to additional descriptions of these achievements. Refer to indicators from Table 1, as relevant.

ILRI activities in Bijapur District of Karnataka focused on 1) understanding the livestock systems, 2) dissemination of dual purpose maize and 2) exploration of development small scale business models around simple chopping machines to promote improved crop residue utilization and reduce wastage of fodder resources. Three villages in Bijapur district Nandyal, Balaganur and Mannur were selected. Participatory rural appraisals showed that livestock was dominated by goats and draught animals followed by nondescript/indigenous cattle and buffalo cows. Crossbred animals are rare since their male calves are not suitable for draught purpose. Additional reasons for not keeping crossbreds were labor, water and fodder shortage. The average milk yield in cattle and buffaloes ranges from 1-2 and 2-3.5 l/d, respectively and no village was selling milk. The villages purchased milk daily (150-300 l) from the Karnataka Milk Federation. The quantity of dry fodder offered daily per animal (cow/buffalo/bullock) was approximately 8 kg. The majority of the farmers offered dry fodder without chopping. When chopping was applied the particle size was 15-20 cm, which is too large and resulting in feed wastage of about 25%. Concentrate feeding was not practiced by the farmers except in Mannur village where some homemade concentrate was fed to the large ruminants by few farmers only. The inter-calving interval in dairy animals ranged from 18 to 24 months. Among the small ruminants goats are more important than sheep and are a good choice for dry land system for income and risk mitigation. Does of local non-descript goat breed are high prolific with 30% twinning and 15%, triplets in each kidding, respectively. Potentially a range of livestock intervention exist such as such: 1) Introduction of thermo-tolerant milch breed of cattle, 2) Challenge feeding of local cattle and buffaloes to test their production potential, 3, Intensive type of male kid rearing and bucks selection for exchange between villages, 4) Feed and fodder library for the dry land system, 5) Analyzing current feeding regimens and correcting if required, 6) Dual purpose crops for increased grain/pod and stover yields with high stover quality, 7) Documenting wastage of dry/green fodder in the existing feeding practices and comparing with data after introduction of simple crop residue processing machines, 8) Dry/green fodder wastage with or without introduction of simple feed mangers (baskets), 9) Documenting local goat breed performance and comparing with data after introduction of Sirohi bucks. However allocated funding allowed only for a small selected choice of interventions.

1. Dissemination of dual purpose maize

Two hundred kg seeds (enough for about 10 ha) of dual purpose maize hybrid NK 6240 previously identified by ILRI and CIMMYT through multi-dimensional crop improvement were disseminated in the villages for rain fed cultivation during the Kharif 2015 season (approximately June to October). A visit in November showed that most famers preferred NK 6240 and declared that they want to switch to this cultivar. Feeding trials with this cultivar to see the effect on milk yields were planned.

II. Progress towards the achievement of research outcomes and IDOs (2 pages)

One joint ICRISAT - ILRI publication was finalized

Haileslassie, A., Craufurd P., Thiagarajah, R., Kumar, S., Whitbread, A., Rathor, A., Blümmel, M., and Ericsson, P. 2016. Empirical evaluation of sustainability of divergent farms in the dryland farming systems of India. 2016. Ecological Indicators 60: 710-723.

III. Progress towards Impact (1/2 page)

Exploring development of small scale business models around feed and fodder. ILRI has identified and purchased three chopper and two shredders with hand, electric, diesel and tractor driven modes to explore small scale business opportunities around fodder processing. The different types of choppers were chosen considering different demand for stover, model of ownership for example service supplier versus cooperative versus private farmer and availability and cost of electric power and diesel. The details of the choppers are:

- One tractor driven chopper with a capacity of about 5 000-6 000 kg/h
- Two shredders with output capacity of 500-900 (electric) and 600-1200 kg/h (diesel) respectively
- Two choppers with a capacity of 100 (hand driven) and 200 (electric) kg/h
- A protocol is developed with the help of the Agri Business Incubator of ICRISAT to understand the economics of different models considering demand for stover, increased value of stover after chopping, reduced stover wastage and diverse fixed and variable costs to identify and target suitable small and medium feed and fodder business models.

IV. Unexpected Outputs, Outcomes and or Impact

Please summarise any unexpected outputs and outcomes that contributed to impact and progress towards IDOs and Impact. Please include links to relevant documents and research evidence.

SECTION III – CROSS-CUTTING ISSUES

Commented [PE2]: Still to complete

a. Gender Research Achievements (1 page)

This section has to be developed jointly with your Center's Gender Focal Point

I. Please describe the key Dryland Systems gender research achievements in 2015 with reference to the specific CRP's outputs and outcomes to which they contributed, with clear web links to gender research evidence, publications and other supporting materials.
II. Please describe key challenges encountered in mainstreaming gender into Dryland Systems research and any mitigation actions taken to address the challenges.
III. Please use the process indicators specified in the CRP Gender Strategy to assess the effectiveness of gender research mainstreaming in 2015.

Commented [PE3]: Not yet completed.

b. Partnerships Building Achievements (1 page)

- Please describe the key partnership building achievements (if any new ones since last year) and associated strategic partnership issues, including public- private partnerships where relevant with clear links to research evidence, publications and other supporting materials.
- Please include a brief description of mechanisms designed to align CRP with priorities in national, regional bodies etc.
- Please describe CRP research outputs and outcomes are being used by partners
- Please describe strategic interactions with other CRPs and their effectiveness.

The "enhancing community resilience "project with SNV helped ILRI to develop key partnerships with the livestock market development community in Northern Kenya (NGOs, county governments, and the Kenya Livestock Marketing Council). This has build a foundation for more collaboration in the future, which has directly enabled ILRI to be awarded a USD 8 million dollar grant to support livestock markets in Northern Kenya by USAID for the next three years.

The IBLI team continues to strengthen partnerships both with the private sector, through engaging insurance companies to actually sell the product. One of the key achievements they have made has been to redesign their approach to partnerships in early 2014, in order to develop the capacity of implementing partners for future sustainability of the project. A second key achievement described in the outcome story has been the role of the IBLI team in helping the Kenyan government to launch a national Kenya Livestock Insurance Program (KLIP).

The new Drylands Restoration project funded by EC/ IFAD through ICRAF is managed by ILRI in Ethiopia. In 2015 ILRI has carefully developed partnerships with the Ministries of Agriculture and Livestock for national level coordination. The project is also coordinating with existing IFAD investments and several USAID and World Bank funded projects to build upon successes in drylands restoration and to ensure we meet the scaling up objectives.

c. Capacity Building Achievements (1 page)

This section has to be developed jointly with your Center's CapDev Focal Point

I. Please provide a synthesis of key achieves/outcomes related to CD activities and highlights/summary of trainings outputs and outcomes with clear links to research evidence, publications and other supporting materials.
II. Please use indicators from Table 1, as appropriate to indicate levels of CD outreach.

Persuading pastoralists in northern Kenya to take control over their own livelihoods by embracing IBLI is the challenge that ILRI and the Government of Kenya face. Research on microinsurance indicates that the primary issue is one of trust.[1] Building trust in an index-based insurance product is a challenge exacerbated by the basis risk inherent in any product, which uses an index to predict loss. Prospective customers, who are poor, often illiterate, and usually not familiar with the concepts of insurance, need to be educated to have a deep understanding of the product. If not, unrealistic expectations resulting from an imperfect understanding of the contract may result in disappointment when a premium is not refunded in a year where drought is not experienced, or when a loss of livestock due to disease or predation is not indemnified. The ultimate result is poor sales and even poorer levels of renewals.

Faced with this challenge, the IBLI Unit within ILRI has designed a set of classroom training materials, which are currently being used to train government extension workers and sales agents across northern Kenya and in the Borana region of Ethiopia. IBLI recognises that not everyone will have the opportunity to attend classroom training and have also commissioned the development of eLearning modules covering the same content. Links to these materials, although still in progress, are listed below:

- https://vimeopro.com/user31068204/ilri-ibli-kenya-videos-for-review/video/139327571
- https://www.dropbox.com/s/nz1on2uuh8d8cmp/Pocket%20IBLI%20%28gamification%29.apk?dl=0
- https://www.dropbox.com/sh/75ajt0uqjylzhe8/AAAXw-rVeG6fkGZI-ogAQxWKa?dl=0

We further highlight a case study written about the IBLI experience, that has been used to train MBA students (see blog here: http://www.thecasecentre.org/educators/ordering/selecting/featuredcases/SatelliteData)

d. Risk Management (less than 1/2 page)

Please list at least three major risks that hindered the expected delivery of results by the CRP and describe the mitigation actions taken to manage these risks.

The major risk in 2015 was the deep and unpredicted budget cuts. This hindered our ability to deliver any results with the Window 1 / 2 funds directly. It is only because of our large bilateral portfolio that we were able to make any contributions towards IDOs.

e. Lessons Learned (1 page)

I. Please describe the key Lessons Learned during the course of implementing Dryland Systems research activities in 2015, by evaluating the key indicators of progress in terms of quantitative and qualitative achievements.

II. If applicable, please describe the reasons why certain research avenues/activities did not produce the expected results and provide actions – taken or recommended – to adjust and/or develop new research activities in line with expected outputs and outcomes.

Commented [PE4]: Still to write

[1] Ibid.

f. CRP Financial Report

This section will be completed when your centre will close the accounting books in 2016.

SECTION IV - RESEARCH OUTCOME STORIES

OUTCOME STORY 1

OUTCOME STORY

Name of research activity/project title:	Index-Based Livestock Insurance
Flagship:	ESA
Geographical region:	Sub-Saharan Africa
Name and email of Activity Lead:	Andrew Mude a.mude@cgiar.org
Name and email of Outcome Story Lead:	Bryn Davies b.davies@cgiar.org
Activity Lead Center:	ILRI
Activity Partner Center(s):	N/A
Activity Partner CRPs:	N/A

1. Outcome Story Headline:

Since 2010, ILRI and its partners have pursued a comprehensive research agenda aimed at designing, developing and implementing market mediated index-based insurance to protect livestock keepers from drought related asset losses.

2. Outcome Story Abstract

From 2012, the development of a cutting-edge econometric response model by the IBLI team at ILRI enabled expansion into new areas by identifying the relationship between the Normalized Difference Vegetation Index (NDVI) and livestock mortality. In this way, IBLI

was designed to protect to pastoralists' from the risk of drought related forage scarcity. It is a market-mediated product that is sold to pastoralists by private sector insurance companies. Since it's inception, over 10,000 pastoralists in Kenya have insured livestock worth over $5 million and these pastoralists have received indemnities totaling $120,000. In Ethiopia, over 3,000 pastoralists have insured livestock worth $1.2 million and have received indemnities totaling $30,000.

In 2015, IBLI underwent a shift from an asset replacement to an asset protection contract, as the program scaled up to areas without sufficient livestock mortality data to estimate a statistical response function. Furthermore, the Government of Kenya launched the Kenya Livestock Insurance Programme in August/September 2015, which will offer limited livestock insurance contracts to targeted individuals in Northern Kenya with possible subsidies to the general public in later years.

3. Problem/Challenge Overview:

The frequency of drought is increasing, which is testing the resilience of millions of pastoralists in the Arid and Semi-Arid Lands (ASALs), and making them the largest group of humanitarian aid recipients in the world. IBLI seeks to protect livestock keepers from drought related asset losses. For pastoralists whose livelihoods rely solely or partly on livestock, the resulting high livestock mortality rate has devastating effects on asset levels, rendering them among the most vulnerable populations in Kenya and Ethiopia. IBLI represents an exciting innovation that could allow vulnerable rural smallholder farmers and livestock keepers to benefit from insurance and thus reduce climate-related risk. More specifically, IBLI endeavors to reduce pastoral vulnerability; increase stability of asset accumulation (lower levels of distress livestock sales); to stem the downward spiral of vulnerable households into poverty through improved risk management; to reduce the need for *food aid among the pastoral population.*

4. What are the main research activities:

The main IBLI research objective was to *design and implement index-based insurance products that livestock keepers—particularly in the drought prone arid and semi-arid lands (ASALs)— can purchase to protect themselves from drought-related asset losses.*

IBLI related activities include:

- *Herd/Pastoral surveys*
- *Extension/Outreach*
- *Community engagement*
- *Sales/Marketing support*
- *Product redesign/improvement*
- *Innovation for Pastoral areas*

Phases are as follows:

- *Pilot[2] (33 %)*
- *Scaling Up[3] (33 %)*
- *Scaling Out[4] (33 %)*

The IBLI program began in 2010 and plans to continue through 2016, with the support of the program's donors. The IBLI Team is also exploring what other innovation and new technology could benefit pastoralists in the ASAL region and will be focusing on those later in 2016.

5. What are the main Outcomes of your research?

Outcomes of IBLI's work should include reduced rural poverty and increased food security. IBLI seeks to generate a group of informed pastoralists who are purchasing IBLI products, which are provided by a capacitated insurance industry within a supportive policy and institutional environment. Indicators of success would include 4000+ of households having purchased IBLI; 4 providers offering IBLI service.

Research published in 2015 has shown that IBLI coverage has strong positive impacts on subjective, economic and health-related indicators of well-being. The gains are especially pronounced in the midst of drought events. Moreover, the marginal benefit/cost ratio of IBLI substantially exceeds that of unconditional cash transfers, and these gains emerge despite IBLI's imperfect coverage of purchaser's risk exposure. Finally, the uptake of the product has been significant, with more than 40% of sampled households purchasing IBLI at least once.

