RESEARCH PROGRAM ON Livestock and Fish

CGIAR

More meat, milk and fish by and for the poor

CGIAR Research Program on Livestock and Fish
2015 Performance Monitoring Report

Lead Center: International Livestock Research Institute (ILRI)

CGIAR Center partners: CIAT, ICARDA, WorldFish,

Non-CGIAR partners: SLU

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ICARDA Science for Better Livelihoods in Dry Areas

WorldFish

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CGIAR is a global partnership that unites organizations engaged in research for a food-secure future. The CGIAR Research Program on Livestock and Fish aims to increase the productivity of small-scale livestock and fish systems in sustainable ways, making meat, milk and fish more available and affordable across the developing world. The Program brings together five partners: the International Livestock Research Institute (ILRI) with a mandate on livestock; WorldFish with a mandate on aquaculture; 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 the Swedish University of Agricultural Sciences (SLU) which provides expertise particularly in animal health and genetics. http://livestockfish.cgiar.org

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Acronyms

AA	amino acids
AAS	CGIAR Research Program on Aquatic Agricultural Systems
ADVC	Accelerating Dairy Value Chain project
AFEX	Ammonia fiber expansion
AnGR	Animal genetic resources
AR4D	Agricultural research for Development
ATA	Agricultural Transformation Agency
A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
BMP	Best management practices
CBBP	Community-based breeding programs
CBPP	Contagious bovine pleuropneumonia
CIAT	International Center for Tropical Agriculture
CLEANED	Comprehensive Livestock-Aquaculture Environmental Assessment for Improved Nutrition, a Secured Environment and Sustainable Development along Value Chains
CRP	CGIAR Research Program
ECF	East Coast fever
FEAST	Feed Assessment Tool
GAAP	Gender, Agriculture and Assets Project
GIFT	Genetic Improvement in Farmed Tilapia
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GTA	Gender transformative approaches
ICARDA	International Center for Agricultural Research in the Dry Areas
IDO	Intermediate development outcome
IEIDEAS	Improving employment and incomes through development of Egypt's aquaculture sector project
ILRI	International Livestock Research Institute
INRA	French National Institute of Agricultural Research
ITM	Infection and treatment method
KAPCI	Knowledge, attitudes, practices, capacities and incentives
KIT	Royal Tropical Institute
M&E	Monitoring and evaluation
Mmc	Mycoplasma mycoides capri
NIRS	Near-Infrared Spectroscopy
OCS	One Corporate System (of CGIAR)
PCR	Polymerase chain reaction
PPR	Peste des petits ruminants
SASI	Systems Analysis for Sustainable Innovations flagship
SDC	Swiss Development Corporation
SLU	Swedish Agricultural University
SNV	Netherlands Development Organization
SoFT	Selection of Forages for the Tropics
SPAC	Science and Partnership Advisory Committee
TechFit	A tool for feed technology prioritization
TOSA	Tools for systems analysis
USAID	United States Agency for International Development
VCTS	Value chain transformation and scaling flagship
VietGAHP	Vietnam Good Animal Husbandry Practices
VPM	Vietnam Pig Model
W1/2/3	CGIAR Funding Windows 1/2/3

A. Key messages

A.1 Progress and challenges

The CGIAR Research Program (CRP) on Livestock and Fish maintains a vision for the health, livelihoods and future prospects of the poor and vulnerable, especially women and children, to be transformed through two pathways: through consumption of adequate amounts of meat, milk and fish, and through benefits to improved incomes and livelihoods by participating in the associated animal-source food value chains. The program seeks to achieve this vision by increasing the productivity of small-scale livestock and fish production systems and improving the performance of their associated value chains.

The program proposed an ambitious new model to enhance the relevance, urgency and impact of its research. It was designed to bring together the collective capacity of CGIAR and other partners to develop and deliver appropriate integrated solutions for the pro-poor transformation of selected animal-source food value chains. As part of the model, the program is exploring how to work with development partners to translate these solutions into large development investments likely to achieve sustainable impact at scale. The process also defines longer-term research to prepare future breakthroughs to ensure the continued viability and growth of these value chains. This model is a new way of working for the CGIAR that has required reorienting capacity, testing novel approaches, mobilizing new resources and establishing new types of partnerships and capacity to engage effectively in the selected value chains.

In its fourth year, the program maintained its steady output of research results from its technology platforms for animal health, genetics and feeds and forages to support sustainable livestock and aquaculture intensification, and registered encouraging progress in several of its targeted value chains. Careful management of its W1/2 funding allowed the program to protect temporarily its research momentum from the general decline in funding at the CGIAR System level. At the same time, new bilateral funding came on line, especially for genetics research. Taking stock was a recurrent theme over the year as the program participated in independent external evaluations and shaping the second phase of the CRP portfolio. The main external evaluation concluded 'the value chain approach, although not yet delivering on its promise, is innovative and generating valuable lessons. Progress in establishing an institutional base and development partnerships in the field has been especially promising." It also concludes "the evaluators have no serious concerns about the quality of scientific output." The evaluations have therefore endorsed the program's agricultural-research-for-development (AR4D) model within the value chain framework in priority sites, its ability to deliver good science, and commended its management and governance arrangements. Recommendations pointed to the need for more strategic management supported by stronger monitoring and evaluation (M&E) and research management systems to sharpen focus and strengthen the value chain work. Meanwhile, the development of the second phase CRP portfolio clarified that the Livestock and Fish CRP agenda is to continue, but is being consolidated with the existing Systems CRP work in separate new Fish and Livestock CRPs; in each case, the value chain approach will become a component of an expanded overall CRP agenda. Considerable effort was devoted to preparing the new CRPs.

To reduce internal transactions costs and improve integration both across disciplines and between the discovery and delivery components, three CRP Themes (Value Chain Development; Targeting; Gender & Learning) were re-organized into two flagships: Systems Analysis for Sustainable Intensification and Value Chain Transformation & Scaling. Challenges remain, however, to integrate more effectively flagship research within the target value chains.

Highlights for the year included a strengthened population health agenda in the animal health flagship with ILRI-WorldFish collaboration to identify emerging fish diseases, a major new activity on indigenous poultry genetics that will help explore CGIAR comparative advantage in poultry research, and initial findings on how feed and breeding in the developing country context may reduce greenhouse gas emissions. Gender mainstreaming is also becoming increasingly evident across the full range of the program's research agenda. Importantly, the program is beginning to realize the benefits of the value chain approach as demonstrated by recognition and involvement in shaping national development agendas related to small ruminant work in Ethiopia, smallholder pig systems in Vietnam and Uganda, aquaculture development in Egypt and the smallholder dairy and livestock sector in Tanzania. While certainly not attributable to the Livestock and Fish CRP alone, the concerted engagement from producer to policy level in the target value chains has clearly positioned the CRP value chains teams as a valued partner.

A.2 Two most significant achievements/success stories

Genetics of small ruminant adaptation to hot arid environments

A significant step was achieved in understanding how genomic selection might be applied to breeding goats and sheep suitable for hot arid environments. In partnership with scientists from Animal Production Research Institute (Egypt), Iowa State University (USA) and Virginia State University (USA), ICARDA scientists investigated genomic signatures of natural selection for adaptation to hot arid environments. Barki goats and sheep well adapted to the dry Coastal Zone of the Western Desert in Egypt were compared against five exotic breeds of goats and three of sheep originating from temperate regions and thus poorly adapted to hot drylands. The latest genome-wide scan technique was applied and several candidate genomic regions under positive selection were identified. Several of these candidate regions spanned genes that influenced traits related to adaptation to hot arid environments such as thermo-tolerance, energy and digestive metabolism, as well as autoimmune response. Through comparative genome-wide mapping, the study also identified eight common candidate genes under selection in the two species and a shared selection signature that spanned a conserved syntenic segment to bovine chromosome 12 on caprine chromosome 12 and ovine chromosome 10 respectively. The results were published in Heredity and selected for the Heredity Podcast. The results set the basis for further studies to understand and exploit the mechanisms of adaptation to hot arid environments and highlight the potential of indigenous breeds as the genetic resources of choice to mitigate against climate change.

Towards improved vaccines for mycoplasma diseases

Contagious bovine pleuropneumonia (CBPP) and contagious caprine pleuropneumonia are major livestock diseases in developing countries caused by mycoplasma. ILRI scientists with collaborators from the French National Institute of Agricultural Research (INRA) and the University of Bern (Switzerland) used state-of-the-art synthetic genomics tools to engineer and phenotype a *Mycoplasma mycoides capri* strain which lacks the terminal gene in the galactofuranose synthesis pathway. The new mutant genome was engineered within yeast as an intermediate host and genome transplantation was used to generate the mutant Mycoplasma strain. The established technologies are being deployed to identify potential subunit vaccine targets. This work is a significant and exciting step towards creation of an improved live attenuated vaccine for mycoplasma diseases.

A.3 Financial summary

The program executed USD 28.5 million (80% overall; 92% of W1/2 versus 70% of W3/bilateral) of the total 2015 USD 35.8 million budget. Gender research accounted for 10% of expenditures.

B. Impact pathways and intermediate development outcomes (IDOs)

The overall program impact pathway and theory of change is described in the program's **Results Strategy Framework and Intermediate Development Outcomes (IDOs) (v.3)** (http://livestock-fish.wikispaces.com/IDO) and summarized in the program's 2015–2016 extension proposal. The six IDOs adopted by the program are: IDO1—Increased livestock and fish productivity in small-scale production systems for the target commodities; IDO2—Increased quantity and improved quality of the target commodity supplied from the target small-scale production and marketing systems; IDO3—Increased employment and income for low-income actors in the target value chains, with an increased share of employment opportunities for and income controlled by low-income women; IDO4—Increased consumption of the target commodity responsible for filling a larger share of the nutrient gap for the poor, particularly for nutritionally vulnerable populations (women of reproductive age and young children); IDO5—Lower environmental impacts in the target value chains; IDO6—Policies (including investments) support the development of the small-scale production and marketing systems, and seek to increase the participation of women within these value chains.

Indicators for the IDOs and methodology for estimating their target and actual values are described in an **IDO Indicator Manual.** The program IDOs have been maintained here for consistency; with the adoption of the new CGIAR Strategy and Results Framework 2016–2030, a revised, standard set of IDOs and sub-IDOs has been introduced, so it is anticipated that the indicators and methodology for their estimation will need to be revised. Work continued in 2015 to define how the monitoring and evaluation framework will be operationalized in practice, including the appropriate use of benchmarking, baselines and dedicated data collection. To date, the program is relying on situation analyses for

the selected value chain countries that describe a range of indicators of the current status of the target pro-poor value chain based largely on secondary data in the public domain. More detailed baseline information is being collected as bilateral projects are funded and implemented in each value chain.

C. Progress along the impact pathways

The following summaries are derived from detailed annual reports by value chain and CGIAR center, and synthesis reports by program flagships; they can be accessed at: http://livestock-fish.wikispaces.com/2015_AnnualReports.

C.1 Progress towards outputs

For the extension period 2015–2016, the program was restructured from six themes to five flagships, three of which support the principal technology drivers of productivity and intensification in livestock and aquaculture systems: animal health, animal genetics, and feeds and forages. The other two flagships (systems analysis for sustainable innovation and value chain transformation and scaling) apply a combination of relevant biological and social science to address key dimensions associated with pro-poor value chain development and intensification and ensure more effective agricultural research-for-development that translates into impact.

Flagship 1—Animal health: This flagship generates data and materials for solutions to improve the pro-poor management of animal health and food safety in the selected value chains and more generally.

A first cluster of activities assesses productivity constraints imposed by disease to inform prioritization. The delay in work on this agenda was resolved with new dedicated capacity on livestock and fish health at ILRI and WorldFish, strengthening the flagship's engagement in the target value chains. Research on emerging diseases in farmed fish is becoming a priority. In collaboration with Merck Lab Singapore and Bangladesh Fisheries Research Institute, *Streptococcus agalactiae* biotype 1 was identified as the main cause of streptococcosis in Tilapia in ponds and cages in Bangladesh, prompting initiation of a cross-sectional epidemiological study. Initial fish health scoping and diagnostic studies by ILRI and Merck identified *Aeromonas veronii* as a possible factor in significant summer mortality that has emerged on tilapia fish farms in Egypt, and are serving as the basis for in-depth histopathologic and epidemiological studies. The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) contributed complementary results establishing that Egyptian farmed fish is safe from the point of view of chemical contamination but could be unsafe because of spoilage caused by poor post-harvest handling. In Uganda, initial characterization of the pig disease situation has led to a focus on improving biosafety in the value chain. Key outputs were publications characterizing the pig value chain, results and tools for participatory risk assessment of African swine fever and assessing knowledge, attitudes, practices, capacities and incentives (KAPCI) for its control through biosecurity among pig producers, traders, butchers, input suppliers and extension workers. A study on the socio-cultural factors and gender dimensions in pig management and biosecurity identified factors that govern the level of adoption and application of biosecurity measures at farm level, such as the perception of some farmer communities that throwing away the animal carcasses is a waste of food, or the taboo for some communities associated with burying a dead animal.

The program's new epidemiology capacity has raised the profile of the flagship's second cluster on animal population health. In Ethiopia, health issues for rams in community-based breeding programs (CBBP), a central best-bet for small ruminant value chain development, began to be addressed through a sero-survey. Importantly, preliminary results showed no differences between rams in CBBPs and animals from non-program herds, which means that CBBPs urgently need to develop health schemes to reduce disease transmission risks through breeding animals. In Uganda, the focus is still on better understanding the epidemiology of African swine fever: risk factors for outbreaks and risk factors in smallholder systems were identified, the measure of infectiousness R0 was estimated to be between 1.6 and 3.4, and a cohort study found low incidence of carrier animals in smallholder systems compared to higher prevalence in samples collected at slaughter indicating farmers rapidly sell animals perceived as sick at onset of clinical signs. Genotype IX, the primary strain found in Uganda outbreaks, was sequenced and compared with genotype X virus.

Much of the flagship activity remains concentrated in the third cluster development of vaccines and diagnostics for priority neglected diseases. Recombinant protein to five new candidate sporozoite antigens for East Coast fever was made, of which two are going forward towards vaccine trials[1]. A method to differentiate BoLA-A18 and BoLA-A18v cattle was developed and a panel of eight different peptide-MHC class I tetramer was developed to assess peptide specific CD8 T cell responses to immunization, and a library of ~41,000 synthetic peptides derived from 506 genes was

[1] ILRI laboratory notebooks

ordered to facilitate the identification of new schizont candidate vaccine antigens. Experiments using adenovirus prime/MVA boost with the Tp1 antigen in three different formats were also carried out, and while all protocols induced CD8 T cells that were positive in ELISPOT and in killing of peptide pulsed cells, these cells did not kill parasite-infected cells. There was some indication of immunity to challenge but the data were equivocal. Results on antigenic variation in Infection & Treatment Method (ITM) vaccine stabilates showed that the vaccine stabilates displayed far less variation than field isolates, provoking re-thinking on how the current mixture induces broader protection than single isolates. Other studies confirmed that ITM vaccinated cattle were not protected against natural challenge with buffalo-derived *T. parva,* and contributed to growing evidence that co-infections need to be better understood for effective control. Progress was achieved in understanding of immune response to recombinant proteins and the role Mycoplasma polysaccharides and their potential use in vaccine development. An established goat infection model for Mmc served as a surrogate for Mmm studies, and demonstrated attenuation of Mmc via deletion of 68 genes. The genome of two virulent Mmm strains were sequenced, and a field-applicable diagnostic assay for CCPP produced. For African swine fever, collaboration with Friedrich Loeffler Institute successfully generated a CD2 deletion mutant of the genotype IX virus, which is now being evaluated *in vivo* as an experimental vaccine.

The final cluster on equitable delivery of animal health services and technologies secured funding to pursue work on scaling out vaccine-based control of East Coast fever in Tanzania and *peste des petits ruminants* (PPR) in Mali.

Flagship 2—Animal genetics: This flagship aims to ensure that choices of improved and appropriate livestock breeds, breed combinations and strains are widely available, being sustainably used, and equitably providing income and nutritious, affordable food for the poor.

The first cluster of activities focuses on better assessment of opportunities for using animal genetic resources (AnGRs) appropriately. Sixteen assessment studies were undertaken or reported for various species in a variety of contexts. Results included analyses of genetic versus non-genetic factors affecting survival of Ethiopian sheep breeds, pig breeding practices in a rural commune in the Nghe An province of Vietnam, trypanosomosis resistance of Mursi cattle in Ethiopia and the establishment of a sustainable small ruminant breeding program for climate-smart villages in Kenya (joint output as CCAFS working paper). Other studies focused on characterizing strategic features of AnGRs and included: for small ruminants, the genetic basis of adaptation to heat stress in Egyptian Barki sheep and goats (highlighted as one of the program's success stories); a meta-analysis of complete and partial ovine mitogenomic sequences providing insight into the history of sheep evolution, an analysis of mitochondrial heteroplasmy in Nepalese and Chinese sheep, the genetic diversity and structure in Egyptian sheep, and identification of novel loci associated with gastrointestinal parasite resistance in African sheep; for poultry establishing homozygous MHC-B haplotype chicken populations as a resource for determining the genetic determination of pathogen resistance and susceptibility in chicken. The GIFT breeding program for Nile tilapia validated its strategy by showing genetic variance can be exploited to improve uniformity of their harvest weight, analyzing genetic and non-genetic indirect effects related to social interactions on their harvest weight, assessing the opportunity to exploit sexual size dimorphism, and demonstrating genetic parameters for survival during their grow-out period had not been adversely affected by breeding for improved growth, meaning the fish are better performing while remaining resilient. A review on African indigenous cattle was published, summarizing the unique genetic attributes of selected breeds.

Under the second cluster on developing and promoting improved breeds and strains, long-term breeding programs were continued. A thirteenth generation of the improved Abbasa strain of Nile Tilapia was produced in Egypt and three new breeding nucleus for genetically improved farmed tilapia (GIFT) were established in Bangladesh and stocked with eleventh generation GIFT from Malaysia. Other results were generated to inform breeding objectives: a study in Ethiopia evaluated the relative resistance of Menz and Washera sheep breeds to artificial infection with *Haemonchus contortus*; a participatory approach defined breeding objectives for sheep in pastoral systems in Kenya; a strategy was described for optimizing goat crossbreeding in low-input systems in Kenya; an analysis was performed on the factors affecting ewe longevity and lamb survival for the Menz breeding program in Ethiopia; and a case study reported women's use of improved sheep breeds to adapt to climate change in Kenya. Community based livestock breeding programs in developing countries were reviewed, giving examples and lessons on best-practices and informing the interventions being tested in Ethiopia. Insights from implementing a Cashmere goat breeding program amongst nomads in Southern Iran were also reported.

The third cluster aims at strengthening the delivery and use systems for improved animal genetic resources. To support the challenge of scaling out improved small ruminant genetics from CBBP in Ethiopia, a literature review of the current state of knowledge related to the reproductive performance and characteristics of Ethiopian sheep was completed, and initial evaluations were conducted of innovative reproductive technology options, including an assessment of breeding soundness of rams; development of clean, non-invasive and cost-effective estrous synchronization protocols for sheep and goats; and development of an effective field solution for artificial insemination in sheep with fresh

semen. In Senegal, a review of the national dairy germplasm production and delivery value chain provided recommendations to strengthen the value chain. A new research agenda on poultry genetics was initiated with innovation platforms established in Ethiopia, Tanzania and Nigeria.

Work under the fourth cluster targets 'breakthrough technologies' to support improved genetics in the smallholder context. Reproductive technologies are key, and advanced methods to determine sperm viability by flow cytometry were established to address this. Farmer recording systems are also a critical challenge, and a data capture and management system was developed, tested and used for chicken data. Improving access and ownership of AnGR information was achieved by testing and transferring country level databases (called Country-DAGRIS) to partners from focal institutes in 17 African countries. Finally, the livestock biorepository at ILRI continue to grow, and guidelines and an ODK system for its use as a service were established, while the fish biorepository at WorldFish became operational.

Flagship 3—Feeds and forages: This flagship develops superior feed and forage options that respond to current and evolving demands to increase meat, milk and fish production, while reducing the ecological footprint.

A first cluster of activities has been working to establish a shared platform of tools and approaches to support the feed research agenda. This has now largely been achieved as the flagship's Technology Platform is able to address most feed advisory, feed analytical and phenotyping demands from the CRP's value chains, other CRPs and collaborating NARES and private sector. Central to the platform are the diagnostic and analytical tool developments for FEAST, TechFit, SoFT, extended feed demand-supply scenarios and near-infrared spectroscopy (NIRS). To respond to growing use of the Feed Assessment Tool, FEAST, among researchers and agricultural development practitioners and institutions, an e-learning version of the tool was developed and made available in collaboration with the Humidtropics CRP. The value of incorporating gender dimensions into the tool was demonstrated in work in Ethiopia. New equations were developed and validated for the stationary NIRS network including results for all amino acids (AA) in 200 representative samples from Africa and Asia to address the increasing importance of monogastric and fish feeds and feed ingredients.

The second cluster seeks to ensure existing feed resources are used better. In Ethiopia, sheep fattening strategies were evaluated and demonstrated the importance of sheep breed in determining profitability. Abassa tilapia were also shown to improve feed conversion in Egyptian aquaculture, and an analysis of the fish feed value chain in Egypt was reported. On-farm pilot studies in India generated evidence of the benefits of chopping of crop residues using a range of locally produced choppers with different degree of sophistication and improved feed presentation in feeding troughs: feed intake was increased, feed waste reduced, and labour investment of women in feeding cut down substantially.

