

Livestock CRP

2018 Plan of Work & Budget

Implementing Partners:

- Lead: International Livestock Research Institute (ILRI)
- German Development Agency (GIZ)
- International Centre for Tropical Agriculture (CIAT)
- International Centre for Agricultural Research in the Dry Areas (ICARDA)
- Swedish University for Agricultural Sciences (SLU)

3 April 2018

CGIAR is a global partnership that unites organizations engaged in research for a food-secure future. The CGIAR Research Program on Livestock provides research-based solutions to help smallholder farmers, pastoralists and agro-pastoralists transition to sustainable, resilient livelihoods and to productive enterprises that will help feed future generations. It aims to increase the productivity of livestock agri-food systems in sustainable ways, making meat, milk and eggs more available and affordable across the developing world. The Program brings together five core partners: the International Livestock Research Institute (ILRI) with a mandate on livestock; the International Center for Tropical Agriculture (CIAT), which works on forages; the International Center for Research in the Dry Areas (ICARDA), which works on small ruminants and dryland systems; the Swedish University of Agricultural Sciences (SLU) with expertise particularly in animal health and genetics and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) which connects research into development and innovation and scaling processes.

The Program thanks all donors and organizations who globally supported its work through their contributions to the [CGIAR system](#)

© 2018



This publication is licensed for use under the Creative Commons Attribution 4.0 International Licence. To view this licence, visit <https://creativecommons.org/licenses/by/4.0>.

Unless otherwise noted, you are free to share (copy and redistribute the material in any medium or format), adapt (remix, transform, and build upon the material) for any purpose, even commercially, under the following conditions:



ATTRIBUTION. The work must be attributed, but not in any way that suggests endorsement by the publisher or the author(s).

Patron: Professor Peter C Doherty AC, FAA, FRS

Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax +254 20 422 3001
Email ilri-kenya@cgiar.org

ilri.org
better lives through livestock
ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia
Phone +251 11 617 2000
Fax +251 11 667 6923
Email ilri-ethiopia@cgiar.org

ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

LIVESTOCK CRP Plan of Work and Budget 2018

1. Expected Key Results:

1.1 Adjustments/ Changes to Your Theories of Change:

In 2018, the approval of the two unfunded Livestock CRP flagships to receive W1/W2 funding from 2018 restores the original programmatic balance presented in the CRP proposal. The two flagships have revised their strategies and Theories of Change, summaries of which are provided in the annex. The Feeds & Forages FP3 is now much more demand oriented and applies a product line approach. Stronger focus is given in the flagship to prioritization at different scales (on-farm, large-scale, global) and ex-ante/ex-post impact assessments. Technology development will have a stronger link to the work on new business approaches, extension models and public-private partnerships within the seed sector that will provide the means to scale innovations to a range of different end-users. Livestock Livelihoods & Agri-Food Systems FP5 sharpens its focus, combining the work at farm and value chain level into a single Cluster of Activity. Also, all policy-related work has been combined to create greater coherence and clarity. The basic premise of the FP5 Theory of Change remains the same in that FP5 aims to influence decision makers at a variety of levels, from individual men and women to farm-household to policy makers to investors, to achieve outcomes that improve the welfare of resource-poor people. Another key change to the overall approach of the CRP has been to re-orient the role of priority countries. It was not feasible to maintain the nine priority countries identified in the CRP proposal. The number of priority countries is therefore being reduced to four to ensure sufficient investment can be achieved, and their role has changed from being a primary impact pathway for CRP research to instead demonstrate proof-of-concept that the research-to-impact process can be accelerated by having flagships contribute to joint efforts in selected locations to integrate their research into livestock development interventions that can then go to scale. A selection process will decide which countries are retained and the change will be reflected in flagship planning for 2019; activities for 2018 continue to target for now the original nine countries.

1.2 Expected CRP Progress Towards Intermediate Outcomes and SLOs:

The main areas where the Livestock CRP expects to make significant progress towards achieving its outcomes include:

- The first major chicken phenotyping facility for Africa will be established in Ethiopia by Livestock Genetics FP1. Business plans and strategic partnerships will be developed to guide and test pilot-scale multiplication and delivery of improved genotypes for dual purpose chicken and dairy cattle will be piloted in Ethiopia, Tanzania and Nigeria.
- FP1 will make globally available the comprehensive baseline genome characterisation information on existing livestock populations for Ethiopia (cattle, sheep, goats, chicken), Tanzania (cattle), and Nigeria (chicken).
- Livestock Health FP2 will establish an analytical platform and evidence base to inform strategic choices for the international effort to control and eradicate *peste des petits ruminants* (PPR). This is an important contribution given critical knowledge gaps could undermine the major investment being mounted to control this disease of sheep and goats. An epidemiological modeling framework will be established, and studies undertaken to confirm key veterinary and institutional parameters required for successful control. The potential role of thermostable vaccines will be assessed, including their cost effectiveness.
- The Feed Assessment Tool (FEAST), which is gaining widespread use, will be upgraded by Feeds & Forages FP3 to incorporate explicitly a range of gender considerations.
- FP3 will have a *Urochloa* (signalgrass) hybrid commercialized by the private sector, which will also be scaling out existing forage hybrids in at least 15 additional countries covering an additional 100,000 hectares in 2018.

- Livestock & the Environment FP4 will make public the first available set of baseline greenhouse gas emissions data for livestock in Kenya and Vietnam. Flagship results will be disseminated in high level communication events at the Global Forum for Food & Agriculture and the UNFCCC COP24.
- Livestock Livelihoods & Agri-Food Systems FP5 will have completed supporting the scaling out of CRP-tested dairy and other livestock technologies and management strategies to 133,000 households in Kenya, Tanzania and Uganda.
- FP5 continues to directly shape livestock investment policy through development of new Livestock Master Plans in Bihar, India and in Rwanda. The previously completed Plan for Ethiopia is underpinning a World Bank loan to the Government of Ethiopia to begin in 2018. Innovations in the methodology for formulating Plans will more explicitly factor in outcomes for gender and social inclusion for livestock development investment.

1.3 Obtaining Evidence on Relevant Outcomes and Impacts:

The CRP has given priority to addressing the lack of evidence regarding the impact of feed and forage research. Two studies, funded by the CRP's Strategic Investment Fund will be implemented in 2018 to: (i) assess the robustness of using seed sales to measure forage uptake, and (ii) assess the promotion and uptake of dual-purpose groundnut varieties in Odisha, India. In addition, FP5 will use W1/W2 funding to undertake ex-post assessments of the impact of research-based interventions in two recently completed IFAD projects on small ruminant value chains in Ethiopia and on small-scale beef fattening enterprises in Swaziland. Jointly with the PIM CRP, FP5 will conduct an outcome and impact assessment study of the dairy check-off system in Kenya. FP2 and FP5 will assess the effectiveness of mobile delivery of livestock health services in Northern Kenya. FP2 will complete impact studies on herd health training modules and on the Infection and Treatment Method vaccine against East Coast fever in Tanzania.

1.4 Plans by CRP Flagships:

Livestock Genetics FP1: There are no changes to the flagship theory of change to highlight. A strategy will be finalized in 2018 to strengthen the gender dimension across the flagship's portfolio. No major area of work will be discontinued.

To have relevant data on livestock diversity and systems necessary for decision making on genetic improvement and conservation in CRP priority countries (Outcome 1.1), datasets and new knowledge on genotypes and agro-systems characteristics (chicken, small ruminants, cattle) will continue to be gathered to develop and refine country strategies. We will focus on Ethiopia, Nigeria and Tanzania applying livestock landscape genomics approaches. The collection of phenotypic data under major BMGF-funded chicken and dairy projects will be considerably reduced as the focus shifts to data analysis and integration of these data into large databases including environmental as well as socio-economical information to inform the design of new breeding strategies and associated new breeding interventions. The objective is to identify relevant genetic markers which then can be integrated into novel screening tools (e.g. SNPs chip) to guide selection of the best genotypes. This work will also allow prioritization of conservation interventions by assessing genetic variation in the population examined. Finally, a new poultry phenotypic characterization platform in ILRI Ethiopia will be launched and used to compare productivity and resilience of different chicken populations across Africa.

To inform the development of improved public and private sector breeding schemes in priority countries (Outcome 1.2), new tools will be developed to screen appropriate dairy cattle genotypes. They will be tested in priority countries Ethiopia and Tanzania. Building on the identification of the best poultry genotypes in different agro-ecologies of Ethiopia, Nigeria and Tanzania, and following analysis of resilience and productivity data collected in 2017, our main milestones will contribute to developing business models for the delivery and improvement of chickens (Outcome 1.3). These will incorporate a gender perspective, including publication of a study reporting how gender dynamics may affect genetic interventions (Outcome 1.4). The work on business models, which includes a strong focus on youth and capacity development, is leading to several new partnerships with small and medium-

size enterprises in the priority countries, and strategic partnerships are being explored with large breeding companies for the multiplication and delivery of the improved chicken genotypes (e.g. Hendrix Genetics Corporate).

For sheep and goats, a major milestone toward the development of sustainable breeding programs to improve productivity within the context of community-based breeding programs, will be establishing and disseminating guidelines on institutional arrangements to certify breeding ram and bucks (Outcome 1.5). While the work focuses on priority country Ethiopia, the guidelines will have wider relevance across many African countries.

The delivery of the above milestones is supported primarily by secured bilateral funding. W1/W2 will complement this funding and will specifically contribute to the new poultry phenotypic platforms and to the business models, supporting participation and inputs from relevant experts, consultants and partners.

Livestock Health FP2: While the flagship is not adjusting its theory of change, it is applying a product-line approach to better align its research agenda to the flagship outcomes. To help decision-makers make informed decisions where to invest resources for animal health, the flagship will continue in 2018 to identify the extent and impact of animal health constraints by developing assessment tools and protocols for use by animal health professionals and agencies. To assess risks for geographical emergence of infectious livestock diseases and their impact on livestock production systems, epidemiological models will be developed that take into account possible differential impacts on men's and women's livelihoods. These approaches will first be used in the focus systems and value chains in CRP priority countries and then in other locations. Disease mapping activities started in 2017 in Uganda, Ethiopia and Vietnam will be completed. New work will apply this approach to *peste des petits ruminants* (PPR) with a focus in the Sahel region, for which significant W1/W2 funding will be used to match bilateral funding. SLU bilateral funding is also expected to contribute to these activities.

To improve animal health and increase productivity, we will continue to evaluate, refine and adapt herd health approaches, especially those related to feeding, biosecurity and reproduction. We will finalize several training modules for animal health extension workers that we started to develop in 2017. In 2018, the focus will be on in-depth studies in the pig value chain in Uganda and the small ruminant value chain in Ethiopia. W1/W2 funding will be used in these two settings to refine the herd health approach, that may in turn provide a basis for future bilateral funding. If additional W1/W2 funding is made available, a priority will be to include Tanzania in this work. These improved herd health approaches target farmers and veterinary/extension workers and are being tested for cost-effectiveness. Efficient herd health interventions will also reduce the need to use antimicrobials. The flagship will undertake studies on knowledge, attitudes and practices related to antimicrobial use and resistance among smallholder livestock keepers in the CRP priority countries Uganda, Ethiopia and Vietnam, mainly funded by W1/W2, but with some support from bilateral funds leveraged by SLU.