This supports IBLI's goals to enhance livelihoods and reduce the vulnerability of pastoral populations

6. What are the main research Outputs that resulted in the outcome(s)?

- Jensen, Nathan, Barrett, Chris, Mude., A. (2015). "Index-based Insurance: Lottery ticket or insurance?" ILRI Research Brief No. 53. pdf
- Jensen, N., Barrett, C. and Mude, A. (2015). "The favourable impacts of Index-Based Livestock Insurance: Evaluation results from Ethiopia and Kenya." ILRI Research Brief No. 52. pdf
- Chelang'a, P.K., Banerjee, R., Mude, A. (2015). "Index-Based Livestock Insurance (IBLI) Lessons in Extension and Outreach: The Case of Wajir County." ILRI Research Brief No. 39. pdf
- Upton, Joanna B., Jennifer Denno Cisse, and Christopher B. Barrett (2015). "Food

[2] **Pilot** is a small scale preliminary study conducted in order to evaluate feasibility, time, cost, adverse events, and effect size (statistical variability) in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project.

[3] **Scaling up** involves a change in qualities/properties of the object of scaling, and will therefore involve more complexity. It means transition, institutionalization, transformation, integration, incorporation, evolution, development. For more details click here.

[4] **Scaling out** essentially involves replication. We may say that we at least already have a 'prototype'. It means replication, copy-paste, more of the same, expansion, extension, adoption, dissemination, transfer (of technology), mainstreaming, roll-out, or multiplication. For more details click here.

Security As Resilience: Reconciling definition and measurement." **pdf**
- Takahashi, Kazushi, Munenobu Ikegami, Megan Sheahan, Christopher B. Barrett (2016) "Experimental Evidence on the Drivers of Index-Based Livestock Insurance Demand in Southern Ethiopia." *World Development.* **pdf**
- Ermon S, Xue Y, Toth R, Dilkina B, Bernstein R, Damoulas T, Clark P, DeGloria S, **Mude A**, Barrett B, and C Gomes. 2015. Learning Large Scale Dynamic Discrete Choice Models of Spatio-Temporal Preferences with Application to Migratory Pastoralism in East Africa. AAAI-15. *In Proc. 29th AAAI Conference on Artificial Intelligence.*
- Vrieling A, Meroni M, **Mude A**, Chantarat S, Ummenhofer C, and de Bie Kees. 2015. Early Assessment of Seasonal Forage Availability for Mitigating the Impact of Drought of East Africa Pastoralists. *Under review, Natural Hazards*
- Woodard J, Shee A, and **Mude A**. 2015. A Spatial Econometric Approach to Scalable Index Insurance against Drought Related Livestock Mortality in Kenya. *Accepted for publication in 2016, The Geneva Papers on Risk and Insurance – Issues and Practice*

Project Data:

- **IBLI Marsabit Household Survey Data: link to rounds 1-4 data**
- **IBLI Borena Household Survey Data: link to rounds 1-3 data**

7. **Who were the intermediary and direct users of your research outputs and what role did they play in achieving the outcome:**

15+ partners were the intermediary users of the research outputs for dissemination of the technology/tool/practice

2 partners were the intermediary/direct users of research outputs for formulation of policy or development project - The Government of Kenya, along with The World Bank Group, are direct users of the IBLI product and its research.

Over 13,000 pastoralists in Southern Ethiopia and Northern Kenya are direct users of IBLI

8. **How were your research outputs used (will be used in the future):**

IBLI and livestock insurance are now part of the daily agenda, as the Government's of Kenya plans to assist the very poor in Northern Kenya through a similar IBLI-type contract where it pays the premium on behalf of a recipient but the indemnity goes directly to the pastoralist. Moreover, insurers and other NGOs are realizing the importance of this once ignored population and are expanding their operations into these areas.

Through the KLIP program, an Insurance Design Tool as been created to allow governments, private insurers, etc. to determine the sort of IBLI product they want to offer to pastoralists.

IBLI Market & Capacity Development team is also working to create digital training materials that will be open source in order to transfer the heavy burden of capacity building and enable them to focus on the next phase of bringing innovation to pastoral areas.

9. What is the Evidence of Your Research Outcomes:

Sales Dashboard for Kenya:

https://www.dropbox.com/s/xfrb6235kwpa6co/IBLI%20Sales%20Dashboard_%20V6.xlsm?dl=0

Sales Dashboard for Ethiopia

https://www.dropbox.com/s/hkrh1gvei8jgji1/IBLI%20Ethiopia%20Sales%20Dashboard_v4.xlsm?dl=0

http://clippings.ilri.org/2015/08/10/klip-a-new-kenya-livestock-insurance-program-will-start-to-serve-pastoralists-across-northern-kenya-in-october/

Jensen, N., Barrett, C. and Mude, A. (2015). "The favourable impacts of Index-Based Livestock Insurance: Evaluation results from Ethiopia and Kenya." ILRI Research Brief No. 52. pdf

10. Testimonials:

https://www.dropbox.com/s/5463l0lp5y6t3nq/Bringing%20Innovation%20to%20the%20Pastoral%20Areas%20of%20Southern%20Ethiopia.mp4?dl=0

https://adrasibli.wordpress.com/academic-workshop/

https://adrasibli.wordpress.com/policy-workshop/

http://ibli.ilri.org/2015/08/17/oromia-insurance-offers-new-coverage-for-vulnerable-livestock/

http://clippings.ilri.org/2015/08/10/klip-a-new-kenya-livestock-insurance-program-will-start-to-serve-pastoralists-across-northern-kenya-in-october/

11. Lessons Learned:

While risk-adverse pastoralists should be keen to adopt a product allowing them to manage the risk of the increasingly serious droughts experienced in the area (De Bock & Gelade 2012, p.3), there are many challenges in building a market for index based micro-insurance products. Since 2010, insurance companies and the IBLI team have struggled to overcome infrastructural obstacles such as low mobile phone and internet coverage, and minimal road networks, coupled with a nomadic client living in an expansive area.

In response to this challenge, the IBLI Leadership created the Market & Capacity Team whose objective was to increase informed demand among pastoralists and to build capacity within our insurance partners. Currently, this same team is putting together e- and m-

Learning materials, which aim to make their work more efficient, sustainable, and long-lasting.

Moreover, while it was thought that IBLI could be transitioned to a fully private sector product, the team and its donors have agreed that it continues to need some level of donor/public sector support. Although the level of support is declining year-by-year, it will take time for it to be fully unsubsidized in any way and commercially viable on its own.

12. Full reference citations and URL link to published research work.

http://ibli.ilri.org/publications/

OUTCOME STORY

Name of research activity/project title:	Mapping of livestock routes in Tanzania and Ethiopia
Flagship:	ESA
Geographical region:	Sub-Saharan Africa
Name and email of Activity Lead:	Fiona Flintan f.flintan@cgiar.org
Name and email of Outcome Story Lead:	Fiona Flintan f.flintan@cgiar.org
Activity Lead Center:	ILRI
Activity Partner Center(s):	Tanzania Livestock Research Institute- Tanzania, Pastoral Directorate-Ministry of Livestock and Fisheries-Ethiopia, International Land Coalition (ILC).
Activity Partner CRPs:	N/A

13. Outcome Story Headline:

Mapping of livestock routes is a foundation block for raising awareness on mobility, its importance for livestock production in drylands and ways to service and protect it: ILRI has been supporting this process with national government and research institutes in Tanzania and Ethiopia.

14. Outcome Story Abstract

ILRI has been supporting governments in Tanzania and Ethiopia to map livestock route in order to service and protect them. A national map of livestock routes was supported in Tanzania, which is already being used in land use and development planning processes. In

Ethiopia an international meeting was held to share experiences from other countries, and to raise awareness and commitment for developing a national strategy to develop and protect livestock routes. The process did not only collect useful information, but it also build capacity and strategically built an improved enabling environment for further development of activities.

15. Problem/Challenge Overview:

Land and resource tenure security in pastoral areas of East/Horn of Africa is weak. This has contributed to the encroachment of rangelands or allocation to non-pastoral uses. Livestock routes are blocked or are sources of conflict between pastoralists and other land users. Land leased to investors is provided with little if any, thought or provision for maintaining of access to such as rivers and other water sources. With increasing pressure on land and resources, conflicts between different land uses and land users are set to grow.

Despite the critical value of livestock routes to not only local livelihoods but also to national economic growth in East/Horn of Africa, livestock routes receive poor protection, and servicing (water, veterinary services, resting places etc) of the routes is often non-existent. As a result the health and safety of livestock and livestock herders using these routes are at risk, and it is often the case that livestock arrive at their destination in much poorer condition than when they set-out – resulting in lower prices and sales.

16. What are the main research activities:

In Tanzania, ILRI supported the Tanzania Livestock Research Institute to produce a national map on 'major' livestock routes. The process was led by Dr Maria Mashingo (at the time a director of research at TALRI but now Permanent Secretary of Livestock in the new Ministry of Agriculture, Livestock and Fisheries), and supported by ILRI (namely Mohammed Said, Shem Kifugo and Fiona Flintan plus two Masters students). A series of meetings was organised bringing together government livestock experts from the different regions of Tanzania. Six teams of livestock experts were established who focused on different regions of the country. The teams mapped major routes, infrastructure and services on topographic maps such as markets, water points, holding ground, checkpoints etc. and whether they were functioning or not. The information was then transferred to GIS and regional maps and a national map (of all regions) was produced (see attached). Different types of routes (primary, secondary) were colour coded.

In Ethiopia a national meeting was held on livestock routes, and consensus reached that the government and development partners would invest in mapping routes and related activities.

17. What are the main Outcomes of your research?

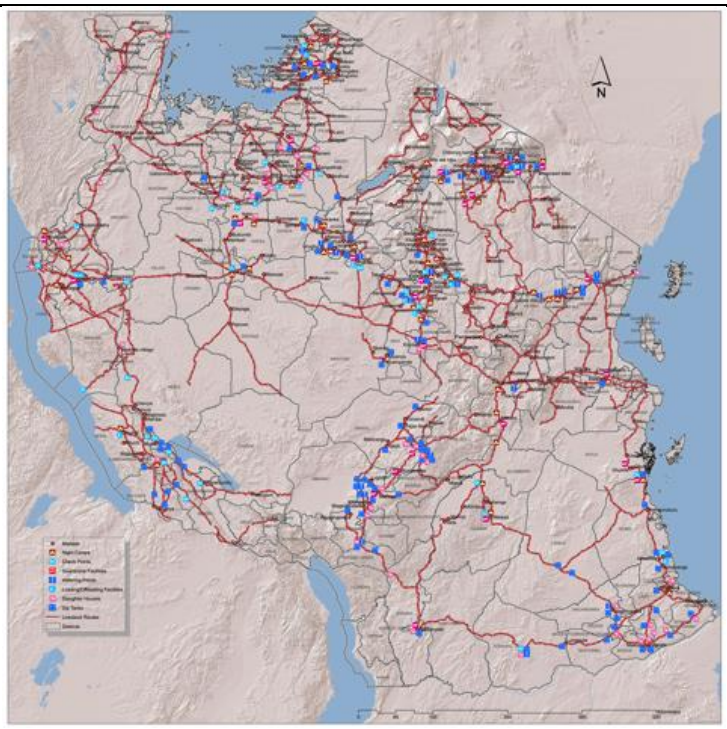
The main outcomes of the activities have been raising awareness on the issues which has lead to commitment by national governments and other stakeholders to carry out further mapping of livestock routes, as well as identifying how best they can be serviced and protected. In addition, information collected and the livestock routes produced have been used in national planning processes, and also by the private sector in determining where for example livestock services including abattoirs are established.

Ultimately better servicing and protecting of livestock routes will lead to improved livestock production and increased incomes for pastoralist and agropastoralists, and a reduction in conflicts over land use and movement, as well as improved trade (including cross-border trade).

The process and the increased awareness raised have contributed to discussions about appropriate mechanisms to better protect the routes amongst the government and technical experts.

18. What are the main research Outputs that resulted in the outcome(s)?

A first draft national map of livestock routes across the country in Tanzania was produced (see below), plus more detailed regional maps. In addition detailed written information was produced on the infrastructure, services, route accessibility etc. which serves as a database for further use. It is anticipated that ILRI will assist the MALF to establish as computerised KM system to store the information and make it more available for use.



Dr Maria of the Tanzania Livestock Research Institute has made several presentations of the mapping process in meetings in Tanzania and one in Ethiopia (see below). In addition the map and process was a key input to the development of Tanzania's Livestock Modernisation Initiative by the then Ministry of Livestock and Fisheries Tanzania, which specifically mentions the need to map and protect livestock routes in the Initiative's publication. The work also contributed to a Manual on Participatory Rangeland Resource Mapping in Pastoral Areas in Tanzania, that is also available in Swahili and will be printed and distributed in the next two months with funding from IFAD and the International Land Coalition.

The below photo is taking at the workshop to write the Tanzania Livestock Modernisation Initiative which included the mapping of livestock routes as an activity based on the map that was displayed there.

The experiences of Tanzania and the mapping process undertaken there was shared with the then State Ministry of Livestock Development (MoA) (now the Ministry of Livestock and Fisheries) in Ethiopia including through an international meeting on livestock routes, held in Addis Ababa in September 2015. At this meeting the State Minister stated his commitment to mapping and protecting livestock routes in the country (see attached report). This is used as a basis for developing activities with the Ministry and other actors over the next year.

These activities have been further developed into a four-country concept note on mapping, valuing, servicing and protecting livestock routes currently in the pipeline with IFAD.