Creating higher quality feed options is the focus of the third cluster. Major efforts were again devoted to increasing fodder/feed biomass quantity and quality through identification, breeding and dissemination of superior food-feed cereal (maize, sorghum, pearl millet, rice, wheat and leguminous crops: cowpea, chickpea, groundnut) and maize, sorghum and pearl millet forage) cultivars. An important finding is that many Napier, sorghum and pearl millet forage cultivars perform poorly in terms of fodder quality, with low voluntary feed intake compared to maize forage. Breeding programs for interspecific *Brachiaria* hybrids and intraspecific *B. humidicola* hybrids have full cultivar development pipelines and are advancing rapidly in terms of improving genetic gain through the evaluation of larger populations, integration of improved high-throughput phenotyping protocols, and development of relevant molecular tools. Further evidence was generated on the multipurpose benefits from some forages notably *Brachiaria* and the BNI capacity of *B. humidicola*. New research on upgrading of lignocellulosic biomass for animal feed using ammonia fiber expansion (AFEX) was initiated with Michigan Biotechnology Institute. A successful pilot feed value chain for poultry and pigs based on turning cassava peel into a concentrate feed was established in collaboration with the RTB and Humidtropics CRPs. Use of maize fiber—a by-product of starch production—as basal feed for ruminants was optimized.

Flagship 4—Systems Analysis for Sustainable Innovations (SASI): This flagship acts at the interface between the technology generation flagships (Health, Genetics and Feeds & Forages) and the value chain transformation and scaling flagship (VCTS), to ensure integration of the various components through a whole-systems perspective looking at livestock and fish value chains as coupled socio-ecological systems that are operating in a wider regional and global context. The flagship was established for the extension period to consolidate cross-cutting elements of previous, smaller themes and serves as a temporary arrangement to facilitate transition to the Phase 2 CRPs on Fish and Livestock.

A first cluster of activities is dedicated to cross-cutting research that supports pro-poor value chain transformation, including gender dimensions reported in a separate section. To test the appropriateness of institutional models for inclusive value chains, analyses were reported of dairy business hubs and producer preferences in Tanzania and pig cooperative and slaughter options in Uganda. Partial equilibrium modelling indicated that improving efficiency in the

Tanzania informal dairy value chain would mainly be in the form of scale rather than cost efficiency, offering relatively large benefits to both producers and consumers. An innovation systems approach was applied to documenting the processes and innovation architecture in the Tanzania dairy value chain, highlighting the key role of dairy development at national level and various organizations and platforms at local level. Important evidence relevant to the program's theory of change came from an innovative analysis of household data conducted jointly with CCAFS CRP and published in PNAS which suggests that targeting poverty through improving market access and off-farm opportunities is a better strategy to increase food security than focusing on agricultural production and closing yield gaps: this finding can be interpreted as support for the CRP's value chain approach. Applications of an improved environmental impact assessment framework (CLEANED) for the dairy value chain in Tanzania, the dual-purpose cattle value chain in Nicaragua and the pig value chain in Uganda were reported. Investment in the Mazingira lab in Nairobi began to generate returns: an indigenous sheep feeding trial showed that the protein rich roots, leaves and vines of the sweet potato have the ability to significantly improve productivity and decrease methane emissions intensity in animals fed low-quality basal diets, like poor quality pasture or stovers. New investment was made to develop the human nutrition dimension by convening a consultation at the Leverhulme Centre for Integrative Research on Agriculture and Health for coalition building and to develop an agenda on the role of animal-source food in the developing world; a first draft strategy for nutrition-related research was subsequently prepared.

The second cluster under this flagship provides cross-cutting backstopping on the design and development of integration intervention packages in the target value chains. The focus to date has been on developing and implementing a best-bet protocol with criteria and evidence for deciding which components to take forward for scaling as part of an intervention strategy. As part of the development of a comprehensive global livestock information system to better target livestock research and investment, the Livestock Geo-Wiki was significantly improved.

A third cluster is intended to assess progress and capture lessons. Work under this cluster has been focusing on the developing an M&E framework and system appropriate for an AR4D program, responding to the recommendations of the CRP Science & Partnership Advisory Committee and the CRP-Commissioned External Evaluation on the program's value chain approach.

Flagship 5—Value chain transformation and scaling: This flagship was redefined for the extension period to focus on using research to develop evidence-based interventions to promote inclusive, sustainable animal-source food value chains and stimulate processes to achieve transformative scale in the target value chains. The value chain research teams serve as the interface between cross-cutting research in the other flagships and integrated solutions for generating impact in a specific national or regional context.

After an initial phase of assessment during the first years of the CRP, much of the work by the value chain research teams has now shifted to piloting and validating best-bet interventions, which is the focus of the first cluster of activities. The exact stage and level of activity varied considerably across the value chains depending on when CRP country engagement began and on donor investment achieved. In addition to work led by other flagships, efforts focused on product quality in collaboration with A4NH, business development services, integrating gender and policy analysis. In Ethiopia, processing technologies to improve quality and safety of goat dairy products were tested. Analysis of the pig sector in Vietnam highlighted the opportunity to develop market differentiation and price premiums for 'safe' pork produced by Vietnam Good Animal Husbandry Practices (VietGAHP) certified producers. Based on gaps identified in business management practices in surveyed co-operatives, materials were prepared in Uganda to promote pig business planning and financial management in Uganda to begin building capacity within the value chain. Gender perceptions of resource ownership and their implications for food security were explored among rural livestock owners in Tanzania, Ethiopia, and Nicaragua, providing qualitative evidence that local meaning and gender dynamics play a crucial role in food security at the household level, and can inform locally relevant approaches to improving gender equity. A gendered analysis of barriers to adoption of best practices in pig value chain in Vietnam described how labor allocation in pig production aligned with traditional gender roles of men and women changes as scale increases, with the role of women vis-à-vis men declining. Results of updated modeling of the Vietnam pork sector shows that smallholders will remain the dominant suppliers of Vietnam's pork market in the next decades. This analysis combined with systems dynamic modeling to evaluate value chain performance contributed to policy change recognizing the smallholder sector role.

The second cluster focuses on research to support implementation of innovations at scale, including improving assessment of capacity development needs and the role of innovation platforms. Various forms of innovation platforms are being applied to facilitate identifying opportunities and adapting best-bet technologies. The multi-stakeholder process and its role in fostering innovations and enhancing market linkages was documented for Tanzania, offering the lesson that innovation platforms at different levels are a very efficient approach to identifying and resolving complex mix of constraints to dairy development at the local level when there is an appropriate mix of actors.

The deployment of innovation platforms in bilateral projects in India, Tanzania and Egypt demonstrates how to deal with the institutional environment that may enable or limit adoption and the role of the platforms in scaling up.

C.2 Progress towards the achievement of research outcomes and IDOs

The program devotes science to generating novel technologies and effective strategies that support inclusive livestock and fish value chain development and transformation. Several examples demonstrate that research from the program is being taken up by next users beyond the program's direct sphere of control.

- In Ethiopia, the strategy for genetic improvement of small ruminants in lower-input systems based on CBBP has been prioritized by the national research system and Livestock Ministry for important Ethiopian sheep and goat breeds and is being considered as a component of the Second Growth and Transformation Plan.
- In Vietnam, the Department of Livestock Production relied on evidence provided by the program to revise the Livestock Development Strategy to 2030 to address the need for a better and more conducive environment for smallholders to sustain their competitiveness in the pork sector.
- In Bangladesh, improved Tilapia are being utilized by 59 hatcheries for multiplication and further dissemination. Also, 78 semi-automated feed mills are now in operation with more than 500 tons of feed provided to 800 remote small farmers. Training of 300 nutritionists and engineers in commercial automated feed mills helped produce more than 60,000 tons of quality feed using extrusion technology. Ten feed companies adopted user-friendly fish feed formulation software developed by WorldFish.
- Pig value chain training manuals developed by the program are being used more widely by Pig Production and Marketing Uganda Ltd, Adina Foundation and Masaka district local government for their own activities, serving to scale out capacity development interventions.
- Outputs from the smallholder dairy team in Tanzania were recognized as influencing the decision of large dairy processors to source supplies from agro-pastoralist producers.
- The Animal Health Flagship achieved its target of having 200,000 doses of East Coast fever (ITM) vaccine deployed by other actors in East Africa.
- A manual for artificial insemination on goats has been taken up by goat herder associations in Pakistan and by the relevant institutions from the State Ministry of Livestock to train village-based technicians in local semen production from genetically superior bucks.

C.3 Progress towards impact

Evidence about impact of program research were provided by an internal evaluation of the Egyptian aquaculture intervention, performance monitoring of the Bangladesh aquaculture intervention, a review of CBBP in Ethiopia and private sector forage seed sales.

An impact assessment of the fish value chain project in Egypt, the IEIDEAS project, provided insights on changes in the yields and profits of fish farmers as a result of training on best management practices (BMP) and adoption of the Abbassa Tilapia strain. The IEIDEAS project theory of change assumed that BMP trained and farmers stocking the faster-growing Abbassa strain would increase their productivity and production, resulting in increased employment along the value chain. The impact assessment found farms adopting the Abbassa strain achieved much more efficient use of feeds (feed conversion ratio of 1.48 compared to 1.83 on control farms), and BMP-trained farmers achieved significantly higher net profits (29.3%) compared to control farmers (12.3%), with fish farmers who stocked the Abbassa strain probably using the faster growth of the new fish to achieve the target harvest weight slightly earlier but, because they only stock once per season, this did not result in higher production. It is assumed going forward that more profitable BMP-trained fish farmers will be confident enough to invest in higher productivity and that once fish farmers are used to the faster growth of the improved strain, they will devise strategies to increase their productivity. Improved understanding of the decision-making process of fish farmers will be studied to test this hypothesis, i.e. whether more profitable fish farmers will invest in sustainable intensification, thereby increasing productivity and production, or continue to improve efficiency (and reduce environmental impacts) without increasing production.

In Bangladesh, the Aquaculture for Improved Nutrition project's own annual performance survey analyzed the impact of its interventions on farms and in the seed value chain (source: project reports). The results indicate that more than 550,000 fish farmers have benefited from program interventions, resulting in improved quality of inputs (fish seed), farm management practices, and farm outputs. Increased capacity of the private sector to supply Indian Major Carps fingerlings among 425,732 fish farmers contributed to increased fish sales by USD16.3 million; more than 76,000 fish farmers trained increased their fish production and sales by USD12.6 million; and shrimp hatcheries supplying disease-free seed to 17,362 farmers, together with training, resulted in an additional incremental sales of USD79.9 million.

An evaluation of three CBBPs for small ruminants in Ethiopia indicated that such programs have generated reasonable improvements in the recorded traits. The CBBP have also contributed to increased income from sale of sheep and goats as well as household meat consumption.

Brachiaria hybrids from the CIAT breeding program are being adopted around the world: from 2001–2013, seed sales data shows adoption on approximately 475,000 hectares (source: private company data). Data for 2014 shows further adoption on approximately 64,000 hectares. Main adopter countries are Brazil, Mexico, Colombia, and Nicaragua but also countries in Asia and Africa have started increasingly adopting.

D.Gender research achievements

The program's gender initiative made significant progress across all four objectives of the Livestock and Fish gender strategy related to: gender capacity development; approaches and strategies to improve value chain participation; gender transformative approaches; and consumption (nutrition). As a joint effort with the program's capacity development specialist, a participatory gender capacity assessment tool for partners was developed working with a consultant, Transition International. The results are reported under Section F below.

The innovative approach reported last year to address the challenge of developing internal capacity for gender mainstreaming moved forward with a coordinated set of activities to strengthen the capacity of non-gender scientists to use and understand gender concepts, tools and analysis. The activity is led by the Royal Tropical Institute (KIT) with the support of the CRP gender experts and involves coaching non-gender scientists to apply a gender lens in their research. Ten gender-integrated research projects were funded and implemented specifically in response to the 2014 call for gender-integrated research proposals, and sixteen projects were coached across all flagships and in six target value chains. Initial reports from the coached studies have been written and a subset are being prepared for publication. Integrating gender into Livestock and Fish research is an ongoing process to build up the collective capacity for interdisciplinarity. This approach has generated increasing appreciation by non-gender scientists of the value of gender analysis for improving the quality and impact of their technical, value chain and systems research. The surge of interest in and commitment to gender-integrated research has, however, put additional pressure on the limited gender staff in trying to respond to all of the requests to integrate gender in proposal writing, tool development and implementation, data analysis and discussion. A challenge going forward will be to clarify roles and responsibilities of all researchers (gender and non-gender) to ensure high quality science and benefits are appropriately shared by the researchers involved.

The program's strategic gender research is focusing on gender relations and dynamics, access to and control of productive resources and gender transformative approaches. Analyses on this subject included an article reviewing recent tools developed to capture gender relations at household and community levels, and a policy brief on how to take into account that farmers' capacity to mitigate climate change is affected by gender relations. Access to and control of productive resources is often mentioned as a key factor affecting the ability of livestock farmers, women in particular, to participate in value chains, control the generated revenues and generally improve their livelihoods. One study reported how four dairy and horticultural projects impacted on the income and asset base of participating women and men farmers, finding the gender-asset gap did not decrease due to gender-asset disparities that limit women's participation in projects and by gender norms that reduced their control over generated revenues. Another study examined how gender affects preferences for livestock species and ownership and management of goats in a Kenyan district, concluding that a gender lens is needed when introducing new livestock species. A second study clarifies how ownership perceptions of livestock differ from other assets in selected households in Tanzania, Ethiopia and Nicaragua, largely due to the informal nature of livestock ownership. The study concluded that 'livestock ownership' is an unreliable indicator of progress on gender but at the same time, livestock offer opportunities to enhance women's control over resources when gender norms regulating the utilization of livestock are addressed.

Research continued on gender transformative approaches, including radio vignettes produced in the Nicaragua value chain to question traditional gender roles. Another publication focusses on the role of gender-transformative approaches in agricultural research for development, using the aquaculture sector in Bangladesh as a case study. The IEIDEAS impact assessment concluded that while there was evidence of economic gain among the informal female fish vendors in Egypt, the main benefit was the sense of empowerment that was created through a group-based approach. The women' empowerment in livestock index (WELI) captures changes in empowerment specific to livestock keeping, and was applied in Tanzania in conjunction with a nutrition survey. A TV episode of the television series Shamba Shape–up in Kenya incorporated input from the CRP about the role of women's groups in livestock development.

E. Partnerships building achievements

The Swedish University of Agricultural Sciences (SLU) was the first non-CGIAR partner to join the program under a program partner agreement. The priority for SLU contributions will be to strengthen recognized gaps in the animal health flagship, particularly with respect to animal population and reproductive health.

Collaborations were initiated with several private sector companies to leverage particular veterinary research capacities. The Merck aquaculture R&D lab in Singapore contributed analyses of fish disease in Bangladesh; Harris Vaccines Inc. is helping test their proprietary vaccine technology for East Coast fever; Senova GmbH is involved in developing the lateral flow diagnostic test for CBPP; and Hester Biosciences is participating in the continued development of the thermos-stable vaccine for PPR. WorldFish expanded its relationship with Skretting, the largest global fish feed company, by signing a research partnership agreement to operate a feeds research facility at the WorldFish Abbassa research center in Egypt. The facility will help identify new feed raw materials for inclusion in aquaculture feeds in Egypt and Africa. In Tanzania, a private-public partnership was forged with ASAS Dairies, a major milk processor in Tanzania, to directly involve a target market client with five farmer groups as part of piloting of dairy market hubs and using a check-off system to facilitate market transactions.

At national level, a promising new type of arrangement for scaling is the program's engagement with the Ethiopia Agricultural Transformation Agency (ATA): the agency organized a workshop on design of small ruminant breeding programs jointly with the Ethiopian Agricultural Research Institute and the Livestock and Fish CRP team. At the same time, the agency participated in the stakeholder gender capacity assessment conducted by the CRP and is promoting wider use of the tool among its partners. Similarly, in Colombia, the program is engaging with the Livestock Roundtable seeking to implement sustainable livestock production. The strengthened animal health flagship established new, but more conventional, collaboration with the National Animal Health and Diagnostic Investigation Centre in Ethiopia and the National Veterinary Research Institute in Vietnam in carrying out farm-level sero-surveys.

New areas of collaboration across CRPs included the co-convening with A4NH of a consultation on animal-source foods for nutrition to set the basis for joint program development in second phase CRPs, and dedicated efforts to intensify breeding of dual purpose and forage cultivars with the Dryland Cereal and Grain Legumes CRPs. At the operational level, the Animal Genetics Flagship developed a CBBP for small ruminants as part of the CCAFS Climate-Smart Villages effort which will provide a working example of how CRPs can integrate their work and minimize duplication.

F. Capacity building achievements

Training activities are embedded throughout the program and a list of events is provided in the Performance Indicator Table in annex. Approximately 139,000 people, 53% of them women, were involved in short-term training events during the year. These included a series of training events in Uganda on improved pig management involving 3,177 pork value chain actors, in Bangladesh on aquaculture and business management skills for 130,848 value chain actors (55% women); and in Tanzania on dairy practices and management for 1,821 dairy value chain actors, of which half were women. The program also hosted 102 graduate fellows as future leaders in research, nearly half of whom (45%) were women.

Particular attention was given to instructional design and developing blended-learning materials to support and increase research uptake. Initial efforts include classroom and online modules for the Feed Assessment Tool (FEAST), a joint development with CRP Humidtropics, and the Learning Management System launched in partnership with SONATA Learning and which provides a centralized platform for developing online courses to reach wider audiences.

A key achievement for capacity development efforts in 2015 was to complete the development of a participatory gender capacity assessment tool for partners, led by Transition International. The tool has been used with research and development partners in four value chains: Tanzania, Ethiopia, India and Uganda. Its findings have been documented in various formats including reports for each value chain and blog posts. The assessment has led to a set of interventions to be implemented in 2016. After participating in the assessment, ATA adopted the tool for wider use with its partners. The participatory assessment was found to already increase the partners' understanding of what gender analysis entails in research and development work, and also in the institution's workplace arrangements. As a result, partners became pro-active in identifying what support they need to strengthen the desired gender skills.

G.Risk management

The three major risks that may hinder the expected delivery of results by the program include:

Increasing program and funding uncertainty and complexity: An assumption underlying the Livestock and Fish CRP approach is that a focused interdisciplinary focus on improving selected value chains will improve the relevance and urgency of AR4D. Maintaining sufficient continuity to allow this approach to demonstrate impact is threatened by both the constant reconfiguration of CGIAR arrangements and priorities, and the increasing restrictions on W1/2 funding and reliance on bilateral funding. To manage this risk, the CRP is giving more emphasis to translating major components of its research agenda into very large bilateral proposals that may be attractive to consortia of donors and that can provide more stability over several years. This will also address associated risks of alienating partners and not being able to attract quality scientific staff.

Weak M&E systems: The need for a credible M&E system for the CRP has been highlighted by recent reviews, the risk being that the program does not detect poor performing or inappropriate research in a timely way, or donors perceive it as inadequate and lose confidence. At the same time, there is a risk of investing in developing a CRP-specific system that does not meet evolving system-level requirements, such as the adoption of the IDOs defined by the SRF superseding those previously developed by the Livestock and Fish CRP. To balance these risks, the CRP is giving priority to developing first a theory of change-based M&E system for monitoring its research, while contributing to efforts to develop a system-level strategy for monitoring the IDOs.

Weak program management systems: As also pointed out in the recent Independent External Evaluation, relying on program information extracted periodically from center financial management systems, whether OCS-based or not, has not been effective and has restricted the ability to manage the CRP strategically. To address the risk of this situation continuing, priority is being given to reviewing the existing CCAFS system and adapting it to the Livestock and Fish context so that it is in place for the phase II CRPs.

H.Lessons learned

H.1 Confidence of indicators

The indicators reported in Table 1 are derived from detailed data presented in the various background reports, which cite the supporting evidence. The program has confidence in the quality of the indicator data supplied because of the straightforward data collection methods and application within a simple database across the nine value chains, five partners and five flagships. This allows for duplications to be more easily detected and resolved. The program also performed a mid-year update of indicator data which has contributed to more exhaustive reporting.

H.2 Changes in research direction

A major funding opportunity supported the opening of new research on poultry genetics. Although the CRP does not currently include a target poultry value chain, the focus on poultry genetics responds to concerns that the CRP was ignoring poultry, as well as contributes an important dimension with a shorter generational cycle to understanding issues regarding appropriate use of indigenous genetic resources and their delivery, as well as providing the opportunity to assess the appropriateness of poultry value chains in addressing the CRP's objectives. New work was also initiated on the delayed herd health agenda and to address emerging fish health issues through cross-center collaboration with external partners. A significant step was taken to realize the CRP's ambitions to address human nutrition dimensions more directly by developing a consensus on priority research opportunities with a range of potential partners, but which will require mobilizing new resources to pursue.

H.3 Lessons learned from evaluation

The CRP benefitted from several forms of evaluation including review by the Science and Partnership Advisory Committee, finalization of a CRP-Commissioned External Evaluation on the value chain approach, preliminary findings of the Independent External Evaluation and an advisory audit by the CGIAR Internal Audit Unit. Overall, these evaluations have consistently endorsed the science agenda and approach being pursued by the CRP, but highlighted challenges and particularly weaknesses in its management systems. A central challenge remains more effectively linking the cross-cutting work in the flagships to the work in the target value chains, and ensuring sufficient scientific

rigor for the action research in the value chains. Another important gap has been the lack of agribusiness expertise to translate the various research outputs into workable business-based interventions at value chain level, which is being addressed through new staff recruitment. Improving management systems has been given priority, both with respect to M&E systems and online systems for real-time monitoring of program activities and budgetary resources.