To contribute to the identification, containment and possibly control of contagious animal diseases, strategic long-term work on vaccines and diagnostic tools continues largely supported by W1/W2. In 2018, this work is expected to provide proof-of-concept for a contagious caprine pleuropneumonia (CCPP) vaccine and an agreement for commercialization of a novel diagnostic test for contagious bovine pleuropneumonia (CBPP). In addition, we will report on issues related to thermostable vaccines. Eventually, such novel animal health products will contribute to reducing livestock mortality and morbidity, thereby increasing productivity and reducing the need for antibiotics. Priority is assigned to the most strategic, longer-term vaccine development activities. Work on identifying candidate East Coast fever schizont vaccine antigens and several activities on CBPP have been halted. If more funding is secured, priority will be given to reporting on the immunogenicity of vaccine trails for ruminant mycoplasmas and novel assays to support deployment of PPR vaccines.

In working towards livestock keepers having better access to animal health products and services, flagship technological outputs will be used as model products and services to be tested in delivery systems. This includes the work started in 2017 in Kenya to evaluate the degree to which products and services indeed reach their intended beneficiaries, both men and women. In 2018, we will provide a stakeholder report on the market for novel diagnostic products including the prototypes for CBPP lateral flow, CBPP Elisa and CCPP Elisa, to be taken up for

mass production and commercialization in Africa. Also, final reports supported by W1/W2 funding will be published on available animal health products and recommendations and testing of novel delivery models in the CRP priority countries of Ethiopia, Burkina Faso, Kenya, Tanzania, and Uganda.

Feeds & Forages FP3: Significant adjustments in the FP3 theory of change have been made to better address sustainable animal nutrition through demand-oriented feed and forage product lines. In 2018, FP3 will make progress towards five of the six outcomes identified in the CRP proposal. The flagship will achieve a milestone contributing to the use of regional and national feed supply-demand scenarios in CRP priority countries Vietnam and Ethiopia (Outcome 3.1). We will also deliver a genderized Feed Assessment Tool (FEAST) app, an update of SoFT, and three issues of the online journal Tropical Grasslands-Forrajes Tropicales, with the latter two supported by W1/W2 funds. Developing priority setting (e.g. foresight analysis) capacity will be the priority if additional funding is secured.

A second milestone deals with making forage hybrids available to end-users through collaboration with the private seed sector (Outcome 3.3). One new *Urochloa* hybrid will be commercialized and already available forage hybrids will be scaled out in at least 15 countries, including CRP priority country Ethiopia and flagship priority countries in LAC and East Africa. We expect these hybrids to be planted on at least 100,000 additional hectares in 2018. Development work on new *Urochloa* and *Megathyrus* hybrids with tolerance to biotic/abiotic stresses for diverse agro-ecosystems is targeting priority countries Ethiopia, Tanzania and Vietnam. Long-term experiments will be initiated to select forage (e.g. *C. purpureus*) and rangeland (e.g. *Opuntia*) species for drier areas in priority countries Tunisia and Ethiopia, and in Latin America. The forage selection and breeding work relies primarily on W1/W2 investment. Another milestone will make available forage ontologies to research partners to increase breeding and selection efficiency (Outcome 3.3). This includes publication of an annotated reference genome of diploid *Urochloa* and establishing drought and agronomic performance protocols for *C. purpureus*, both supported by W1/W2 funds. Use of geno-/phenotyping tools in breeding (e.g. GWAS/MAS) will be priority if additional W1/W2 funding is available. Although no specific 2018 milestone has been defined for making improved forage and crop cultivars for feed use available (Outcome 3.4), progress continues by documenting the potential in Ethiopia of genetic enhancement of full purpose barley (bilateral funded), and developing new superior dual-purpose maize, sorghum, millet and groundnut (W1/W2 funded).

To make better use of existing feed resources, the flagship will deliver tools such as total mixed rations for smallholder producers, information on feed-price-quality relationships and a ration balancing app that development partners, government agencies or private sector can use to increase productivity while reducing feed and labour costs (Outcome 3.5). It will also provide decentralized feed compounding options for Ethiopia (W1/W2 funded), training of farmers on best agronomic rangeland practices for cactus in India, and ration balancing options/least cost diets for rangelands in Ethiopia, also using W1/W2 funds (Outcome 3.6). If additional funding is secured, this work will be extended with additional focus on gender-related issues (e.g. extend gender-specific labor/ration balancing work to Tanzania).

To catalyze scaling of technologies developed in FP3 (Outcome 3.8), we defined three milestones reliant mainly on bilateral funding. The first will develop new feed/seed business approaches focusing on situation analysis of seed systems (Ethiopia), identification of actors for scaling, alternative feed and forage production through cooperatives, processing approaches (hay, silage, feed blocks), and cost-benefit analyses for different forages (e.g. *Leucaena*). The second will deliver novel extension approaches for feeds and forages. We will work on developing radio messages, new training material for small-scale seed production, technical information and training modules on feed/forage processing. The third milestone will consolidate the exchange with Innovation Platforms (IP), roundtables and the private sector around feeds and forages production, processing and marketing. This builds on the efforts made in 2017 and will primarily focus in North and East Africa on participating in and evaluating of existing IP, knowledge sharing and validation with roundtables, and identification of actors (e.g. from the dairy sector) to inform future scaling activities.

Livestock & the Environment FP4: In 2018, the Environment flagship will make progress towards each of the main outcomes with no major adjustments required to the original work plan. The flagship will achieve two milestones contributing to raising awareness around environmental concerns by decision makers (Outcome 4.1). With support from W1/W2 funds, GHG baseline emissions for cattle will be published for CRP priority countries Kenya and Vietnam. With this more reliable data about actual emissions from livestock production, decision makers can better target interventions to reduce emissions from the sector, and put in place the monitoring, reporting and verification schemes that government and international investment in Low Emissions Development require. This milestone builds upon the Phase 1 investment from CCAFS and ILRI to develop research capacity for undertaking emissions measurements from livestock and livestock systems, along with a range of discussions with national governments and international donors. The second milestone is to disseminate forage intensification options (e.g. improved grass species and inter-cropping arrangements) adapted to climate change in priority countries Tanzania and Nicaragua. This contributes to the outcome on targeted solutions for sustainable productivity (Outcome 4.2). We will also continue the research on heat stress in the pig value chain of Uganda, as this is a key climate change adaptation priority. With W1/W2 support a key paper analyzing several country data sets (including all CRP priority countries) on gender engagement in livestock production and environmental management will also be published indicating how women and men differentially use practices and can be engaged in additional environmental interventions for mixed crop-livestock systems. Finally, we will continue the local and national stakeholder trainings to use the CLEANED ex-ante impact assessment tool to target environmental solutions in Tanzania, Kenya and Ethiopia.

The flagship will also deliver a milestone leading to uptake of management solutions to optimize the impact of livestock production on the environment (Outcome 4.3). Building upon a strong portfolio of bilateral projects and research supported by the Phase I Dryland Systems CRP, we will disseminate sustainable rangelands interventions that combine community-based planning and governance with re-seeding and resting periods, in CRP priority countries Kenya, Tanzania, Ethiopia and Tunisia to address growing donor and government interest in such solutions. The second main environmental footprint the flagship seeks to reduce is GHG emissions from livestock, and piloting of improved feed and manure management practices (e.g. improved manure storage, improved forage, silages) to reduce these emissions will be expanded in the dairy sector in Kenya and Tanzania. Work continues towards the use of gender responsive options (Outcome 4.4), as lessons are applied from CCAFS on making low emissions schemes for dairy more gender inclusive by understanding the constraints women face to participate in commercial value chains in Kenya and Tanzania. W1/W2 will fund our investigation of what has been learned more broadly across the field of sustainable land management to build upon previous successes and identify key gaps for including women in land management. If additional W1/W2 funding is made available, priorities will be work on interventions for livestock and water, as well as investigating the feasibility of Payments for Ecosystem Service for smallholder livestock producers.

We will deliver two milestones for the outcome on policies for environmental management (Outcome 4.5) by disseminating manuals and tools for rangelands and land use planning processes in CRP priority countries Kenya and Tanzania. The guidance to improve rangelands governance and planning must happen in tandem with the biophysical restoration work. The final outcome pertains to influencing global agendas (Outcome 4.6). In addition to targeting the inclusion of our new emissions factors in the next IPCC report, we have proposed a side event at UNFCCC COP 24, in part with W1/W2 support. The flagship will also be instrumental in preparing a communication from the Global Forum For Agriculture (January 2018) that records the support of over ministers from over 60 countries for research on livestock and the environment.

Livestock Livelihoods & Agri-Food Systems FP5: Our target to raise awareness of the importance of livestock investment and provide guidance for that investment (Outcome 5.1) is advancing significantly in 2018 with the arrival of a new principal scientist to lead the work. With CCAFS we have started a modeling study with University of Florida (UF) targeting CRP priority countries Ethiopia and Burkina Faso and a yet-to-be confirmed country in Asia

to examine impacts of livestock development and climate scenarios developed with local partners. Jointly with GLDC we will also contribute to assessment of the impact of dry-land crop development on livestock feed availability in South Asia and MENA. Recognizing the significant shortcomings in global livestock modeling platforms, new linkages have been established with modelers in CSIRO, FAO, UF, and CIRAD, together with partner IFPRI (jointly with PIM CRP). Building on the significant outcomes of a global livestock advocacy initiative, a new phase will be launched to increase our outreach to global decision makers and assemble more key evidence on the important welfare benefits and risks associated with livestock and present these at high-level global events and through media bursts. To achieve fit-for-purpose and demand-driven national and meso-level strategies for livestock investment and policy (Outcome 5.2), the work on Livestock Master Plans (LMP) will be expanded to Bihar State in India, while the LMPs in Rwanda and Tanzania completed in 2017 will be officially launched by the respective governments. An initiative with FAO, World Bank, and CIRAD will begin developing a new LMP modeling framework to improve the toolkit used for this work (Livestock Sector Investment Planning Tool).

To achieve benefits of including gender equity considerations, one continuing product line is directed to actors and stakeholders dealing with livestock technologies, working across flagships, on analyzing gender issues in livestock production and value chains and developing interventions to enhance opportunities for both women and men. Through multiple bilateral projects we are analyzing gender issues in livestock technologies and value chains to ensure candidate technologies are supporting women and for increased understanding of normative gendered barriers preventing this from happening (with Royal Tropical Institute). Another line of work will assess whether and how livestock and livestock interventions can support progress towards gender equity, including applying our new Women's Empowerment in Livestock Index tool to monitor and facilitate progress towards gender-transformative outcomes. Implementation of the new Livestock CRP Youth Strategy will be initiated with W1/W2 funds through pilot studies on youth-led participation in livestock value chain enterprises.

To provide development agencies, government and private sector with means to enhance food and nutrition security through livestock, a menu of approaches for nutrition-sensitive livestock-related interventions will be produced. Most of the 2018 work will focus on livestock keepers' communities with the development of social and behavioral communication strategies for CRP priority countries Kenya and Tanzania to reach over 133,000 households. Collaboration with A4NH flagship on food systems (FP1) will start by developing a theory of change of the link between livestock and nutrition, and nutrition-health interactions, assessing the strength of evidence associated with the different pathways. Analysis will be undertaken of ongoing projects to obtain relevant evidence on impact pathways to improved nutrition, that will be used to design interventions for nutritional impact (with Catholic University of Murcia Spain). Ongoing projects are mostly focused in Tanzania where they will inform the development of a next phase proposal on nutrition-sensitive dairy development; in Uganda, related to the pork value chain; and in Rwanda, where nutrition education will be implemented among dairy smallholders. We will seek opportunities from design stage to test the nutrition impact of interventions at market level or community level that are planned across the FP.