19. Who were the intermediary and direct users of your research outputs and what role did they play in achieving the outcome:

Currently the direct users of the information and maps are national and local governments, private investors, and development actors in their planning of use and development in pastoral and agropastoral areas. The Government of Tanzania, namely livestock experts, played a central role in the collection of information to produce the outputs – it was their knowledge that was mainly used. To date the information has not been widely circulated as it does require verification and gap-filling – however it is anticipated that this will occur in the next phase of the Sustainable Rangeland Management Project, which ILRI is managing with the GoT.

20. How were your research outputs used (will be used in the future):

This exercise can promote land development, efficient and targeted range management, further promote investment on rangelands and improve livestock resources (production and breeds) and services. The outputs can be used in land use planning and other planning processes at national, region and local levels. It can be used for identifying the most appropriate place for the development of livestock services e.g. veterinary, disease control, feed, water, (and potentially human health services) e.g. where routes converge (i.e. where large amount of livestock and people travel through). The information can also be used for identifying hotspot areas for conflict e.g. where routes go through strongly developed agricultural areas – and where attention may be required (especially in times of drought) to prevent conflicts between land users.

21. What is the Evidence of Your Research Outcomes:

Tanzania's Livestock Modernisation Initiative: http://clippings.ilri.org/2015/08/13/tanzania-livestock-modernization-initiative-to-improve-livelihoods-of-smallholders-and-boost-food-security/

Report on "importance of livestock routes in Ethiopia": http://www.celep.info/importance-of-livestock-routes-in-ethiopia/

22. Testimonials:

Quotation from letter of support from then Deputy Permanent Secretary, Dr Maria Mashingo (now P/S for livestock) for work to map livestock routes in Tanzania: *"we welcome and fully support the initiative of ILRI to work with us in developing a programme on mapping, valuing, servicing and protecting livestock routes at different levels in the country. We have already worked with ILRI on an initial mapping of national major routes, and this programme would allow us to build on this"*(2015).

Opening speech from then State Minister Livestock, MoA at meeting on livestock routes in Ethiopia (2015): "*Due to the fact that pastoralist move from place to place within the country and from country to country in search of feed and water, some of the initiatives deals with cross boarder issues and involves cluster approach with neighboring countries. Thus, knowledge of the livestock routes are vital for livestock trade, accessing water and feed, for transport of goods and services, and for moving livestock away from crises such as drought or floods….I very much look forward to seeing the outputs and conclusions of this meeting, which will I hope lead us to developing a strategy for developing, maintaining and protecting livestock routes for livestock development."*

23. Lessons Learned:

1. *ILRI can play a facilitating role in bringing together different stakeholders to share knowledge and document it (map it).*
2. *Technical support to e.g. government can be a strategic entry point which will strengthen the enabling environment for positive change.*
3. *A simple but focused action-research approach can build capacity and gain strategic advantage to realize goals, whilst also collecting information.*

24. Full reference citations and URL link to published research work.

OUTCOME STORY

Name of research activity/project title:	Zimbabwe crop-livestock integration for food security
Flagship:	ESA
Geographical region:	Sub-Saharan Africa
Name and email of Activity Lead:	Godfrey Manyawu g.manyawu@cgiar.org
Name and email of Outcome Story Lead:	Godfrey Manyawu g.manyawu@cgiar.org
Activity Lead Center:	ILRI
Activity Partner Center(s):	CIMMYT, ICRISAT
Activity Partner CRPs:	N/A

25. Outcome Story Headline:

ILRI, as lead partner and its other partners (CIMMYT and ICRISAT) have implemented a project on crop-livestock integration in Zimbabwe since 2012, aimed at improving productivity of crop and livestock, improve farmers' access to resources and increase capacity of farmers, extension and other stakeholders.

26. Outcome Story Abstract

Smallholder farmers in Sub-saharan Africa, experience seasonal food insecurity resulting from deficits in staple crops due to low yield potential emanating from poor crop varieties, soils and management practises. Owing to climate challenges, crops and livestock contribute negligible income to household economic food security. The situation is exacerbated by poor livestock feed quality and quantity especially during the drier months. Lack of consistent markets with viable prices also contributes significantly to production constraints. Results of the ZimCLIFS project in Zimbabwe indicate that sustainable intensification of integrated cereal–legume–livestock systems coupled with livestock market development systems have the potential to increase the participation and market share value of smallholder farmers. The project demonstrated that overall farming efficiency can increased (income, labour, water use etc.) when the system components are well integrated. Through participatory research, households increased their income and nutritional status on existing land,

when crops and livestock are integrated and symbiotic relations yield significant agro-ecological and economic margins.

27. Problem/Challenge Overview:

On-farm productivity in smallholder farming areas is decreasing, with a corresponding decrease in crop yields. Technologies to improve productivity are often packaged in silos, either specific to crop production or to animal production. Farmers are often left with the decision to put these technologies into a system that harmoniously produces synergistic effects. There lacks a concise integrated crop-livestock systems approach that employs a holistic approach to farming systems, which harnesses crop and livestock technologies to induce symbiotic benefits. Crop related challenges include poor yields, infertile soils and inadequate inputs. On the other hand, feed and feeding value remain the major challenge limiting smallholder livestock productivity. Marketing information and linkages remain a major challenge.

28. What are the main research activities:

The main research activities included

1. Conducting baseline survey to produce farmer and community characteristics – farmer typologies
2. Identify candidate technologies on crop and livestock
3. Using livestock models to conduct ex-ante and participatory evaluations
4. Conduct trials and demonstrations on representative farm sites and test adaptation of technologies
5. Conduct value chain analysis to identify best relationships, challenges and opportunities in identified value chains
6. Establish and strengthen innovation platforms
7. Develop and implement a knowledge sharing and out scaling strategy
8. Synthesize and communicate lessons leant

29. What are the main Outcomes of your research?

- The report focusses on the effects of improving crop-livestock integration at smallholder farms on beef production using local cattle breeds.
- The project targeted to reach 4800 core farmers by 2015. Through the use of innovation platforms (IPs), feedback meetings, farmer demonstration and farmers-to-farmer extension the project was able to surpass its target, reaching over 5000 core-farmers (Tiers 1 and 2).
- The Project has been able to promote the use of mechanized Conservation Agriculture (CA) and adoption of good CA practices in integrated smallholder crop-livestock farming systems. Widespread adoption of CA in Murehwa and Goromonzi has led to reduced soil

disturbance and increased use of herbicides. Farmers never used to use herbicides before the project was introduced.

- Another important output of the CA research is the recommendation that farmers must apply at least 60 kg N/ha in basal fertilizer to compensate for N-lockup whenever crop residues are applied as mulch in CA systems. This might be too expensive for the average farmer to maintain.
- Our research shows that most farmers feed maize stover to livestock and use thatch grass (Hyperrhenia species) as mulch, suggesting that there is minimal trade-off between feeding stover to livestock as opposed to providing soil cover.
- Research highlights from agronomy R4D work stressed the need to enforce the use of recommended plant population for maize, use of lime to increase soil pH and a need to use annual legumes (sunhemp, tephrosia, cowpea, *Lablab purpureus* and M. pruriens (or Mucuna) to improve soil N content in maize-legume rotations among smallholder farmers.
- About 245 core farmers have adopted the use of forage legumes in Murehwa and Goromonzi districts alone. Legume-cereal crop rotations that utilize *Mucuna pruriens* (velvet beans) to ameliorate the soil as well as to provide fodder stood out as the most profitable. A draft paper on this has been produced and now being finalized for submission to a journal.
- The project managed to improve livelihoods and it increased the contribution of livestock to livelihoods from 29 to 42%. Farmers have engaged in commercial trade of hay and forage seed at village, district and national level. In the two Mashonaland Project districts, farmers sold over 3 tons of forage seed realizing over US$11,000 in income during 2014
- In 2012/13 the project initiated livestock feeding as a business, with a demonstration at 1 farmer in Chikwaka Communal Lands. This farmer's success to livestock feeding being adopted by 39 famers in the 2014 dry season and 58 farmers in 2015.
- Through feeding trials and demonstrations, the project demonstrated livestock feeding as a livelihood option and came up with 4 forage based beef diets and 3 forage based dairy diets. The project trained and linked farmers to markets.
- Use of legume hays by smallholder farmers as high-protein feed supplements for livestock during the dry season has increased in past three years. In Goromonzi and Murehwa the total area sown to these forages was 46 ha in the 2014/15 wet season, with mean area sown 0.25ha (range 0.1 to 0.4 ha). This resulted in 24 tons of forage hay and 26 tons of legume seed/grain.
- Through training the farmers engaged the private sector buyers (including abattoirs) to sell their livestock. The farmers managed to sell over 25 head of cattle in 2014 and this brought over US$20 000 as gross income. The quality of the beef animals improved from the lowest grade (manufacturing) to the commercial grade (3rd), with effective increase in price from US$2.40 to US$3.60 per kg dressed mass. The average farmer therefore earned $102 and 197per head from feeding cattle over 60 days in 2013 and 2014, respectively.
- Innovation Platforms were created at ward level and they enabled farmers to interact with private sector companies and establish market linkages. By June 2015, 30 private sector companies had participated at one or more meetings.
- IPs enabled farmers to operate in Commodity Groups. Operating in commodity groups reduced transaction costs and enabled farmers to go for visual training and knowledge exchange visits (organised visits to abattoirs including Binder, Koala, Surrey, Carswell abattoirs and 2 private livestock auctions around Harare). The latter visits improved market intelligence of farmers and negotiation skills and fuelled uptake of livestock

production as a business.

- Through the project, the farmers gained knowledge in live animal grading, pricing, cost-benefit analysis, record keeping, marketing skills, negotiation and stakeholder engagement at private sector level.
- The project was out-scaled to Manicaland and Mashonaland Central in the 2014/15 season, where over 2000 kg of forage seed was distributed to about 200 farmers 50 ha of fodder were established. Some forage seed was sold to other NGOs and across the border to Swaziland.
- Farmers are now able to organize their own field days, marketing meetings including round tables and "dry-shows" where trade occurs.
- Farmers and extension staff from non-participating districts have shown interest and are now enquiring how they can also be involved in the project from those in participating wards.

30. What are the main research Outputs that resulted in the outcome(s)?

1. Dube T., Homann-Kee Tui S., van Rooyen A., Rodriguez D. (2014) Baseline and Situation Analysis Report: Integrating Crop and Livestock Production for Improved Food Security and Livelihoods in Rural Zimbabwe, Socioeconomics Discussion Series Paper Series Number 29. http://oar.icrisat.org/8410/1/ISEDPS_29_2014. pdf
2. Dube et al., 2014, baseline and situation analysis report http://dataverse.icrisat.org/dvn/dv/MIP/faces/study/StudyPage.xhtml?globalId=hdl:11038/10205&studyListingIndex=2_d63795514167e450fd4dc0061d01
3. Manyawu G.J., Chakoma I.C., Moyo S., Gwiriri L. and Dube S. 2015. The effect of herbage conditioning and natural aeration methods on rate of moisture loss and crude protein content of *Lablab purpureus* herbage during hay-making. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
4. Manyawu G.J., Chakoma I.C., Moyo S., Gwiriri L., Mutenje M., Nyagumbo I., and Mujeyi A. 2015. Improving market participation and competiveness of communal area beef farmers in Zimbabwe's Mashonaland East Province through better feeding and value chain initiatives. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
5. Chakoma I.C., Moyo S., Gwiriri L., Manyawu G.J. , Dube S., Shumba M. and Gora A. 2015. Forage Seed Production and Trade as a Pathway out of Poverty in the Smallholder Sector: Lessons from the Zimbabwe Crop Livestock Integration for Food Security (ZimCLIFS) Project. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
6. Chakoma I.C., Manyawu G.J. , Moyo S., Gwiriri L., Chakoma C., Maasdorp B., Dube S., Chikosi V., Halimani T. and Buwu V. 2015. Promoting the use home-mixed supplements as alternatives to commercial supplements in smallholder beef production systems of the sub humid region of Zimbabwe. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
7. Gwiriri L.C., Manyawu G.J., Mashanda P., Chakoma I.C., Moyo S. , Chakoma C., Sethaunyane H.V. , Imbayarwo-Chikosi V. , Dube S. and Maasdorp B., 2015. The potential of replacing conventional dairy supplements with forage legume- based diets in Zimbabwe's smallholder dairy sector. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
8. Mujeyi A., Mutenje M., Manyawu G.J., Gwiriri L. and Chakoma I.C. Spearheading development through empowering smallholder farmers along beef cattle value chains: a

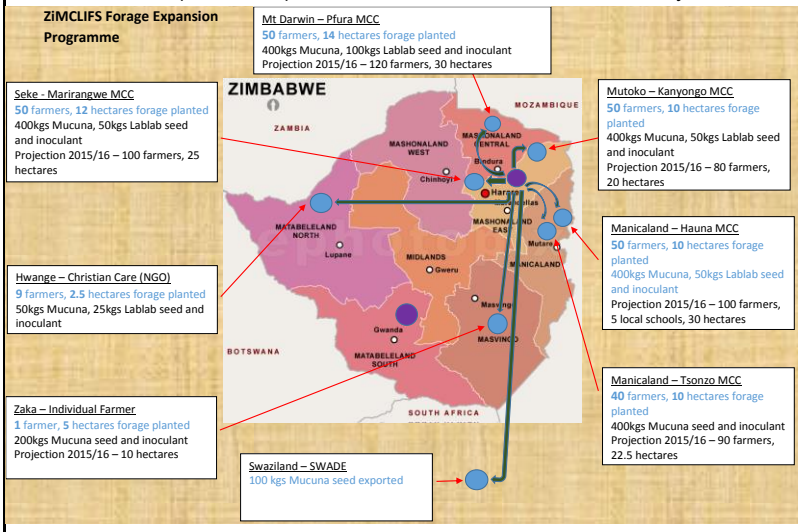
case of Goromonzi and Murehwa districts, Zimbabwe - International Journal of Managing Value and Supply Chains (IJMVSC) 6 (4): 31-44. http://airccse.org/journal/mvsc/current2015.html

1. **Who were the intermediary and direct users of your research outputs and what role did they play in achieving the outcome:**

- Two NGO partners were the intermediary users of the research outputs for out scaling and dissemination to the wider community. Their role was to mobilize and train farmers and ensure availability of resources for demonstrations.
- Forty-four extension staff (including district staff) were also intermediary and direct research result users as the extension arm of the ministry of agriculture that ensures that farmers get access to information.
- Farmers were the direct users of the results. They played the role of host sites for trials and demonstrations, initiators of interventions and solutions to challenges.
- Academic institutions participated in the modelling work and they played the role of applying the modelling packages to produce scenarios of farmer typologies.