Important insights were provided by an internal assessment of aquaculture project work in Egypt. The project theory of change assumed that farmers trained in best management practices and stocking the faster-growing Abbassa strain would increase their productivity and production. However, the assessment found that farmers behaved logically by using their training to feed more efficiently and reduce operating costs, maintaining the same production levels but with higher profits. Farmers using the Abbassa strain were probably using the faster growth of the new fish to achieve the targeted harvest weight slightly earlier, but as they only stock once per season this did not result in higher production. This challenge to the theory of change has led to a critical re-think of the approach and the need to understand better farmer behaviour, and point to the need for a more research-based M&E system.

I. Financial report

The financial reports are attached as Annex 3.

Annex 1. Program Indicators of Progress

Detailed explanation for the source of the indicators can be found at http://livestock-fish.wikispaces.com/2015_AnnualReports in the Source of Summary Indicators file and in the various Flagship, center and value chain reports posted there. Explanatory notes at the bottom of the table are provided for selected indicators.

Indicator	Deviation narrative (if actual is more than 10% away from target)	2014		2015		2016
		Target	Actual	Target	Actual	Target
KNOWLEDGE, TOOLS, DATA						
1. Number of flagship "products" produced by CRP		5	None		None	5
2. % of flagship products produced that have explicit target of women farmers/NRM managers		Not set	N/A		N/A	1 (20%)
3. % of flagship products produced that have been assessed for likely gender-disaggregated impact		Not set	N/A		N/A	Not set
4. Number of tools produced by the CRP		25	40		N = 70	40

					(* = 50% shared with A4NH; ** = 80% L&F and 20% A4NH; *** = 50% shared with PIM; # 90% CCAFS and 10% L&F; $ = 50% shared with HT) Uganda Pig Value Chain assessment tools http://livestock-fish.wikispaces.com/VCD+Uganda - Pig Value Chain Development - Uganda-Tools and Resources Uganda Pig Value Chain bench marking assessment tools http://livestock-fish.wikispaces.com/Uganda+pig+value+chain+bench+marking+tools Tanzania smallholder dairy value chain change pathway http://livestock-fish.wikispaces.com/file/detail/Tanzania_dairy_VC_change pathway_2015.pdf * A survey tool to understand adoption of best practices (GAHP) in the Vietnam pig value chain http://livestock-fish.wikispaces.com/file/view/GAHP pig producer questionnaire.pdf/572841729/GAHP pig producer questionnaire.pdf VietGAHP pig producer semi-structured interview tool http://livestock-fish.wikispaces.com/file/view/FGD%20tool.pdf/572841715/FGD%20tool.pdf Nicaragua value chain assessment tools http://livestock-fish.wikispaces.com/Country+rapid+VC+assessment Semi-auto feed mill operation manual for Bangladesh http://katalyst.com.bd/training-on-latest-aquafeed-technology-organized-by-katalyst-and-worldfish-for-bangladesh-fish-feed-companies-in-china/ Training of trainers (TOT) manual for semi-auto feed mill operation http://katalyst.com.bd/training-on-latest-aquafeed-technology-organized-by-katalyst-and-worldfish-for-bangladesh-fish-feed-companies-in-china/ Gender transformative toolkit for Bangladesh value chain	

					http://livestock-fish.wikispaces.com/file/view/VCA_ENG_Producers_6Feb15_final.docx http://livestock-fish.wikispaces.com/file/view/Cards_ENG_VCmapping_compressed.pptx VietGAHP pig producer questionnaire for the assessment of gendered analysis of barriers to adoption of best practices in Vietnam pig value chain http://lf-gendercop.wikispaces.com/file/view/VietGAHP questionaire_producers_final.pdf Gender capacity assessment and development guide for L&F CRP http://hdl.handle.net/10568/56983 **Parasite control in pigs: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/56639 African swine fever: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/56789 Pig management: Ensuring appropriate husbandry practices for profitability: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/64960 Pig feeding strategies: Uganda smallholder pig value chain capacity development training manual https//hdl.handle.net/10568/65209 Pig marketing and institutional strengthening: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/56688 Pig business planning and financial management: Uganda smallholder pig value chain capacity development training manual	

					http://hdl.handle.net/10568/56822 Gendered rapid assessment and benchmarking tools for Uganda Smallholder Pig Value chain http://livestock-fish.wikispaces.com/Uganda+pig+value+chain+bench+marking+tools Toolkit for assessing knowledge attitude practices capacities and incentives of input suppliers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Input_suppliers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of extension staff on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/VCD+Uganda Gender sensitive toolkit for participatory assessment of livestock disease constraints http://livestock-fish.wikispaces.com/VCD+Ethiopia Toolkit for Participatory risk assessment of African swine fever in the smallholder pig value chains in Uganda http://livestock-fish.wikispaces.com/file/view/Qualitative_VC_assessment%20of%20ASF_180315_FINAL.pdf Toolkit for rapid value chain assessment of animal health and husbandry practices http://livestock-fish.wikispaces.com/file/view/Rapid_assessment_Animal%20Health%20_FINAL_180315.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig producers on biosecurity for the control of African swine fever in Uganda	

					http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Producer%20%2B%20boar%20keepers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig traders on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Traders_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pork butchers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Butchers_180315_FINAL.pdf Gender capacity assessment tool http://livestockfish.cgiar.org/2015/10/28/gender-capacity-assessment/ Women's empowerment and child nutrition survey tool, Tanzania Contact a.galie@cgiar.org Women's empowerment in livestock index (WELI) http://livelihoods-gender.ilri.org/2015/08/21/is-the-empowerment-of-women-livestock-keepers-the-key-to-improved-nutrition-a-new-study-seeks-to-find-out/ Genderized sero-survey tool http://livestock-fish.wikispaces.com/VCD+Ethiopia East African Dairy Development Project cost of production survey tool, Uganda and Tanzania Contact: i.baltenweck@cgiar.org East African Dairy Development Project annual survey tool Contact: i.baltenweck@cgiar.org Fodder Impact Study Tool	

					Contact: n.teufel@cgiar.org More Milk in Tanzania Project Monitoring survey tool http://data.ilri.org/portal/dataset/moremilkit-mon-tz More Milk in Tanzania Project Baseline Household Survey Tool http://data.ilri.org/portal/dataset/moremilkit-hh-tz ***Tool for the evaluation of the Tanzania Dairy Development Forum http://data.ilri.org/portal/dataset/tddf-evaluation Tools used for mainstreaming gender in animal health and pig hub interventions http://livestock-fish.wikispaces.com/file/view/Focus Group Discussion for Hub.pdf AND http://livestock-fish.wikispaces.com/file/view/GTA tools for the HUBs.pdf African swine fever: A guide for pork butchers http://hdl.handle.net/10568/69434 African swine fever: A guide for pig farmers http://hdl.handle.net/10568/69435 Baseline survey tool for collection of data on small-scale dairy farmers in East Africa http://ilriangr.wikispaces.com/PEARL+Project+tools Assessment tools for collection of data on small ruminants in climate smart villages in Kenya https://ilri-angr.wikispaces.com/CCAFS+Nyando+project+tools A set of tools for monitoring performance and productivity of dual purpose cattle in Nicaragua http://ilri-angr.wikispaces.com/ADA+Longitudinal+Survey+Tools Survey tool to obtain baseline information on chicken keeping households in Tanzania, Nigeria and Ethiopia	

					http://acgg.wikispaces.com/file/detail/ACGG-DraftQuClean4ODK_3Jul15.docx Set of tools for evaluation of the performance of different chicken breeds in smallholder systems in Africa http://acgg.wikispaces.com/file/view/ACGG%20draft%20On-farm%20and%20on-station%20testing%20protocol%20FG%20TD%20JB%20edits%20January%2021%202016%20.pdf/ Updated Animal Genetic Training Resource training module http://agtr.ilri.cgiar.org/index.php?option=com_content&view=article&id=301&Itemid=361 A training manual on artificial insemination in goats http://hdl.handle.net/10568/67783 Report on established protocols for semen analysis http://ilri-angr.wikispaces.com/file/view/Report+-+Analyzing+bovine+semen+using+flow+cytometry_final.pdf A data capture and management system developed, tested and used to aggregate, clean, and maintain chicken data from Nigeria, Tanzania and Ethiopia http://acgg.wikispaces.com/Data+Management Guidelines for use of the bio-repository service, and the associated open data kit (ODK) system for data collection http://azizi.ilri.org/azizi/documentation.html Tools for study of gender and value chain governance https://goo.gl/rtBAiG Guidelines on ex-ante environmental impact assessment, Nicaragua http://livestock-fish.wikispaces.com/file/detail/Notenbaert_etal_20141025.pdf Five manuals on animal production, Nicaragua	

					http://hdl.handle.net/10568/70089 http://hdl.handle.net/10568/70087 http://hdl.handle.net/10568/70061 http://hdl.handle.net/10568/70088 http://hdl.handle.net/10568/70090 ***Growth trajectories for aquaculture in Bangladesh under various scenarios http://livestockfish.cgiar.org/2015/02/19/fish-futures-bangladesh/ TV episode of Shamba Shape UP, a citizen TV program in Embu, Kenya. The theme of the show was "women farmer groups and succeeding in business as a woman". http://shambashapeup.com/viewepisode/258 FEAST e-learning tool and associated updated guides. https://www.ilri.org/feast Updated Mobile Near Infrared Spectroscopy (NIRS) equations, India http://ilrihyd.wikispaces.com/20.Mobile_NIRS 8 expanded and 3 new NIRS equations and 22 amino acids for stationary NIRS http://ilrihyd.wikispaces.com/28.Amino+Acids Gender capacity assessment and development methodology and tools: The case of Ethiopia http://hdl.handle.net/10568/68645 Livestock and Fish Best Bets Evaluation Checklist http://livestock-fish.wikispaces.com/file/detail/Best+bet+indentification_Uganda_Report_October+2015-Final+draft.doc A methodological framework for the collection and analysis of producer level gender-disaggregated L&F value-chain data	

					http://livestock-fish.wikispaces.com/Gender+Initiative Questionnaires on gender dynamics in the dairy value chain governance system of Nicaragua https://www.dropbox.com/sh/vthachqprok7s3v/AADNCXpTuo9W-907Flo_Z8l8a?dl=0 Longitudinal monitoring tool for the ADA Genetics Project https://ilri-angr.wikispaces.com/Nicaragua+Project+Tools Focus group discussion guide on assessing gender norms in design and implementation of pig business hubs http://livestock-fish.wikispaces.com/file/view/GTA%20tools%20for%20the%20HUBs.pdf # Farm-level GHG and nutrient balance calculator http://livestock-fish.wikispaces.com/SASI+FP	
5. % of tools that have an explicit target of women farmers		Not set	24 (60%)		N = 26 (37%) Uganda Pig Value Chain assessment tools http://livestock-fish.wikispaces.com/VCD+Uganda - Pig Value Chain Development - Uganda-Tools and Resources Uganda Pig Value Chain bench marking assessment tools http://livestock-fish.wikispaces.com/Uganda+pig+value+chain+bench+marking+tools Tanzania smallholder dairy value chain change pathway http://livestock-fish.wikispaces.com/file/detail/Tanzania_dairy_VC_change pathway_2015.pdf Nicaragua Value Chain Assessment tools http://livestock-fish.wikispaces.com/Country+rapid+VC+assessment Gender transformative toolkit for Bangladesh value chain http://livestock-fish.wikispaces.com/file/view/VCA_ENG_Producers_6Feb15_final.docx	Not set

					http://livestock-fish.wikispaces.com/file/view/Cards_ENG_VCmapping_compressed.pptx VietGAHP pig producer questionnaire for the assessment of gendered analysis of barriers to adoption of best practices in Vietnam pig value chain http://lf-gendercop.wikispaces.com/file/view/VietGAHP questionaire_producers_final.pdf Gender capacity assessment and development guide for L&F CRP http://hdl.handle.net/10568/56983 African swine fever: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/56789 Toolkit for assessing knowledge attitude practices capacities and incentives of input suppliers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Input_suppliers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of extension staff on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/VCD+Uganda Gender sensitive toolkit for participatory assessment of livestock disease constraints http://livestock-fish.wikispaces.com/VCD+Ethiopia Toolkit for participatory risk assessment of African swine fever in the smallholder pig value chains in Uganda http://livestock-fish.wikispaces.com/file/view/Qualitative_VC_assessment%20of%20ASF_180315_FINAL.pdf	

					Toolkit for rapid value chain assessment of animal health and husbandry practices http://livestock-fish.wikispaces.com/file/view/Rapid_assessment_Animal%20Health%20_FINAL_180315.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig producers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Producer%20%2B%20boar%20keepers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig traders on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Traders_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pork butchers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Butchers_180315_FINAL.pdf Gender capacity assessment tool http://livestockfish.cgiar.org/2015/10/28/gender-capacity-assessment/ Women's empowerment and child nutrition survey tool, Tanzania Contact a.galie@cgiar.org More Milk in Tanzania Project Monitoring survey tool http://data.ilri.org/portal/dataset/moremilkit-mon-tz Tools used for mainstreaming gender in animal health and pig hub interventions	

					http://livestock-fish.wikispaces.com/file/view/Focus Group Discussion for Hub.pdf AND http://livestock-fish.wikispaces.com/file/view/GTA tools for the HUBs.pdf Tools for study of gender and value chain governance https://goo.gl/rtBAiG TV episode of Shamba Shape UP, a citizen TV program in Embu, Kenya. The theme of the show was "women farmer groups and succeeding in business as a woman". http://shambashapeup.com/viewepisode/258 FEAST training materials https://www.ilri.org/feast Gender capacity assessment and development methodology and tools: The case of Ethiopia http://hdl.handle.net/10568/68645 Questionnaires on gender dynamics in the dairy value chain governance system of Nicaragua https://www.dropbox.com/sh/vthachqprok7s3v/AADNCXpTuo9W-907Flo_Z8l8a?dl=0 Focus group discussion guide on assessing gender norms in design and implementation of pig business hubs http://livestock-fish.wikispaces.com/file/view/GTA%20tools%20for%20the%20HUBs.pdf	
6. % of tools assessed for likely gender-disaggregated impact		Not Set	12 (30%)		N = 21 (30%) Tanzania smallholder dairy value chain change pathway http://livestock-fish.wikispaces.com/file/detail/Tanzania_dairy_VC_change pathway_2015.pdf Nicaragua value chain assessment tools http://livestock-fish.wikispaces.com/Country+rapid+VC+assessment	Not set

					VietGAHP pig producer questionnaire for the assessment of gendered analysis of barriers to adoption of best practices in Vietnam pig value chain http://lf-gendercop.wikispaces.com/file/view/VietGAHP questionaire_producers_final.pdf Gender capacity assessment and development guide for L&F CRP http://hdl.handle.net/10568/56983 African swine fever: Uganda smallholder pig value chain capacity development training manual http://hdl.handle.net/10568/56789 Toolkit for assessing knowledge attitude practices capacities and incentives of input suppliers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Input_suppliers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of extension staff on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/VCD+Uganda Gender sensitive toolkit for participatory assessment of livestock disease constraints http://livestock-fish.wikispaces.com/VCD+Ethiopia Toolkit for participatory risk assessment of African swine fever in the smallholder pig value chains in Uganda http://livestock-fish.wikispaces.com/file/view/Qualitative_VC_assessment%20of%20ASF_180315_FINAL.pdf Toolkit for rapid value chain assessment of animal health and husbandry practices	

					http://livestock-fish.wikispaces.com/file/view/Rapid_assessment_Animal%20Health%20_FINAL_180315.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig producers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Producer%20%2B%20boar%20keepers_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pig traders on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Traders_180315_FINAL.pdf Toolkit for assessing knowledge attitude practices capacities and incentives of pork butchers on biosecurity for the control of African swine fever in Uganda http://livestock-fish.wikispaces.com/file/view/ASF_KAPCI_Butchers_180315_FINAL.pdf More Milk in Tanzania Project Monitoring survey tool http://data.ilri.org/portal/dataset/moremilkit-mon-tz Tools used for mainstreaming gender in animal health and pig hub interventions http://livestock-fish.wikispaces.com/file/view/Focus Group Discussion for Hub.pdf AND http://livestock-fish.wikispaces.com/file/view/GTA tools for the HUBs.pdf Tools for study of gender and value chain governance https://goo.gl/rtBAiG FEAST Focus group discussion guide. https://www.ilri.org/feast	

					A methodological framework for the collection and analysis of producer level gender-disaggregated L&F value-chain data http://livestock-fish.wikispaces.com/Gender+Initiative Questionnaires on gender dynamics in the dairy value chain governance system of Nicaragua https://www.dropbox.com/sh/vthachqprok7s3v/AADNCXpTuo9W-907Flo_Z8l8a?dl=0 Longitudinal monitoring tool for the ADA Genetics Project https://ilri-angr.wikispaces.com/Nicaragua+Project+Tools Focus group discussion guide on assessing gender norms in design and implementation of Pig business hubs http://livestock-fish.wikispaces.com/file/view/GTA%20tools%20for%20the%20HUBs.pdf	
7. Number of open access databases maintained by CRP		6	7	6	N = 18 GIS layers MoreMilkiT scenarios: Spatial practicalities and implications for Tanzania dairy value chain: http://ilri-cleaned.wikispaces.com/file/view/GeoPortalPGISlayers.zip Animal Feeds Analysis Application: http://temp.icarda.org/afawa SoFT Tropical Forage Selection: http://www.tropicalforages.info DAGRIS (origin, distribution, diversity, present use and status of indigenous farm animal genetic resources). http://dagris.info AZIZI Bio-repository: http://azizi.ilri.cgiar.org Animal Genetic Training Resources: http://agtr.ilri.cgiar.org Baseline on improved breeds in Nicaragua (ADA-financed project): http://data.ilri.org/portal/dataset/adanicbaseline Baseline FSP-Solidaridad project: http://livestock-fish.wikispaces.com/file/detail/Informe LB Proyecto Carne y Lácteos competitivos FINAL28OCT.docx Raw feed material nutrient values (Aquaculture Bangladesh):	24

					http://hdl.handle.net/10568/65130 http://hdl.handle.net/10568/6513 http://hdl.handle.net/10568/65132 Tropical Grasslands - Forrajes Tropicales Journal: http://www.tropicalgrasslands.info/index.php/tgft Food Demand, Role of Pork in the Diets and Nutritional Security in Pig Value Chains in Uganda: http://data.ilri.org/portal/dataset/moreporkug MoreMilkiT Baseline Household Survey in Tanzania: http://data.ilri.org/portal/dataset/moremilkit-hh-tz Database on Nicaragua dual-purpose cattle: http://data.ilri.org/portal/dataset?q=nicaragua Database on Senegal dairy cattle: http://data.ilri.org/portal/dataset?q=SDG&vocab_ILRI_voccountries=SENEGAL Database on Red Maasai, Dorper and Red Maasai x Dorper sheep breeding program in Kenya: http://data.ilri.org/portal/dataset/ilri-kapiti-sheep Dairy Genetics East Africa 1 of baseline and longitudinal monitoring data related to animal performance: https://data.ilri.org/portal/dataset MoreMilkIT project evaluation of Innovation Platforms: https://data.ilri.org/portal/dataset ImGoats Mozambique dataset used for gender analysis: https://data.ilri.org/portal/dataset	
8. Total number of users of these open access databases		Not set	244,268		N = 341,050	Not set
9. Number of publications in ISI		57	48		N = 70	67

journals produced by CRP					(see Annex 3)	
10. Number of strategic value chains analyzed by CRP		9	14		N= 11 Analysis of wild forages as pig feed in Nagaland, India, South Asia http://hdl.handle.net/10568/67772 Analysis of goat market value chain in Uttarakhand, India, South Asia http://hdl.handle.net/10568/65092 Feed and fodder value chain of Bihar, India, South Asia http://livestock-fish.wikispaces.com/file/detail/Fodder%20markets_Bihar.pdf Dairy value chain assessment in Nalanda district of Bihar, India, South Asia http://livestock-fish.wikispaces.com/file/detail/A%20Report%20on%20Dairy%20Value%20Chain%20Assessment%20in%20Nalanda%20District.pdf Dual-purpose cattle, Nicaragua, Central America http://hdl.handle.net/10568/52349\ Analysis of the economic performance of peri-urban smallholder pig value chains in Masaka and Mukono Districts of Uganda, East Africa http://www.slideshare.net/ILRI/analysis-of-the-economic-performance-of-periurban-and-rural-smallholder-pig-producer-enterprises-in-masaka-and-mukono-districts-of-uganda Uganda smallholder pigs value chain development: Situation analysis and trends, East Africa http://hdl.handle.net/10568/34090 Commercial and per-commercial dairy value chains, Tanzania, East Africa http://livestock-fish.wikispaces.com/VCD+Tanzania	0