To provide development agencies with integrated technologies, practices and institutional innovation for improved livestock systems, work is on-going in CRP priority countries Ethiopia on small ruminants, Kenya on dairy and Uganda on pig value chains, working closely with development and government agencies. Some of this work is done within large NGO-led development projects, thus providing excellent opportunities for impact and scaling. An important effort supported by W1/W2 resources will develop new analytical frameworks for evaluating performance and impact of integrated on-farm technologies and institutional innovations using metrics that range from efficiency to gender and equity. We aim to use this across CRP sites and partners to improve our ability for cross-site comparison and strategic syntheses such as across dairy sites in Kenya and Tanzania. We are collaborating with PIM FP3 in this effort, given the relevance of such tools across agricultural value chains more generally. Outcome and impact studies listed in section 1.3 are supported by this cluster, given the emphasis on understanding the effects of technologies, practices and institutional innovations on the welfare of our target beneficiaries

1.5. Cross Cutting Dimensions:

1.5.1 Gender, Youth and Capacity Development:

The gender portfolio in the CRP will be implemented through a partnership between flagship scientists and the gender scientists housed in Livestock Livelihoods & Agri-Food Systems FP5. A coordinated effort is ensuring each flagship finalizes its own gender strategy consistent with the overall CRP gender strategy and having specific entry points for women and men to benefit from the interventions developed. In 2018, each flagship will also develop, where possible, a more sustainable funding mechanism to support its gender agenda. Each flagship will, as in the past, be supported by a dedicated gender scientist, to ensure quality technical input. For Genetics FP1, two areas will be highlighted this year. First is work under a BMGF-funded chicken genetics project where a dedicated gender researcher will be implementing the project's gender strategy developed by Royal Tropical Institute (KIT). This includes working strongly with gender focal points in project countries and getting a better understanding on how the voice of women can be reflected in breeding programs. Second, complementary work will be done in FP1 looking at the role of trait preference amongst women for goats. Livestock and the Environment FP4 are the first to finalize their flagship gender strategy and will implement it by starting a baseline study using the RHOMIS survey tool to understand the gendered aspects of different management systems. They will also supplement this with a study as to the different technologies available and tried by women looking at land management and livestock. To support this work, a post-doc/scientist on gender, livestock and the environment will be hired. They also continue to work on gendered access to land use/land tenure in pastoral systems. For Feed and Forages (FP3), 2018 will see the finalization of a post doc study on forage trait preference of women. This will be supplemented by an analysis to get a better understanding of the present and potential role of women in forage production and use, identifying opportunities and barriers. For Livestock Health FP2, work will continue on understanding the differential gendered impacts of animal diseases in Ethiopia, and the role of gender in the delivery and uptake of animal health services. This will specifically look at issues of gendered differences in management and control of livestock as these might differ significantly. Work will also be on-going on gender and vaccines, as well as, gender and emerging issues such as antimicrobial resistance (AMR). In relation to youth this year, Feeds & Forages FP3 will look at youth-specific factors in adoption of improved forage and feed processing technologies, and Livestock Health FP2 will develop innovative learning materials on community animal health focused towards youth.

A Youth Strategy for the CRP will be finalised in the first quarter of 2018 and will then guide planning and investment at both CRP and Flagship level. Livestock Livelihoods & Agri-food Systems FP5 will take the lead on implementing the Youth Strategy and use W1/W2 funds to initiative pilot studies in 2018 to examine how to support youth-led participation in livestock value chains.

In 2018, in line with our proposal and the cross-cutting CapDev work conducted in 2017, the CRP's capacity development work will focus on publishing a capacity development strategy for the CRP, considering the existing CapDev activities in the five flagships and the findings and recommendations of capacity needs assessments conducted in 2017 in the CRP priority countries Ethiopia, Nicaragua, Tanzania, Tunisia and Uganda. The CapDev strategy will be structured around the elements of the CGIAR capacity development framework for the phase 2 CRPs and will be accompanied by a review of existing CapDev activities and future opportunities, to help CRP leadership take informed decisions on where best to invest in cross-cutting capacity development in the CRP, and whether any changes to the current CapDev practices should be considered.

1.5.2 Open Data and Intellectual Assets:

Together with Big Data Platform, open-data activities for the CRP include: 'data sprints' to make both Phase 1 and Phase 2 priority datasets open-access, materials for promotion of CRP-developed tools (e.g. SoFT) and materials to support partners in documenting data for open-access. No specific activities are planned for Intellectual Assets although the CRP is also included under the umbrella of CG-centre/SMO activities to achieve EU General Data

Protection Regulations (GDPR) compliance by May 2018, of relevance to the CRP in terms of our information systems including MARLO.

2. Planning for CRP Effectiveness and Efficiency

2.1 CRP Staffing in 2018:

Table D is based on staffing lists for each Activity and includes all staff from the three CGIAR and one non-CGIAR Managing Partner institutions. The staffing mix represents a critical mass of senior researchers (~37%) across all flagships, with a complement of younger researchers (post-docs and research fellows, ~15%) and scientific support staff (~47%). Overall, 31% of staff working on the CRP Livestock are female.

The CRP has achieved the needed staffing to ensure scientific leadership and capacity of the priority product lines and Clusters of Activities across the flagships. Filling specific gaps or strengthening capacity in priority areas continue to be addressed through leveraging of existing and new partnerships as noted in section 2.3.1. After delays in 2017 due to reduced funding, the CRP management unit will achieve its full staff complement in 2018, including communications and monitoring and evaluation.

2.2 Financial Plan for 2018, including use of W1/W2:

Livestock CRP is implementing its program based on the budget detailed in Table E. The W1/W2 budget represents 80% of the allocation approved by the System Council for 2018, reflecting a conservative scenario in view of W1/W2 funding uncertainties. W3/bilateral project funding contributes \$33.9m, accounting for 66% of the total. An additional \$2.9m in W1/W2 carried forward from the Phase 1 Livestock & Fish CRP is being allocated to the Strategic Investment Fund. Center own funds total \$1.1m.

Footnote: The non-CGIAR partner Swedish University of Agricultural Sciences (SLU) has aligned deliverables from three non-CGIAR bilateral projects that it leads to the Livestock Health flagship regarding antimicrobial resistance interventions (\$410k), monitoring transboundary disease in small ruminants in Tanzania and Zambia (\$125k), and smallholder herd health management (\$500k), representing a total contribution of \$1.0m in additional leveraged bilateral project funding that does not appear in the CGIAR accounts.

2.3 Collaboration and Integration

2.3.1 New Key External Partnerships:

The Livestock CRP has been developing several new partnerships consistent with its theory of change that will become active in 2018. At the CRP level, **Royal Tropical Institute (KIT)** will be building on earlier support it provided to the CRP gender agenda and helping to implement the CRP's performance management framework, strengthening the evaluation and performance monitoring capacity. It will also strengthen the CRP's social science research across gender, youth, food security and agri-business development. Consideration is being given to have KIT join as a full implementing partner of the CRP. Other new partners working with specific flagships include:

- **Ethiopian Veterinary Association (EVA)**, which is partnering with the Livestock Health FP2 to test public private partnership business models and to facilitate the creation of an enabling environment with a strong focus on institutional adjustments and capacity development in the Ethiopian veterinary sector. Through its mandate related to supporting professional education, its experiences in piloting PPP approaches related to the sanitary mandate and its national network, EVA can lead policy dialogue and complement the research, technical backstopping and capacity development expertise within the CRP.
- A private multinational forage seed producer. Discussions on a new partnership in their final stage and an agreement is expected in early 2018. Sub-licenses for specific regions and countries may result, greatly enhancing FP3's capacity to directly scale out new forage technologies.

- **Global Research Alliance for Agricultural Greenhouse Gases.** Previous collaboration is being renewed in conjunction with CCAFS to convene regional information sharing and priority setting in East and West Africa, and Latin America, with several regional activities planned with FP4 for high level impact and collaborative support to key countries.
- **CSIRO and the University of Edinburgh.** As FP5 now begins to initiate its agenda on foresight, it is developing collaboration with these two new partners with joint activities planned through the BMGF and DFID-funded Livestock Data 4 Decisions project. CSIRO has become a custodian of important livestock systems data in developing countries which will be critical to FP5 ambitions for scenario and trade-off analysis.
- **Catholic University of Murcia (UCAM, Spain):** UCAM offers capacity on nutrition and food technology and will be supporting development of dietary assessment and novel methods for food preservation and distribution.

2.3.2 New Contribution to and from Platforms:

Excellence in Breeding -- Genotyping/sequencing and Phenotyping:

- Feeds & Forages FP3 is initiating an effort with EiB to standardize and apply plant breeding advances not only in genotyping and phenotyping, but also in logistics and allocation of resources. The insight from work with largely wild species will be of high value for the platform, recognizing that tropical forages is likely the most recent of the breeding efforts.

Genebank -- Conservation and Use Modules:

- FP3 will be generating Digital Object Identifiers (DOIs) for 100% of the ILRI collection, which will support integration between its genebank and CRP breeding programs. It is also contributing data on three new traits on common subsets of accessions and through the creation of focal subsets, encouraging users to focus in-depth phenotyping efforts to create synergies amongst studies. GBS data will be generated for genotyping to create core collection for *Chloris gayana* and *Cenchrus ciliaris*.

Big Data -- Module 1 Organise

- FP3 is actively developing joint work on a Near Infrared Spectroscopy (NIRS) platform.

Big Data -- Module 2

- Big Data is supporting collation of databases on smallholder farm typology/ characterization, contributing to the larger interest in using "big data" to understand regional and even global patterns of household typologies and how these affect food security outcomes, income and assets, for example.

2.3.3 New Cross-CRP Interactions:

New major interactions with other CRPs include:

- **A4NH FP5** -- Improving Human Health and Livestock Health FP2 are initiating collaborative activities to address anti-microbial resistance (AMR) within a One Health framework with the Livestock CRP focusing on use of antimicrobials in livestock and the implications for their effectiveness in livestock, and A4NH focusing on the link to human AMR. Among other activities, CRP Livestock is providing assessment tools to measure/characterize AM use in livestock on farms in Vietnam where A4NH is addressing AMR. Joint risk assessments and studies on emerging zoonotic diseases, including tick distribution and vector-borne diseases, are also planned.
- **CCAFS** -- Priorities and policies for climate-smart agriculture FP1 is beginning activities with Livestock Livelihoods & Agri-Food Systems FP5 through collaboration with the University of Florida on national and regional level livestock modeling in selected countries, some among CRP priority countries, in the context of the Livestock Systems Innovation Lab.

2.3.4 Expected Efforts on Country Coordination:

The Livestock CRP plans to support ILRI in leading development of a CGIAR Country Collaboration strategy in Ethiopia by providing partnership management training and facilitation services. This will build on and protect the momentum already achieved in improving CGIAR coordinated engagement with the government and the donor platform there. The CRP supports its staff to continue contributing to initiatives from the lead Centre in each of the CRP priority countries, should they arise.

2.4 Monitoring, Evaluation, and Learning

During 2018, the CRP will mainstream Theory of Change based learning within Flagships, roll out the CGIAR common indicators as they are agreed at System level, and develop methodologies, tools and indicators for assessing the outputs and outcomes of Flagship activities in the 4 priority countries. Baseline situation analyses established by the phase 1 Livestock & Fish CRP will be updated in these countries. MARLO is being deployed for the first time for both planning and reporting to improve our ability to track deliverables and progress toward outcomes. Indicators for monitoring our quality of research (R4D) will be piloted, taking into account evolving guidance at System level. The CRP is engaging with KIT (Royal Tropical Institute, Netherlands) to review and strengthen our overall CRP performance management framework and systems and to better document learning cycles. Some evaluations are planned at Flagship level, as outlined in Table H, but none at the overall CRP level.

3. CRP Management

3.1 Management of Risks to Your CRP:

The principal programmatic risk faced by the CRP remains the financial instability that threatens the ability to maintain the expected momentum across the flagships.