2. **How were your research outputs used (will be used in the future):**

- Farmers adopted CA technologies and livestock feeding as a business improving livelihoods significantly
- Farmers outside the project areas, through information exchange visits, publications and Innovation platforms adopted the technologies as shown in the map below
- Research outputs were presented at the 50th Grasslands Society Annual Congress in South Africa, in July 2015.
- amphlets on forage and livestock production were produced. Stakeholders can always refer to these outputs for relevant information



3. What is the Evidence of Your Research Outcomes:

- Farmers have adopted CA (including crop rotation and mulching) and use of herbicides, which has seen an increase in maize and forage yield
- Local agro-dealers were able to increase sales of agricultural inputs (fertilizers, pesticides and veterinary medicines) to farmers that are fattening cattle.
- Farmers got better animal grades, better prices ($600-$900 compared to $200-300 offered by local traders and middleman) and organized themselves into beef marketing groups. Farmers gained negotiation skills, confidence and bargaining power by working in groups.
- Farmers gained knowledge in livestock grading and how the commercial markets operate. They developed negotiation skills in handling buyers.
- Binder Abattoir, after attending innovation platform understood the lack of genetic material in the communal areas, hence donated a bull per community, to address the shortage of good bulls in rural areas.
- Private sector AI companies (namely ABS) have started AI services in the community.
- Linkages with private abattoirs opened channels to negotiate loans and other contractual agreements, which the project is pursuing (e,g. obtaining cash advances for buying cattle to fattening or feed ingredients).
- Service slaughter facilities at Binder enables ($25/animal) enables farmers to meet up with buyers and negotiate better prices directly (not through middlemen). It is allowing farmers to obtain extra income from selling the animal's fifth quarter - unlike selling to abattoirs like Surrey who do not pay farmers for the fifth quarter.
- Farmers now have a way to by-pass unscrupulous middleman.

4. Testimonials:

9. *Gwiriri L., Chakoma I.C., Manyawu G.J. and Dube S. 2015* No longer business as usual: Improved feeds transforming dairying in Zimbabwe . ILRI News Posted: 07 Dec 2015 09:00 PM PST. http://news.ilri.org/2015/12/08/no-longer-business-as-usual-improved-feeds-transforming-dairying-in-zimbabwe/
10. Chakoma I. C., Gwiriri L., Gora A. and Hamadziripi L. 2015. Forage farming changes lives of Zimbabwe smallholder farmers ILRI News Posted: 21 Dec 2015 http://news.ilri.org/2015/12/21/forages-zimclifs/

5. Lessons Learned:

- CA increases crop yields with as much as double the yield being achieved.
- Overall farming efficiency can increase (income, labour, water use etc.) when these system components are well integrated.
- Households can increase their income and nutritional status on existing land, there is no need to expand cropping areas when crops and livestock are integrated and one fuels off the other in both agroecological terms and economically.
- Integration of crops, especially fodder crops assist livestock production.

- Dry season livestock supplementary feeding improves livestock productivity
  - average daily weight gain improved to 1.2 kg liveweight gain/day
  - body condition score and grade (on hoof) of the animal improved generally from economy grade to commercial grade [averaging US$360-380/kg] enhances the role of livestock in rural communities and multi-functionality of livestock in household dynamics: the contribution of livestock to household income increased from 29% to 42% per annum.
- Existence of consistent and viably priced markets enhances resilience of smallholder communities to livelihood shocks through adoption of new crop–livestock technologies enhancing economic food security. Farmers sold cattle to and engaged abattoirs at negotiation level.
- Farmers generally lack information and market intelligence culminating in selling at low prices. Provision of information is key in achieving livelihood benefits. Private sector engagement through multi-stakeholder innovation platforms, feedback meetings IPs enhanced market information, knowledge exchange and participatory problem solving critical in on-farm decision-making.
- Forage seed sales from velvet bean and lablab contributed significantly to household economic food security within and outside project areas.
- The Project's technologies are scalable. To date technologies have been packaged and scaled out to five new districts in Zimbabwe, and to Swaziland.
- Farmers learn by vision and adopt technology better by demonstration than top-down approaches or teachings without context.
- Participatory methods including market induction, exchange visits, IPs and round tables are key in market linkages.
- Creating demand for products or outputs is a critical push factor for technology uptake. Most farmers adopt technology that feeds into a product that has a demand and translates into food security and income rather that general shelf knowledge
- Innovation platforms evolve through various critical stages, from rudimentary to effective stages. During these stages, critical information sharing is invaluable and stakeholder support is necessary to commercially orient the process**.** Financial support is necessary for the initial stages of the IPs
- Group-individual-group model is more effective. Model involves buying inputs as a **group**, then produce at **individual** level and then market as a **group**. Collective action or groups are important for procurement, information and marketing, but technology uptake and diffusion is more effective at individual level. Role of off-farm income is crucial in maintaining livelihoods.
- At the initial stages of adoption of innovations, off-farm income is crucial in maintaining livelihoods and for funding new initiatives.
- Zimbabwe uses a specialistic or "silo" approach to deliver extension services at farmer-level. There are separate roles for crop, livestock, irrigation and mechanization Extension Officers. The current project operated at systems level and it trained individual Extension Officers to operate effectively across disciplines. The officers became effective in disseminating multi-disciplinary information and technologies to farmers, thereby proving that a generalistic approach can be more effective and economically efficient.

6. Full reference citations and URL link to published research work.

1. Homann-Kee Tui S., Masikati P., Dube T., de Voil P., Van Rooyen A., Rodriguez D. and Valdivia R. 2015. Co-designing the transitions towards integrated market oriented mixed farming systems in semi-arid Zimbabwe**.** *Tropical Agriculture Conference. 16-18 November 2015. Brisbane Convention & Exhibition Centre.*
2. Homann-Kee Tui S., Hendrickx S., Manyawu G.J., Rao K.P. and Robinson L. 2015. Implementing Innovation Platforms: a guideline for Dryland Systems Research - *Draft*

3. Dube T., Homann-Kee Tui S., van Rooyen A., Rodriguez D. (2014) Baseline and Situation Analysis Report: Integrating Crop and Livestock Production for Improved Food Security and Livelihoods in Rural Zimbabwe, Socioeconomics Discussion Series Paper Series Number 29. http://oar.icrisat.org/8410/1/ISEDPS_29_2014. pdf
4. Dube et al., 2014, baseline and situation analysis report http://dataverse.icrisat.org/dvn/dv/MIP/faces/study/StudyPage.xhtml?globalId=hdl:11038/10205&studyListingIndex=2_d63795514167e450fd4dc0061d01
5. Manyawu G.J., Chakoma I.C., Moyo S., Gwiriri L. and Dube S. 2015. The effect of herbage conditioning and natural aeration methods on rate of moisture loss and crude protein content of *Lablab purpureus* herbage during hay-making. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
6. Manyawu G.J., Chakoma I.C., Moyo S., Gwiriri L., Mutenje M., Nyagumbo I., and Mujeyi A. 2015. Improving market participation and competiveness of communal area beef farmers in Zimbabwe's Mashonaland East Province through better feeding and value chain initiatives. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
7. Chakoma I.C., Moyo S., Gwiriri L., Manyawu G.J. , Dube S., Shumba M. and Gora A. 2015. Forage Seed Production and Trade as a Pathway out of Poverty in the Smallholder Sector: Lessons from the Zimbabwe Crop Livestock Integration for Food Security (ZimCLIFS) Project. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
8. Chakoma I.C., Manyawu G.J. , Moyo S., Gwiriri L., Chakoma C., Maasdorp B., Dube S., Chikosi V., Halimani T. and Buwu V. 2015. Promoting the use home-mixed supplements as alternatives to commercial supplements in smallholder beef production systems of the sub humid region of Zimbabwe. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
9. Gwiriri L.C., Manyawu G.J., Mashanda P., Chakoma I.C., Moyo S. , Chakoma C., Sethaunyane H.V. , Imbayarwo-Chikosi V. , Dube S. and Maasdorp B., 2015. The potential of replacing conventional dairy supplements with forage legume- based diets in Zimbabwe's smallholder dairy sector. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
10. Mujeyi A., Mutenje M., Manyawu G.J., Gwiriri L. and Chakoma I.C. Spearheading development through empowering smallholder farmers along beef cattle value chains: a case of Goromonzi and Murehwa districts, Zimbabwe - International Journal of Managing Value and Supply Chains (IJMVSC) 6 (4): 31-44. http://airccse.org/journal/mvsc/current2015.html

OUTCOME STORY

Name of research activity/project title:	The Technical Consortium for Building Resilience in the Horn of Africa
Flagship:	?
Geographical region:	Horn of Africa

Name and email of Activity Lead:	Katharine Downie k.downie@cgiar.org
Name and email of Outcome Story Lead:	As above
Activity Lead Center:	ILRI
Activity Partner Center(s):	N/A
Activity Partner CRPs:	N/A

31. Outcome Story Headline:

The Technical Consortium for Building Resilience in the Horn of Africa is a project of the CGIAR and its member centers, which was formed in 2011 to provide support to IGAD and its member states to mitigate the effects of recurrent drought. The Technical Consortium functioned as a complex research platform, involving multiple partnerships with multiple institutions working towards a common agenda. This agenda was primarily to provide technical support and guidance to the IGAD member states and support the implementation of their ASAL investment plans by developing monitoring and evaluation systems for the projects in the Ending Drought Emergencies Programme Framework; including metrics and analytics to enhance the impact of these projects with respect to the resilience of vulnerable populations in the Horn of Africa.

32. Outcome Story Abstract

Over the last four years, the Technical Consortium has been engaged in research focusing on analytics, metrics and appropriate data to enhance resilience for vulnerable populations. There has been a surge of interest in resilience as a core concept on which strategic planning for development assistance and humanitarian aid might be based. Initially introduced as concept to drive policies and programmes, more recent activity has been focused on measurement. Questions raised about resilience measurement are motivated by the need to assess the impacts of the growing number of policies and programs that are meant to promote resilience. From an analytical vantage point, addressing questions about measurement will underwrite efforts to understand and model the dynamics that account for varied outcomes following shock exposure. Why do some households and/communities manage shocks better than other? How can programmes and policies be best targeted to meet the needs of populations that live in shock-prone contexts? Measurement that is well-tailored to such resilience-oriented questions sets the stage for constructing data-based inferences to guide and evaluate investment decisions.

In response to these questions, the Technical Consortium has produced two technical report series. In 2014, the Technical Consortium's first Technical Series was published, entitled "Measuring Resilience in the Horn of Africa". This first series was followed by a second series called "Strengthening the Evidence Base for Resilience in the Horn of Africa", the reports from which are being published in 2016.

Some of this research has focused on developing theories of change for resilience investments and projects and methodologies for the selection of appropriate indicators. Much of this is at "proof of concept" stage and this meeting will afford the opportunity for the experts to engage with development practitioners regarding the potential for application of some of the more theoretical concepts.

In addition, four papers which focus on the amassing of evidence on which factors (social capital, livelihood diversity and psycho-social perceptions, for example) have the greatest influence on resilience for populations in the Horn, will be presented. The analysis carried out in these papers has been done using datasets from drylands across Africa – from Ethiopia to Burkina Faso. It is expected that these findings from these papers will contribute substantially to the evidence base for enhancing decision-making and programming strategies for better targeting of projects and interventions aimed at improving people's resilience.

The last set of papers will focus on the practical implementation of resilience analytical framework using an open access data and knowledge management platform and the process of managing the resilience indicators and datasets from multiple sources and harmonizing them over space and time. This process will provide some insight into the potential for use of secondary data for the construction of future baselines in the region; a practice that could forestall reliance on costly primary data surveys. In addition, the report presents two case studies on how the catalogue-provided indicator data from different temporal and spatial resolutions were harmonized and used to develop resilience analyses in the ASAL region in Kenya.

33. Problem/Challenge Overview:

Drought remains one of the biggest threats to economic development in Kenya. Not only does it portend dramatic consequences in the form of widespread suffering and loss among drought-prone communities, it also has a major impact on the economy; the 2008-2011 drought cost Kenya US$ 12.1 billion in damages and losses combined, and it slowed the GDP by an average of 2.8 % per annum (FAO, 2010; RoK, 2012). Droughts are a national concern and affect the whole of Kenya, directly and indirectly. Over the past 30 years there has been significant investment in interventions and programs to mitigate the effects of droughts and enhance the resilience of vulnerable populations, with mixed success. If we are to improve this success rate, more attention must be focused on developing theories of change that accurately reflect a plausibility of causality and our ability to be able to measure the impact of interventions.

34. What are the main research activities:

The main research objective of the Technical Consortium was to look at the measurement of interventions designed to enhance the resilience of populations in the Horn of Africa, particularly with respect to drought and cyclical hazards. These activities included being a member of the Resilience Measurement Technical Working Group and other relevant fora, as well as commissioning pieces of research focusing on the analytics, metrics and data required to better measure projects aimed at enhanced resilience.