					Contribution of smallholder pig systems in pork supply in Uganda, East Africa and Vietnam, South-east Asia http://hdl.handle.net/10568/68013 Fish value chain literature review of selected aquaculture value chains in Southern Bangladesh, South Asia http://livestockfish.cgiar.org/2015/03/12/bangladesh-vc/ Gender integrated fish value chain assessment in Bangladesh (production node), South Asia http://livestockfish.cgiar.org/2015/03/12/bangladesh-vc/	
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS						
13. Number of trainees in short-term programs facilitated by CRP (male)		5,976	5,339		N = 66,230 800 - Farm plans, dry season feeding alternatives, reproductive health, pasture management, agricultural input management, Matalgapa, Nicaragua http://livestock-fish.wikispaces.com/file/view/Individual+Semester+Project+Progress+Report+June+2015+Sustainable+Livestock-Nicaragua+190715.docx 59,000 - Good management practices for fish farmers, Khulna hub, Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarcGpZZ0k3eUNwTVU/view?usp=sharing 825 - Business operations for seed and feed value chain actors, Khulna Hub, Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarcGpZZ0k3eUNwTVU/view?usp=sharing 2,000 - Service provision to fish farmers, Khulna hub, Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarcGpZZ0k3eUNwTVU/view?usp=sharing 25 - Learning Alliance meeting, Ban Lung, Ratanakiri, Cambodia	2,880

					https://www.dropbox.com/s/clvtewl296taycm/Agenda%20Learning%20Alliance%20Meeting%20Ratanakiri%20-%20June%202015.pdf?dl=0 8 - Crop to farm to landscape modeling, Lushoto, Tanzania https://www.dropbox.com/s/9mxfefpetttpesr/Modelling%20Workshop%20Report%20%20final.pdf?dl=0 15 - Forage trials training workshop (trial establishment, data collection and participatory evaluation), Lushoto, Tanzania https://www.dropbox.com/s/krpy24shtxycpq0/Lushoto%20training.pdf?dl=0 1 - Conducting CLEANED GHGe and soil assessments for value chain transformation, Managua, Nicaragua https://www.dropbox.com/s/psv93x949nsmc2e/CLEANED4NIC_20150629.pdf?dl=0 https://www.dropbox.com/s/rb5wls22caxqs7q/Workshop_agenda.pdf?dl=0 13 - Training facilitators on application of FEAST tool, Kampala, Uganda http://livestockfish.cgiar.org/2015/01/28/feast-uganda/ 9 - Training of facilitators for value chain toolkit administration, Hoima, Uganda http://livestockfish.cgiar.org/2015/08/26/uganda-pigs-summary 40 - Training of pork butchers on appropriate pig slaughter and pork handling, Mukono, Uganda http://livestockfish.cgiar.org/2015/09/09/butchers-training-uganda 60 - Business and entrepreneurial skills for the pig farmers involved in the pig business hub in Masaka, Uganda http://livestockfish.cgiar.org/2015/07/27/piggery-to-the-fore/ 483 - Training of pig farmers on feeding and pig marketing, Matugga, Uganda http://livestockfish.cgiar.org/2015/04/22/private-sector-training/	

					18 - Training extension staff on African swine fever data collection along the smallholder pig value chain, Lira and Masaka, Uganda http://hdl.handle.net/10568/67031 540 - Training of pig farmers on biosecurity for control of African swine fever, Lira and Masaka, Uganda http://livestockfish.cgiar.org/2015/09/11/asf-training-uganda/ 15 - Participatory risk assessment for African swine fever, Lira and Masaka, Uganda http://livestockfish.cgiar.org/2014/10/21/pigs-asf/ 21 - Participatory Epidemiology and Gender, Ethiopia http://livestockfish.cgiar.org/2015/07/19/participatory-epidemiology-and-gender-training-in-ethiopia-to-overcome-animal-diseases/ 22 - Participatory epidemiology and gender training phase 1 and phase 2, Ethiopia http://livestockfish.cgiar.org/2015/07/19/participatory-epidemiology-and-gender-training-in-ethiopia-to-overcome-animal-diseases/ 19 - Business Opportunity Seminar, Tanzania dairy value chain, Contact: Amos Omore a.omore@cgiar.org 573 - Cattle husbandry and Group development, breeding, feeding, and pasture establishment, Tanzania various locations https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 300 - Dairy business management, Morogoro and Tanga, Tanzania https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 45 - Milk quality assurance, Morogoro and Tanga, Tanzania https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 15 - Forage data collection training, Lushoto, Tanzania	

					https://www.dropbox.com/s/lxiy48h04q0i4bn/Forage%20Training%20Report%20%28Lushoto%20Aug%2011th%202015%29%20%282%29.docx?dl=0 101 - Leadership and governance for pig farmer collectives, Mukono, Uganda http://livestockfish.cgiar.org/2015/07/27/piggery-to-the-fore/ 122 - Pig Multi-Stakeholder Plarforms, various locations, Uganda http://uganda-pigs.wikispaces.com/Pig+Multi-Stakeholder+platforms+in+Uganda 7 - Integrating Feeding Strategies into the Community-based Sheep Breeding Programs – Phase II, Ethiopia http://livestock-fish.wikispaces.com/ethiopia_sheep_cbbp_feeds_phaseII 5 - Gender capacity assessment tool for Ethiopian Government's Agricultural Transformation Agency, Addis Ababa, Ethiopia http://livestockfish.cgiar.org/2015/12/01/capdev-gender-ethiopia 6 - Using feeds assessment tool (FEAST), Eldoville, Kenya https://www.dropbox.com/s/4o3joyugnfmagxc/Survey%20Report%202SCALE%20project%20latest.docx?dl=0 24 - Developing a gender capacity assessment of local organizations, Managua, Nicaragua http://goo.gl/A6GDJr 24 - Gas exchange measurements training in partnership with LICOR Biosciences, CIAT HQ, Cali. Colombia https://www.dropbox.com/s/5moz8tdab9cjfs5/Internal%20Report%20Workshop%20Leaf%20Gas%20Exchange%20Measurements%20Using%20The%20Li.docx?dl=0 18 - Value chain analysis: Theory and Practices, Vietnam National Agricultural University, Vietnam http://livestock-fish.wikispaces.com/file/view/Value%20chain%20analysis_%20theory%20and%20practice%20%28TO%20VNUA%2017.11.2015%29.pdf	

					140 - Balanced feeding of dairy animals during different physiological stages, Mulkanoor, India http://ilrihyd.wikispaces.com/Short_term_training_at_Mulkanoor_Raichur 25 - Feeding and Reproductive Management of Dairy Animals, Raichur, India http://ilrihyd.wikispaces.com/Short_term_training_at_Mulkanoor_Raichu 7 - Networked Near Infrared Spectroscopy (NIRS) Feed and Fodder Technology Platform, Hyderabad, India http://ilrihyd.wikispaces.com/NIRS_training_worldfish 10 - African Chicken Genetic Gain project sub-national coordinators facilitation training, Addis Ababa, Ethiopia http://acgg.wikispaces.com/Facilitation+training+1 30 - Advanced course on poultry breeding, Addis Ababa, Ethiopia https://www.wageningenur.nl/en/activity/Advanced-course-on-Design-and-implementation-of-breedingprograms-for-smallholder-poultry-farmers.htm 10 - Training on Livestock recording and database management, and the use of MISTRO livestock recording and monitoring database software for Rwanda Agricultural board, Kigali, Rwanda http://ilri-angr.wikispaces.com/file/view/Trip%20Report-Rwanda-20150717.pdf 31 - Training to farmers on animal breeding management through focus group discussions, Nicaragua http://ilri-angr.wikispaces.com/file/view/Report_FDG_Nicaragua_2015_format.pdf 4 - Training for MSc students in Summer school in Animal breeding and genetics, Wageningen, Netherlands http://www.wageningenur.nl/en/Education-Programmes/prospective-master-students/MSc-programmes/MSc-Animal-Sciences/International-Programmes/European-Master-in-Animal-Breeding-and-Genetics/Summer-school-and-minor.htm	

					18 - Training course in Quantitative Genetics and Genomics, Kenya https://www.dropbox.com/sh/h653mvi9auo6vah/AADdd94H1jjLRsEMwOmphkE3a?dl=0 500 - Farmer field schools, various locations Nicaragua http://livestock-fish.wikispaces.com/file/view/Sistematizacion%20de%20ecas%20proy%20solidaridad.docx 299 - Training of dairy farmers on using weigh bands for predicting the weight of dairy animals from heart-girth measurements, Senegal http://ilri-angr.wikispaces.com/file/detail/Senegal%20Dairy%20Genetics%20training%202015.pdf 26 - Feed mill staff plus other feed service providers/dealers trained on aqua-feed technology, China http://katalyst.com.bd/training-on-latest-aquafeed-technology-organized-by-katalyst-and-worldfish-for-bangladesh-fish-feed-companies-in-china/ 25 - Feed formulation and fish nutrition, Gazipur, Bangladesh http://agrilife24.com/index.php/2013-07-02-09-51-02/165-2013-07-09-21-11-31/7140-a-day-long-training-on-fish-feed-nutrition-and-formulation-was-held-at-gazipur/	
14. Number of trainees in short-term programs facilitated by CRP (female)		5,666	1,883		N =73,636 200 - Farm plans, dry season feeding alternatives, reproductive health, pasture management, agricultural input management, Matalgapa, Nicaragua http://livestock-fish.wikispaces.com/file/view/Individual+Semester+Project+Progress+Report+June+2015+Sustainable+Livestock-Nicaragua+190715.docx 71,000 - Good management practices for fish ponds and ghers, Khulna Hub, Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarcGpZZ0k3eUNwTVU/view?usp=sharing	1,440

					25 - Learning Alliance meeting, Ban Lung, Ratanakiri, Cambodia https://www.dropbox.com/s/clvtewl296taycm/Agenda%20Learning%20Alliance%20Meeting%20Ratanakiri%20-%20June%202015.pdf?dl=0 5 - Crop to farm to landscape modeling, Lushoto, Tanzania https://www.dropbox.com/s/9mxfefpetttpesr/Modelling%20Workshop%20Report%20%20final.pdf?dl=0 2 - Conducting CLEANED GHGe and soil assessments for value chain transformation, Managua, Nicaragua https://www.dropbox.com/s/psv93x949nsmc2e/CLEANED4NIC_20150629.pdf?dl=0 https://www.dropbox.com/s/rb5wls22caxqs7q/Workshop_agenda.pdf?dl=0 2 - Training facilitators on application of FEAST tool, Kampala, Uganda http://livestockfish.cgiar.org/2015/01/28/feast-uganda/ 6 - Training of facilitators for value chain toolkit administration, Hoima, Uganda http://livestockfish.cgiar.org/2015/08/26/uganda-pigs-summary 7 - Training of pork butchers on appropriate pig slaughter and pork handling, Mukono, Uganda http://livestockfish.cgiar.org/2015/09/09/butchers-training-uganda 90 - Business and entrepreneurial skills for the pig farmers involved in the pig business hub in Masaka, Uganda http://livestockfish.cgiar.org/2015/07/27/piggery-to-the-fore/ 357 - Training of pig farmers on feeding and pig marketing, Matugga, Uganda http://livestockfish.cgiar.org/2015/04/22/private-sector-training/ 5 - Training extension staff on African swine fever data collection along the smallholder pig value chain, Lira and Masaka, Uganda http://hdl.handle.net/10568/67031	

					616 - Training of pig farmers on biosecurity for control of African swine fever, Lira and Masaka, Uganda http://livestockfish.cgiar.org/2015/09/11/asf-training-uganda/ 3 - Participatory risk assessment for African swine fever, Lira and Masaka, Uganda http://livestockfish.cgiar.org/2014/10/21/pigs-asf/ 1 - Participatory epidemiology and gender, Ethiopia http://livestockfish.cgiar.org/2015/07/19/participatory-epidemiology-and-gender-training-in-ethiopia-to-overcome-animal-diseases/ 1 - Participatory epidemiology and gender training phase 1 and phase 2, Ethiopia http://livestockfish.cgiar.org/2015/07/19/participatory-epidemiology-and-gender-training-in-ethiopia-to-overcome-animal-diseases/ 6 - Business Opportunity Seminar, Tanzania dairy value chain, Contact: Amos Omore a.omore@cgiar.org 547 - Cattle husbandry and group development, breeding, feeding, and pasture establishment https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 341 - Dairy business management, Morogoro and Tanga, Tanzania https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 21 - Milk quality assurance, Morogoro and Tanga, Tanzania https://moremilkit.wikispaces.com/file/view/Sept%202015Maziwa%20Zaidi%20meeting%20Report%20.pdf 3 - Forage data collection training, Lushoto, Tanzania https://www.dropbox.com/s/lxiy48h04q0i4bn/Forage%20Training%20Report%20%28Lushoto%20Aug%2011th%202015%29%20%282%29.docx?dl=0 43 - Leadership and governance for pig farmer collectives, Mukono, Uganda	

					http://livestockfish.cgiar.org/2015/07/27/piggery-to-the-fore/ 148 - Pig multi-stakeholder platforms, various locations, Uganda http://uganda-pigs.wikispaces.com/Pig+Multi-Stakeholder+platforms+in+Uganda 9 - Gender capacity assessment tool for Ethiopian Government's Agricultural Transformation Agency, Addis Ababa, Ethiopia http://livestockfish.cgiar.org/2015/12/01/capdev-gender-ethiopia 5 - Gas exchange measurements training in partnership with LICOR Biosciences, CIAT HQ, Cali. Colombia https://www.dropbox.com/s/5moz8tdab9cjfs5/Internal%20Report%20Workshop%20Leaf%20Gas%20Exchange%20Measurements%20Using%20The%20Li.docx?dl=0 1 - Training on advances in forages research, CIAT HQ, Cali, Colombia https://www.dropbox.com/s/yvkpmo0ruvn07hd/Presentaci%C3%B3n%20CIAT-FORRAJES-EARTH.pdf?dl=0 https://www.dropbox.com/s/8zfzlktp6ticdpp/Acuerdos%20y%20compromisos%20Programa%20ganader%C3%ADa%20INIAP.pdf?dl=0 12 - Value chain analysis: Theory and Practices, Vietnam National Agricultural University, Vietnam http://livestock-fish.wikispaces.com/file/view/Value%20chain%20analysis_%20theory%20and%20practice%20%28TO%20VNUA%2017.11.2015%29.pdf 60 - Balanced feeding of dairy animals during different physiological stages, Mulkanoor, India http://ilrihyd.wikispaces.com/Short_term_training_at_Mulkanoor_Raichur 5 - African Chicken Genetic Gain project sub-national coordinators facilitation training, Addis Ababa, Ethiopia http://acgg.wikispaces.com/Facilitation+training+1 4 - Advanced course on poultry breeding, Addis Ababa, Ethiopia	

					https://www.wageningenur.nl/en/activity/Advanced-course-on-Design-and-implementation-of-breedingprograms-for-smallholder-poultry-farmers.htm 7 - Training on Livestock recording and database management, and the use of MISTRO livestock recording and monitoring database software for Rwanda Agricultural board, Kigali, Rwanda http://ilri-angr.wikispaces.com/file/view/Trip%20Report-Rwanda-20150717.pdf 2 - Training to farmers on animal breeding management through focus group discussions, Nicaragua http://ilri-angr.wikispaces.com/file/view/Report_FDG_Nicaragua_2015_format.pdf 5 - Training for MSc students in Summer school in Animal breeding and genetics, Wageningen, Netherlands http://www.wageningenur.nl/en/Education-Programmes/prospective-master-students/MSc-programmes/MSc-Animal-Sciences/International-Programmes/European-Master-in-Animal-Breeding-and-Genetics/Summer-school-and-minor.htm 3 - Training course in Quantitative Genetics and Genomics, Kenya https://www.dropbox.com/sh/h653mvi9auo6vah/AADdd94H1jjLRsEMwOmphkE3a?dl=0 94 - Training of dairy farmers on using weigh bands for predicting the weight of dairy animals from heart-girth measurements, Senegal http://ilri-angr.wikispaces.com/file/detail/Senegal%20Dairy%20Genetics%20training%202015.pdf	
15. Number of trainees in long-term programs facilitated by CRP (male)		7	50		N = 63 5 – Bachelors 30 – Masters 26 – PhD 2 - Other	Not set

16.Number of trainees in long-term programs facilitated by CRP (female)		10	54		N = 54 7 – Bachelors 24 – Masters 22 – PhD 1 - Other	Not set
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT						
18. Number of technologies/NRM practices under research in the CRP (Phase I)		32	22		N = 27 Biological Biological Nitrification Inhibition (BNI) potential of *Brachiaria humidicola*, various sites in Nicaragua http://livestock-fish.wikispaces.com/file/view/BMZ-GIZ-BNI-Project+Report-Year+3+%282015%29+final.docx Use of *Brachiaria humidicola* hybrids with high Biological Nitrification Inhibition potential to reduce environmental footprint, various locations globally https://www.dropbox.com/s/g4ue1exctj18v7y/BMZ-GIZ-BNI-Project%20Report-Year%203%20%282015%29%20final.pdf?dl=0 Evaluation and identification of *Cenchrus ciliaris and Chloris Gayana* dry matter production in terms of quality, protein content and digestibility, CIAT Campus, Colombia https://www.dropbox.com/s/00r8iz19vge3xjz/Poster_TPTAG_2015_Chloris gayana v last.ppt?dl=0 https://www.dropbox.com/s/8z6n6p06p7wz540/Poster_TPTAG_2015_Cenchrus%20ciliaris%20v%20last.pdf?dl=0 Reproductive technologies (ultrasound, synchronization and artificial insemination), various sites in Ethiopia http://drylandsystems.cgiar.org/news-opinions/ultrasound-diagnosis-low-tech-tool-sheep-and-goat-production-systems AND http://livestockfish.cgiar.org/2015/03/30/cbbp-ethiopia-rams	29

					Mud crab breeding helping to increase aquaculture productivity, Khulna hub, Bangladesh http://www.newshour.com.bd/2015/02/12/mud-crab-breeding-will-help-increase-aquaculture-productivity/ Eight superior, dual-purpose cultivars (maize, chickpea, sorghum, pearl millet, groundnut, cowpea, mung bean and soybean), various locations http://ilrihyd.wikispaces.com/CBB_conference Intercropping of forage grasses with food-feed crops Comparative water source treatment for forage production Use of maize fiber as basal diet for sheet, India http://ilrihyd.wikispaces.com/30.Maize+Fiber Upgrading of ligno-cellulosic biomass for livestock feed http://ilrihyd.wikispaces.com/file/view/Blummel%20et%20al%202nd%20spin%20off.pdf Insects as potential protein source in livestock feed, India http://ilrihyd.wikispaces.com/file/view/Insects%20for%20Animal%20Feeding_A%20review.pdf Management and cultural Feed & fertilization efficiency study, Khulna hub, Bangladesh https://drive.google.com/file/d/0B6eXEaIQ1tF4ak45NVd1Yi1kb1E/view?usp=sharing_eid Rohu genetic improvement program, Bhubaneswar, India http://blog.worldfishcenter.org/2015/12/fish-genetics-a-year-in-review/ Planted forage legumes for pig feed and soil carbon sequestration http://livestock-fish.wikispaces.com/file/view/FINAL%20FORAGES%20FR%20PIG%20PRODUCTION%20REPORT%2010%20FEB%202014.pdf Pig feed balanced rations from locally available feed resources http://hdl.handle.net/10214/913; http://hdl.handle.net/10568/68569	

					Developing sweet potato-based silage diets for pigs, Masaka and Kamuli Districts, Uganda http://www.slideshare.net/ILRI/sweetpotato-silage-making-for-pig-feed-in-uganda Good animal husbandry practices in pig production, various sites in Vietnam http://livestockfish.cgiar.org/2015/10/14/vietnam-pig-benefits Mechanical/physical Biogas digester for improved waste management at pig slaughter node, Uganda http://livestockfish.cgiar.org/2015/03/10/biogas-kampala/ Feed chopping and feed trough improvements, Bageshwar and Sult, Uttarakhand, India http://ilrihyd.wikispaces.com/39.+Feed+Interventions Processing of cassava peel as livestock feed, Nigeria http://ilrihyd.wikispaces.com/file/view/GFIA%20final%20edited%20Durban%201.pdf	
19. % of technologies under research that have an explicit target of women farmers		Not Set	12 (60%)		N = 6 (22%) Management and cultural Planted forage legumes for pig feed and soil carbon sequestration http://livestock-fish.wikispaces.com/file/view/FINAL%20FORAGES%20FR%20PIG%20PRODUCTION%20REPORT%2010%20FEB%202014.pdf Pig feed balanced rations from locally available feed resources http://hdl.handle.net/10214/913; http://hdl.handle.net/10568/68569 Developing sweet potato based silage diets for pigs, Masaka and Kamuli districts, Uganda http://www.slideshare.net/ILRI/sweetpotato-silage-making-for-pig-feed-in-uganda	Not set