- One way this is being addressed is by adopting a conservative operating budget representing 80% of the 2018 W1/W2 commitment indicated in the Decision Letter.
- Also, as the CRP re-establishes its engagement in priority countries delayed by the restriction on W1/W2 funding for two flagships and CRP management in 2017, the decision has been taken to reduce the number of priority countries to increase the CRP's ability to maintain sufficient investment in each country. The priority countries are considered critical for demonstrating progress made by the CRP through shorter-term collective outcomes and impacts, and criteria for choosing them therefore focus on potential for achieving these shorter-term results. Adequate W1/W2 funding for activities in priority countries ensures continuity across bilateral project activities, also important in protecting the CRP's credibility with partners at country level.
- Another challenge related to financial instability is ensuring adequate investment to the cross-cutting themes underpinning the CRP theory of change, including gender. The current flagship-centered structure for budgeting, planning and reporting makes it difficult to monitor investment and progress in these areas. MARLO offers some help in this respect, but additional effort will be made this year to improve the transparency of investment and progress being made in these areas.
- To address longer-term financial stability, the CRP continues to prioritize resource mobilization and support to ongoing advocacy efforts for livestock development investment.
- Contextual risk associated with the evolving political situation in Ethiopia, a CRP priority country, will continue to be monitored.

3.2 CRP Management and Governance:

The CRP is considering bringing one or two new partners onboard given their interest and strategic capacities to strengthen the CRP at program level consistent with the CRP theory of change. These additional partners may lead to expanding membership of the Program Management Committee.

TABLES

Table A: Planned Milestones

Table A1: 2022 CRP outcomes mapped to sub-IDs with contributing budget

FP	Mapped and contributing to Sub-IDO	2022 CRP outcomes for each FP	2018 Budget W1/W2	2018 Budget W3/Bilateral	2018 Budget Center own funds
F1	• Increased conservation and use of genetic resources	F1 Outcome: Outcome 1.1: Data on livestock diversity and systems, including from a gendered lens, used to develop or refine genetic improvement and / or conservation strategies by policymakers, national research and development partners, and the private sector, in 5 CRP priority countries and other locations.	\$ 1,019,284	\$ 1,420,790	\$ 0
F1	• Closed yield gaps through improved agronomic and animal husbandry practices	F1 Outcome: Outcome 1.2 Genetic improvement strategies for improved livestock genetics implemented by national research and development partners, and the private sector in 6 CRP priority countries and other locations.	\$ 1,447,745	\$ 3,524,258	\$ 0
F1	• CC: Technologies that reduce women's labor and energy expenditure developed and disseminated	F1 Outcome: Outcome 1.3 Business models for multiplication and delivery of improved livestock genetics, to resource poor women and men livestock keepers, implemented by national research and development partners, and the private sector in five CRP priority countries and other locations.	\$ 85,278	\$ 1,199,035	\$ 0
F1	• Increased livelihood opportunities	F1 Outcome: Outcome 1.4 Women and men resource poor livestock keepers sustainably utilizing improved livestock genetics, both productive and adapted, in 3 priority countries and other locations.	\$ 85,278	\$ 1,199,035	\$ 0
F1	• Closed yield gaps through improved agronomic and animal husbandry practices	F1 Outcome: Outcome 1.5 Guidelines on policy and institutional arrangements for improvement and conservation of animal genetic resources (AnGR) adopted by policymakers, national research and development partners, and the private sector, in at least 4 priority countries and other locations.	\$ 32,495	\$ 582,797	\$ 0
F2	• Reduced livestock and fish disease risks associated with intensification and climate change	F2 Outcome: Outcome 2.1 Assessment tools for significance of animal diseases and risk maps for emergence of animal diseases are used by 100 local and national and 50 international research partners and donors to prioritise research and development interventions to reduce livestock disease risks for livestock keepers.	\$ 236,000	\$ 781,293	\$ 0

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

F2	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F2 Outcome: Outcome 2.2 Context specific herd health management packages adopted by farmers, extension and animal health workers in priority countries and other locations.	\$ 379,999	\$ 40,711	\$ 0
F2	<ul style="list-style-type: none"> • Reduced biological and chemical hazards in the food system 	F2 Outcome: Outcome 2.3 Livestock keepers have necessary knowledge of AMR and antiparasitic resistance (APR) to change their practices accordingly, piloted in two priority countries.	\$ 73,000	\$ 0	\$ 0
F2	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F2 Outcome: Outcome 2.4 National and international research partners, government agencies and the private sector use 2 novel diagnostic assays and vaccines for control of ASF, CBPP, CCPP, ECF and PPR in at least 6 priority countries.	\$ 1,810,001	\$ 2,746,897	\$ 0
F2	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F2 Outcome: Outcome 2.5 Improved access to livestock-related health services and products for female and male livestock keepers in 4 priority countries	\$ 180,999	\$ 94,166	\$ 0
F3	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F3 Outcome: Outcome 3.1 - Local, national and international research and development partners, the private sector, decision-makers and livestock producers are able to diagnose feed constraints and opportunities and to effectively prioritize and target feed and forage interventions, resulting in: a 10% improvement in utilization of feeds and forages, a 20% increase in animal production using improved feed and forage technologies, a 10% accuracy increase for biomass and quality estimation and at least 250,000 annual visitors to global databases, repositories, interactive tools and maps and the Tropical Grasslands/ <i>Forrajes Tropicales</i> journal website.	\$ 167,186	\$ 366,707	\$ 0
F3	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F3 Outcome: Outcome 3.3 - National and international research and development partners and the private sector are using CRP developed forage and rangeland resources (with enhanced traits), in 30 countries and reaching producers who plant over 2 million ha, to increase the rate of genetic gain and exploit the genetic diversity of forages and rangeland species to enhance stress-tolerance, biomass productivity and nutritive value.	\$ 740,604	\$ 1,347,321	\$ 106,632
F3	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F3 Outcome: Outcome 3.4 - New forage and crop cultivars, superior to local (based on food, feed and fodder traits weighted according to target domains), made available by development partners, government agencies and the private sector and applied by farmers in 7 priority counties and other locations.	\$ 354,573	\$ 540,753	\$ 0
F3	<ul style="list-style-type: none"> • Closed yield gaps through improved agronomic and animal husbandry practices 	F3 Outcome: Outcome 3.5 - National and international development partners, government agencies and extension services, the private sector and community-based organisations in 3 priority countries are using CRP-related research outputs for better utilization of existing and novel feed and forage resources. This will be through (a)	\$ 89,031	\$ 1,382,009	\$ 0

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

		scalable processing technologies, (b) management strategies to conserve and rehabilitate rangelands and (c) diet formulation that increases productivity while reducing overall feed and forage costs and environment impacts.			
F3	• More efficient use of inputs	F3 Outcome: Outcome 3.6 - Livestock producers in 3 priority countries: apply management strategies to conserve and rehabilitate rangelands and pastures while ensuring ongoing ability to produce, preserve and store feed biomass and use diets that increase productivity while reducing overall feed and forage costs and environmental impacts (with the environment and livelihoods flagships).	\$ 146,359	\$ 77,107	\$ 0
F3	• More efficient use of inputs	F3 Outcome: Outcome 3.8 - Increased delivery and uptake of feed and forage resources through proof-of-concept scaling, business model development and value-chain approaches by development partners, the private sector (feed and forage traders, feed processors) and (1 million by 2022) farmers across diverse environments in priority countries and other locations in Latin America, North and East Africa and South and Southeast Asia.	\$ 347,055	\$ 1,001,923	\$ 0
F4	• More productive and equitable management of natural resources	F4 Outcome: 4.1 Environmental concerns are considered in decision making across at least 10 priority countries and other locations, by national and international development partners, government agencies and extension systems, including technology developers seeking to improve cattle, small ruminant and pig production.	\$ 180,734	\$ 200,887	\$ 0
F4	• Agricultural systems diversified and intensified in ways that protect soils and water	F4 Outcome: 4.2 Targeted solutions are used by research and development partners, across at least 10 priority countries and other locations, to increase the productivity of cattle, small ruminants and pigs in the face of ongoing environmental changes.	\$ 378,885	\$ 953,431	\$ 0
F4	• More productive and equitable management of natural resources	F4 Outcome: 4.3 Government agencies and development partners at local and national levels across at least 10 priority countries and other locations are promoting environmental management options.	\$ 591,217	\$ 2,481,675	\$ 0
F4	• CC: Improved capacity of women and young people to participate in decision-making	F4 Outcome: 4.4 Gender responsive environmental management options that are well adapted to Global Environmental Change are adopted by households (women and youth) in 6 countries.	\$ 24,214	\$ 0	\$ 0
F4	• Land, water and forest degradation (Including deforestation) minimized and reversed	F4 Outcome: 4.5 National government agencies across at least 5 priority countries design and implement key policies to improve the environmental management of livestock systems	\$ 200,509	\$ 2,657,357	\$ 0
F4	• Reduce net greenhouse gas emissions from	F4 Outcome: 4.6 Evidence generated by the flagship influences key global livestock agendas (IPCC, Global agenda for Sustainable Livestock)	\$ 0	\$ 0	\$ 0

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

	agriculture, forests and other forms of land-use				
F5	• CC: Conducive agricultural policy environment	F5 Outcome: 5.1 National and international research partners and policymakers use analyses of livestock-sector dynamics, investment and ex-ante impact assessments to guide priority setting, investment and policy development for the livestock sector in 5 priority countries and within the Livestock CRP	\$ 389,708	\$ 1,759,306	\$ 231,317
F5	• CC: Conducive agricultural policy environment	F5 Outcome: 5.2 International researchers and agencies use improved livestock system modelling tools and apply them to new problems based on their mandate areas	\$ 118,315	\$ 1,203,710	\$ 43,978
F5	• CC: Gender-equitable control of productive assets and resources	F5 Outcome: 5.3 Policy- or decision-makers in 4 countries use the packages developed and the evidence on the benefits of including gender equity considerations in the development of livestock projects and planning at community and national level (Ethiopia, Kenya, Nicaragua, Vietnam)	\$ 116,492	\$ 40,174	\$ 21,017
F5	• CC: Improved capacity of women and young people to participate in decision-making	F5 Outcome: 5.4 Local or national development partners in four priority countries adopt gender-transformative and youth-supportive approaches (using the evidence from the strategic gender research done under the CRP)	\$ 71,674	\$ 13,861	\$ 21,734
F5	• Increased availability of diverse nutrient-rich foods	F5 Outcome: 5.5 Local and national development actors, government agencies, and the private sector invest in and adopt the most successful approaches for enhancing livestock-mediated nutritional impact, including institutional arrangements and behavioural change, in 3 priority countries.	\$ 117,024	\$ 332,842	\$ 68,107
F5	• Increased livelihood opportunities	F5 Outcome: 5.6 Livestock communities across 4 priority countries apply tested technologies, management strategies and institutional arrangements, taking the multiple functions of livestock into account	\$ 364,103	\$ 3,217,151	\$ 127,428
F5	• Reduced market barriers	F5 Outcome: 5.7 Development partners, private sector and government agencies across 4 priority countries apply innovative institutional arrangements to enhance competitiveness and inclusiveness	\$ 329,207	\$ 4,728,648	\$ 297,431