The Technical Consortium ran from February 2012 until February 2016.

35. What are the main Outcomes of your research?

The main outcomes of the Technical Consortium's work are as follows:

- A methodology for developing theories of change for interventions aimed at enhancing resilience
- A process for selecting indicators which are appropriate for monitoring the progress of interventions aimed at enhancing resilience and evaluating the impact of such interventions
- A review of impact assessment methodologies characterized by their suitability for evaluating the impact of investments and projects aimed at enhancing resilience under different conditions
- A data catalogue containing the relevant meta data for datasets necessary to monitor and evaluate the success and impact of interventions aimed at enhancing resilience

36. What are the main research Outputs that resulted in the outcome(s)?

TECHNICAL BRIEFS

Behnke, R., Flintan, F., and Neely, C. 2013. Natural resource management in the drylands in the Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI). Brief #1. International Livestock Research Institute. Nairobi, Kenya.

Aklilu, Y., D. Little, P., Mahmoud, H., and McPeak, J. 2013. Market access and trade issues in the drylands in the Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI). Brief #2. International Livestock Research Institute. Nairobi, Kenya.

Kerven, C., and Morton, J. 2013. Livelihood and basic service support in the drylands in the Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI). Brief #3. International Livestock Research Institute. Nairobi, Kenya.

Crosskey, A., and Fitzgibbon, C. 2013. Disaster Risk Management in the drylands in the Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on

International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI). Brief #4. International Livestock Research Institute.

Davies, J., Downie, K., Ericksen, P., Neely, C., and Tilstone, V. 2013. Knowledge management and research for resilience in the drylands of the Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI). Brief #5. International Livestock Research Institute. Nairobi, Kenya.

Pavanello, S., and Scott-Villiers, P. 2013. Conflict resolution and peace building in the drylands in the Greater Horn of Africa. Brief prepared by the Technical Consortium, a project of the Consultative Group on International Agricultural Research (CGIAR) hosted at the International Livestock Research Institute (ILRI).). Brief #6. International Livestock Research Institute. Nairobi, Kenya.

REPORTS for the First Technical Report Series (2014)

Chesterman, S and Downie, K. 2014. Preliminary review of datasets to inform the development of IGAD member state baselines. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Downie, K., Chesterman, S., Davies, R., Wroblewski, T., Busby, J. and Smith, T. 2014. The development of baseline datasets, indicator selection and analytics to assess the impact of investment for IGAD member states. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Davies, R., Wroblewski, T., Busby, J., Smith, T., Downie, K. and Chesterman, S. 2014. Development of a pilot composite index using data from the IGAD region. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

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Davies, R., Wroblewski, T., Downie, K. and Chesterman, S. 2014. Gaps in spatial data for social, ecological and economic systems. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Busby, J. and Smith, T. 2014. The creation of a household resilience index using limited data from the IGAD region. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

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trends in the Horn of Africa. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Luedeling, E., Shepherd, K., de Leeuw, J. and Downie, K. 2014. The application of decision analysis modelling for investment targeting. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Davies, R. and Wroblewski, T. 2014. Modeling potential livestock losses and vulnerability due to drought in the IGAD region. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Davies, R. and Wroblewski, T. 2014. Spatial analysis for investment targeting: pilot tool. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 1: Measuring Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI).

REPORTS for the Second Technical Report Series (2015-2016)

Carabine, E., Jouanjean, M-A. and J. Tsui. 2015. Kenya Ending Drought Emergencies Policy Review: Scenarios for Building Resilience in the ASALs. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Overseas Development Institute (ODI) publication.

Constas, M., Frankenberger, T., Knippenberg, E. and K. Downie. 2016. Building Better Connections between Theories of Change and the Empirical Demands of Evidence-Based Decisions: The Case of Kenya's Ending Drought Emergencies Policy. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Cornell University publication. (in press)

Constas, M., Upton, J., Knippenberg, E., and K Downie. 2016. Classification of Indicators for Resilience Analysis: An Assessment of Selected Data Sources Focused on Arid and Semi-Arid Lands. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI). (in press)

Constas, M., Cisse, J., and J. Upton. 2016. A Systematic Review of Methods to Measure Resilience: An Analysis of Variable Construction Processes, Prediction Models, and Application Contexts. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Cornell University publication. (in press)

Woodson, L, Frankenberger, T., Smtih, L., Langworthy, M. and C. Presnall. 2016. The Effects of Social Capital on Resilience: Evidence from Ethiopia, Kenya, Uganda, Niger and Burkina Faso. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International

publication. (in press)

Signorelli, S., Azzarri, C. and Roberts, C. 2016. Malnutrition and Climate Patterns in the ASALs of Kenya: a resilience analysis based on a pseudo-panel dataset. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and International Food Policy Research Institute (IFPRI) publication. (in press)

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Bower, T., Frankenberger, T., Nelson, S., Finan, T., and M. Langworthy. 2016. The effect of livelihood diversity on recovery and shock impact in Ethiopia, Kenya and Uganda. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication. (in press)

Béné, C., Frankenberger, T., Langworthy, M., Mueller, M. and S. Martin. 2016. The influence of subjective and psycho-social factors on people's resilience: conceptual framework and empirical evidence. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No. 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication.

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37. Who were the intermediary and direct users of your research outputs and what role did they play in achieving the outcome:

Donors, development partners, NGOs and in particular, the National Drought Monitoring Agency in Kenya and other agencies within the IGAD member states charged with implementing the Ending Drought Emergencies dryland investment plans are direct users of the tools, methodologies and data.

38. How were your research outputs used (will be used in the future):

It is anticipated that the tools and methodologies developed by the Technical Consortium largely as proof of concept studies will be field tested by the many agencies involved in implementation of development interventions aimed at enhancing resilience in the Horn. The evidence gained from this trialling and testing will hopefully inform further refining of the tools. It is also intended that the data catalogue be curated, maintained and updated by the Kenya NDMA

39. What is the Evidence of Your Research Outcomes:

Publications listed in this document and found at the following url:
http://www.technicalconsortium.org/publications/

40. Lessons Learned:

It would have been helpful if there had been more collaboration and agreement from the donors following the 2011 drought on what the research agenda should involve. As it was, donors spent a lot of the time fighting for "territory" within the resilience "arena" and there were duplicate mechanisms created. This created unnecessary competition instead of collaboration and impeded the development of tools and methodologies.

41. Full reference citations and URL link to published research work.

http://www.technicalconsortium.org/publications/

SECTION V – LIST OF 2015 PUBLICATIONS AND SCIENTIFIC OUTPUTS

In 2015, ~~Name of CENTER~~ILRI produced under the framework of the CGIAR Research Program on Dryland Systems a total of X published articles (Y indexed by ISI), Z books, and several policy and technical briefs.

~~A clear move towards the examination of new systems approaches is emerging in this body of scientific knowledge, including two strategy papers. We expect the systems approach will generate greater public awareness of agricultural livelihood issues in dryland areas and reshape traditional thinking about key performance determinants of dryland agro-ecosystems and relevant responses to meet challenges faced by rural dryland communities.~~

The following represents a summary of all 2015 publications and research outputs produced by ~~Centre~~ ILRI under Dryland Systems by Region/ALS Flagship, including full and correct citation of all publications, weblink and categories of scientific output marked with the following codes to indicate:

- (S) = multidisciplinary/system research
- (M) = mono-disciplinary research
- [X.XX]= ISI Impact Factor[5]
- (O) = Open Access

***IMPORTANT NOTE":** All listed publications must clearly acknowledge the research was conducted under the framework of CGIAR Research Program on Dry and Systems and include the appropriate acknowledgment statement as suggested in the Guidance on Dryland Systems Acknowledge and Disclaimer (see link).

Table 1. Summary of all ISI publications

Region/ALS	ISI Factor [range of ISI scores]	ISI Open (% of ISI articles)	ISI Monodisciplinary (% of ISI articles)	ISI Multidisciplinary (% of ISI articles)
WAS/				
NAWA/				
ESA/				
CA/				
SA/				
TOTAL				

Table 2. Summary of Non-ISI Publications

Region/ALS	Non-ISI Articles	Book Chapters	Technical Reports & Working Papers	Proceedings	Datasets	Other
WAS/						
NAWA/						
ESA/						
CA/						
SA/						
TOTAL						

[5] *For ISI, the JCR Impact Factor List for 2013 has used (https://www.360researchpapers.com/resources/impact-factor, accessed 6 July 2015). For journals not listed, the website of that journal was checked and if it lists an* Region *ISI factor, this was recorded.*

ISI Journal Articles (4)

1. Amole T. A and Ayantunde A.A. (2016). Assessment of existing and potential feed resources for improving livestock productivity in Sahel Agro-ecological zone of Niger Republic. International Journal of Agricultural Research (Accepted).
2. Ayantunde, A.A., Turner, M.D. and Kalilou, A. 2015. Participatory analysis of vulnerability to drought in three agro-pastoral communities in the West African Sahel. Pastoralism: Research, Policy and Practice, 5:13. DOI 10.1186/s13570-015-0033-x.
3. Haileslassie, A., Craufurd P., Thiagarajah, R., Kumar, S., Whitbread, A., Rathor, A., Blümmel, M., and Ericsson, P. 2016. Empirical evaluation of sustainability of divergent farms in the dryland farming systems of India. 2016. Ecological Indicators 60: 710-723.
4.

Non-ISI Journal Articles and Theses (2)

1. Amole T. A and Ayantunde A.A. (2016). Assessment of livestock feed resources and management practices in Sudan-Savanna zones of West Africa. African Journal of Agricultural Research (Accepted).
2. Mujeyi A., Mutenje M., Manyawu G.J., Gwiriri L. and Chakoma I.C. Spearheading development through empowering smallholder farmers along beef cattle value chains: a case of Goromonzi and Murehwa districts, Zimbabwe - International Journal of Managing Value and Supply Chains (IJMVSC) 6 (4): 31-44. http://airccse.org/journal/mvsc/current2015.html

Books (0)

Book Chapters (0)

Technical Reports and Working Papers (18)

1. Alemu, Tsegaye. 2015. Landscape Management and Governance, Gomole Rangeland, Ethiopia. ILRI Project Report. Nairobi, Kenya: ILRI.
2. Upton, Joanna B., Jennifer Denno Cisse, and Christopher B. Barrett (2015). "Food Security As Resilience: Reconciling definition and measurement." pdf

3. Ermon S, Xue Y, Toth R, Dilkina B, Bernstein R, Damoulas T, Clark P, DeGloria S, **Mude A**, Barrett B, and C Gomes. 2015. Learning Large Scale Dynamic Discrete Choice Models of Spatio-Temporal Preferences with Application to Migratory Pastoralism in East Africa. AAAI-15. *In Proc. 29th AAAI Conference on Artificial Intelligence.*

4. Vrieling A, Meroni M, **Mude A**, Chantarat S, Ummenhofer C, and de Bie Kees. 2015. Early Assessment of Seasonal Forage Availability for Mitigating the Impact of Drought of East Africa Pastoralists. *Under review, Natural Hazards*

5. Woodard J, Shee A, and **Mude A**. 2015. A Spatial Econometric Approach to Scalable Index Insurance against Drought Related Livestock Mortality in Kenya. *Accepted for publication in 2016, The Geneva Papers on Risk and Insurance – Issues and Practice*

6. Carabine, E., Jouanjean, M-A. and J. Tsui. 2015. Kenya Ending Drought Emergencies Policy Review: Scenarios for Building Resilience in the ASALs. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Overseas Development Institute (ODI) publication.
7. Constas, M., Frankenberger, T., Knippenberg, E. and K. Downie. 2016. Building Better Connections between Theories of Change and the Empirical Demands of Evidence-Based Decisions: The Case of Kenya's Ending Drought Emergencies Policy. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Cornell University publication. (in press)
8. Constas, M., Upton, J., Knippenberg, E., and K Downie. 2016. Classification of Indicators for Resilience Analysis: An Assessment of Selected Data Sources Focused on Arid and Semi-Arid Lands. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: International Livestock Research Institute (ILRI). (in press)
9. Constas, M., Cisse, J., and J. Upton. 2016. A Systematic Review of Methods to Measure Resilience: An Analysis of Variable Construction Processes, Prediction Models, and Application Contexts. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and Cornell University publication. (in press)
10. Woodson, L, Frankenberger, T., Smtih, L., Langworthy, M. and C. Presnall. 2016. The Effects of Social Capital on Resilience: Evidence from Ethiopia, Kenya, Uganda, Niger and Burkina Faso. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication. (in press)
11. Signorelli, S., Azzarri, C. and Roberts, C. 2016. Malnutrition and Climate Patterns in the ASALs of Kenya: a resilience analysis based on a pseudo-panel dataset. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and International Food Policy Research Institute (IFPRI) publication. (in press)
12. Msangi , S. and S. Signorelli. 2016. Maintaining resilience in the ASALs of Kenya: Managing stocking rates in extensive livestock systems. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi,

Kenya: A joint International Livestock Research Institute (ILRI) and International Food Policy Research Institute (IFPRI) publication. (in press)
13. Koo, J., Azzarri, C., Signorelli, S., Comanescu, M. and Guo, Z. 2016. Open Data Infrastructure for Resilience Analysis: Implementation, Examples, and Case Studies in Kenya. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and International Food Policy Research Institute (IFPRI) publication. (in press)
14. Bower, T., Frankenberger, T., Nelson, S., Finan, T., and M. Langworthy. 2016. The effect of livelihood diversity on recovery and shock impact in Ethiopia, Kenya and Uganda. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication. (in press)
15. Béné, C., Frankenberger, T., Langworthy, M., Mueller, M. and S. Martin. 2016. The influence of subjective and psycho-social factors on people's resilience: conceptual framework and empirical evidence. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No. 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication.
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17. Amole, TA., A.Ayantunde and A. Dangoma. 2015 Practical guidelines on least cost ration for sheep fattening for livestock farmers and extension workers in West African Sahel. ILRI.
18. Dan-Goma, A., A. Ayantunde and T. Amole. 2015. Sheep Fattening with locally available feed resources in Fakara, Niger. ILRI.