					Good animal husbandry practices in pig production, various sites in Vietnam http://livestockfish.cgiar.org/2015/10/14/vietnam-pig-benefits Feed chopping and feed trough improvements, Bageshwar and Sult, Uttarakhand, India http://ilrihyd.wikispaces.com/39.+Feed+Interventions Processing of cassava peel as livestock feed, Nigeria http://ilrihyd.wikispaces.com/file/view/GFIA%20final%20edited%20Durban%201.pdf	
20. % of technologies under research that have been assessed for likely gender-disaggregated impact		Not Set	0 (0%)		N = 2 (7%) Biological Nitrification Inhibition (BNI) potential of *Brachiaria humidicola*, various sites in Nicaragua http://livestock-fish.wikispaces.com/file/view/BMZ-GIZ-BNI-Project+Report-Year+3+%282015%29+final.docx Developing sweet potato based silage diets for pigs, Masaka and Kamuli Districts, Uganda http://www.slideshare.net/ILRI/sweetpotato-silage-making-for-pig-feed-in-uganda	Not set
23. Number of technologies /NRM practices field tested (phase II)		16	22		N = 17 Biological Biological Nitrification Inhibition (BNI) potential of *Brachiaria humidicola* to improve nitrogen efficiency and reduce emissions of nitrous oxide, Campapa, Nueva Guinea, Nicaragua http://livestock-fish.wikispaces.com/file/view/BMZ-GIZ-BNI-Project+Report-Year+3+%282015%29+final.docx Tilapia breeding nucleus, Khulna hub, Bangladesh https://youtu.be/SmCE8_9kdOA New and improved *Brachiaria* spp. cultivars, various sites in Colombia; Mexico; Brazil; Central America and East Africa.	5

					http://dx.doi.org/10.1080/00128325.2015.1041263 Endophytes and stress tolerance of *Brachiaria* cultivars, various sites in Colombia; Rwanda, Kenya https://www.dropbox.com/s/s5z8v9g4bc33feo/Sida-CIAT-Progress%20report%20July%202015%20Part%201.pptx?dl=0 Dual-purpose feed-fodder crops, Tumkur and Karnataka, India http://ilrihyd.wikispaces.com/52.Field+Visit-Tumkur and reference number 53 on this page) Balanced concentrate feed, Bihar, East India http://ilrihyd.wikispaces.com/ - see reference number 43 on this page Mineral mixture feeding, Bihar, East India http://ilrihyd.wikispaces.com/ - see reference number 42 on this page Management and cultural Improved silvo-pastoral practices, Matagalpa, Nicaragua http://livestock-fish.wikispaces.com/file/view/Individual+Semester+Project+Progress+Report+June+2015+Sustainable+Livestock-Nicaragua+190715.docx Use of *Brachiaria humidicola* – Maize rotation systems for an improved maize grain yield, Meta Department, Colombia https://www.dropbox.com/s/tyhez5d3dfhqf8g/BMZ-GIZ-BNI-Project%20Report-Year%202%20%282014%29%20final.pdf?dl=0 Biosecurity protocols for controlling African swine fever, Lira and Masaka Districts, Uganda http://hdl.handle.net/10568/56819 Pig business hubs for improved pig markets, Masaka district, Uganda http://hdl.handle.net/10568/66617 Use of sweet potato silage based diets for pig feed, Masaka and Kamuli districts, Uganda	

					http://www.rtb.cgiar.org/endure/ Dissemination of the Abbassa strain of Nile tilapia, Kafr el Sheikh, Behera, Sharkia, Fayoum, Egypt http://blog.worldfishcenter.org/2015/12/fish-genetics-a-year-in-review/ Best management practice training of fish farmers, Kafr el Sheikh, Behera, Sharkia, Fayoum, Egypt http://www.worldfishcenter.org/content/improving-efficiency-and-increasing-employment-egypts-aquaculture-sector PCR tested negative shrimp seed transportation mechanism, Khulna hub, Bangladesh http://www.bffea.net/news/BFFEA_News_Letter_2015.pdf Introduction of specific pathogen free (SPF) shrimp in Khulna hub, Bangladesh http://blog.worldfishcenter.org/2015/12/aquatic-animal-health-year-review/ Role of farmed fish in the diets of the resource-poor in Kafr el Sheikh, Behera, Sharkia, Fayoum, Egypt http://www.worldfishcenter.org/content/role-farmed-fish-diets-resource-poor-egypt	
27. Number of technologies/NRM practices released by public and private sector partners globally (phase III)		11	7		N = 4 Genetically improved farmed tilapia, Bangladesh http://fishfarminginternational.com/how-genetics-is-shaping-the-future-of-aquaculture/ Tilapia breeding nucleus, Bangladesh http://worldfishcenter.org/content/genetically-improved-farmed-Tilapia-gift-dissemination-bangladesh Quality Tilapia seed, Bangladesh http://worldfishcenter.org/content/genetically-improved-farmed-Tilapia-gift-dissemination-bangladesh#sthash.66O3WrQl.dpuf	6

					Fish feed mills, Khulna hub, Bangladesh http://www.worldfishcenter.org/content/affordable-quality-feed-helps-rural-bangladeshi-farmers-grow-more-fish	
POLICIES IN VARIOUS STAGES OF DEVELOPMENT						
28. Numbers of Policies/ Regulations/ Administrative Procedures Analyzed (Stage 1)		4	5		N = 19 Pig breeding policy, Nagaland, India https://asia.ilri.org/2016/01/12/nagaland-breeding-policy/ Tanzania Livestock Modernization Initiative, http://clippings.ilri.org/2015/08/13/tanzania-livestock-modernization-initiative-to-improve-livelihoods-of-smallholders-and-boost-food-security/ Law No. 124/1983 concerning fishing and regulation of aquaculture, Egypt Minister of Agriculture Decree No. 303/1987 concerning issue of executive regulation for Law No. 124/198, Egypt Minister of Agriculture Decree No. 447/2012 concerning amendment of the executive regulation of fisheries and aquaculture law, issued by Decree No. 303/1987, Egypt Presidential Decree No. 190/1983 concerning establishment of GAFRD, Egypt Presidential Decree No. 456/1983 concerning specification of water surfaces where fishing is developed and overseen by GAFRD, Egypt Minister of Agriculture Decree No. 446/1983 concerning oversight of GAFRD on fish resources companies, Egypt Minister of Agriculture Decree No. 2655/2003 concerning prohibition of use of the hormone of 17 alpha methyl testosterone to produce unisex tilapia, Egypt Law No. 123/1983 concerning aquatic cooperatives, Egypt Minister of Agriculture Decree No. 181/1984 concerning issue of executive regulation for Law No. 123/1983, Egypt	4

					Law No. 48/1982 concerning protection of the River Nile and water channels from pollution, Egypt Minister of Irrigation Decree No. 92/2013 concerning amendment of executive regulation of the law for protection of water and canals from pollution, issued by Decree No. 402/2009, Egypt Law No.9/2009 concerning amendment of environment Law No. 4/1994, Egypt Prime Minister Decree No. 338/1995 concerning executive regulation of environment Law No. 4/1994, Egypt Prime Minister Decree No. 1741/2005 concerning amendment of some provisions of Prime Minister Decree No. 338/1995 concerning executive regulation of environment Law, Egypt Law No. 89/1998 concerning government bids and tenders, Egypt GAFRD Decision No. 70/1986 concerning rent and allocation of GAFRD land, Egypt Minister of Agriculture Decree No. 1132/2007 concerning offering aquaculture and hatcheries overseen by GAFRD for rent or lease-holding, Egypt www.fishupdate.com/egypt-addresses-its-aquaculture-challenges	
29. Number of policies / regulations / administrative procedures drafted and presented for public/stakeholder consultation (Stage 2)		0	1		N = 18 Tanzania Livestock Modernization Initiative http://clippings.ilri.org/2015/08/13/tanzania-livestock-modernization-initiative-to-improve-livelihoods-of-smallholders-and-boost-food-security/ Law No. 124/1983 concerning fishing and regulation of aquaculture, Egypt Minister of Agriculture Decree No. 303/1987 concerning issue of executive regulation for Law No. 124/198, Egypt Minister of Agriculture Decree No. 447/2012 concerning amendment of the executive regulation of fisheries and aquaculture law, issued by Decree No. 303/1987, Egypt	0

					Presidential Decree No. 190/1983 concerning establishment of GAFRD, Egypt Presidential Decree No. 456/1983 concerning specification of water surfaces where fishing is developed and overseen by GAFRD, Egypt Minister of Agriculture Decree No. 446/1983 concerning oversight of GAFRD on fish resources companies, Egypt Minister of Agriculture Decree No. 2655/2003 concerning prohibition of use of the hormone of 17 alpha methyl testosterone to produce unisex tilapia, Egypt Law No. 123/1983 concerning aquatic cooperatives, Egypt Minister of Agriculture Decree No. 181/1984 concerning issue of executive regulation for Law No. 123/1983, Egypt Law No. 48/1982 concerning protection of the River Nile and water channels from pollution, Egypt Minister of Irrigation Decree No. 92/2013 concerning amendment of executive regulation of the law for protection of water and canals from pollution, issued by Decree No. 402/2009, Egypt Law No.9/2009 concerning amendment of environment Law No. 4/1994, Egypt Prime Minister Decree No. 338/1995 concerning executive regulation of environment Law No. 4/1994, Egypt Prime Minister Decree No. 1741/2005 concerning amendment of some provisions of Prime Minister Decree No. 338/1995 concerning executive regulation of environment Law, Egypt Law No. 89/1998 concerning government bids and tenders, Egypt GAFRD Decision No. 70/1986 concerning rent and allocation of GAFRD land, Egypt Minister of Agriculture Decree No. 1132/2007 concerning offering aquaculture and hatcheries overseen by GAFRD for rent or lease-holding, Egypt	

					www.fishupdate.com/egypt-addresses-its-aquaculture-challenges	
30. Number of policies / regulations / administrative procedures presented for legislation (Stage 3)		5	0		N = 0	0
31. Number of policies / regulations / administrative procedures prepared passed/approved (Stage 4)		0	0		N = 0	0
32. Number of policies / regulations / administrative procedures passed for which implementation has begun (Stage 5)		0	0		N = 2 Feed Act (market standards and regulations), Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarQmc2NjZPTC03b1k/view?usp=sharing Hatchery Act (market standards and regulations), Bangladesh https://drive.google.com/file/d/0B5EB86-UaNarcjRHckN5YXBVaFU/view?usp=sharing	0
OUTCOMES ON THE GROUND						
33. Number of hectares under improved technologies or management practices as a result of CRP research		n = 232,148ha (162,352 ha new + 69,796 ha continued)	n = 112,882 ha. (cont.) and 40,347 ha.(new areas) and 479,000 ha. not		N = 5,968 (new hectares) + 17,500 (continuing hectares) Improved silvo-pastoral practices, improved milking practices, improved pasture management, Matagalpa, Nicaragua (3,967 ha. new) http://livestock-fish.wikispaces.com/file/view/Individual+Semester+Project+Progress+Report+June+2015+Sustainable+Livestock-Nicaragua+190715.docx *Brachiaria* Hybrids, global (2,001 ha. new)	600

			categorized.		https://www.dropbox.com/s/b74lxlouwlax34g/CIAT%20EFO31%20Brachiaria%20Hybrids%20Seed%20Sales%20Data%202001-14.pdf?dl=0 Applying aquaculture best management practices, Kafr el Sheikh, Behera, Sharkia, Fayoum, Egypt (17,500 ha. continuing) http://www.worldfishcenter.org/content/improving-efficiency-and-increasing-employment-egypt%E2%80%99s-aquaculture-sector	
34. Number of farmers and others who have applied new technologies or management practices as a result of CRP research		n = 2,040 (1,520 male + 520 female)	n = 70, 818 female farmers and 417,538 male farmers		N = 31,770 male farmers + 84 female farmers Improved silvo-pastoral practices, improved milking practices, improved pasture management, Matagalpa, Nicaragua (335 male farmers and 55 female farmers) http://livestock-fish.wikispaces.com/file/view/Individual+Semester+Project+Progress+Report+June+2015+Sustainable+Livestock-Nicaragua+190715.docx *Brachiaria* Hybrids, global, number of farmers applying unknown https://www.dropbox.com/s/b74lxlouwlax34g/CIAT%20EFO31%20Brachiaria%20Hybrids%20Seed%20Sales%20Data%202001-14.pdf?dl=0, Applying aquaculture best management practices, Kafr el Sheikh, Behera, Sharkia, Fayoum, Egypt (2,500 male farmers) http://www.worldfishcenter.org/content/improving-efficiency-and-increasing-employment-egypt%E2%80%99s-aquaculture-sector Community-based sheep breeding programs, Menz, Horro and Bonga, Ethiopia (29 female and 342 male farmers) http://hdl.handle.net/10568/35466	5,900

Annex Table 1A: List of publications in ISI journals, supplement to Indictor 9.

Publication Title	Year	Citation	Journal Name	Impact Factor 2014	L&F funding acknow-ledged	Item type	ISI Journal	cgspace handle	DOI
Feed resources vis-a-vis Livestock and Fish Productivity in a Changing Climate	2015	Blümmel,M., Haileslassie,A., Herrero, M., Beveridge, M., Phillips, M., and Havlik, P. 2015. Feed resources vis-à-vis livestock and fish productivity in a changing climate. IN: Malik, P.K.et al. 2015. Livestock production and climate change. Wallingford, UK: CABI: 8-24.			NA	Book chapter	ISI chapter	http://hdl.handle.net/10568/67253	http://dx.doi.org/10.1079/9781780644325.0008
Reciprocal full-sib recurrent selection and tools for accelerating genetic gain in apomictic *brachiaria*	2015	Worthington, Margaret; Miles, John W. 2015. Reciprocal full-sib recurrent selection and tools for accelerating genetic gain in apomictic *brachiaria*. In: Budak, H. and G. Spangenberg (eds) Molecular Breeding of Forage and Turf: The Proceedings of the 8th International Symposium of Molecular Breeding of forage and Turf. Springer International Publishing: 19-30.			NA	Book chapter	ISI chapter	http://hdl.handle.net/10568/68105	http://dx.doi.org/10.1007/978-3-319-08714-6_3
A gendered analysis of goat ownership and marketing in Meru, Kenya	2015	Waithanji, E., Njuki, J., Mburu, S., Kariuki, J. and Njeru, F. 2015. A gendered analysis of goat ownership and marketing in Meru, Kenya. Development in Practice 24(2): 188-203.	Develop-ment in Practice	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65058	http://dx.doi.org/10.1080/09614524.2015.1002453
A longitudinal survey of African swine fever in Uganda reveals high apparent disease incidence rates in domestic pigs, but absence of detectable persistent virus infections in blood and serum	2015	Muhangi, D., Masembe, C., Emanuelson, U., Boqvist, S., Mayega, L., Ademun, R.O., Bishop, R.P., Ocaido, M., Berg, M. and Ståhl, K. 2015. A longitudinal survey of African swine fever in Uganda reveals high apparent disease incidence rates in domestic pigs, but absence of detectable persistent virus infections in blood and serum. BMC Veterinary Research 11:106	BMC Veterinary Research	1.777	NA	Journal Article	ISI Journal		http://dx.doi.org/10.1186/s12917-015-0426-5

A method to discriminate between closely related bovine major histocompatibility complex class I alleles by combining established PCR-SSP assays with RFLPs	2015	Svitek, N., Nzau, B., Steinaa, L. and Nene, V. 2015. A method to discriminate between closely related bovine major histocompatibility complex class I alleles by combining established PCR-SSP assays with RFLPs. Tissue Antigens 85(4):278-282.	Tissue Antigens	2.137	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66014	http://dx.doi.org/10.1111/tan.12524
Adaptation of institutional arrangements to management of Northern Rangelands of Kenya	2015	Kanyuuru, C.K., Mburu, J., Njoka, J. 2015. Adaptation of institutional arrangements to management of Northern Rangelands of Kenya. Environment, Development and Sustainability 1-16	Environment, Development and Sustainability	0.673	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s10668-015-9718-y
African indigenous cattle: Unique genetic resources in a rapidly changing world	2015	Mwai, O., Hanotte, O., Young-Jun Kwon and Seoae Cho. 2015. African indigenous cattle: Unique genetic resources in a rapidly changing world. Asian-Australasian Journal of Animal Sciences 28(7): 911-921	Asian-Australasian Journal of Animal Sciences	0.541	No	Journal article	ISI Journal		http://dx.doi.org/10.5713/ajas.15.0002R
An exploratory study of dairying intensification, women's decision making, and time use and implications for child nutrition in Kenya	2015	Njuki, J.M., Wyatt, A., Baltenweck, I., Yount, K., Null, C., Ramakrishnan, U., Girard, A.W. and Sreenath, S. 2015. An exploratory study of dairying intensification, women's decision making, and time use and implications for child nutrition in Kenya. European Journal of Development Research	European Journal of Development Research	0.851	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67914	http://dx.doi.org/10.1057/ejdr.2015.22
Analysis of immune responses to recombinant proteins from strains of Mycoplasma mycoides subsp. mycoides, the	2015	Perez-Casal, J., Prysliak, T., Maina, T., Wang, Y., Townsend, H., Berverov, E., Nkando, I., Wesonga, H., Liljander, A., Jores, J., Naessens, J., Gerdts, V. and Potter, A. 2015. Analysis of immune responses to recombinant proteins from strains of Mycoplasma mycoides subsp. mycoides, the causative agent of CBPP.	Veterinary Immunology and Immunopathology	1.535	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/68492	http://dx.doi.org/10.1016/j.vetimm.2015.08.013

causative agent of CBPP		Veterinary Immunology and Immunopathology 168(1–2): 103–110							
BoLA-6 01301 and BoLA-6 01302, two allelic variants of the A18 haplotype, present the same epitope from the Tp1 antigen of Theileria parva	2015	Svitek, N., Awino, E., Nene, V. and Steinaa, L. 2015. BoLA-6*01301 and BoLA-6*01302, two allelic variants of the A18 haplotype, present the same epitope from the Tp1 antigen of Theileria parva. Veterinary Immunology and Immunopathology 167(1-2):80–85.	Veterinary Immunology and Immunopathology	1.535	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67244	http://dx.doi.org/10.1016/j.vetimm.2015.06.007
Calf management practices, challenges and opportunities in traditional cattle production systems in the Peanut Basin of Senegal	2015	Tebug, S.F., Kamga-Waladjo, A.R., Ema, P.J.N., Muyeneza, C., Kane, O., Seck, A.S., Ly, M.T. and Lo, M. 2015. Calf management practices, challenges and opportunities in traditional cattle production systems in the Peanut Basin of Senegal. Tropical Animal Health and Production 47(5):797-804.; http://hdl.handle.net/10568/67229; .	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s11250-015-0782-y
Characterization of smallholder pig breeding practices within a rural commune of North Central Vietnam	2015	Nahoko Ieda, Quang Van Bui, Nga Thi Duong Nguyen, Lapar, L. and Marshall, K. 2015. Characterization of smallholder pig breeding practices within a rural commune of North Central Vietnam. Tropical Animal Health and Production 47(6): 1005 - 1016	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s11250-015-0817-4
Co-infections determine patterns of mortality in populations exposed to parasite infection	2015	Woolhouse, M.E.J., Thumbi, S.M., Jennings, A., Chase-Topping, M., Callaby, R., Kiara, H., Oosthuizen, M.C., Mbole-Kariuki, M.N., Conradie, I., Handel, I.G., Poole, E.J., Njiiri, E., Collins, N.E., Murray, G., Tapio, M. Auguet, O.T., Weir, W., Morrison, W.I., Kruuk, L.E.B., Bronsvoort, B. M. de C. Hanotte, O., Coetzer, K., Toye, P.G. 2015. Co-infections determine patterns of mortality in a population exposed to parasite infection. Science Advances 1(2):	Science Advances	NA	No	Journal article	ISI Journal	http://hdl.handle.net/10568/59824	http://dx.doi.org/10.1126/sciadv.1400026

Community based livestock breeding programs: Essentials and examples	2015	Mueller, J.P., Rischkowsky, B., Haile, A., Philipsson, J., Okeyo, A.M., Besbes, B., Valle Zárate, A., Tibbo, M., Mirkena, T., Duguma, G., Solkner, J. and Wurzinger, M. 2015. Community based livestock breeding programmes: Essentials and examples. Journal of Animal Breeding and Genetics 132(2):155–168.	Journal of Animal Breeding and Genetics	1.566	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67889	http://dx.doi.org/10.1111/jbg.12136
Comparative analysis of the complete genome sequences of Kenyan African swine fever virus isolates within p72 genotypes IX and X	2015	Bishop, R.P., Fleischauer, C., Villiers, E.P. de, Okoth, E.A., Arias, M., Gallardo, C. and Upton, C. 2015. Comparative analysis of the complete genome sequences of Kenyan African swine fever virus isolates within p72 genotypes IX and X. Virus Genes 50(2):303-309.	Virus Genes	1.576	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66095	http://dx.doi.org/10.1007/s11262-014-1156-7
Comparison of different poultry breeds under station and on-farm conditions in Ethiopia	2015	Wondmeneh, E., Waaij, E.H Van der, Udo, H.M.J., Dessie, T. and Arendonk, J.A.M Van. 2016. Comparison of different poultry breeds under station and on-farm conditions in Ethiopia. Livestock Science 183:72–77.	Livestock Science	1.171	NA	Journal article	ISI Journal		http://dx.doi.org/10.1016/j.livsci.2015.11.019
Contrasting strategies to cope with drought conditions by two tropical forage C4 grasses	2015	Cardoso, J.A., Pineda, M., Jiménez, J. de la Cruz, Vergara , M.F. and Rao, I.M. 2015. Contrasting strategies to cope with drought conditions by two tropical forage C4 grasses. AoB Plants: pvl107	AoB Plants	1.878	No	Journal article	ISI Journal	http://hdl.handle.net/10568/68100	http://dx.doi.org/10.1093/aobpla/plv107
Cyto-adherence of Mycoplasma mycoides subsp mycoides to primary bovine lung epithelial cells is a critical step in CBPP	2015	Aye, R., Mwirigi, M. K., Frey, J., Pilo, P., Jores, J. and Naessens, J. 2015. Cyto-adherence of Mycoplasma mycoides subsp. mycoides to bovine lung epithelial cells. BMC Veterinary Research 11: 27	BMC Veterinary Research	1.777	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65958	http://dx.doi.org/10.1186/s12917-015-0347-3

Detection and genetic characterization of porcine group. A rotaviruses in asymptomatic pigs in smallholder farms in East Africa: Predominance of P[8] genotype resembling human strains	2015	Amimo, J.O., Junga, J.O., Ogara, W.O., Vlasova, A.N., Njahira, M.N., Maina, S., Okoth, E.A., Bishop, R.P., Saif, L.J. and Djikeng, A. 2015. Detection and genetic characterization of porcine group A rotaviruses in asymptomatic pigs in smallholder farms in East Africa: Predominance of P[8] genotype resembling human strains. Veterinary Microbiology 175(2-4):195–210.	Veterinary Microbiology	2.511	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/52240	http://dx.doi.org/10.1016/j.vetmic.2014.11.027
Differences in sexual size dimorphism among farmed tilapia species and strains undergoing genetic improvement for body weight	2015	Lind, C.E., Safari, A., Agyakwah, S.K., Attipoe, F.Y.K., El-Naggar, G.O., Hamzah, A., G. Hulata, Ibrahim, N.A., Khaw, H.L., Nguyen, N.H., Maluwa, A.O., Zaid, M., Zak, T. and Ponzoni, R.W. 2015. Differences in sexual size dimorphism among farmed tilapia species and strains undergoing genetic improvement for body weight. Aquaculture Reports **1:** 20–27.	Aquaculture Reports	NA	NA	Journal article	ISI Journal		http://dx.doi.org/10.1016/j.aqrep.2015.03.003
Do low-income households in Tanzania derive income and nutrition benefits from dairy innovation and dairy production?	2015	Kidoido, M. and Korir, L. 2015. Do low-income households in Tanzania derive income and nutrition benefits from dairy innovation and dairy production? Food Security 7(3):681-692.	Food Security	1.495	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67175	http://dx.doi.org/10.1007/s12571-015-0419-z
Draft Genome Sequence of the First Human Isolate of the Ruminant Pathogen Mycoplasma capricolum subsp. Capricolum	2015	Seersholm, F.V., Fischer, A., Heller, M., Jores, J., Sachse, K., Mourier, T. and Hansen, A.J. 2015. Draft Genome Sequence of the First Human Isolate of the Ruminant Pathogen *Mycoplasma capricolum* subsp. *Capricolum.* Genome Announcements 3(3):e00583-15.	Genome Announcements	NA	Yes	Journal article	ISI Journal		http://dx.doi.org/10.1128/genomeA.00583-15