Table A2: Planned milestones by flagship and assessment of risk to achievement

FP	2022 CRP outcomes for each FP	Milestone*	Means of verification	Assessment of risk to achievement
F1	F1 Outcome: Outcome 1.1: Data on livestock diversity and systems, including from a gendered lens, used to develop or refine genetic improvement and / or conservation strategies by policymakers, national research and development partners, and the private sector, in 5 CRP priority countries and other locations.	2018 - 1.1.2 Environmental suitability maps for sheep, goat and chicken available for Ethiopia by end of 2018.	Suitability map	Low
		2018 - 1.1.3 Baseline genome characterisation information of existing livestock (small ruminant, cattle, chicken) populations, including genome sequencing, available for Ethiopia and Tanzania, as well as for Ethiopian sheep, by end of 2018.	Database and papers	Low
		2018 - 1.1.4 A poultry phenotypic characterisation platform available at ILRI Ethiopia by end of 2018.	Poultry facility	Low
F1	F1 Outcome: Outcome 1.2 Genetic improvement strategies for improved livestock genetics implemented by national research and development partners, and the private sector in 6 CRP priority countries and other locations.	2018 - 1.2.4 Availability of zebu x taurine admixture SNPs chips for screening of dairy cattle crossbreed in Ethiopia and Tanzania by August 2018.	SNP chips and genotyping data	Low
F1	F1 Outcome: Outcome 1.3 Business models for multiplication and delivery of improved livestock genetics, to resource poor women and men livestock keepers, implemented by national research and development partners, and the private sector in five CRP priority countries and other locations.	2018 - 1.3.2 Development of a business model for the delivery and improvement of chicken relevant to Ethiopia, Tanzania and Nigeria, by end of 2018.	Project proposal for long-term genetic gain	Medium
F1	F1 Outcome: Outcome 1.4 Women and men resource poor livestock keepers sustainably utilizing improved livestock genetics, both productive and adapted, in 3 priority countries and other locations.	2018 - 1.4.1 Publication of a study reporting how gender dynamics may affect genetics interventions and what institutional arrangements may help ensure gender equitable outcomes of genetics interventions by August 2018.	Publication and project proposal	Medium
F1	F1 Outcome: Outcome 1.5 Guidelines on policy and institutional arrangements for improvement and conservation of animal genetic resources (AnGR) adopted by policymakers, national	2018 - 1.5.2 Guidelines established on institutional arrangements needed for certification of breeding rams/bucks by August 2018.	Report and publication	Low

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

	research and development partners, and the private sector, in at least 4 priority countries and other locations.			
F2	F2 Outcome: Outcome 2.1 Assessment tools for significance of animal diseases and risk maps for emergence of animal diseases are used by 100 local and national and 50 international research partners and donors to prioritise research and development interventions to reduce livestock disease risks for livestock keepers.	2018 - A gender-sensitive assessment tool for identifying disease priorities in CRP sites available in the public domain by the end of 2018.	Tool available in the public domain	Low
		2018 - 2 epidemiological risk models (pig and small ruminant disease) developed, and modelling framework for assessment of PPR control and eradication defined, by end of 2018.	Model parameterized and used for pig sector in Vietnam	Medium
F2	F2 Outcome: Outcome 2.2 Context specific herd health management packages adopted by farmers, extension and animal health workers in priority countries and other locations.	2018 - Tool to determine herd health packages for the pig value chain in Uganda developed by the end of 2018.	Protocols available.	Medium
F2	F2 Outcome: Outcome 2.3 Livestock keepers have necessary knowledge of AMR and antiparasitic resistance (APR) to change their practices accordingly, piloted in two priority countries.	2018 - Availability and use of antimicrobials and Knowledge, Attitudes and Practices regarding AMR recorded among smallholders in the small ruminant (Ethiopia) and pig (Vietnam and Uganda) value chains by September 2018.	Draft manuscripts available	Medium
F2	F2 Outcome: Outcome 2.4 National and international research partners, government agencies and the private sector use 2 novel diagnostic assays and vaccines for control of ASF, CBPP, CCPP, ECF and PPR in at least 6 priority countries.	2018 - Down selection of ECF, CBPP, CCPP vaccine antigens and vaccination methods.	Blogs and reports	Low
		2018 - Agreements with at least 2 private partners to commercialise improved diagnostic tests for CBPP in Kenya, Uganda, Ethiopia, Tanzania and Mali by the end of 2018.	Signed agreements	Medium
		2018 - A booting up system developed for ASF virus.	Blogs and reports	High
F2	F2 Outcome: Outcome 2.5 Improved access to livestock-related health services and products for female and male livestock keepers in 4 priority countries	2018 - Two novel delivery models of animal health services and products and cap dev/training methods tested in collaboration with partners in Kenya, Tanzania, Ethiopia and Mali by the end of 2018.	Project reports on the recommendations of novel animal delivery models and training material available.	Low
		2018 - Market for diagnostics in Kenya, Uganda, Tanzania, Ethiopia and Mali assessed and cost effectiveness of producing thermostable PPR vaccine analysed by July 2018.	Stakeholder workshop report on the market for veterinary diagnostics available.	Low

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

F3	F3 Outcome: Outcome 3.1 - Local, national and international research and development partners, the private sector, decision-makers and livestock producers are able to diagnose feed constraints and opportunities and to effectively prioritize and target feed and forage interventions, resulting in: a 10% improvement in utilization of feeds and forages, a 20% increase in animal production using improved feed and forage technologies, a 10% accuracy increase for biomass and quality estimation and at least 250,000 annual visitors to global databases, repositories, interactive tools and maps and the Tropical Grasslands/Forrajes Tropicales journal website.	2018 - Research and development partners, decision makers and input suppliers use at least 2 tools designed or promoted by the CRP (e.g. Legume CHOICE) for regional and national feed supply and demand scenarios in 2 priority countries (Vietnam, Ethiopia) by December 2018.	User statistics	Low
		2018 - Access of research partners to CRP generated knowledge on forages increased through 3 issues of the Tropical Grasslands journal (in January, May and September 2018).	Published journal articles	Low
		2018 - The ICARDA Animal Feed Analysis Web Application (AFAWA) has reached at least 5,000 users by the end of 2018.	Web user statistics	Low
F3	F3 Outcome: Outcome 3.3 - National and international research and development partners and the private sector are using CRP developed forage and rangeland resources (with enhanced traits), in 30 countries and reaching producers who plant over 2 million ha, to increase the rate of genetic gain and exploit the genetic diversity of forages and rangeland species to enhance stress-tolerance, biomass productivity and nutritive value.	2018 - 1 <i>Urochloa</i> hybrid commercialized by the private sector in at least 1 country and already available forage hybrids scaled with private sector partner in at least 15 countries on 100,000 hectares by the end of 2018.	Seed sales data	Medium
		2018 - 3 forage ontologies established and accessible (through reports and publications) to research partners and the private sector to advance selection and breeding of forages.	Validated protocols for drought and agronomic performance in Napier grass	Low
F3	F3 Outcome: Outcome 3.5 - National and international development partners, government agencies and extension services, the private sector and community-based organisations in 3 priority countries are using CRP-related research outputs for better utilization of existing and novel feed and forage resources. This will be through (a) scalable processing technologies, (b) management strategies to conserve and rehabilitate rangelands and (c) diet formulation that increases productivity while reducing overall feed and forage costs and environment impacts.	2018 - At least 2 tools developed for increasing productivity while reducing feed and labor costs, considering gender-responsiveness and scalability for 1 priority country (Ethiopia) and 2 further countries (India, Malawi) by December 2018.	Online and phone app tools	Low
F3	F3 Outcome: Outcome 3.6 - Livestock producers in 3 priority countries: apply management strategies to	2018 - 2 off-farm feed processing options delivered (tested and farmers and NARS staff trained in their use) and 1 agronomic	Reports	Low

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

	conserve and rehabilitate rangelands and pastures while ensuring ongoing ability to produce, preserve and store feed biomass and use diets that increase productivity while reducing overall feed and forage costs and environmental impacts (with the environment and livelihoods flagships).	rangeland practice developed in 1 priority country (Ethiopia) and 3 further countries (India, Malawi, Afghanistan) by December 2018.		
F3	F3 Outcome: Outcome 3.8 - Increased delivery and uptake of feed and forage resources through proof-of-concept scaling, business model development and value-chain approaches by development partners, the private sector (feed and forage traders, feed processors) and (1 million by 2022) farmers across diverse environments in priority countries and other locations in Latin America, North and East Africa and South and Southeast Asia.	2018 - 6 feed/seed business approaches developed in at least 3 countries (Tunisia, Kenya, Colombia/Nicaragua) by end of 2018.	Reports, extension material	Medium
		2018 - At least 4 different extension approaches for feed and forages implemented in 5 countries (Tunisia, Kenya, Rwanda, Tanzania, Ethiopia).	Reports, extension material	Medium
		2018 - Exchange with Innovation Platforms, Roundtables and private sector around feed, forage and processing technologies consolidated (e.g. through meetings, workshops, fairs, information events) in at least 3 countries (Tunisia, Kenya, Colombia) by the end of 2018.	Reports	Medium
F4	F4 Outcome: 4.1 Environmental concerns are considered in decision making across at least 10 priority countries and other locations, by national and international development partners, government agencies and extension systems, including technology developers seeking to improve cattle, small ruminant and pig production.	2018 - GHG baseline emissions are published for Kenya and Vietnam by the end of 2018.	Data collected and archived; papers drafted and published.	Low
F4	F4 Outcome: 4.2 Targeted solutions are used by research and development partners, across at least 10 priority countries and other locations, to increase the productivity of cattle, small ruminants and pigs in the face of ongoing environmental changes.	2018 - Three forage intensification options adapted to climate change are disseminated in Tanzania, Kenya and Ethiopia by the end of 2018.	Documentation on dissemination of options.	Low
F4	F4 Outcome: 4.3 Government agencies and development partners at local and national levels across at least 10 priority countries and other locations are promoting environmental management options.	2018 - Five sustainable rangelands interventions in Kenya, Tanzania, Tunisia and Ethiopia are identified, tested and disseminated to livestock producers by the end of 2018.	Documentation on dissemination and uptake.	Low

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

F4	F4 Outcome: 4.4 Gender responsive environmental management options that are well adapted to Global Environmental Change are adopted by households (women and youth) in 6 countries.	2018 - Tools to enhance gender inclusion in environmental management identified: four tools identified by end of 2018 across five types of sustainable land management projects, based on a global review.	Manuals, tools, planning processes documented.	Low
F4	F4 Outcome: 4.5 National government agencies across at least 5 priority countries design and implement key policies to improve the environmental management of livestock systems	2018 - National environmental policy for Tunisia completed by the end of 2018.	Policy document.	Low
		2018 - Dissemination of manuals/ tools for rangeland and land use planning processes in Tunisia, Kenya and Tanzania to community leaders, local government officials and national line ministry staff by the end of 2018.	Manuals, records of meetings.	Low
F4	F4 Outcome: 4.6 Evidence generated by the flagship influences key global livestock agendas (IPCC, Global agenda for Sustainable Livestock)	2018 - Two events will be influenced by the end of 2018. High level communication on livestock and environment at the GFFA (January 2018) ; side event on livestock and environment at UNFCCC COP 24 in November 2018.	Blogs, presentations to key events.	Low
F5	F5 Outcome: 5.1 National and international research partners and policymakers use analyses of livestock-sector dynamics, investment and ex-ante impact assessments to guide priority setting, investment and policy development for the livestock sector in 5 priority countries and within the Livestock CRP	2018 - Livestock Master Plans completed in Bihar and Tanzania by December 2018.	LMP reports	Low
		2018 - LMP Bihar completed by December 2018 includes a gender analysis section (objective and data).	Bihar LMP report	Low
		2018 - GLAD message map on key livestock facts generated and dissemination on global portal by end of 2018.	GLAD portal	Low
		2018 - Gov of Ethiopia uses completed LMP to share major livestock loan request with WB during 2018.	GoE/WB documents	Low
F5	F5 Outcome: 5.2 International researchers and agencies use improved livestock system modelling tools and apply them to new problems based on their mandate areas	2018 - Scenarios and modeling approaches agreed upon for integrated macro-meso analyses	LSIL project report (with CCAFS)	Medium
F5	F5 Outcome: 5.3 Policy- or decision-makers in 4 countries use the packages developed and the evidence on the benefits of including gender equity considerations In the development of livestock projects and planning at community and national level (Ethiopia, Kenya, Nicaragua, Vietnam)	2018 - Benchmark publication on gender and livestock to identify frontiers in research and development published by December 2018.	Journal article submitted	Medium
		2018 - CRP Gender strategy published by June 2018.	Report	Low
		2018 - CRP Youth strategy published by June 2018.	Report	Low
F5	F5 Outcome: 5.4 Local or national development partners in four priority countries adopt gender-	2018 - Finalised version of the WELL produced by September 2018.	Report	Low