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1. Robinson, Lance W. 2015. How Landscape Level Governance and Land Use Planning are Connected: Insights from Case Studies in Marsabit, Isiolo and Makueni. Presentation at Workshop on Experience Sharing in Land Use Planning, Nairobi, 11-12 February, 2015.
2. Robinson, Lance W. and Joram Kagombe. 2015. Institutional Linkages for Landscape Level Governance: The Case of Mt. Marsabit, Kenya. Paper presented at the Bi-annual Conference of the International Association for the Study of the Commons. 25 – 29 May, 2015, Edmonton, Canada.

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5. Manyawu G.J., Chakoma I.C., Moyo S., Gwiriri L. and Dube S. 2015. The effect of herbage conditioning and natural aeration methods on rate of moisture loss and crude protein content of *Lablab purpureus* herbage during hay-making. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
6. Chakoma I.C., Manyawu G.J. , Moyo S., Gwiriri L., Chakoma C., Maasdorp B., Dube S., Chikosi V., Halimani T. and Buwu V. 2015. Promoting the use home-mixed supplements as alternatives to commercial supplements in smallholder beef production systems of the sub humid region of Zimbabwe. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.
7. Gwiriri L.C., Manyawu G.J., Mashanda P., Chakoma I.C., Moyo S. , Chakoma C., Sethaunyane H.V. , Imbayarwo-Chikosi V. , Dube S. and Maasdorp B., 2015. The potential of replacing conventional dairy supplements with forage legume- based diets in Zimbabwe's smallholder dairy sector. Paper presented at the Grassland Society of Southern Africa 50th Annual Congress, South Africa, 19-23 July 2015.

Factsheets (4)

1. Chakoma, IC., GJ. Manyawa, S. Moyo, LC Gwiriri and S. Dube. 2015. A guide to the agronomy and use of Lablab purpureus in smallholder farming systems of Southern Africa. ILRI
2. Chakoma, IC, GJ Manyawa, LC Gwiriri, S Moyo and S Dube. 2015. Velvetbean (Macuna pruriens) production in Southern Africa. ILRI
3. Chakoma, IC, GJ Manyawu, K. Gwezuva and L. Gwiriri. 2015. Principles of Haymaking using tropical grasses and legumes. ILRI
4. Manyawu, GJ. I.C. Chakoma, K. Gwezuva, L. Gwiriri and S. Moyo. 2015. Principles of silage making. ILRI

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2. *Gwiriri L., Chakoma I.C., Manyawu G.J. and Dube S. 2015* No longer business as usual: Improved feeds transforming dairying in Zimbabwe . ILRI News Posted: 07 Dec 2015 09:00 PM PST. http://news.ilri.org/2015/12/08/no-longer-business-as-usual-improved-feeds-transforming-dairying-in-zimbabwe/
3. Jensen, Nathan, Barrett, Chris, Mude., A. (2015). "Index-based Insurance: Lottery ticket or insurance?" ILRI Research Brief No. 53. pdf
4. Jensen, N., Barrett, C. and Mude, A. (2015). "The favourable impacts of Index-Based Livestock Insurance: Evaluation results from Ethiopia and Kenya." ILRI Research Brief No. 52. pdf
5. Chelang'a, P.K., Banerjee, R., Mude, A. (2015). "Index-Based Livestock Insurance (IBLI) Lessons in Extension and Outreach: The Case of Wajir County." ILRI Research Brief No. 39. pdf
6. Importance of Livestock Routes for Local, National and Regional Development: Their mapping, servicing and protection. 8th September 2025. Addis Ababa

Annex 1: CRP indicators of progress, with glossary and targets

This table will be automatically generated by Dryland Systems' Monitoring, Evaluation and Learning (MEL) platform. However, it is recommended that you fill the tables to ensure accuracy of reporting and accountability.

Indicator	Description of Activities and Products measured by Indicator	Deviation narrative (+/- 10%)	2015 Actual	2016 Target
KNOWLEDGE, TOOLS, DATA				
1. Number of "products" produced by the Center	Glossary: These are frameworks and concepts that are significant and complete enough to have been highlighted on web pages, publicized through blog stories, press releases and/or policy briefs. They are significant in that they should be likely to change the way stakeholders along the impact pathway allocate resources and/or implement activities. They should be products that change the way these stakeholders think and act. Tools, decision-support tools, guidelines and/or training manuals are not included in this indicator. Specify what type of products, from above glossary, you have included in the number indicated under 2013; if relevant specify geographic locations			
2. Number of products produced that have explicit target of women farmers/NRM managers	Glossary: The web pages, blog stories, press releases and policy briefs supporting indicator #1 must have an explicit focus on women farmers/NRM managers to be counted Provide concrete examples of what you include in this indicator			
3. Number of products produced that have been assessed for likely gender-disaggregated impact	Glossary; Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted Provide concrete examples of what you include in this indicator			
4. Number of "tools" produced by the Center	Glossary: These are significant decision-support tools, guidelines, and/or training manuals that are significant and complete enough to have been highlighted on web pages, publicized through blog stories, press releases and/or policy briefs. They are significant in that they should be likely to change the way stakeholders along the impact pathway allocate resources and/or implement activities. Based on the glossary, describe the types of outputs you include in this indicator			

5. Number of tools that have an explicit target of women farmers	Glossary: The web pages, blog stories, press releases and policy briefs supporting indicator #4 must have an explicit focus on women farmers/NRM managers to be counted			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
KNOWLEDGE, TOOLS, DATA				
6. Number of tools assessed for likely gender-disaggregated impact	Glossary: Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted			
7. Number of open access databases maintained by Center	Indicate the type of data bases (e.g., socio-economic survey data; crop yields in field experiments…) you are reporting on in the following columns			
8. Total number of users of these open access databases				
9. Number of publications in ISI journals produced by Center	Please indicate total number and complete in detail Section V of the annual report			
10. Number of strategic value chains analyzed by Center	Clearly indicate the type of value chains you are reporting on in the next columns			

11. Number of targeted agro-ecosystems analysed/ characterised by Center	Specify the type of system, using its main products as descriptors (e.g., mixed crop, livestock system; monoculture of XX; agroforestry with maize, beans, etc..; mixed cropping with upland rice, cassava, etc...)by geographical location and agroecological zones (FAO typology)			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
KNOWLEDGE, TOOLS, DATA				
12. Estimated population of above-mentioned agro-ecosystems				
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS				
13. Number of trainees in short-term programs facilitated by Centre (male)	Glossary: The number of individuals to whom significant knowledge or skills have been imparted through interactions that are intentional, structured, and purposed for imparting knowledge or skills should be counted. This includes farmers, ranchers, fishers, and other primary sector producers who receive training in a variety of best practices in productivity, post-harvest management, linking to markets, etc. It also includes rural entrepreneurs, processors, managers and traders receiving training in application of new technologies, business management, linking to markets, etc., and training to extension specialists, researchers, policymakers and others who are engaged in the food, feed and fiber system and natural resources and water management. Include training on climate risk analysis, adaptation, mitigation, and vulnerability assessments, as it relates to agriculture. Training should include food security, water resources management/IWRM, sustainable agriculture, and climate change resilience Indicate, from the above list, the general subject matters in which training was provided.			
14. Number of trainees in short-term programs facilitated by Centre (female)	(see above, but for female)			

15. Number of trainees in long-term programs facilitated by Center (male)	Glossary: The number of people who are currently enrolled in or graduated in the current fiscal year from a bachelor's, master's or Ph.D. program or are currently participating in or have completed in the current fiscal year a long term (degree-seeking) advanced training program such as a fellowship program or a post-doctoral studies program. A person completing one long term training program in the fiscal year and currently participating in another long term training program should be counted only once. Specify in this cell number of Master's and number of PhD's			
16. Number of trainees in long-term programs facilitated by Center (female)	(see above, but for female)			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS				
17. Number of multi-stakeholder R4D innovation platforms established for the targeted agro-ecosystems by the Center	Glossary: To be counted, a multi-stakeholder platform has to have a clear purpose, generally to manage some type of tradeoff/conflict among the different interests of different stakeholders in the targeted agro-ecosystems, and inclusive and clear governance mechanisms, leading to decisions to manage the variety of perspectives of stakeholders in a manner satisfactory to the whole platform. Indicate the focus of each platform in this cell, including geographical focus			
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

18. Number of technologies/NRM practices under research in the Center (Phase I)	Glossary: Technologies to be counted here are agriculture-related and NRM-related technologies and innovations including those that address climate change adaptation and mitigation. Relevant technologies include but are not limited to: • Mechanical and physical: New land preparation, harvesting, processing and product handling technologies, including biodegradable packaging • Biological: New germplasm (varieties, breeds, etc.) that could be higher-yielding or higher in nutritional content and/or more resilient to climate impacts; affordable food-based nutritional supplementation such as vitamin A-rich sweet potatoes or rice, or high-protein maize, or improved livestock breeds; soil management practices that increase biotic activity and soil organic matter levels; and livestock health services and products such as vaccines; • Chemical: Fertilizers, insecticides, and pesticides sustainably and environmentally applied, and soil amendments that increase fertilizer-use efficiencies; • Management and cultural practices: sustainable water management; practices; sustainable land management practices; sustainable fishing practices; Information technology, improved/sustainable agricultural production and marketing practices, increased use of climate information for planning disaster risk strategies in place, climate change mitigation and energy efficiency, and natural resource management practices that increase productivity and/or resiliency to climate change. IPM, ISFM, and PHH as related to agriculture should all be included as improved technologies or management practices. New technologies or management practices under research counted should be only those under research in the current reporting year. Any new technology or management practice under research in a previous year but			
19. Number of technologies under research that have an explicit target of women farmers	The papers, web pages, blog stories, press releases and policy briefs supporting indicator #x must have an explicit focus on women farmers/NRM managers to be counted			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

20. Number of technologies under research that have been assessed for likely gender-disaggregated impact	Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted			
21. Number of agro- ecosystems for which CRP has identified feasible approaches for improving ecosystem services and for establishing positive incentives for farmers to improve ecosystem functions as per the CRP's recommendations	Use the same classification of agro-ecosystem as for indicator 11 above, including geographical location and agro-ecological zone			
22. Number of people who will potentially benefit from plans, once finalised, for the scaling up of strategies	Indicate the potential number of both women and men			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				
23. Number of technologies /NRM practices field tested (phase II)	Glossary; Under "field testing" means that research has moved from focused development to broader testing (pilot project phase) and this testing is underway under conditions intended to duplicate those encountered by potential users of the new technology. This might be in the actual facilities (fields) of potential users, or it might be in a facility set up to duplicate those conditions. Clearly identify in this cell the type of technology and the geographical locations of the field testing/pilot projects reported in next columns			

24. Number of agro-ecosystems for which innovations (technologies, policies, practices, integrative approaches) and options for improvement at system level have been developed and are being field tested (Phase II)	Clearly identify in this cell the type of technology and the geographical location of the field testing/pilot projects, and use the same classification of agroecosystem as for indicator 11, specifying the type of agroecosystems in which field testing is taking place			
25. Number of above innovations/approaches/options that are targeted at decreasing inequality between men and women				
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

26. Number of published research outputs from CRP utilised in targeted agro-ecosystems				
27.Number of technologies/NRM practices released by public and private sector partners globally (phase III)	Glossary: In the case of crop research that developed a new variety, e.g., the variety must have passed through any required approval process, and seed of the new variety should be available for multiplication. The technology should have proven benefits and be as ready for use as it can be as it emerges from the research and testing process. Technologies made available for transfer should be only those made available in the current reporting year. Any technology made available in a previous year should not be included. Clearly identify in this cell the technologies/practices thus released (scale up phase), the geographical areas concerned			
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				
28. Numbers of Policies/ Regulations/ Administrative Procedures Analyzed (Stage 1)	Number of agricultural enabling environment policies / regulations / administrative procedures in the areas of agricultural resource, food, market standards & regulation, public investment, natural resource or water management and climate change adaptation/mitigation as it relates to agriculture that underwent the first stage of the policy reform process i.e. analysis (review of existing policy / regulation / administrative procedure and/or proposal of new policy / regulations / administrative procedures).Please count the highest stage completed during the reporting year – don't double count for the same policy. Clearly identify in this cell the type of policy, regulations, etc. from the above list			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				

29. Number of policies / regulations / administrative procedures drafted and presented for public/stakeholder consultation (Stage 2)	....that underwent the second stage of the policy reform process. The second stage includes public debate and/or consultation with stakeholders on the proposed new or revised policy / regulation / administrative procedure. Clearly identify in this cell the type of policy, regulations and so on, and the geographical location of the consultations			
30. Number of policies / regulations / administrative procedures presented for legislation(Stage 3)	: ... underwent the third stage of the policy reform process (policies were presented for legislation/decree to improve the policy environment for smallholder-based agriculture.) Clearly identify in this cell the type of policy and the country/region concerned			
31. Number of policies / regulations / administrative procedures prepared passed/approved (Stage 4)	: ...underwent the fourth stage of the policy reform process (official approval (legislation/decree) of new or revised policy / regulation / administrative procedure by relevant authority). Clearly identify in this cell the type of policy and the country/region concerned			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/-10%)**	**2015 Actual**	**2016 Target**
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				

32. Number of policies / regulations / administrative procedures passed for which implementation has begun (Stage 5)	: ...completed the policy reform process (implementation of new or revised policy / regulation / administrative procedure by relevant authority) Clearly identify in this cell the type of policy and the country/region concerned			
OUTCOMES ON THE GROUND				
33. Number of hectares under improved technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic locations where this is occurring and whether the application of technologies is on a new or continuing area			
34A. Number MALE of farmers and others who have applied new technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic location of these farmers and whether the application of technologies is on a new or continuing area and indicate:			

34B. Number of FEMALE farmers and others who have applied new technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic location of these farmers and whether the application of technologies is on a new or continuing area and indicate:			

Annex 2: Performance indicators for gender mainstreaming with targets defined

Please delete the part not achieved by your centre and add details.