Effect of feeding sweet sorghum stover-based complete rations on the growth performance and carcass characteristics of ram lambs	2015	Babu, J., Kumari , N.N., Reddy, Y.R., Raghunandan, T. and Sridhar, K. 2015. Effect of feeding sweet sorghum stover-based complete rations on the growth performance and carcass characteristics of ram lambs. Tropical Animal Health and Production 47(3):623-626.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s11250-015-0755-1
Effect of protein and energy levels in sweet sorghum bagasse leaf residue-based diets on the performance of growing Deccani lambs	2015	Yerradoddi, R.R., Khan, A.A., Mallampalli, S.R., Devulapalli, R., Kodukula, P. and Blümmel, M. 2015. Effect of protein and energy levels in sweet sorghum bagasse leaf residue-based diets on the performance of growing Deccani lambs. Tropical Animal Health and Production 47(4):743-749.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66456	http://dx.doi.org/10.1007/s11250-015-0788-5
Enabling the Development and Deployment of Next Generation Point-of-Care Diagnostics	2015	Derda, R., Gitaka, J., Klapperich, C.M., Mace, C.R., Kumar, A.A., Lieberman, M., Linnes, J.C., Jores, J., Nasimolo, J., Ndung'u, J., Taracha, E., Weaver, A., Weibel, D.B., Kariuki, T.M. and Yager, P. 2015. Enabling the Development and Deployment of Next Generation Point-of-Care Diagnostics. PLoS One 9(5): e0003676.	PLOS Neglected Tropical Diseases	4.569	No	Journal article	ISI Journal		http://dx.doi.org/10.1371/journal.pntd.0003676
Establishment of six homozygous MHC-B haplotype populations associated with susceptibility to Marek's disease in Chinese specific pathogen-free BWEL chickens	2015	Caixia Gao, Lingxia Han, Jianlin Han, Jiasen Liu, Qian Jiang, Dongchun Guo and Liandong Qu. 2014. Establishment of six homozygous MHC-B haplotype populations associated with susceptibility to Marek's disease in Chinese specific pathogen-free BWEL chickens. Infection, Genetics and Evolution 29: 15-25.	Infection, Genetics and Evolution	3.015	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/51625	http://dx.doi.org/10.1016/j.meegid.2014.10.031

Estimates of repeatability and heritability of methane production in sheep using portable accumulation chambers	2015	Goopy, J.P., Robinson, D.L., Woodgate, R.T., Donaldson, A.J., Oddy, V.H., Vercoe, P.E. and Hegarty, R.S. 2015. Estimates of repeatability and heritability of methane production in sheep using portable accumulation chambers. Animal Production Science; http://hdl.handle.net/10568/67383;	Animal Production Science	1.286	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67383	http://dx.doi.org/10.1071/AN13370.
Estimating the basic reproductive number (R0) for African swine fever virus (ASFV) transmission between pig herds in Uganda	2015	Barongo, M.B., Stahl, K., Bett, B., Bishop, R.P., Fevre, E.M., Aliro, T., Okoth, E., Masembe, C., Knobel, D. and Ssematimba, A. 2015. Estimating the basic reproductive number (R0) for African swine fever virus (ASFV) transmission between pig herds in Uganda. PLOS ONE 10(5): e0125842.	PLOS One	3.324	No	Journal article	ISI Journal	http://hdl.handle.net/10568/65978	http://dx.doi.org/10.1371/journal.pone.0125842
Experimental evaluation of inactivated and live attenuated vaccines against Mycoplasma mycoides subsp. Mycoides	2015	Mwirigi, M., Nkando, I., Aye, R., Soi, R., Ochanda, H., Berberov, E., Potter, A., Gerdts, V., Perez-Casal, J., Naessens, J. and Wesonga, H. 2015. Experimental evaluation of inactivated and live attenuated vaccines against Mycoplasma mycoides subsp. Mycoides. Veterinary Immunology and Immunopathology.	Veterinary Immunology and Immunopathology	1.535	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/69443	http://dx.doi.org/10.1016/j.vetimm.2015.12.006
Exposure of vaccinated and naive cattle to natural challenge from buffalo-derived Theileria parva	2015	Sitt, T., Poole, E.J., Ndambuk, G., Mwaura, S., Njoroge, T., Omondi, G.P., Mutinda, M., Mathenge, J., Prettejohn, G., Morrison, W.I. and Toye, P. 2015. Exposure of vaccinated and naive cattle to natural challenge from buffalo-derived Theileria parva. International Journal for Parasitology: Parasites and Wildlife 4(2):244–251.	International Journal for Parasitology: Parasites and Wildlife	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66148	http://dx.doi.org/10.1016/j.ijppaw.2015.04.006
Field-applicable recombinase polymerase amplification assay for rapid detection of	2015	Liljander, A., Mingyan Yu, O'Brien, E., Heller, M., Nepper, J.F., Weibel, D.B., Gluecks, I., Younan, M., Frey, J., Falquet, L. and Jores, J. 2015. Field-applicable recombinase polymerase amplification assay for rapid detection of	Journal of Clinical Microbiology	4.232	Yes	Journal Article	ISI Journal		http://dx.doi.org/10.1128/JCM.00623-15

Mycoplasma capricolum subsp. Capripneumoniae		Mycoplasma capricolum subsp. Capripneumoniae. Journal of Clinical Microbiology 53(9): 2810-2815							
First human case of severe septicaemia associated with Mycoplasma capricolum subsp. Capricolum infection	2015	Heller, M., Schwarz, R., Noe, G., Jores, J., Fischer, A., Schubert, E. and Sachse, K. 2015. First human case of severe septicaemia associated with Mycoplasma capricolum subsp. Capricolum infection. JMM Case Reports	JMM Case Reports	NA	Yes	Journal article	ISI Journal		http://dx.doi.org/10.1099/jmmcr.0.000101
Gender, Assets and Market-oriented Agriculture: Learning from high-level crop and livestock projects in Africa and Asia	2015	Quisumbing, A.R., Rubin, D., Manfre, C., Waithanji, E., Bold, Mara van den., Olney, D., Johnson, N., Meinzen-Dick, R. 2015. Gender, assets, and market-oriented agriculture: learning from high-value crop and livestock projects in Africa and Asia. Agriculture and Human Values 32(1):	Agriculture and Human Values	1.617	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/56776	http://dx.doi.org/10.1007/s10460-015-9587-x
Genetic diversity and structure in Egyptian indigenous sheep populations mirror patterns of anthropological interactions	2015	Elbeltagy, A.R., Aboul-Naga, A.M., Hassen, H., Rischkowsky, B. and Mwacharo, J.M. 2015. Genetic diversity and structure in Egyptian indigenous sheep populations mirror patterns of anthropological interactions. Small Ruminant Research 132: 137–142	Small Ruminant Research	1.125	NA	Journal article	ISI Journal		http://dx.doi.org/10.1016/j.smallrumres.2015.10.020
Genetic options for improving fodder yield and quality in forage sorghum	2015	Aruna, C,. Swarnalatha, M., Praveen Kumar, P, Devender, V., Suguna, M., Blümmel, M., and Patil. J.V. 2015. Genetic options for improving fodder yield and quality in forage sorghum. Tropical Grasslands−Forrajes Tropicales 3(1): 49-58	Tropical Grasslands	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65139	http://dx.doi.org/10.17138/TGFT(3)49-58
Genetic parameters for survival during the grow-out period in the GIFT strain of Nile tilapia	2015	Hamzah, A., Mekkawy, W., Hooi Ling Khaw, Nguyen Hong Nguyen, Hoong Yip Yee, Abu Bakar, K.R., Nor, S.A.M. and Ponzoni, R.W. 2015. Genetic parameters for survival during the grow-out period in the GIFT strain of	Aquaculture Research	1.376	NA	Journal article	ISI Journal		http://dx.doi.org/10.1111/are.12859

(*Oreochromis niloticus*) and correlated response to selection for harvest weight		Nile tilapia (*Oreochromis niloticus*) and correlated response to selection for harvest weight. Aquaculture Research							
High carbon and biodiversity costs from converting Africa's wet savannahs to cropland	2015	Searchinger, T., Estes, L., Thornton, P.K., Beringer, T., Notenbaert, A, Rubenstein, D., Heimlich, R., Licker, R. and Herrero, M. 2015. High carbon and biodiversity costs from converting Africa's wet savannahs to cropland. Nature Climate Change 5: 481–486.	Nature Climate Change	14.547	No	Journal article	ISI Journal	http://hdl.handle.net/10568/58318	http://dx.doi.org/doi:10.1038/nclimate2584
High occurrence of mitochondrial heteroplasmy in Nepalese indigenous sheep (Ovis aries) compared to Chinese sheep	2015	Gorkhali, N.A., Jiang, L., Shrestha, B.S., He X.H., Junzhao, Q, Han, J.L., Ma, Y.H. 2015. High occurrence of mitochondrial heteroplasmy in Nepalese indigenous sheep (Ovis aries) compared to chinese sheep. Mitochondrial DNA 18:1-3.	Mitochondrial DNA	1.701	NA	Journal article	ISI Journal		http://dx.doi.org/10.3109/19401736.2015.1041134
High quality draft genomes of the *Mycoplasma mycoides* subsp.*mycoides* challenge strains Afadé and B237	2015	Santana-Cruz, I., Hegerman, J., Gourlé, H., Schieck, E., Lambert, M., Nadendla, S., Wesonga, H., Miller, R.A., Vashee, S. and Weber, J. 2015. High quality draft genomes of the *Mycoplasma mycoides* subsp.*mycoides* challenge strains Afadé and B237. Standards in Genomic Sciences **10**:89.	Standards in Genomic Sciences	3.167	NA	Journal article	ISI Journal		http://dx.doi.org/10.1186/s40793-015-0067-0
Identification of novel loci associated with gastrointestinal parasite resistance in a red Maasai x Dorper backcross population	2015	Benavides, M.V., Sonstegard, T.S., Kemp, S., Mugambi, J.M.M., Gibson, J.P., Baker, R.L., Hanotte, O., Marshall, K. and Tassell, C.V. 2015. Identification of novel loci associated with gastrointestinal parasite resistance in a red Maasai x Dorper backcross population. PLoS One	PLOS One	3.324	No	Journal article	ISI Journal		http://dx.doi.org/10.1371/journal.pone.0122797

Implementation of a cashmere goat breeding program amongst nomads in Southern Iran	2015	Mueller, J.P., Ansari-Renani, H.R., Momen, S.M.S., Ehsani, M., Alipour, O. and Rischkowsky, B. 2015. Implementation of a cashmere goat breeding program amongst nomads in Southern Iran. Small Ruminant Research 129:69–76.	Small Ruminant Research	1.125	NA	Journal article	ISI Journal		http://dx.doi.org/doi:10.1016/j.smallrumres.2015.05.011
Introgression of staygreen QLT's for concomitant improvement of food and fodder traits in Sorghum bicolor	2015	Blümmel, M., Deshpande, S., Kholova, J. and Vadez, V. 2015. Introgression of staygreen QLT's for concomitant improvement of food and fodder traits in Sorghum bicolor. Field Crops Research 180:228-237.; http://hdl.handle.net/10568/67251;	Field Crops Research	2.976	NA	Journal article	ISI Journal		http://dx.doi.org/10.1016/j.fcr.2015.06.005
Knowledge, attitudes and practices related to African Swine Fever within smallholder pig production in northern Uganda	2015	Chenais, E., Boqvist, S., Sternberg-Lewerin, S., Emanuelson, U., Ouma, E., Dione, M., Aliro, T., Crafoord, F., Masembe, C. and Stahl, K. 2015. Knowledge, attitudes and practices related to African Swine Fever within smallholder pig production in northern Uganda. Transboundary and Emerging Diseases	Transboundary and Emerging Diseases.	2.944	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65163	http://dx.doi.org/10.1111/tbed.12347
LivestockPlus – The sustainable intensification of forage-based systems to improve livelihoods and ecosystem services in the tropics	2015	Rao, Idupulapati Madhusudana; Peters, Michael; Castro, Aracely; Schultze-Kraft, Rainer; White, D.; Fisher, Myles; Miles, John; Lascano, Carlos; Blümmel, M.; Bungenstab, D.; Tapasco, Jeimar; Hyman, Glenn; Bolliger, A.; Paul, Birthe Katharina; Van der Hoek, Rein; Maass, Brigitte L.; Tiemann, Tassilo T.; Cuchillo, Mario; Douxchamps, S.; Villanueva, C.; Rincon, Alvaro; Ayarza, M.; Rosenstock, T.; Subbarao, Guntur V.; Arango, Jacobo; Cardoso, J.; Worthington, Margaret; Chirinda, Ngonidzashe; Notenbaert, A.; Jenet, A.; Schmidt, A.; Vivas, N.; Lefroy, R.; Fahrney, K.; Guimaraes, Elcio Perpétuo; Tohme, Joseph M.; Cook, S.; Herrero, M.; Chacón, M.; Searchinger, T.; Rudel, T.. 2015. LivestockPlus – The sustainable intensification of forage-based	Tropical Grasslands	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66022	http://dx.doi.org/10.17138/TGFT(3)59-82

		agricultural systems to improve livelihoods and ecosystem services in the tropics . Tropical Grasslands – Forrajes Tropicales 3(2): 59-82.							
LivestockPlus: Forages, sustainable intensification, and food security in the tropics	2015	Rudel, Thomas K.; Paul, Birthe Katharina; White, Douglas; Rao, Idupulapati Madhusudana; Van der Hoek, Rein; Castro, Aracely; Boval, Maryline; Lerner, Amy; Schneider, Laura; Peters, Michael. 2015. LivestockPlus : Forages, sustainable intensification, and food security in the tropics. Ambio: a journal of the human environment 44(7): 685-693.	Ambio	2.873	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67311	http://dx.doi.org/10.1007/s13280-015-0676-2
Mathematical modelling of the transmission dynamics of CBPP reveals minimal target profiles for improved vaccines and diagnostic assays	2015	Ssematimba, A., Jores, J. and Mariner, J.C. 2015. Mathematical modelling of the transmission dynamics of contagious bovine pleuropneumonia reveals minimal target profiles for improved vaccines and diagnostic assays. PLoS ONE 10(2):e0116730.	PLOS One	3.324	No	Journal article	ISI Journal	http://hdl.handle.net/10568/66097	http://dx.doi.org/10.1371/journal.pone.0116730
Mitogenomic meta-analysis identifies two phases of migration in the history of eastern Eurasian sheep	2015	Feng-Hua Lv, Wei-Feng Peng, Ji Yang, Yong-Xin Zhao, Wen-Rong Li, Ming-Jun Liu, Yue-Hui Ma, Qian-Jun Zhao, Guang-Li Yang, Feng Wang, Jin-Quan Li, Yong-Gang Liu, Zhi-Qiang Shen, Sheng-Guo Zhao, EEr Hehua, Gorkhali, N.A., Farhad Vahidi, S.M., Muladno, M., Naqvi, A.N., Tabell, J., Iso-Touru, T., Bruford, M.W., Kantanen, J., Jian-Lin Han and Meng-Hua Li. 2015. Mitogenomic meta-analysis identifies two phases of migration in the history of Eastern Eurasian sheep. Molecular Biology and Evolution 32 (10): 2515-2533.	Molecular Biology and Evolution	9.105	Yes	Journal article	ISI Journal	http://hdl.handle.net/10568/68520	http://dx.doi.org/10.1093/molbev/msv139
Molecular evolution of a central region containing B-cell	2015	Obara, I., Ulrike, S., Musoke, T., Spooner, P. R., Jabbar, A., Odongo, D., Kemp, S., Silva, J. C. and Bishop, R. P. 2015. Molecular evolution of a	Parasitology Research	2.098	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66016	http://dx.doi.org/10.1007/

epitopes in the gene encoding the p67 sporozoite antigen within a field population of Theileria parva		central region containing B cell epitopes in the gene encoding the p67 sporozoite antigen within a field population of Theileria parva. Parasitology Research 114(5):1729-1737							s00436-015-4358-6
Morpho-anatomical traits of root and non-enzymatic antioxidant system of leaf tissue contribute to waterlogging tolerance in *Brachiaria* grasses	2015	Jiménez Serna, Juan de la Cruz; Cardoso, Juan Andrés; Dominguez, Moralba; Fischer, Gerhard; Rao, Idupulapati Madhusudana. 2015. Morpho-anatomical traits of root and non-enzymatic antioxidant system of leaf tissue contribute to waterlogging tolerance in *Brachiaria* grasses. Grassland Science 10 p.	Grassland Science	0.627	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/67428	http://dx.doi.org/10.1111/grs.12095
Nutrient composition and seasonal availability of local feedstuffs for pigs in western Kenya	2015	Carter, N.A., Dewey, C.E., Lukuyu, B., Grace, D. and Lange, C.F.M. de. 2015. Nutrient composition and seasonal availability of local feedstuffs for pigs in western Kenya. Canadian Journal of Animal Science 95(3): 397-406.	Canadian Journal of Animal Science	0.983	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/66460	http://dx.doi.org/10.4141/CJAS-2015-003
Nutritional values of available ruminant feed resources in smallholder dairy farms in Rwanda	2015	Mutimura, Mupenzi; Ebong, Cyprian; Rao, Idupulapati Madhusudana; Nsahlai, Ignatius Verla. 2015. Nutritional values of available ruminant feed resources in smallholder dairy farms in Rwanda. Tropical Animal Health and Production 47(6): 1131-1137.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65363	http://dx.doi.org/10.1007/s11250-015-0839-y
Opportunities from second-generation biofuel technologies for upgrading lignocellulosic biomass for livestock feed	2015	Blümmel, M., Steele, B. and Dale, B.E. 2015. Opportunities from second-generation biofuel technologies for upgrading lignocellulosic biomass for livestock feed. CAB Reviews 9 (041)	CAB Reviews	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65054	