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

	transformative and youth-supportive approaches (using the evidence from the strategic gender research done under the CRP)			
F5	F5 Outcome: 5.5 Local and national development actors, government agencies, and the private sector invest in and adopt the most successful approaches for enhancing livestock-mediated nutritional impact, including institutional arrangements and behavioural change, in 3 priority countries.	2018 - Social and Behavioural Change Communication (SBCC) strategy for nutrition-related behaviour implemented among 5,000 households, (in Kenya targeted particularly at children 6-23 months and women) by October 2018.	Project final report	Low
		2018 - Major report on influence of animal-sourced foods on child and mother nutrition published by June 2018.	Chatham House report (with A4NH)	Low
F5	F5 Outcome: 5.6 Livestock communities across 4 priority countries apply tested technologies, management strategies and institutional arrangements, taking the multiple functions of livestock into account	2018 - AVCD and EADD projects dairy - Livestock communities in Kenya, Tanzania and Uganda apply tested feed, health and breeding technologies and/or management strategies (over 140,000 households combined: 78,000 in Kenya, 26,000 in Tanzania and 36,000 in Uganda) by December 2018.	Project reports	Low
		2018 - Protocol for use by Livestock CRP and other researchers to guide testing, evaluation and scaling of technologies developed by December 2018.	Protocol document	Medium
F5	F5 Outcome: 5.7 Development partners, private sector and government agencies across 4 priority countries apply innovative institutional arrangements to enhance competitiveness and inclusiveness	2018 - AVCD and EADD dairy- livestock communities in Kenya, Tanzania and Uganda apply tested organizational and business models among over 133,000 households combined	Project reports	Low
		2018 - Protocol for use by Livestock CRP and other researchers, to guide testing, evaluation and scaling of institutional innovation developed by December 2018.	Protocol document	Medium

Table B: Planned Studies for Relevant Outcomes and Impacts

Planned topic of study	Geographic scope	Relevant to Sub-IDO, or SRF target if appropriate	Comments
A global approach to improving the estimation of forage adoption based on seed distribution studies	Global	<ul style="list-style-type: none"> Enhanced genetic gain 	The aim of this study is to develop a methodological approach for estimating the relative use levels of different forages, with global applicability.
Adoption study of dual-purpose (feed and food) groundnut varieties in Odisha, India	Sub-National: Single province or state	<ul style="list-style-type: none"> Diversified enterprise opportunities # of more farm households have adopted improved varieties, breeds or trees 	Funded by SIF, by end 2018
An ex-post assessment of an innovative scheme for funding small-scale beef fattening enterprises in Swaziland	Sub-National: Single province or state	<ul style="list-style-type: none"> Improved access to financial and other services 	W1/2 funded, by end 2018
Ex-post quantitative impact assessment of SMART marketing interventions in Menz-Gishe, Ethiopia	Sub-National: Multiple provinces or states	<ul style="list-style-type: none"> Increased livelihood opportunities # of people, of which 50% are women, assisted to exit poverty 	W1/2 funded, by end 2018
Outcome and impact assessment study of the dairy “check off” system (input credit received against future milk delivery) among dairy project participants in Kenya	Sub-National: Multiple provinces or states	<ul style="list-style-type: none"> Increased livelihood opportunities # of people, of which 50% are women, assisted to exit poverty 	Jointly with PIM Flagship 3, by end 2018.
Case study on mobile animal health delivery in extensive livestock production systems in Kenya	National	<ul style="list-style-type: none"> Closed yield gaps through improved agronomic and animal husbandry practices # of more farm households have adopted improved varieties, breeds or trees 	Due to limited funds this is only done on a limited scope but the lessons will be applicable in other extensive systems.
Impact of herd health training modules in Ethiopia	National	<ul style="list-style-type: none"> Closed yield gaps through improved agronomic and animal husbandry practices Reduce agriculturally related greenhouse gas emissions compared to business-as-usual scenario 2022 	Impact on productivity and changes in knowledge and practices of small ruminant producers trained in herd health will be monitored over time
East Coast fever Infection-and-Treatment Method (ECF-ITM) Impact Study in Tanzania	National	<ul style="list-style-type: none"> Increased livelihood opportunities Closed yield gaps through improved agronomic and animal husbandry practices 	Data collection and initial analysis funded by GALVmed in 2017

Table C: Cross-cutting Aspect of Expected Deliverables

Cross-cutting	Number (%) scored 2 (Principal)	Number (%) scored 1 (significant)	Number (%) scored 0	Total overall number of deliverables
Gender	8.8%	28.6%	62.6%	262
Youth	1.2%	16.4%	82.4%	
CapDev	6.5%	15.7%	77.9%	

Table D: CRP Staffing

Category	Female (FTE*)	Male (FTE)	To be recruited (FTE)	Total FTE	% Female ¹ (FTE)
Program director & flagship leaders	0.3 (0.0)	3.0 (0.2)	-	3.5	8.6%
Principal Investigators	13.7 (0.0)	34.4 (0.1)	-	48.2	28.4%
Other Senior Scientists (not PIs)	11.2 (0.1)	20.8 (0.0)	0.8 (0)	33.0	35.2%
Post-docs / junior scientists	6.1 (0.5)	12.1 (1.0)	0.8 (0)	20.5	31.9%
Research fellows	2.5 (0.1)	9.3 (0.0)	1.4 (0)	13.1	21.8%
Other science support staff	31.7 (0.0)	66.6 (0.0)	5.6 (0)	103.9	32.2%
Total CRP	65.5 (0.7)	146.2 (1.3)	8.5 (0)	222.2	30.8%

*FTE= Full Time Equivalent

¹Calculation of % female FTE is based on the current staffing, i.e. it does not include the positions that are still to be recruited for 2018.

Table E: CRP Planned Budget 2018

	Planned Budget 2018 (\$US)					Comments on major changes
	2017 Carry forward W1/W2	W1/W2	W3/Bilateral	Center Own funds	Total	
F1	\$0	\$2,670,079	\$7,925,915	\$0	\$10,595,995	N/A
F2	\$0	\$2,679,999	\$3,663,067	\$0	\$6,343,066	N/A
F3	\$0	\$1,844,808	\$4,715,820	\$101,632	\$6,627,260	N/A
F4	\$0	\$1,375,559	\$6,293,350	\$0	\$7,668,909	N/A
F5	\$0	\$1,506,522	\$11,295,691	\$811,012	\$13,613,225	N/A
Strategic Competitive Research grant	\$2,940,000	\$1,355,000	\$0	\$0	\$4,295,000	2017 Carry forward W1/W2 comes from the Phase 1 Livestock and Fish CRP, and will be allocated as Strategic Investment Fund activities over 2018-2019
CRP Management & Support Cost	\$0	\$2,317,919	\$0	\$191,980	\$2,509,899	Includes both CRP Management and Flagship Management costs
CRP Total	\$2,940,000	\$13,749,886	\$33,893,843	\$1,109,624	\$51,693,354	

Table F: Main Areas of W1/W2 Expenditure

Expenditure area*	Estimated percentage of total W1/W2 funding in 2018	Comments
Planned research: principal or sole funding source	64.6%	The majority of W1/W2 funding is for planned research
Planned research: Leveraging W3/bilateral funding	4.5%	This represents primarily co-financing from W1/W2 of bilateral project funding
Catalyzing new research areas	3.9%	This is for new research work under Flagship 3 (feeds and forages) and Flagship 5 (livestock livelihoods and agri-food systems)
Gender	6.7%	This W1/W2 expenditure may also be included under the categories of planned research and new research areas
Youth	1.4%	This W1/W2 expenditure may also be included under the categories of planned research and new research areas
Capacity development	5.6%	This W1/W2 expenditure may also be included under the categories of planned research and new research areas
Start-up or maintenance of partnerships (internal or external)	0%	No W1/W2 funds are currently allocated here (work with KIT comes under monitoring, evaluation and learning)
Monitoring, learning and self-evaluation	2%	This W1/W2 expenditure is also included under other (CRP management)
Evaluation studies and Impact Assessment studies	0.6%	N/A
Emergency/contingency	0%	No funds are allocated for emergency/contingency use
Other	27.6%	Flagship management (4/7%), Strategic Investment Fund (9.9%) and CRP management (13.1%)
Total Funding (Amount)	\$13,749,886	

Table G: Collaborations among Programs and between the Program and Platforms

Name of CRP or Platform	Brief description of collaboration (give and take among CRPs) and value added*	Relevant FP
A4NH	A joint agenda on animal source food and the role of livestock and fish systems in improving human nutrition is being initiated through a series of joint student research projects and a joint bilateral funding proposal.	FP1- Food Systems for Healthier Diets
A4NH	Collaborative activities are being initiated to address anti-microbial resistance within a One Health framework with Livestock CRP focusing on the use of antimicrobials in livestock and the implications for their effectiveness in livestock, and A4NH focusing on the link to human AMR. CRP Livestock is providing assessment tools to measure/characterize AM use in livestock on farms in Vietnam where A4NH is accessing AMR. An AMR experience sharing workshop will be held in Uganda on methodology development. Other joint resource mobilization opportunities are being explored.	FP5 - Improving Human Health
A4NH	Risk assessments and studies on emerging diseases, including tick distribution and vector-borne diseases, will be conducted in collaboration with A4NH and Livestock CRP flagships	FP5 - Improving Human Health
EiB	The interaction with the excellence in breeding platform to standardize and apply plant breeding advances not only in genotyping and phenotyping, but also in logistics and allocation of resources is being defined. The insight from work with largely wild species will be of high value for the platform, recognizing that tropical forages is likely the most recent of the breeding efforts.	Genotyping/sequencing and Phenotyping
Genebank	There is a close connection with the genebank platform, with the main efforts currently identifying the key forage species for conservation and use. The core activities for the USE module of the Genebank Platform are designed to enable more effective access and use of germplasm: 1. Generation of Digital Object Identifiers (DOIs) and integration between genebanks and breeding programs (by the end of 2018 ILRI plans to assign DOIs to 100% of our collection) and; 2. Enrichment of data on collections through the creation of focal subsets, encouraging users to focus in-depth phenotyping efforts on common subsets of accessions to create synergies amongst studies (by the end of 2018 ILRI plans to have three new traits are associated with genebank accessions) Work has been initiated which in the sub-setting area will include generating GBS data for genotyping in order to create core collection for <i>Chloris gayana</i> and <i>Cenchrus ciliaris</i> .	Conservation and Use Modules
BigData	The linkages with Big Data are actively being defined for a Near Infrared Spectroscopy (NIRS) platform. The CRP NIRS platform coordinated by ILRI was also contacted by the phenotyping working group of Excellence in Breeding.	Module 1 Organise
CCAFS	CIATs CCAFS project "Livestock Plus" was granted with funds for 2018 and strong synergies exist with work that will be conducted under Feeds and Forages and Livestock and the Environment, i.e. on silvo-pastoral systems, GHG emissions, public policies and gender. This is being actively discussed by the involved researchers in both CRPs. Funds are largely from CCAFS funds but have synergies with the Livestock CRP and thus is discussed and listed in both CRPs.	Low Emissions Development