Performance Indicator	CRP performance approaches requirements	CRP performance meets requirements	CRP performance exceeds requirements
1. Gender equality	Sex-disaggregated social data is being	Sex-disaggregated social data collected and used to diagnose important gender-related	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the

targets defined	collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations	constraints in at least one of the CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs)	CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs) And CRP targets changes in levels of gender inequality to which the CRP is or plans to contribute, with related numbers of men and women beneficiaries in main target populations
2. Institutional architecture for integration of gender is in place	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research And A CRP plan approved for capacity development in gender analysis	CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research And A CRP plan approved for capacity development in gender analysis And The CRP uses feedback provided by its M&E system to improve its integration of gender into research

ANNEX 3: List of Centre Research Staff contributing to Dryland Systems

Please provide list and relevant information of all research staff in your centre involved in Dryland Systems research from all Windows of funding by completing the attached excel document and submitting it separately as an attachment to the annual report.

OUTCOME STORY 2

OUTCOME STORY 3

OUTCOME STORY 4

OUTCOME STORY 5

OUTCOME STORY Template

This template is intended for use of Dryland Systems scientists and partners to identify and highlight outcomes of their research activities funded by and/or mapped to the program. Each section in the template is followed by a self-check, which outlines criteria relevant to that section. The maximum number of word required to fill this template is 1450- 1500.

Name of research activity/project title:	
Flagship:	
Geographical region:	
Name and email of Activity Lead:	
Name and email of Outcome Story Lead:	
Activity Lead Center:	
Activity Partner Center(s):	
Activity Partner CRPs:	

42. Outcome Story Headline:

Guidance:

In no more than 15-20 words, please provide a descriptive headline that captures the main research outcome

SELF-CHECK – Have you:

- ☐ *Captured the overall message of the outcome story?*
- ☐ *Included an action verb?*
- ☐ *Captured the reader's attention?*

43. Outcome Story Abstract

Word limit: 200 words

SELF-CHECK – Have you:

- ☐ *Summarized the problem, program/activity, and outcomes?*
- ☐ *Provided a summary with specific measurable outcomes that avoids broad, sweeping statements such as "There was a noticeable increase in healthy eating habits"?*

44. Problem/Challenge Overview:

Some guidance:

Start with the issue, challenge, problem or opportunity that Dryland Systems has aimed to address. This should relate to one of the IDOs (resilience, wealth and wellbeing, food access, natural resources management, gender empowerment, capacity to innovate).

Clarify who this outcome story is about (e.g., farmer, scientist, community, research partner, policy maker, etc.) by adding a human interest angle. Who is/was experiencing this problem/challenge and how would they benefit if it was solved? What are the opportunities and what is at stake for a person, community or other group of people?

Word limit: 150 words

SELF-CHECK – Have you:

- ☐ *Described the issue(s), challenge(s), problem(s), opportunities being addressed and why are these important?*
- ☐ *Used data to frame the problem, including the social and economic costs?*
- ☐ *Specified the affected dryland population(s)?*
- ☐ *Specified the affected dryland area (in hectares)*

45. What are the main research activities:

Some guiding questions:

Please describe the main research question(s), activities, strategy and timeline.

What did you do to address the aforementioned challenge(s) and make the most of the opportunities available?

How were different research users engaged in or consulted in the research process?

How do you think this made your research better?

Word limit: 150 words

SELF-CHECK – Have you:

- ☐ *Described your approach of designing and implementing the research?*
- ☐ *Identified the various research users involved at different stages of the research process?*
- ☐ *Identified any major shifts or changes to the research activities and approach?*

46. What are the main Outcomes of your research?

An outcome is generally defined as the short-term and medium-term effect of an intervention's outputs, such as change in knowledge, attitudes, beliefs, behaviors.

Bearing this definiton in mind, please provide a short description of the actual changes that occurred as a result of your research activities and outputs. How are different users utilizing your research outputs? what has changes in their practice, policy and/or investment? How and why did they take up the research outputs? What are the key milestones in the timeline of change that occurred? What is the potential for scaling the outcome up and out?

Word limit: 200 words

SELF-CHECK – Have you:

- ☐ *Described actual changes that occurred as opposed to desired or anticipated changes in your initial research proposal?*
- ☐ *Identified any outcomes that you did not intend or anticipate? How are these justified and/or attributed to your activities?*
- ☐ *Demonstrated the scalability of the outcomes for greater reach and impact (in terms of both dryland communities and land area?*

47. What are the main research Outputs that resulted in the outcome(s)?

Outputs are generally defined as the tangible products or direct deliverables of your research activities, such as research papers, publications, policy recommendations, models, on-farm trials, methodologies, technologies, assessments, improved seeds, increased yields, hectares of degraded land restored, quantity of natural resources management, efficiency gains, new institutional arrangements made, participatory research actions, innovation platforms, trainings, etc.

Bearing this definition in mind, please list the main research outputs of your research that led to the outcomes reported above.

Word limit: 150 words

SELF-CHECK – Have you:

- ☐ *Identified all types of outputs delivered and observed?*
- ☐ *Included facts and figures to demonstrate the strength and outreach of your research outputs?*
- ☐ *Avoided vague output statements such as "farmers benefited from increased food security as a result of our assessments of crop varieties."*

48. Who were the intermediary and direct users of your research outputs and what role did they play in achieving the outcome:

Guidance:

Please list the main intermediary and direct users of your research and indicate the role they played in achieving the reported outcomes

For example:

X partners were the intermediary users of the research outputs for dissemination of the technology/tool/practice

Y partners were the intermediary/direct users of research outputs for formulation of policy or

development project

X number of farmers in X area were are the direct users of the technology/tool/practice

Word limit: 100 words

SELF-CHECK – Have you:

- ☐ *Clearly identified all users and distinguished between intermediary and direct users of your research?*
- ☐ *Described their specific related role in terms of research, development, technology dissemination, policy formulation, adaptation, adoption, etc.?*
- ☐ *Used facts and figures to strengthen your statements?*

49. How were your research outputs used (will be used in the future):

Describe how your research output was used and what changes occurred? How did these changes set the stage for the achievements of the outcomes reported above? Where there any research activities and changes you did not anticipate, and if so, how did you adjust? What steps did each user take to adopt, scale out or scale up the results of your research outputs? What are the follow up actions to ensure sustainability?

Word limit: 150 words

SELF-CHECK – Have you:

- ☐ *Described actual changes that occurred during or immediate after the release of your research outputs?*
- ☐ *Identified how the use of research outputs set the stage for achieving the outcomes?*
- ☐ *Identified steps and actions for ensuring sustainability?*

50. What is the Evidence of Your Research Outcomes:

Provide solid evidence for this outcome (Document, news article, impact assessment, etc.) in terms of actions and changed behaviour of users and beneficiaries of your research. How can these changed actions and behaviours be sustained in the long run?

Word limit: 150 words

SELF-CHECK – Have you:

- ☐ *Identified how the actions and behaviours of key stakeholders have now changed?*
- ☐ *Identified how these changes will be sustained?*

51. Testimonials:

Testimonials are written or recorded statements that support program credibility and level of expertise. They also strengthen our reputation by expressing the trust that other people have in the program and its offerings. They are a wonderful way to help us to attract a deeper interest from existing and prospective stakeholders. Testimonials are the holy grail of

marketing and advertising. Marketing Experiments demonstrate that testimonials can work wonders. For example, a written testimonial can increase customer conversion by 25%; video testimonials on the other hand, can increase the conversion rates increased by a whopping 201%!

- ☐ Testimonials from Beneficiaries (quote, video, letter, interview, survey, etc.)
- ☐ Testimonials from Partners (quote, video, letter, interview, survey, etc.)

SELF-CHECK – Have you:

- ☐ *Included the name, position, organization and location of person giving the testimonial?*
- ☐ *Included a testimonial that clearly identifies a direct benefit to a person/community/organizations, as opposed to vague general praise for the program activity?*
- ☐ *Included a testimonial that captures the beneficiary's strong emotion stemming from the outcome of your activities in his/her life, community, organization, etc.?*
- ☐ *Ensured each quote is no more than 2-3 lines.*

52. Lessons Learned:

Lessons learned are usually defined as generalizations based on the evaluation of programs, interventions or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact.

Some guiding questions:

What did you learn in this process?

What was difficult or challenging?

How did you overcome the challenges faced?

How did you engaged or worked with partners successfully?

If you were to start over, what would you do differently?

Word limit: 200 words

SELF-CHECK – Have you:

- ☐ *Identified both challenges/weaknesses and successes/strengths?*
- ☐ *Identified what you might have done differently to ensure a better outcome or greater impact?*
- ☐ *Identified who/what other organization/canter/CRP can potentially benefit from these lessons?*

53. Full reference citations and URL link to published research work.

For all research publications and other types of research outputs (data, tools, guidelines etc.) associated with this outcome story, please include below:

54. Please check any of the following that are being submitted to complement your outcome story:

- ☐ Quality Photo(s) (of landscape, beneficiaries and activities) with appropriate captions and credit
- ☐ Testimonials from Beneficiaries (quote, video, letter, interview, survey, etc.)
- ☐ Testimonials from Partners (quote, video, letter, interview, survey, etc.)
- ☐ Full reference citations and URL hyperlinks to published research work
- ☐ Blog and/or other website stories with URL links
- ☐ Newspaper Articles (print or electronic)
- ☐ Communication (non-scientific) Materials Produced (brochure, poster, press release, etc.)
- ☐ Supporting Materials (presentations, workshop reports, activity reports, donor reports)
- ☐ Video/Audio Clips
- ☐ Other (please explain: _____)

55. Final Checklist

Please use the following checklist to ensure your outcome story is ready for sharing.

No.	Question to consider	Yes	No
1	Does the story describe the outcomes the research produced and the people who are benefitting? What changes–in skills, knowledge, attitude, practice, or policy–has the research brought, and who is benefitting from these changes?		
2	Does the story capture outcomes from an interesting angle (possibly a human angle) that would captivate the attention of the target audience?		
3	Does the story explain what new insights the research brings? Does the story describe a key insight on what works and what doesn't and something that future research could build on.What are the main lesson learned?		
4	Does the story make a compelling point that people will remember? Does the story show how the research makes a difference to improving livelihoods and reducing poverty?		
5	Does the story provide interesting facts that people will remember?		
6	Does the story explain in clear and measurable ways the kind of impact - beyond the level of the reported outomces - could be achieved if the research outputs scaled out and up?		
7	Does the story show which partners contributed and how?		
8	Does the story include quotes from scientists, partners and/or beneficiaries?		
9	Have I provided links to other media (journal articles, website news, newsletter, blogs, annual reports of other CGIAR centres, CRPs) that also feature this story?		

10	Have I provided the contact details of people who can provide more information?		

SECTION V – LIST OF 2015 PUBLICATIONS AND SCIENTIFIC OUTPUTS

In 2015, Name of CENTER produced under the framework of the CGIAR Research Program on Dryland Systems a total of X published articles (Y indexed by ISI), Z books, and several policy and technical briefs.

A clear move towards the examination of new systems approaches is emerging in this body of scientific knowledge, including two strategy papers. We expect the systems approach will generate greater public awareness of agricultural livelihood issues in dryland areas and reshape traditional thinking about key performance determinants of dryland agro-ecosystems and relevant responses to meet challenges faced by rural dryland communities.

Commented [TL5]: See example, and please provide a short narrative of what this body of scientific knowledge represents. What's new and innovative about it?

The following represents a summary of all 2015 publications and research outputs produced by Centre under Dryland Systems by Region/ALS Flagship, including full and correct citation of all publications, weblink and categories of scientific output marked with the following codes to indicate:

- (S) = multidisciplinary/system research
- (M) = mono-disciplinary research
- [X.XX]= ISI Impact Factor[6]
- (O) = Open Access

Table 1. Summary of all ISI publications

Region/ALS	ISI Factor [range of ISI scores]	ISI Open (% of ISI articles)	ISI Monodisciplinary (% of ISI articles)	ISI Multidisciplinary (% of ISI articles)
WAS/				
NAWA/				
ESA/				
CA/				
SA/				
TOTAL				

Table 2. Summary of Non-ISI Publications

Region/ALS	Non-ISI Articles	Book Chapters	Technical Reports & Working Papers	Proceedings	Datasets	Other
WAS/						
NAWA/						

[6] *For ISI, the JCR Impact Factor List for 2013 has used (https://www.360researchpapers.com/resources/impact-factor, accessed 6 July 2015). For journals not listed, the website of that journal was checked and if it lists an* Region *ISI factor, this was recorded.*

ESA/						
CA/						
SA/						
TOTAL						

Please list in alphabetical order, full citation, weblink and codes as applicable for all publications as shown in the examples below under each category of research output.