Optimum crossbreeding systems for goats in low-input livestock production system in Kenya	2015	Mbuku, S.M., Okeyo, A.M., Kosgey, I.S. and Kahi, A.K. 2015. Optimum crossbreeding systems for goats in low-input livestock production system in Kenya. Small Ruminant Research 123(1):55–61.	Small Ruminant Research	1.125	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/51339	http://dx.doi.org/10.1016/j.smallrumres.2014.10.001
Pasture degradation decreases organic P content of tropical soils due to soil structural decline	2015	Nesper, Maike; Bünemann, Else K.; Fonte, Steven J.; Rao, Idupulapati Madhusudana; Velásquez, Jaime Enrique; Ramírez, Bertha; Hegglin, Django; Frossard, Emmanuel; Oberson, Astrid. 2014. Pasture degradation decreases organic P content of tropical soils due to soil structural decline . Geoderma. 257-258:123-133	Geoderma	2.772	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/51381	http://dx.doi.org/10.1016/j.geoderma.2014.10.010
Phenotypic characteristics and trypanosome prevalence of Mursi cattle breed in the Bodi and Mursi districts of South Omo Zone, southwest Ethiopia	2015	Terefe, E., Haile, A., Mulatu, W., Dessie, T. and Mwai, O. 2015. Phenotypic characteristics and trypanosome prevalence of Mursi cattle breed in the Bodi and Mursi districts of South Omo Zone, southwest Ethiopia. Trop Anim Health and Production. 47(3): 485-93.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s11250-014-0746-7
Relative resistance of Menz and Washera sheep breeds to artificial infection with Haemonchus contortus in the highlands of Ethiopia	2015	Getachew, T., Alemu, B., Sölkner, J., Gizaw, S., Haile, A., Gosheme, S.,Notter, D.R. 2015. Relative resistance of Menz and Washera sheep breeds to artificial infection with Haemonchus contortus in the highlands of Ethiopia. Tropical animal health and production. 47 (5): 961-968.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal		http://dx.doi.org/10.1007/s11250-015-0815-6
Responses of vegetation and soils to three grazing management regimes in a semi-	2015	Habtemicael, M., Yayneshet, T. and Treydte, A.C. 2015. Responses of vegetation and soils to three grazing management regimes in a semi-arid highland mixed crop-livestock system.	African Journal of Ecology	0.688	NA	Journal article	ISI Journal		http://dx.doi.org/10.1111/aje.12185

arid highland mixed crop-livestock system		African Journal of Ecology 53(1):75-82.; http://hdl.handle.net/10568/56779; .							
Review of the history, status and prospects of the black tiger shrimp (Penaeus monodon) hatchery sector in Bangladesh	2015	Debnath, P., Khan, S.H., Karim, M., Belton, B., Mohan, C.V. and Phillips, M. 2015. Review of the history, status and prospects of the black tiger shrimp (Penaeus monodon) hatchery sector in Bangladesh. Reviews in Aquaculture	Reviews in Aquaculture	3.923	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65119	http://dx.doi.org/10.1111/raq.12094
Risk factors associated with occurrence of African swine fever outbreaks in smallholder pig farms in four districts along the Uganda-Kenya border	2015	Nantima, N., Ocaido, M., Ouma, E.A., Davies, J., Dione, M., Okoth, E., Mugisha, A and Bishop, R. 2015. Risk factors associated with occurrence of African swine fever outbreaks in smallholder pig farms in four districts along the Uganda-Kenya border. Tropical Animal Health and Production 47(3):589-595.	Tropical Animal Health and Production	0.817	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/56743	http://dx.doi.org/10.1007/s11250-015-0768-9
Risk factors for African swine fever in smallholder pig production systems in Uganda	2015	Dione, M.M., Akol, J., Roesel, K., Kungu, J., Ouma, E.A., Wieland, B. and Pezo, D. 2015. Risk factors for African swine fever in smallholder pig production systems in Uganda. Transboundary and Emerging Diseases	Transboundary and Emerging Diseases	2.944	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/69415	http://dx.doi.org/10.1111/tbed.12452
Suppression of soil nitrification by plants	2015	Subbaraoa, Guntur Venkata; Yoshihashia, Tadashi; Worthington, Margaret; Nakahara, Kazuhiko; Ando, Yasuo; Sahrawat, Kanwar Lal; Rao, Idupulapati Madhusudhana; Lata, Jean-Christophe; Kishii, Masahiro; Braune, Hans-Joachim. 2015. Suppression of soil nitrification by plants. Plant Science 233: 155-164.	Plant Science	3.607	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/56845	http://dx.doi.org/10.1016/j.plantsci.2015.01.012
Survival analysis of genetic and non-genetic factors influencing ewe	2015	Getachew, T., Gizaw, S., Wurzinger, M., Haile, A., Rischkowsky, B., Okeyo, A.M., Sölkner, J. and Mészáros, G. 2015. Survival analysis of genetic and non-genetic factors influencing	Livestock Science	1.171	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/65973	http://dx.doi.org/10.1016/j.livsci.2015.03.021

longevity and lamb survival of Ethiopian sheep breeds		ewe longevity and lamb survival of Ethiopian sheep breeds. Livestock Science							
Survival, male morphotypes, female and male proportion, female reproductive status and tag loss in crosses among three populations of freshwater prawn Macrobrachium rosenbergii (de Man) in India	2015	Pillai, B.R., Mahapatra, K.D., Ponzoni, R.W., Sahoo, L., Lalrinsanga, P. L., Mekkawy, W., Khaw, H.L., Nguyen, N.H., Mohanty, S., Sahu, S. and Patra, G. 2015. Survival, male morphotypes, female and male proportion, female reproductive status and tag loss in crosses among three populations of freshwater prawn Macrobrachium rosenbergii (de Man) in India. Aquaculture Research 46(11): 2644–2655	Aquaculture Research	1.376	NA	Journal article	ISI Journal		http://dx.doi.org/10.1111/are.12419
The African buffalo parasite Theileria sp. (buffalo) can infect and immortalize cattle leukocytes and encodes conserved and divergent orthologues of Theileria parva antigen genes	2015	Bishop, R.P., Hemmink, W.I., Morrison, J.D., Weir, W., Toye, P.G., Sitt, T., Spooner, P.R., Musoke, A.J., Skilton, R.A. and Odongo, D.O. 2015. The African buffalo parasite Theileria. sp. (buffalo) can infect and immortalize cattle leukocytes and encodes divergent orthologues of Theileria parva antigen genes. International Journal for Parasitology: Parasites and Wildlife 4(3):333–342.	International Journal for Parasitology: Parasites and Wildlife	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/71030	http://dx.doi.org/10.1016/j.ijppaw.2015.08.006
The epidemiology of tick-borne haemoparasites as determined by the reverse line blot hybridization assay in an intensively studied cohort of calves in western Kenya	2015	Njiiri, N.E., Bronsvoort, B.M. deC., Collins, N.E., Steyn, H.C., Troskie, M., Vorster, I., Mwangi, T.S., Sibeko, K.P., Jennings, A., Wyk, I.C. van, Mbole-Kariuki, M., Kiara, H., Poole, J., Hanotte, O., Coetzer, K., Oosthuizen, M.C., Woolhouse, M. and Toye, P. 2015. The epidemiology of tick-borne haemoparasites as determined by the reverse line blot hybridization assay in an intensively studied cohort of calves in western Kenya. Veterinary Parasitology 210(1/2):69-76.	Veterinary Parasitology	2.460	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/63495	http://dx.doi.org/doi:10.1016/j.vetpar.2015.02.020

The gendered impacts of agricultural asset transfer projects: Lessons from the Manica smallholder dairy development program	2015	Johnson, N., Njuki, J., Waithanji, E., Nhambeto, M., Rogers, M. and Kruger, E.H. 2015. The gendered impacts of agricultural asset transfer projects: Lessons from the Manica smallholder dairy development program. Gender Technology and Development 19(2): 145-180.	Gender Technology and Development	NA	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/68296	http://dx.doi.org/10.1177/097185241557804 1
Vaccination of cattle with the N terminus of LppQ of Mycoplasma mycoides subsp. mycoides results in type III immune complex disease upon experimental infection	2015	Mulongo, M., Frey, J., Smith, K., Schnier, C., Wesonga, H., Naessens, J. and McKeever, D. 2015. Vaccination of cattle with the N terminus of LppQ of Mycoplasma mycoides subsp. mycoides results in type III immune complex disease upon experimental infection. Infection and Immunity 83(5): 1992-2000.; http://hdl.handle.net/10568/66364;	Infection and Immunity	3.731	No	Journal article	ISI Journal		http://dx.doi.org/10.1128/IAI.00003-15
Value chain analysis of the aquaculture feed sector in Egypt	2015	El-Sayed, A.-F. M. , Dickson, M.W. and El-Naggar, G.O. 2015. Value chain analysis of the aquaculture feed sector in Egypt. Aquaculture 437: 92–101	Aquaculture	1.878	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/56965	http://dx.doi.org/10.1016/j.aquaculture.2014.11.033
Variation and covariation in strongyle infection in East African shorthorn zebu calves	2015	Callaby, R., Hanotte, O., Wyk, I.C. van, Kiara, H., Toye, P.G., Mbole-Kariuk, M.N., Jennings, A., Thumbi, S.M., Coetzer, J.A.W., Bronsvoort, B.M. De. C., Knott, S.A., Woolhouse, M.E.J. and Kruuk, L.E.B. 2015. Variation and covariation in strongyle infection in East African shorthorn zebu calves. Parasitology 142(3):499-511.	Parasitology	2.35	No	Journal article	ISI Journal	http://hdl.handle.net/10568/67376	http://dx.doi.org/10.1017/S0031182014001498
	2015	Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M. , Biggs, R., Carpenter, S.R., Vries, W. de, Wit, C.A. de, Folke, C., Gerten, D. , Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. and Sörlin, S. 2015. Planetary boundaries: Guiding	Science	33.611	NA	Journal article	ISI Journal		http://dx.doi.org/10.1126/science.1259855

		human development on a changing planet. Science 347:6219.; http://hdl.handle.net/10568/53095							
	2015	Sambo, E., Bettridge, J., Dessie, T., Amare, A., Habte, T., Wigley, P. and Christley, R.M. 2015. Participatory evaluation of chicken health and production constraints in Ethiopia. Preventive Veterinary Medicine 118(1):117-127.; http://hdl.handle.net/10568/51793; .	Preventive Veterinary Medicine	2.167	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/51793	http://dx.doi.org/10.1016/j.prevetmed.2014.10.014
	2015	Tebug, S.F., Kamga-Waladjo, A.R., Ema, P.J.N., Muyeneza, C., Kane, O., Seck, A., Ly, M.T. and Lo, M. 2015. Cattle farmer awareness and behavior regarding prevention of zoonotic disease transmission in Senegal. Journal of Agromedicine 20(2):217-224.; http://hdl.handle.net/10568/66314; .	Journal of Agromedicine	0.905	NA	Journal article	ISI Journal		http://dx.doi.org/10.1080/1059924X.2015.1010068
Participatory assessment of animal health and husbandry practices in smallholder pig production systems in three high poverty districts in Uganda.	2014	Dione, M.M., Ouma, E.A., Roesel, K., Kungu, J., Lule, P. and Pezo, D. 2014. Participatory assessment of animal health and husbandry practices in smallholder pig production systems in three high poverty districts in Uganda. Preventive Veterinary Medicine 117(3-4):565-576.	Preventive Veterinary Medicine	2.167	NA	Journal article	ISI Journal	http://hdl.handle.net/10568/51612	http://dx.doi.org/10.1016/j.prevetmed.2014.10.012

Annex 2. Performance indicators for gender mainstreaming with targets defined

Performance Indicator	CRP performance approaches requirements	CRP performance meets requirements	CRP performance exceeds requirements
1. Gender inequality targets defined	Sex-disaggregated social data is being collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs) The gender analysis within value chains undertaken in 2014 has continued and deepened in 2015. Fourteen gender-integrated research projects have been undertaken in value chains and in the technical flagships, which go beyond sex-disaggregated data collection to embedding gender concepts in overall research questions and considering gender dimensions in design as well as using gender analysis once the data is collected. Some projects diagnose gender-based constraints in main target populations, for example, the gendered analysis of the fish feed chain in Bangladesh and gender-integrated value chain analysis of five main fish species, also in Bangladesh. Another example of baseline data collection is that of the empowerment and nutrition research undertaken in Tanzania.	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations And The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs) And CRP targets changes in levels of gender inequality to which the CRP is or plans to contribute, with related numbers of men and women beneficiaries in main target populations

Performance Indicator	CRP performance approaches requirements	CRP performance meets requirements	CRP performance exceeds requirements
Institutional architecture for integration of gender is in place	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed**,** have written TORs. - Procedures defined to routinely report use of available diagnostic or baseline knowledge on gender for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research	- CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORs and funds allocated to support their interaction. -Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research -CRP plan approved for capacity development in gender analysis Across the partner institutes of L&F, the Gender Theme is picking up momentum with a growing number of full-time and part-time gender scientists, as well as gender research technicians with clear TORs and work plans. WorldFish, in particular, has dedicated significant resources to gender staffing, been successful in recruiting and has allocated staff time for the L&F gender agenda in 2015. The Gender initiative (in conjunction with the CG Gender Network) has begun to define standards for assessing the gender implications of the CRP flagship projects. Inclusion of the Gender Initiative leader in the PPMC demonstrates the research program's commitment to building the institutional architecture for gender and ensuring a gender voice in influencing the overall direction of the CRP. Funds have been made available by all institute for gender-integrated research. Notable, is the ILRI call for gender-integrated projects that lead to 11 being implemented and coached on their gender dimensions, in 2015. Tailored coaching plans for non-gender scientists working on a total of 14 gender integrated projects were developed and implemented in 2015. Financial tracking on gender has been done more systematically in the research program in 2015. Reflection on gender budgeting discrepancies and different ways of approaching gender budgeting was prioritized in the first half of the year as a review of 2014 gender budgeting was undertaken. From this exercise, best practices were discussed and guidelines presented in June 2015 to	CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORs and funds allocated to support their interaction. e.g. ILRI call for gender-integrated projects lead to 11 funded and coached in 2015 - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy-CRP M&E system has protocol for tracking progress on integration of gender in research And A CRP plan approved for capacity development in gender analysis And The CRP uses feedback provided by its M&E system to improve its integration of gender into research

		all institutes in L&F in order to align 2015 gender budgeting. In addition, in preparations for the phase II CRPs, a theory of change on gender was developed based on the 2015 gender agenda. Initial progress was made in building the capacity of research and development partners in NI, ET, UG and TZ value chains through the implementation of a participatory assessment tool for gender capacities which helped increase their awareness of what gender analysis entails and what their individual and institutional shortcomings are.	

Annex 3. Financial reports

CGIAR TEMPLATE: L101

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2012 - 12/31/2015
Amounts in USD (000's)

Cumulative Financial Summary

Report Description

Name of Report:	Cumuative Financial Summary
Frequency/Period:	Annual
Deadline:	Every April 15th

Summary Report - by CG Partners	(a) Total POWB budget since inception					(b) Actual cumulative Expenses					(c) Variance / Balance				
	Windows 1 & 2	Window 3	Bilateral Funding	Center funds	Total Funding	Windows 1 & 2	Window 3	Bilateral Funding	Center funds	Total Funding	Windows 1 & 2	Window 3	Bilateral Funding	Center funds	Total Funding
1. AFRICA RICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. BIOVERSITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. CIAT	5,646	2,355	9,887	-	17,889	5,750	831	7,087	-	13,668	(104)	1,524	2,801	-	4,221
4. CIFOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. CIMMYT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. CIP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. ICARDA	2,107	284	450	-	2,840	2,106	136	398	-	2,640	1	148	52	-	200
8. ICRAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9. ICRISAT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10. IFPRI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11. IITA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. ILRI	35,631	13,559	22,177	-	71,367	35,626	9,916	20,268	-	65,810	5	3,643	1,909	-	5,557
13. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14. IWMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. WORLDFISH	5,437	3,427	8,771	-	17,635	5,330	6,806	6,820	59	19,015	107	(3,379)	1,951	(59)	(1,380)
Total for CRP	**48,821**	**19,625**	**41,285**	**-**	**109,731**	**48,812**	**17,690**	**34,573**	**59**	**101,134**	**9**	**1,935**	**6,713**	**(59)**	**8,598**
	44%	**18%**	**38%**	**0%**	**100%**	**48%**	**17%**	**34%**	**0%**	**100%**	**0%**	**23%**	**78%**	**-1%**	**100%**

CGIAR TEMPLATE: L106

CRP :	**"3.7" - "Livestock & Fish"**	**Annual Funding**			
Period:	**01/01/2015 - 12/31/2015**				
Amounts in USD (000's)					
Report Description					
Name of Report: Annual Funding Summary					
Frequency/Period: Annual					
Deadline:	Every April 15th				
PART 1 - Annual FINANCE PLAN (Totals for Windows 1 and 2 combined)					
Approved Level for Year - Initial Approval (as per PIA)					
Approved Level for Year - Final Amount					
PART 2 - Funding Summary for Year					
			2015 Actual Funding		
		Windows 1&2	Window 3	Bilateral Funding	Total Funding
1	CGIAR Fund	14,398	-	-	14,398
2	Bill & Melinda Gates Foundation (BMGF)	-	3,230	76	3,306
3	Ireland Embassy	-	-	1,012	1,012
4	Deutsche Gesellschaft Fur Technische Zusammenarbeit (GIZ)	-	-	1,307	1,307
5	Heifer International Project	-	-	432	432
6	International Maize And Weat Improvement Centre (CIMMYT)	-	-	395	395
7	Ministry Of Foreign Affairs Finland	-	-	350	350
8	Agricultural Research Challenge Fund	-	-	246	246
9	United States Agency For International Development (USAID)	-	2,003	180	2,183
10	Austrian Development Agency (ADA)	-	86	177	263
11	International Maize And Wheat Improvement Centre (CIMMYT)	-	-	176	176
12	United Nations-Unep-Gef/Unops/Unep-Depi	-	-	152	152
13	Rural Development Adminstration - Korea	-	-	146	146
14	Genesis Laboratories Inc	-	-	145	145
15	Common Wealth Scientific And Industrial Research Organization (CSIRO)	-	-	180	180
16	Food And Agriculture Organization Of The United Nations (FAO)	-	-	99	99
17	JVC-National Science	-	-	97	97
18	University Of New England	-	-	82	82
19	China	-	71	-	71
20	Government Of Mexico	-	82	-	82
21	African Union Interafrican Bureau For African Resources	-	-	65	65
22	Navaibai Ratan Tata Trust (NRTT)	-	-	48	48
23	Australian Centre For International Agricultural Research (ACIAR)	-	-	169	169
24	Global Alliance For Livestock Veterinary Medicines (GALVMED)	-	-	42	42
25	Boehringer Ingelheim Vetmedica Gmbh	-	-	36	36
26	New York University	-	-	33	33
27	National Science Foundation (NSF)	-	-	33	33
28	International Crop Research Institute for Semi-Arid Tropics (ICRISAT)	-	-	31	31
29	International Centre For Agricultural Research In The Dry Areas (ICARDA)	-	-	30	30
30	Instituto Nacional de Investigacion Tecnologia Agraria y Alimentaria (INIA)—Spai	-	23	-	23
31	European Community (EC)	-	-	14	14
32	Pirbright Institute	-	-	13	13
33	International Potato Center (CIP)	-	-	10	10
34	ICRISAT/ Government Of Karnataka	-	-	9	9
35	University Of Vermont	-	-	7	7
36	University Of Wisconsin System	-	-	7	7
37	Wellcome Trust	-	-	3	3
38	International Relief And Development (IRD)	-	-	2	2
39	Ford Foundation	-	-	0	0
40	Consortium Office	-	-	23	23
41	Deutsche Gesellschaft für Technische Zusammenarbeit	-	-	382	382
42	European Commission	-	-	36	36
43	Gordon and Betty Moore Foundation	-	-	95	95
44	International Livestock Research Institute	-	-	7	7
45	KATALYST	-	-	201	201
46	Rajiv Gandhi Center for Aquaculture	-	-	69	69
47	Swiss Agency for Development and Cooperation	-	-	513	513
48	US Soybean Export Council	-	-	10	10
49	IFAD	-	97	328	425
50	EMBRAPA	-	-	4	4
51	ARC Egypt	-	-	35	35
52	Others < $?	-	(18)	36	18
53	MAFF/JAPAN	-	50	-	50
54	DOW	-	-	672	672
55	SOLIDARIDAD	-	-	232	232
56	IFDC	-	-	47	47
					-
					-
Total for CRP "X.X"		**14,398**	5,625	**8,494**	28,517

CGIAR TEMPLATE: L111

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2015 - 12/31/2015
Amounts in USD (000's)

Annual Financial Summary by Centers

Report Description

Name of Report:	Annual Financial Summary by Centers & Other Participants
Frequency/Period:	Annual
Deadline:	Every April 15th

Summary Report - by CG Partners	**(a) CRP 2015 POWB approved budget**					**(b) CRP 2015 Expenditure**					**(c) Variance this Year**				
	Windows 1 & 2	**Window 3**	**Bilateral Funding**	**Center funds**	**Total Funding**	**Windows 1 & 2**	**Window 3**	**Bilateral Funding**	**Center funds**	**Total Funding**	**Windows 1 & 2**	**Window 3**	**Bilateral Funding**	**Center funds**	**Total Funding**
1. AFRICA RICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. BIOVERSITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. CIAT	1,486	711	2,316	-	4,513	1,538	276	1,963	-	3,777	(52)	-	-	-	(52)
4. CIFOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. CIMMYT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. CIP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. ICARDA	500	226	55	-	781	500	105	39	-	644	-	121	16	-	137
8. ICRAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9. ICRISAT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10. IFPRI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11. IITA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12. ILRI	12,115	7,058	6,283	-	25,456	10,910	3,488	5,156	-	19,554	1,205	3,569	1,127	-	5,902
13. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14. IWMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15. WORLDFISH	1,520	1,700	1,878	-	5,098	1,450	1,756	1,336	-	4,542	70	(56)	542	-	556
Total for CRP	**15,621**	**9,694**	**10,533**	**-**	**35,848**	**14,398**	**5,625**	**8,494**	**-**	**28,517**	**1,224**	**3,635**	**1,685**	**-**	**6,543**
	44%	**27%**	**29%**	**0%**	**100%**	**50%**	**20%**	**30%**	**0%**	**100%**	**18.7%**	**55.5%**	**25.8%**	**0%**	**100%**

CGIAR TEMPLATE: L121

Annual Financial Summary by Natural Classification

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2015 - 12/31/2015
Amounts in USD 000's

Report Description

Name of Report:	Financial Summary by Natural Classification lines
Frequency/Period:	Annual
Deadline:	Every April 15th

Total CRP"X.X"	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
	Windows 1 & 2	**Window 3**	**Bilateral Funding**	**Center Funds**	**Total Funding**	**Windows 1 & 2**	**Window 3**	**Bilateral Funding**	**Center Funds**	**Total Funding**	**Windows 1 & 2**	**Window 3**	**Bilateral Funding**	**Center Funds**	**Total Funding**
Personnel	7,278	2,097	3,353	-	12,729	7,281	1,743	2,830	-	11,854	(2)	354	523	-	875
Collaborators Costs - CGIAR Centers	3,673	-	33	-	3,706	28	-	93	-	121	3,645	-	(60)	-	3,585
Collaborator Costs - Partners	481	3,760	1,534	-	5,775	652	996	1,663	-	3,311	(171)	2,764	(129)	-	2,464
Supplies and services	1,715	1,777	3,745	-	7,237	3,670	1,745	2,355	-	7,770	(1,954)	32	1,389	-	(534)
Operational Travel	356	348	666	-	1,371	594	325	550	-	1,469	(238)	24	116	-	(98)
Depreciation	57	189	22	-	268	118	6	25	-	148	(61)	183	(2)	-	120
Sub-total of Direct Costs	**13,560**	**8,172**	**9,353**	**-**	**31,086**	**12,342**	**4,815**	**7,516**	**-**	**24,673**	**1,218**	**3,357**	**1,837**	**-**	**6,413**
Indirect Costs	2,061	1,522	1,180	-	4,763	2,056	811	978	-	3,845	5	712	201	-	918
Total - All Costs	**15,621**	**9,694**	**10,533**	**-**	**35,848**	**14,398**	**5,625**	**8,494**	**-**	**28,517**	**1,224**	**4,069**	**2,038**	**-**	**7,331**
LESS Coll Costs CGIAR Centers	(3,673.3)	-	(33)	-	(3,706)	(28)	-	(93)	-	(121)	(3,645)	-	60	-	(3,585)
Total Net Costs	**11,948**	**9,694**	**10,500**	**-**	**32,142**	**14,370**	**5,625**	**8,401**	**-**	**28,396**	**(2,422)**	**4,069**	**2,098**	**-**	**3,746**