2018 LIVESTOCK CRP Plan of Work and Budget (POWB)

GLDC	Improved forages are a part of the discussion with the Crop Prioritization Group, with the aim to ensure long term viability of selection and breeding efforts. Likely food feed crops will be addressed through the crop improvement CRPs. The concrete activity for 2018 is participation in Breeding Program Assessment Tools (BPAT) which is a major effort focusing mainly on forage breeding in CIAT but connecting with genetic work in ILRI.	FP4: Variety and Hybrid Development
PIM	We will contribute our findings on gender-based engagement in environmental management of livestock production to the gender platform. The lead gender scientist is an active member and serves on the gender platform steering committee. She shares insights on gender analysis relevant to environmental issues with the flagship as well. The Livestock CRP and ILRI will be hosting the Gender Platform meeting in 2018.	FP6 - Cross-cutting Gender Research and Coordination
CCAFS	We are beginning to work with the Univ of Florida on national and regional level livestock modeling in target countries, some among CRP priority sites, in the context of the Livestock Systems Innovation Lab (jointly with CCAFS). They bring specialized livestock systems modeling tools which complement our value chain tools.	FP1: Priorities and policies for climate-smart agriculture

*e.g. scientific or efficiency benefits

Table H: Planned Monitoring, Evaluation, and Learning Exercises

Planned studies/learning exercises in 2018	Comments
Ex-post quantitative impact assessment of SMART marketing interventions in Menz-Gishe, Ethiopia	W1/2 funded, by end 2018
Ex-post impact assessment of research interventions for small ruminant value chains in Ethiopia	W1/2 funded, by end 2018
Review of laws and regulations that constrain private sector role in the delivery of animal health services in Kenya	None of the SRF seems very appropriate for this activity. The objective is to improve business environment for private sector.
Economic cost of the use of counterfeit and substandard veterinary products in Kenya	None of the SRF seems very appropriate for this activity. The objective is to reduce chemical residues in animal source foods.
Impact of herd health training modules	impact on productivity and changes in knowledge and practices of small ruminant producers trained in herd health will be monitored over time
Evaluation of the success of the Index-Based Livestock Insurance Project to date in terms of uptake and sales, to assess its scaling out potential, in particular its agency structure and public-private partnerships.	The IBLI product has been undergoing evolution in terms of the contract design, subsidy, partnership with private insurance companies, outreach tools to pastoralists, and government support. We have funds from 3ie to evaluate the contract design and scaling out model of IBLI to refine the product and its partnerships.
Reviewing evidence base for Theories of Change with Flagship research teams	Identifying current strength of evidence to support assumptions and priorities for additional research to test key assumptions.
Development of country strategies and Theories of Change for 4 CRP priority countries	Supporting development of impact pathways for key value chains and livestock systems and integration of flagship research interventions.



RESEARCH
PROGRAM ON
Livestock

More meat, milk and eggs by and for the poor

Annex

2018 Livestock CRP Plan of Work & Budget

Summaries of Revised Flagship Project Strategies

3 April 2018



CGIAR is a global partnership that unites organizations engaged in research for a food-secure future. The CGIAR Research Program on Livestock provides research-based solutions to help smallholder farmers, pastoralists and agro-pastoralists transition to sustainable, resilient livelihoods and to productive enterprises that will help feed future generations. It aims to increase the productivity of livestock agri-food systems in sustainable ways, making meat, milk and eggs more available and affordable across the developing world. The Program brings together five core partners: the International Livestock Research Institute (ILRI) with a mandate on livestock; the International Center for Tropical Agriculture (CIAT), which works on forages; the International Center for Research in the Dry Areas (ICARDA), which works on small ruminants and dryland systems; the Swedish University of Agricultural Sciences (SLU) with expertise particularly in animal health and genetics and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) which connects research into development and innovation and scaling processes.

The Program thanks all donors and organizations who globally supported its work through their contributions to the [CGIAR system](#)

© 2018



This publication is licensed for use under the Creative Commons Attribution 4.0 International Licence. To view this licence, visit <https://creativecommons.org/licenses/by/4.0>.

Unless otherwise noted, you are free to share (copy and redistribute the material in any medium or format), adapt (remix, transform, and build upon the material) for any purpose, even commercially, under the following conditions:



ATTRIBUTION. The work must be attributed, but not in any way that suggests endorsement by the publisher or the author(s).

Patron: Professor Peter C Doherty AC, FAA, FRS

Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax +254 20 422 3001
Email ilri-kenya@cgiar.org

ilri.org
better lives through livestock
ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia
Phone +251 11 617 2000
Fax +251 11 667 6923
Email ilri-ethiopia@cgiar.org

ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

A.1 Revised Strategy for Livestock Livelihoods and Agri-Food Systems FP5¹

Box 2.5a: Livestock Livelihoods and Agri-Food Systems Flagship – Summary

The objective of this Flagship Project (FP) is to ensure that the CRP has its intended impact on the key sub-IDOs related to livelihoods and gender, among others – in short ensuring that the technologies and strategies developed through the CRP translate into positive impacts on the welfare of the resource poor.

This FP:

- Delivers interventions at producer, market and policy level that positively impact rural livelihoods, nutrition, gender inequity, and livestock agri-food system performance, with livestock mediated livelihoods and wellbeing as its core aim
- To maximize overall CRP performance, provides the integrative mechanisms for technologies and strategies from the CRP technology and environment FPs to be piloted and implemented among target livestock keepers and communities
- Supports and coordinates the entire CRP and its FPs on priority setting, impact assessment, and gender
- Leads the CRP policy and investment analyses to prioritize and provide evidence for promoting livestock opportunities for the poor
- Identifies evidence-based best practices to facilitate scaling by partners of innovation addressing the unique opportunities afforded by livestock value chains
- Provide key linkages for joint research with the PIM CRP for foresight, gender, and scaling, and to the AHNH CRP for human nutrition
- Invests in cross-site and cross-system syntheses to ensure that lessons from multiple bilaterally funded interventions generate IPGs

Contributes directly to the following sub-IDOs:

- Increased access to diverse nutrient-rich foods
- Reduced market barriers
- Increased livelihood opportunities
- Gender-equitable control of productive assets and resources
- Improved capacity of women and youth to participate in decision making
- Conducive agricultural policy environment

2.5.1 Flagship Project Narrative

2.5.1.1 Rationale and scope

Research has indeed shown that livestock generally exhibits greater rural livelihood multiplier effects than crops (ReSAKSS 2016), provide ready cash when needed, thus improve resilience (Moll et al. 2007) and contribute to a generational escape from poverty through providing income for education of children. However, small and medium scale producers are yet to fully exploit growing markets because they lack access to knowledge, inputs and services. Women are constrained by gender disparities, and youth by access to capital and cultural norms. Furthermore, poor-performing markets reduce affordability and access to nutrient-dense ASF. Imperfect models and data for projecting future system changes limit donors' and decision-makers' ability to assess returns on investment and interventions for desired impact.

To effectively deliver interventions that improve livelihoods, we shall consider the contextual interactions between production technologies, markets and institutions, that affect farm and agri-food system performance. Proposed interventions shall overcome barriers presented by gender

¹ Based on the revised flagship proposal submitted to the ISPC in July 2017.

inequities and exploit new opportunities for youth. For this FP and in the overall CRP, our target beneficiaries shall be small and medium scale producers and market agents who subsist most on and produce the bulk of the ASF in the target CRP countries, cognizant of livestock value chain contributions to household incomes and nutrition security.

2.5.1.2 Objectives and targets

The FP will contribute directly to sub-IDs on **increased access to diverse nutrient-rich foods, reduced market barriers, increased livelihood opportunities, gender-equitable control of productive assets and resources, improved capacity of women and youth to participate in decision-making, and a conducive agricultural policy environment.**

The FP's objectives are:

- Conduct foresight, impact and policy analysis to set priorities and guide inclusive and sustainable investments by the CRP and by public and private actors.
- Improve livestock technology and innovation and adoption by ensuring that gender-based analysis informs research design and implementation across the CRP and that delivery and scaling outcomes are equitable.
- Identify, test, and facilitate livestock-mediated pathways to improve nutrition in resource poor households and their communities.
- Improve rural livelihoods, through integrated production technologies and institutional innovations in markets and services to improve the performance of animal-source food systems.

2.5.1.6 Clusters of activity

Cluster 1: Policies, foresight and systems analysis

This cluster aims to target policy and investment for the greatest impact both within the CRP and amongst decision makers.

Its main research outputs include:

- Improved livestock system modelling and data capturing tools developed with partners.
- In target CRP countries, empirical estimates of the levels and structure of future supply and demand for animal-source foods and foresight analysis of likely patterns of livestock system evolution under potential development and climate change and technology scenarios.
- Impact assessment of these scenarios in terms of productivity, livelihoods, income, diet diversity, nutrient availability, equity, water use, and GHG emissions, and in terms of return on investment.
- Guidance on livestock policy, technology and investment priorities and strategies for the other FPs in the CRP, but also development agencies, decision makers, and the CGIAR.

Cluster 2: Gender and social equity

This cluster will ensure that livestock contributes to **opportunities for empowerment and equitable development** by developing and gender-responsive technological and institutional packages.

It's main research outputs include:

- Packages of gender-responsive institutional and technical innovations in genetics, environment, forages and animal health that are known to enhance productivity and equity.
- Gender-transformative approaches developed to address the root causes of gender discrimination, and their effectiveness assessed, and entry points developed within policies, such as the Livestock Master Plans developed under Cluster 1.
- Gender-sensitive indicators and methodologies developed for assessing progress on gender strategic change (e.g. transformation of gender norms or empowerment).

Cluster 3: Food and nutrition security through livestock.

Basing on lessons from previous work in Kenya, Tanzania and Uganda, this cluster will **investigate the animal-source food consumption dynamics, assess their contribution to filling the nutrient gap in vulnerable populations** and identify the key drivers of choice as well as barriers and facilitators of consumption, to identify improved market opportunities for livestock products. Understanding of livestock-mediated pathways to nutrition and health and how women's knowledge, practices and decision-making power relate to food consumption and health will allow scaling up of the relevant interventions. All the work in this cluster will be closely linked to A4NH.

Main research outputs

- Increased understanding of the impact pathways from production of, and access to, animal-source foods, to improved nutrition in rural households, with focus on own-consumption, income expenditure and women empowerment.
- Innovative evidence-based approaches for affordable nutrition-sensitive interventions that can improve availability, affordability, access and utilisation of animal-source food to small and medium scale producers and consumers, focusing on children under five years, adolescent and pregnant and lactating women.

Cluster 4: Integrated technologies, practices and institutions for improved livestock systems

This cluster analyses the effect of integrating animal health, feed and genetic technologies and practices to achieve improved productivity and resilience, and as importantly, assesses the requisite institutional arrangements for livestock keepers and other value chain actors to utilize these technologies for upgrading their practices and strategies in response to market forces.

Main research outputs

- Best bet, improved and integrated suite of technologies which exploit livestock-mediated on-farm and off-farm economic opportunities to enhance livelihoods and resilience (or reduce risk) equitably for women, men and young people.
- New inclusive and scalable institutional arrangements developed and tested, that address key needs for enhanced product and input markets and value chain performance, bearing in mind product grades, quality and safety.
- Harmonized ex ante and ex post impact assessments of selected technologies, practices and institutional arrangements across production systems and value chains

2.5.1.7 Partnerships

The FP will work with a diverse set of new and existing partners to deliver its agenda. Public and private sector partners shall bring expertise in science, development implementation, capacity development, and advocacy and communication. Although some links already exist with the private sector, including dairy business hubs and with input suppliers, new relationships with processors and the food sector will be important.