Annex 1: CRP indicators of progress, with glossary and targets

This table will be automatically generated by Dryland Systems' Monitoring, Evaluation and Learning (MEL) platform. However, it is recommended that you fill the tables to ensure accuracy of reporting and accountability.

Indicator	Description of Activities and Products measured by Indicator	Deviation narrative (+/- 10%)	2015 Actual	2016 Target
KNOWLEDGE, TOOLS, DATA				
1. Number of "products" produced by the Center	Glossary: These are frameworks and concepts that are significant and complete enough to have been highlighted on web pages, publicized through blog stories, press releases and/or policy briefs. They are significant in that they should be likely to change the way stakeholders along the impact pathway allocate resources and/or implement activities. They should be products that change the way these stakeholders think and act. Tools, decision-support tools, guidelines and/or training manuals are not included in this indicator. Specify what type of products, from above glossary, you have included in the number indicated under 2013; if relevant specify geographic locations			
2. Number of products produced that have explicit target of women farmers/NRM managers	Glossary: The web pages, blog stories, press releases and policy briefs supporting indicator #1 must have an explicit focus on women farmers/NRM managers to be counted Provide concrete examples of what you include in this indicator			
3. Number of products produced that have been assessed for likely gender-disaggregated impact	Glossary; Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted Provide concrete examples of what you include in this indicator			

4. Number of "tools" produced by the Center	Glossary: These are significant decision-support tools, guidelines, and/or training manuals that are significant and complete enough to have been highlighted on web pages, publicized through blog stories, press releases and/or policy briefs. They are significant in that they should be likely to change the way stakeholders along the impact pathway allocate resources and/or implement activities. Based on the glossary, describe the types of outputs you include in this indicator Robinson, Lance W. 2015. Influence Diagrams. ILRI Manual. Nairobi, International Livestock Research Institute.		1	
5. Number of tools that have an explicit target of women farmers	Glossary: The web pages, blog stories, press releases and policy briefs supporting indicator #4 must have an explicit focus on women farmers/NRM managers to be counted			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
KNOWLEDGE, TOOLS, DATA				
6. Number of tools assessed for likely gender-disaggregated impact	Glossary: Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted			
7. Number of open access databases maintained by Center	Indicate the type of data bases (e.g., socio-economic survey data; crop yields in field experiments…) you are reporting on in the following columns			
8. Total number of users of these open access databases				
9. Number of publications in ISI journals produced by Center	Please indicate total number and complete in detail Section V of the annual report			
10. Number of strategic value chains analyzed by Center	Clearly indicate the type of value chains you are reporting on in the next columns			

Commented [LWR6]: 1 from Lance. Perhaps more from others.

11. Number of targeted agro-ecosystems analysed/ characterised by Center	Specify the type of system, using its main products as descriptors (e.g., mixed crop, livestock system; monoculture of XX; agroforestry with maize, beans, etc..; mixed cropping with upland rice, cassava, etc...)by geographical location and agroecological zones (FAO typology)			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
KNOWLEDGE, TOOLS, DATA				
12. Estimated population of above-mentioned agro-ecosystems				
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS				
13. Number of trainees in short-term programs facilitated by Centre (male)	Glossary: The number of individuals to whom significant knowledge or skills have been imparted through interactions that are intentional, structured, and purposed for imparting knowledge or skills should be counted. This includes farmers, ranchers, fishers, and other primary sector producers who receive training in a variety of best practices in productivity, post-harvest management, linking to markets, etc. It also includes rural entrepreneurs, processors, managers and traders receiving training in application of new technologies, business management, linking to markets, etc., and training to extension specialists, researchers, policymakers and others who are engaged in the food, feed and fiber system and natural resources and water management. Include training on climate risk analysis, adaptation, mitigation, and vulnerability assessments, as it relates to agriculture. Training should include food security, water resources management/IWRM, sustainable agriculture, and climate change resilience Indicate, from the above list, the general subject matters in which training was provided.		2	
14. Number of trainees in short-term programs facilitated by Centre (female)	(see above, but for female)			

Commented [LWR7]: Two from Lance. Perhaps more from others.

15. Number of trainees in long-term programs facilitated by Center (male)	Glossary: The number of people who are currently enrolled in or graduated in the current fiscal year from a bachelor's, master's or Ph.D. program or are currently participating in or have completed in the current fiscal year a long term (degree-seeking) advanced training program such as a fellowship program or a post-doctoral studies program. A person completing one long term training program in the fiscal year and currently participating in another long term training program should be counted only once. Specify in this cell number of Master's and number of PhD's		1	
16. Number of trainees in long-term programs facilitated by Center (female)	(see above, but for female)			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS				
17. Number of multi-stakeholder R4D innovation platforms established for the targeted agro-ecosystems by the Center	Glossary: To be counted, a multi-stakeholder platform has to have a clear purpose, generally to manage some type of tradeoff/conflict among the different interests of different stakeholders in the targeted agro-ecosystems, and inclusive and clear governance mechanisms, leading to decisions to manage the variety of perspectives of stakeholders in a manner satisfactory to the whole platform. Indicate the focus of each platform in this cell, including geographical focus			
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

Commented [LWR8]: 1 from Lance. Perhaps more from others.

18. Number of technologies/NRM practices under research in the Center (Phase I)	Glossary: Technologies to be counted here are agriculture-related and NRM-related technologies and innovations including those that address climate change adaptation and mitigation. Relevant technologies include but are not limited to: • Mechanical and physical: New land preparation, harvesting, processing and product handling technologies, including biodegradable packaging • Biological: New germplasm (varieties, breeds, etc.) that could be higher-yielding or higher in nutritional content and/or more resilient to climate impacts; affordable food-based nutritional supplementation such as vitamin A-rich sweet potatoes or rice, or high-protein maize, or improved livestock breeds; soil management practices that increase biotic activity and soil organic matter levels; and livestock health services and products such as vaccines; • Chemical: Fertilizers, insecticides, and pesticides sustainably and environmentally applied, and soil amendments that increase fertilizer-use efficiencies; • Management and cultural practices: sustainable water management; practices; sustainable land management practices; sustainable fishing practices; Information technology, improved/sustainable agricultural production and marketing practices, increased use of climate information for planning disaster risk strategies in place, climate change mitigation and energy efficiency, and natural resource management practices that increase productivity and/or resiliency to climate change. IPM, ISFM, and PHH as related to agriculture should all be included as improved technologies or management practices. New technologies or management practices under research counted should be only those under research in the current reporting year. Any new technology or management practice under research in a previous year but not under research in the reporting year should not be included. Clearly indicate, from the list above, the type of technology and geographical location that you are reporting on in next columns . A study of grazing exclosures in Yabello		1	
19. Number of technologies under research that have an explicit target of women farmers	The papers, web pages, blog stories, press releases and policy briefs supporting indicator #x must have an explicit focus on women farmers/NRM managers to be counted			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

Commented [LWR9]: 1 from Lance. Perhaps more from others.

20. Number of technologies under research that have been assessed for likely gender-disaggregated impact	Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted			
21. Number of agro- ecosystems for which CRP has identified feasible approaches for improving ecosystem services and for establishing positive incentives for farmers to improve ecosystem functions as per the CRP's recommendations	Use the same classification of agro-ecosystem as for indicator 11 above, including geographical location and agro-ecological zone			
22. Number of people who will potentially benefit from plans, once finalised, for the scaling up of strategies	Indicate the potential number of both women and men Action plans on bush encroachment, rangeland management, and livestock market planning in Yabello Woreda: ~60,000.			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				
23. Number of technologies /NRM practices field tested (phase II)	Glossary; Under "field testing" means that research has moved from focused development to broader testing (pilot project phase) and this testing is underway under conditions intended to duplicate those encountered by potential users of the new technology. This might be in the actual facilities (fields) of potential users, or it might be in a facility set up to duplicate those conditions. Clearly identify in this cell the type of technology and the geographical locations of the field testing/pilot projects reported in next columns			

24. Number of agro-ecosystems for which innovations (technologies, policies, practices, integrative approaches) and options for improvement at system level have been developed and are being field tested (Phase II)	Clearly identify in this cell the type of technology and the geographical location of the field testing/pilot projects, and use the same classification of agroecosystem as for indicator 11, specifying the type of agroecosystems in which field testing is taking place			
25. Number of above innovations/approaches/options that are targeted at decreasing inequality between men and women				
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT				

26. Number of published research outputs from CRP utilised in targeted agro-ecosystems				
27.Number of technologies/NRM practices released by public and private sector partners globally (phase III)	Glossary: In the case of crop research that developed a new variety, e.g., the variety must have passed through any required approval process, and seed of the new variety should be available for multiplication. The technology should have proven benefits and be as ready for use as it can be as it emerges from the research and testing process. Technologies made available for transfer should be only those made available in the current reporting year. Any technology made available in a previous year should not be included. Clearly identify in this cell the technologies/practices thus released (scale up phase), the geographical areas concerned			
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				
28. Numbers of Policies/ Regulations/ Administrative Procedures Analyzed (Stage 1)	Number of agricultural enabling environment policies / regulations / administrative procedures in the areas of agricultural resource, food, market standards & regulation, public investment, natural resource or water management and climate change adaptation/mitigation as it relates to agriculture that underwent the first stage of the policy reform process i.e. analysis (review of existing policy / regulation / administrative procedure and/or proposal of new policy / regulations / administrative procedures).Please count the highest stage completed during the reporting year – don't double count for the same policy. Clearly identify in this cell the type of policy, regulations, etc. from the above list			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				

29. Number of policies / regulations / administrative procedures drafted and presented for public/stakeholder consultation (Stage 2)	....that underwent the second stage of the policy reform process. The second stage includes public debate and/or consultation with stakeholders on the proposed new or revised policy / regulation / administrative procedure. Clearly identify in this cell the type of policy, regulations and so on, and the geographical location of the consultations			
30. Number of policies / regulations / administrative procedures presented for legislation(Stage 3)	: ... underwent the third stage of the policy reform process (policies were presented for legislation/decree to improve the policy environment for smallholder-based agriculture.) Clearly identify in this cell the type of policy and the country/region concerned			
31. Number of policies / regulations / administrative procedures prepared passed/approved (Stage 4)	: ...underwent the fourth stage of the policy reform process (official approval (legislation/decree) of new or revised policy / regulation / administrative procedure by relevant authority). Clearly identify in this cell the type of policy and the country/region concerned			
Indicator	**Description of Activities and Products measured by Indicator**	**Deviation narrative (+/- 10%)**	**2015 Actual**	**2016 Target**
POLICIES IN VARIOUS STAGES OF DEVELOPMENT				

32. Number of policies / regulations / administrative procedures passed for which implementation has begun (Stage 5)	: ...completed the policy reform process (implementation of new or revised policy / regulation / administrative procedure by relevant authority) Clearly identify in this cell the type of policy and the country/region concerned			
OUTCOMES ON THE GROUND				
33. Number of hectares under improved technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic locations where this is occurring and whether the application of technologies is on a new or continuing area			
34A. Number MALE of farmers and others who have applied new technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic location of these farmers and whether the application of technologies is on a new or continuing area and indicate:			

34B. Number of FEMALE farmers and others who have applied new technologies or management practices as a result of CRP research	Clearly identify in this cell the geographic location of these farmers and whether the application of technologies is on a new or continuing area and indicate:			

Annex 2: Performance indicators for gender mainstreaming with targets defined

Please delete the part not achieved by your centre and add details.

Performance Indicator	CRP performance approaches requirements	CRP performance meets requirements	CRP performance exceeds requirements
1. Gender equality	Sex-disaggregated social data is being	Sex-disaggregated social data collected and used to diagnose important gender-related	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the

targets defined	collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations	constraints in at least one of the CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs)	CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs) And CRP targets changes in levels of gender inequality to which the CRP is or plans to contribute, with related numbers of men and women beneficiaries in main target populations
2. Institutional architecture for integration of gender is in place	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research And A CRP plan approved for capacity development in gender analysis	CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research And A CRP plan approved for capacity development in gender analysis And The CRP uses feedback provided by its M&E system to improve its integration of gender into research

ANNEX 3: List of Centre Research Staff contributing to Dryland Systems

Please provide list and relevant information of all research staff in your centre involved in Dryland Systems research from all Windows of funding by completing the attached excel document and submitting it separately as an attachment to the annual report.

CGIAR

RESEARCH PROGRAM ON
Dryland Systems

The CGIAR Research Program on Dryland Systems aims to improve the lives of 1.6 billion people and mitigate land and resource degradation in 3 billion hectares covering the world's dry areas.

Dryland Systems engages in integrated agricultural systems research to address key socioeconomic and biophysical constraints that affect food security, equitable and sustainable land and natural resource management, and the livelihoods of poor and marginalized dryland communities. The program unifies eight CGIAR Centers and uses unique partnership platforms to bind together scientific research results with the skills and capacities of national agricultural research systems (NARS), advanced research institutes (ARIs), non-governmental and civil society organizations, the private sector, and other actors to test and develop practical innovative solutions for rural dryland communities.

The program is led by the International Center for Agricultural Research in the Dry Areas (ICARDA), a member of the CGIAR Consortium. CGIAR is a global agriculture research partnership for a food secure future.

For more information, please visit

drylandsystems.cgiar.org

Led by:

ICARDA
Science for Better Livelihoods in Dry Areas

In partnership with:

ICRISAT
Science with a human face

Bioversity International

CIAT

Centro Internacional de la Papa
CIP

World Agroforestry Centre

ILRI
International Livestock Research Institute

IWMI
International Water Management Institute