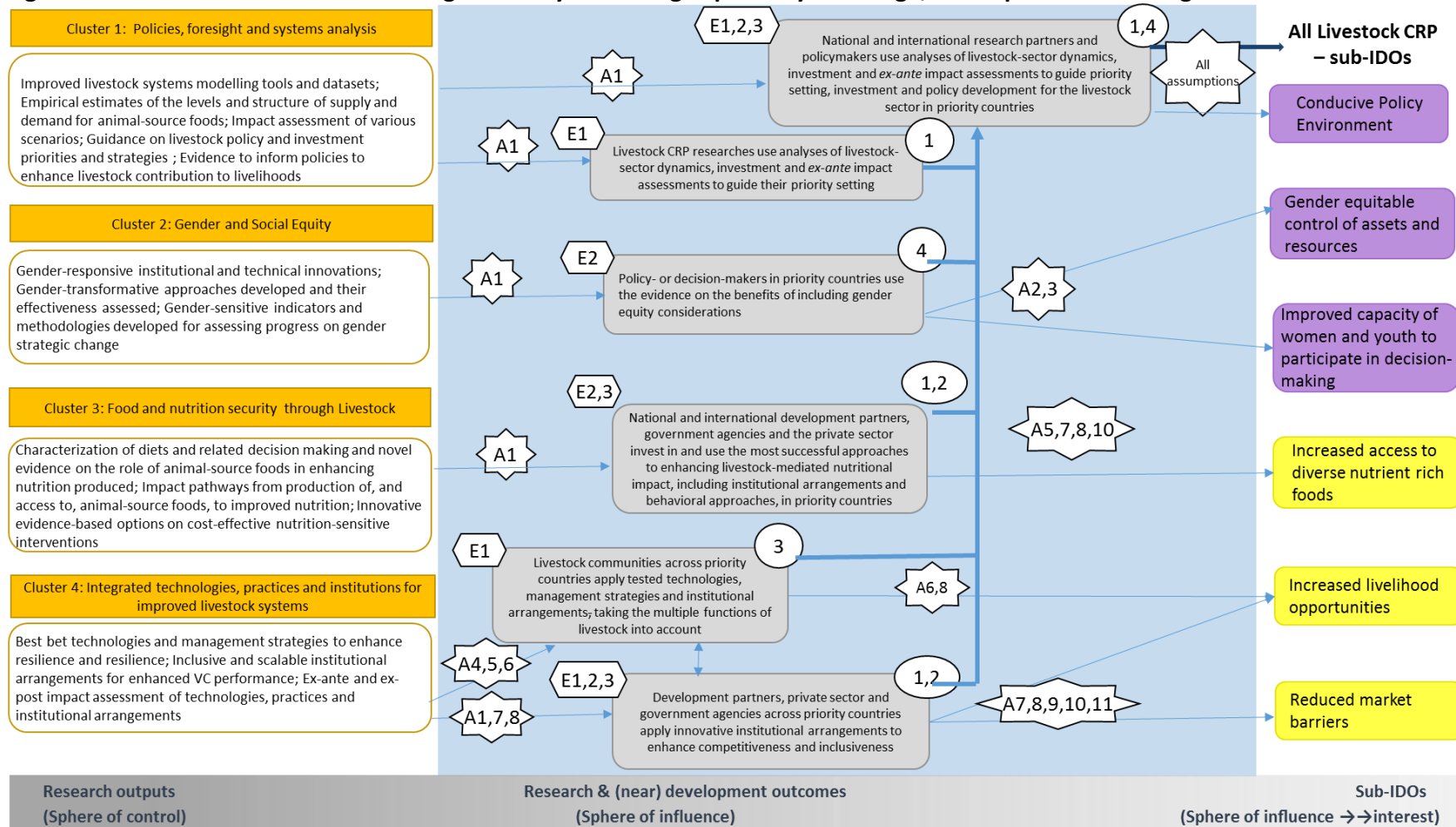
2.5.1.9 Gender

Gender is embedded into each FP cluster, tools and at household and community levels for modelling and scaling work. Cluster 2 research builds on works by the L&F CRP on meanings of livestock ownership and bridging the gender gap in livestock ownership among others. Cluster 3 explores women's key roles in household food and nutrition security and the nexus of women's empowerment with nutritional status of household members vis-à-vis livestock development. Cluster 4 will research gendered constraints and opportunities in controlling livestock resources, technology uptake, and policy frameworks that enhance equitable participation in value chains.

Youth: Work in this FP will also coordinate the research on inclusion of young people in institutional arrangements in systems and value chains.

2.5.1.12 FP management

Implementation will be led by a FP leader (FL), supported by a leader for each cluster (CL). The primary roles of this core team are to develop and update the research agenda and impact pathways, monitor the quality and delivery of knowledge outputs, and report as required. The FL will guide FP priority setting, allocation of W1/2 resources and strategic exploration of new research areas; guide development of bilateral projects in line with the FP, coordinate all reporting and support cross-FP initiatives. Cluster leaders will guide research design in their clusters and monitor science quality of outputs, and will also contribute to reporting.

Figure 2.5a: Livestock Livelihoods and Agri-Food Systems Flagship theory of change, assumptions and change domains

A.2 Revised Strategy for Feeds & Forages FP3²

Improving the productivity of livestock in low and middle-income countries (LMIC) has the potential to transform human nutrition and farmer livelihoods. Along with better animal health and improved genetics, better feeding can bring about transformative change, but success thus far has proved to be variable and limited. We have identified a number of key constraints to improved feeding that the CGIAR and its partners are well placed to tackle through research.

Overall goal: Increased animal productivity through better animal nutrition by providing superior, business-oriented feed and forage strategies and options.

This flagship's objectives are:

- Synthesize global knowledge on livestock feed options and package it into widely available tools for feed solution targeting (Cluster 1).
- Develop improved feed and forage genetic options that are better suited to abiotic/biotic pressures such as drought and disease/pests and that improve the efficiency of livestock-tree-crop systems as a whole, achieving higher productivity at lower resource use (land, water, fertilizer, labour among others) (Cluster 2).
- Target, test and disseminate feed, fodder and forage utilization and processing options to make better use of existing feed resources in small-scale production systems undergoing rapid inclusive or fragile growth (Cluster 3).
- Take promising new and existing feed and forage technologies to scale, by developing, testing and implementing innovative business models and scaling approaches together with the value chain stakeholders (Cluster 4).

Research will contribute directly to three sub-DOs, by targeting the following outcomes:

- Closed (livestock) yield gaps through improved agronomic and animal husbandry practices.
- More efficient use of inputs, specifically stress-tolerant feed and forage options.
- Technologies that reduce women's labour and energy expenditure developed and disseminated, addressed through efficiency gains in forage and feed production, sourcing and processing.

The core research agenda comprises four priority areas supported by W1/2 investment:

- Platforms, tools and analyses to prioritize, document and target context-specific feed and forage interventions (Cluster 1). W1/2 funds will support development of prioritization tools and foresight analyses and novel tools to enhance pheno-/genotyping efficiency.
- Development of new feed and forage options
 - Forage improvement to facilitate sustainable intensification, with an emphasis on the rapid inclusive growth trajectory and on integrating private-sector engagement (Cluster 2). W1/2 funds will support breeding of *Urochloa* and *Megathyrsus* and pheno-/genotyping of *Lathyrus* and *Pennisetum* (now *Cenchrus*).
 - Full-purpose crop improvement, making use of the synergies in crop–livestock interactions to maximize system efficiency (Cluster 2). W1/2 funds will support food-feed crops breeding of

² Based on the revised flagship proposal submitted to the ISPC in July 2017.

maize, sorghum and cowpea.

- Utilizing existing feed resources better (Cluster 3). W1/2 funds will support the development of small-scale feed processing and conservation options.
- Delivery and scaling, to ensure that the pathway from discovery to adoption and impact is completed, also considering gender/youth aspects and capacity development (Cluster 4 with flagship 5). W1/2 funds will support development of gender-/youth-sensitive feed business models and effective extension approaches for scaling forage/feed technologies.

The forage and feed development and utilization work (Clusters 2 and 3) will relate to Clusters 1 and 4 in an iterative and dynamic process of priority setting, targeting and scaling up, ensuring strong orientation to users' demands and maximizing impact at scale.

This translates into the following 4 Clusters of Activity:

- Cluster 1: Diagnosis of feed constraints and opportunities and development of smart approaches for prioritizing and targeting feed and forage interventions

Outcome: Local, national and international research and development partners, the private sector, decision-makers and livestock producers are able to diagnose feed constraints and opportunities and to effectively prioritize and target feed and forage interventions, resulting in: a 10% increase in utilization of improved feeds and forages, a 20% increase in animal production (meat, milk or eggs) using improved feed and forage technologies, a 10% increase in accuracy for biomass and quality estimation and at least 250,000 annual visitors to global databases, repositories, interactive tools and maps and the Tropical Grasslands—Forrajes Tropicales journal website.

- Cluster 2: Development of new feed and forage options

Outcome 1: National and international research and development partners and the private sector are using CRP developed forage and rangeland resources (exploiting the genetic diversity available to enhance stress-tolerance, biomass productivity and nutritive value) in 30 countries in Tropical Africa, Asia and Americas and reaching producers who plant over 2 million ha.

Outcome 2: New forage and crop cultivars, superior to local (based on food, feed and fodder traits weighted according to target domains), being scaled out by development partners, government agencies and the private sector and applied by at least 100,000 farmers in each of at least 7 priority counties and other locations.

- Cluster 3: Using existing feed resources better

Outcome 1: National and international development partners, government agencies and extension services, the private sector and community-based organisations in 3 priority countries are using CRP-related research outputs for better utilization of existing and novel feed and forage resources. This will be through (a) scalable processing technologies, (b) management strategies to conserve and rehabilitate rangelands and (c) diet formulation that increases productivity while reducing overall feed and forage costs and environment impacts.

Outcome 2: Livestock producers in 3 priority countries apply management strategies to conserve and rehabilitate rangelands and pastures while ensuring ongoing ability to produce, preserve and store feed biomass and use diets that increase productivity and reducing feed and forage costs and environmental impacts (with flagships 4 & 5).

- Cluster 4: Facilitating the delivery and uptake of feed and forage technologies

Outcome: Increased delivery and uptake of feed and forage resources and enhanced participation of women through proof-of-concept scaling, business model development and value-chain approaches by development partners, the private sector (feed and forage traders, feed processors), NARS, and small-/medium-scale farmers (1 million by 2022) across diverse environments in priority countries and other locations in LAC, North and East Africa and South and Southeast Asia.

Partnerships:

This flagship's partnership strategy is driven by its ToC and the skills, expertise, facilities and capacity needed along discovery-to-delivery pathways. The combined comparative advantage of the flagship's core program partners guide the choice of further partners needed to bring in additional capacity. Partnerships are also influenced by the target geographies of the CRP. Comparative advantage in feeds and forage technologies is provided by ILRI, CIAT and ICARDA, each with relevant expertise, resources, and genebanks. The choice of partners is largely determined by a) technical, managerial and operational capacities of the partner, b) where the partner is located, c) the stage in the discovery-to-scaling up process and d) existing track record of collaboration. Key cross-CRP partnerships, especially on ASF, will be deepened through the Full-Purpose Crops Initiative and BNI Consortium.