Amounts for each participating center below:

CIAT	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
Personnel	534	199	493	-	1,226	725	104	551	-	1,379	(191)	95	(58)	-	(154)
Collaborators Costs - CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Collaborator Costs - Partners	-	203	466	-	669	-	30	530	-	559	-	174	(64)	-	110
Supplies and services	620	137	911	-	1,669	533	87	536	-	1,156	87	50	376	-	513
Operational Travel	100	97	201	-	397	50	23	96	-	170	49	74	104	-	228
Depreciation	53	-	-	-	53	53	3	-	-	56	0	(3)	-	-	(3)
Sub-total of Direct Costs	**1,307**	**636**	**2,071**	**-**	**4,014**	**1,361**	**246**	**1,713**	**-**	**3,320**	**(54)**	**390**	**358**	**-**	**694**
Indirect Costs	179	75	245		499	177	30	250		457	2	45	(5)	-	42
Total - All Costs	**1,486**	**711**	**2,316**	**-**	**4,513**	**1,538**	**276**	**1,963**	**-**	**3,777**	**(52)**	**434**	**353**	**-**	**736**
LESS Coll Costs CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Net Costs	**1,486**	**711**	**2,316**	**-**	**4,513**	**1,538**	**276**	**1,963**	**-**	**3,777**	**(52)**	**434**	**353**	**-**	**736**

ICARDA	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
Personnel	332	53	5	-	390	336	55	-	-	391	(4)	(2)	5	-	(1)
Collaborators Costs - CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Collaborator Costs - Partners	-	61	24	-	85	-	-	18	-	18	-	61	6	-	67
Supplies and services	62	71	11	-	144	55	32	11	-	98	7	39	-	-	46
Operational Travel	26	20	8	-	54	29	10	5	-	44	(3)	10	3	-	10
Depreciation	4	3	-	-	7	4	-	-	-	4	-	3	-	-	3
Sub-total of Direct Costs	**424**	**208**	**48**	**-**	**680**	**424**	**97**	**34**	**-**	**555**	**-**	**111**	**14**	**-**	**125**
Indirect Costs	76	18	7		101	76	8	5		89	-	10	2	-	12
Total - All Costs	**500**	**226**	**55**	**-**	**781**	**500**	**105**	**39**	**-**	**644**	**-**	**121**	**16**	**-**	**137**
LESS Coll Costs CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Net Costs	**500**	**226**	**55**	**-**	**781**	**500**	**105**	**39**	**-**	**644**	**-**	**121**	**16**	**-**	**137**

ILRI	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
Personnel	4,731	1,241	2,203	-	8,175	4,309	955	1,637	-	6,902	422	285	566	-	1,273
Collaborators Costs - CGIAR Centers	2,396	-	33	-	2,429	28	-	93	-	121	2,368	-	(60)	-	2,308
Collaborator Costs - Partners	135	3,452	727	-	4,314	495	966	853	-	2,315	(360)	2,485	(126)	-	1,999
Supplies and services	46	1,162	2,190	-	3,398	2,565	931	1,572	-	5,069	(2,520)	231	619	-	(1,670)
Operational Travel	111	140	371	-	622	274	188	379	-	842	(163)	(48)	(8)	-	(220)
Depreciation	-	150	18	-	168	61	3	21	-	85	(61)	147	(3)	-	83
Sub-total of Direct Costs	**7,419**	**6,144**	**5,543**	**-**	**19,106**	**7,733**	**3,044**	**4,556**	**-**	**15,333**	**(314)**	**3,100**	**987**	**-**	**3,773**
Indirect Costs	1,309	913	740		2,963	1,326	444	600		2,370	(17)	469	140	-	593
Total - All Costs	**8,728**	**7,058**	**6,283**	**-**	**22,069**	**9,059**	**3,488**	**5,156**	**-**	**17,703**	**(331)**	**3,569**	**1,127**	**-**	**4,366**
LESS Coll Costs CGIAR Centers	(2,396.7)	-	(33)	-	(2,429)	(28)	-	(93)	-	(121)	(2,368)	-	60	-	(2,308)
Total Net Costs	**6,332**	**7,058**	**6,250**	**-**	**19,640**	**9,031**	**3,488**	**5,063**	**-**	**17,582**	**(2,699)**	**3,569**	**1,187**	**-**	**2,058**

	Windows 1 & 2	Window 3	Bilateral Funding	Center Funds	Total Funding	Windows 1 & 2	Window 3	Bilateral Funding	Center Funds	Total Funding	Windows 1 & 2	Window 3	Bilateral Funding	Center Funds	Total Funding
WORLDFISH	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
Personnel	1,038	604	652	-	2,295	1,114	629	642	-	2,384	(75)	(24)	11	-	(89)
Collaborators Costs - CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Collaborator Costs - Partners	5	44	317	-	366	3	-	262	-	265	2	44	55	-	101
Supplies and services	192	407	632	-	1,231	91	695	237	-	1,023	101	(288)	395	-	208
Operational Travel	80	92	86	-	258	47	103	69	-	220	33	(12)	17	-	38
Depreciation	-	36	4	-	41	-	-	3	-	3	-	36	1	-	37
Sub-total of Direct Costs	**1,316**	**1,184**	**1,691**	-	**4,191**	**1,255**	**1,427**	**1,213**	-	**3,896**	**61**	**(244)**	**478**	-	**295**
Indirect Costs	204	516	187		907	195	328	123		646	9	188	64	-	261
Total - All Costs	**1,520**	**1,700**	**1,878**	-	**5,098**	**1,450**	**1,756**	**1,336**	-	**4,542**	**70**	**(56)**	**542**	-	**556**
LESS Coll Costs CGIAR Centers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Net Costs	**1,520**	**1,700**	**1,878**	-	**5,098**	**1,450**	**1,756**	**1,336**	-	**4,542**	**70**	**(56)**	**542**	-	**556**

PMU	**POWB Approved Budget**					**Actual**					**Unspent/Variance**				
Personnel	643	-	-	-	643	798	-	-	-	798	(155)	-	-	-	(155)
Collaborators Costs - CGIAR Centers	1,278	-	-	-	1,278	-	-	-	-	-	1,278	-	-	-	1,278
Collaborator Costs - Partners	341	-	-	-	341	153	-	-	-	153	187	-	-	-	187
Supplies and services	795	-	-	-	795	425	-	-	-	425	370	-	-	-	370
Operational Travel	39	-	-	-	39	193	-	-	-	193	(154)	-	-	-	(154)
Depreciation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total of Direct Costs	**3,095**	-	-	-	**3,095**	**1,569**	-	-	-	**1,569**	**1,526**	-	-	-	**1,526**
Indirect Costs	292				292	282				282	10	-	-	-	10
Total - All Costs	**3,387**	-	-	-	**3,387**	**1,851**	-	-	-	**1,851**	**1,536**	-	-	-	**1,536**
LESS Coll Costs CGIAR Centers	(1,277.5)	-	-	-	**(1,278)**	-	-	-	-	-	**(1,278)**	-	-	-	**(1,278)**
Total Net Costs	**2,110**	-	-	-	**2,110**	**1,851**	-	-	-	**1,851**	**259**	-	-	-	**259**

Annual Financial Summary by Flagship Project

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2015 - 12/31/2015
Amounts in USD 000's

Report Description	
Name of Report:	Financial Summary by Flagship Project
Frequency/Period:	Annual
Deadline:	Every April 15th

	POWB Approved	Current Year Actual Expenditures	Unspent Budget
Summary Report - by Flagship Project			
Animal Health	9,043	7,219	1,824
Genetics and Breeding	10,703	8,639	2,065
Feeds and Forages	2,818	2,498	320
Systems Analysis for Sustainable Innovations (SASI)	7,367	6,349	1,018
Value Chain Transformation and Scaling (VCTS)	2,530	1,962	569
CRP Management/Coordination	3,387	1,851	1,536
Total - All Costs	**35,848**	**28,517**	**7,331**

CIAT			
Animal Health	184	72	111
Genetics and Breeding	2,565	2,338	227
Feeds and Forages	619	356	263
Systems Analysis for Sustainable Innovations (SASI)	1,067	939	128
Value Chain Transformation and Scaling (VCTS)	79	72	8
CRP Management/Coordination			-
Total - All Costs	4,513	3,777	736

ICARDA			
Animal Health	8	8	-
Genetics and Breeding	353	245	108
Feeds and Forages	111	91	20
Systems Analysis for Sustainable Innovations (SASI)	84	93	(9)
Value Chain Transformation and Scaling (VCTS)	225	207	18
CRP Management/Coordination	-		-
Total - All Costs	781	644	137

ILRI			
Animal Health	8,135	6,639	1,496
Genetics and Breeding	5,907	3,949	1,958
Feeds and Forages	1,642	1,689	(47)
Systems Analysis for Sustainable Innovations (SASI)	4,829	4,327	502
Value Chain Transformation and Scaling (VCTS)	1,556	1,099	457
CRP Management/Coordination	3,387	1,851	1,536
Total - All Costs	25,456	19,554	5,902

	POWB Approved	Current Year Actual Expenditures	Unspent Budget
WORLDFISH			
Animal Health	717	500	217
Genetics and Breeding	1,878	2,106	(228)
Feeds and Forages	446	362	84
Systems Analysis for Sustainable Innovations (SASI)	1,387	989	398
Value Chain Transformation and Scaling (VCTS)	670	584	85
CRP Management/Coordination	-	-	-
Total - All Costs	5,098	4,542	556

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2015 - 12/31/2015
Amounts in USD 000's

Annual Financial Summary of Gender by Flagship Project

Report Description

Name of Report:	Financial Summary of Gender Expenditure by Flagship Project
Frequency/Period:	Annual
Deadline:	Every April 15th

	POWB Approved	Current Year Actual Expenditures	Unspent Budget
Summary Gender Report - by Flagship Project			
Animal Health	18	16	2
Genetics and Breeding	48	41	7
Feeds and Forages	120	107	14
Systems Analysis for Sustainable Innovations (SASI)	307	339	(31)
Value Chain Transformation and Scaling (VCTS)	555	460	95
CRP Management/Coordination	-	-	-
Total - All Costs	**1,048**	**963**	**86**
CIAT			
Animal Health			-
Genetics and Breeding	29	29	-
Feeds and Forages	12	10	3
Systems Analysis for Sustainable Innovations (SASI)	59	50	9
Value Chain Transformation and Scaling (VCTS)	344	308	36
CRP Management/Coordination			-
Total - All Costs	444	397	47
ICARDA			
Animal Health	8	8	-
Genetics and Breeding	6	-	6
Feeds and Forages	12	12	-
Systems Analysis for Sustainable Innovations (SASI)	20	28	(8)
Value Chain Transformation and Scaling (VCTS)	36	24	12
CRP Management/Coordination	-	-	-
Total - All Costs	82	72	10
ILRI			
Animal Health			-
Genetics and Breeding			-
Feeds and Forages			-
Systems Analysis for Sustainable Innovations (SASI)			-
Value Chain Transformation and Scaling (VCTS)			-
CRP Management/Coordination			-
Total - All Costs	-	-	-

	POWB Approved	Current Year Actual Expenditures	Unspent Budget
WORLDFISH			
Animal Health	10	8	2
Genetics and Breeding	13	12	1
Feeds and Forages	96	85	11
Systems Analysis for Sustainable Innovations (SASI)	228	261	(32)
Value Chain Transformation and Scaling (VCTS)	175	128	47
CRP Management/Coordination	-	-	-
Total - All Costs	523	494	28

CRP No. 3.7 - "Livestock & Fish"
Period: 01/01/2015 - 12/31/2015
Amounts in USD 000's

CRP Partnership Report

Report Description

Name of Report: CRP Partnerships Report
Frequency/Period: Annual
Deadline: Every April 15th

TOTAL FOR CRP "3.7"				Actual Expenses - This Year				
Item	Institute Acronym	Institute Name	Country	Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1	CORPOICA		Colombia	-	-	14	-	**14**
2	UNA	Universidad Nacional Agraria (UNA)	Nicaragua	-	30	4	-	**34**
3	NARO-NaLIRRI	National Agricultural Research Organization (NARO)	Uganda	-	-	-	-	-
4		NARS (DAFO,PAFO, ...)	Laos	-	-	5	-	**5**
5	LEIBNIZ	Leibniz Center For Agricultural Landscape Research-ZALF	Tanzania	-	-	17	-	**17**
6		CORPOICA	Colombia	-	-	-	-	-
7	UH	University of Hohenheim	Germany	-	-	196	-	**196**
8	NAFRI	National Agriculture and Forestry Research Institute - Ministry of Agricult	Cambodia/Laos/Vietnan	-	-	60	-	**60**
9	TNU	Tay Nguyen University (TNU)	VietNama	-	-	36	-	**36**
10	DAPH	Department of Animal Production and Health (DAPH)	Combodia	-	-	34	-	**34**
11	RUA	RUA Royal University of Agriculture	Combodia	-	-	30	-	**30**
12		NARS		-	-	-	-	-
13	SUA	SOKOINE UNIVERSITY OF AGRICULTURE (SUA)	Tanzania	-	-	-	-	-
14	TALIRI	Tanzania Livestock Research Institute (TALIRI)	Tanzania	-	-	22	-	**22**
15	HEIFER	Heifer International Nicaragua	Nicaragua	-	-	36	-	**36**
16	CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza	Costa Rica	-	-	35	-	**35**
17	CEI	Centro de Exportaciones e Inversiones Nicaragua	Nicaragua	-	-	18	-	**18**
18	NICACENTRO	Cooperativa Multisectorial Lácteos NICACENTRO , R.L	Nicaragua	-	-	22	-	**22**
19	APRI	Animal Production Research Institute	Egypt	-	-	18	-	**18**
20	EIAR	Ethiopia Institute Of Agricultural Research	Ethiopia	-	136	-	-	**136**
21	FIIB	Foundation Institute for Biotechnology Research	Argentina	-	7	-	-	**7**
22	GALVmed	Global Alliance for Livestock Veterinary Medicines	UK	-	11	-	-	**11**
23	ITM	Institute of Tropical Medicine	Belgium	-	141	-	-	**141**
24	OAU	Obafemi Awolowo University, Ile-Ife	Nigeria	-	110	-	-	**110**
25	RVC	Royal Veterinary College	UK	-	102	-	-	**102**
26	USDA	United States Department of Agriculture	US	-	227	-	-	**227**
27	UOC	University of Copenhagen	Denmark	-	17	-	-	**17**
28	UOE	University Of Edinburgh	UK	-	196	-	-	**196**
29	UOO	University of Oxford	UK	-	8	-	-	**8**
30	UOT	University of Toronto	Canada	-	12	-	-	**12**
31	CIAT	International Center for Tropical Agriculture	Colombia	-	-	91	-	**91**
32	SRC	Scotland's Rural College	Scotland	-	-	2	-	**2**
33	BAU	Bangladesh Agricultural University	Bangladesh	-	-	10	-	**10**
34	CAU	China Agricultural University	China	-	-	56	-	**56**
35	CSIRO	Commonwealth Scientific And Industrial Research Organisation (CSIRO)	Australia	-	-	47	-	**47**
36	EISMV	Ecole Inter Etats des Sciences et Médecine Vétérinaires de Dakar (EISMV)	Senegal	-	-	148	-	**148**
37	EU	Enterprise Uganda	Uganda	-	-	11	-	**11**
38	FML	Faida Market Link	Tanzania	-	-	108	-	**108**
39	FORWARD Nepal	FORWARD Nepal	Nepal	-	-	42	-	**42**
40	FLI	Friedrich - Loeffler Institut, Jena, Germany	Germany	-	-	224	-	**224**
41	HI	Heifer International Tanzania	Tanzania	-	-	27	-	**27**
42	NIAH	National Institute of Animal Husbandry (NIAH)	Vietnam	-	-	10	-	**10**
43	NMAIST	Nelson Mandela African Institution Of Science And Technology (NMAIST)	Tanzania	-	-	42	-	**42**
44	SRC	Scotland's Rural College	Scotland	-	-	9	-	**9**
45	SIAR	Senegalese Institute of Agricultural Research	Senegal	-	-	3	-	**3**
46	SNV	SNV Netherlands Development Organisation	Netherlands	-	-	13	-	**13**
47	TDB	Tanzania Dairy Board	Tanzania	-	-	1	-	**1**
48	UOA	University of Agriculture, Faisalabad Pakistan	Pakistan	-	-	32	-	**32**
49	University of Bodenkultur-BO	University of Bodenkultur-BOKU	Austria	-	-	14	-	**14**
50	UOC	University of Copenhagen	Denmark	-	-	0	-	**0**
51	UOP	University of Peradeniya, Sri Lanka	Sri Lanka	-	-	34	-	**34**
52	TIH	Unversitu of Vertinary Medicine Hanover-TIH	Germany	-	-	21	-	**21**
53	CIAT	International Center For Tropical Agriculture (CIAT)	Colombia	28	-	-	-	**28**
54	CAP	Centre for Agricultural Policy (CAP)	Vietnam	42	-	-	-	**42**
55	IASVN	Institute for Animal Sciences for Southern Vietnam (IASVN)	Vietnam	23	-	-	-	**23**
56	KIT	Koninklijk Instituut voor de Tropen	Netherlands	257	-	-	-	**257**
57	NIAH	National Institute of Animal Husbandry (NIAH)	Vietnam	18	-	-	-	**18**
58	RVC	Royal Veterinary College	UK	60	-	-	-	**60**
59	SUA	Sokoine University of Agriculture,Tanzania	Tanzania	25	-	-	-	**25**
60	TNU	Tay Nguyen University (TNU)	VietNama	19	-	-	-	**19**
61	INE	The Institut de l'Environnement et de Recherches Agricoles	Burkina Faso	24	-	-	-	**24**
62	NIVR	The National Institute of Vetinary Research (NIVR) under Cross-CRP Projec	Nigeria	14	-	-	-	**14**
63	UON	Unversity of New York	US	67	-	-	-	**67**
64	WGU	Wageninen University	Netherlands	77	-	-	-	**77**
65		Western Highlands Agriculture & Forestry Science Institute	Vietnam	23	-	-	-	**23**
66	SRC	Stockholm Resilience Centre	Sweden	3	-	-	-	**3**
67		University of Hannover	Germany	-	-	44	-	**44**
68		University of Hohenheim	Germany	-	-	35	-	**35**
69	BIDS	Bangladesh Institute of Development Studies	Bangladesh	-	-	7	-	**7**
70	HKI	Helen Keller International	Bangladesh	-	-	66	-	**66**
71	CARE	Care International Egypt	Egypt	-	-	104	-	**104**
72	RCMFSE	Research Center for Marine and Fisheries Socio Economics	Indonesia	-	-	6	-	**6**
								-
	Total for CRP			**580**	**996**	**1,756**	**-**	**3,432**

1. CIAT

Item	Institute Acronym	Institute Name	Country	Actual Expenses - This Year				
				Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1	CORPOICA		Colombia		-	14	-	**14**
2	UNA	Universidad Nacional Agraria (UNA)	Nicaragua		30	4	-	**34**
3	NARO-NaLIRRI	National Agricultural Research Organization (NARO)	Uganda		-	-	-	-
4		NARS (DAFO,PAFO, ...)	Laos		-	5	-	**5**
5	LEIBNIZ	Leibniz Center For Agricultural Landscape Research-ZALF	Tanzania		-	17	-	**17**
6		CORPOICA	Colombia		-	-	-	-
7	UH	University of Hohenheim	Germany		-	196	-	**196**
8	NAFRI	National Agriculture and Forestry Research Institute - Ministry of Agricult	Cambodia/Laos/Vietnam		-	60	-	**60**
9	TNU	Tay Nguyen University (TNU)	VietNama		-	36	-	**36**
10	DAPH	Department of Animal Production and Health (DAPH)	Combodia		-	34	-	**34**
11	RUA	RUA Royal University of Agriculture	Combodia		-	30	-	**30**
12		NARS						
13	SUA	SOKOINE UNIVERSITY OF AGRICULTURE (SUA)	Tanzania		-	-	-	-
14	TALIRI	Tanzania Livestock Research Institute (TALIRI)	Tanzania		-	22	-	**22**
15	HEIFER	Heifer International Nicaragua	Nicaragua		-	36	-	**36**
16	CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza	Costa Rica		-	35	-	**35**
17	CEI	Centro de Exportaciones e Inversiones Nicaragua	Nicaragua		-	18	-	**18**
18	NICACENTRO	Cooperativa Multisectorial Lácteos NICACENTRO , R.L	Nicaragua		-	22	-	**22**
								-
		Total for CRP		-	30	530	-	**559**

2. ICARDA

Item	Institute Acronym	Institute Name	Country	Actual Expenses - This Year				
				Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1	APRI	Animal Production Research Institute	Egypt			18		
2								
3								
		Total for CRP		-	-	18	-	-

3. ILRI

Item	Institute Acronym	Institute Name	Country	Actual Expenses - This Year				
				Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1	EIAR	Ethiopia Institute Of Agricultural Research	Ethiopia	-	136	-	-	**136**
2	FIIB	Foundation Institute for Biotechnology Research	Argentina	-	7	-	-	**7**
3	GALVmed	Global Alliance for Livestock Veterinary Medicines	UK	-	11	-	-	**11**
4	ITM	Institute of Tropical Medicine	Belgium	-	141	-	-	**141**
5	OAU	Obafemi Awolowo University, Ile-Ife	Nigeria	-	110	-	-	**110**
6	RVC	Royal Veterinary College	UK	-	102	-	-	**102**
7	USDA	United States Department of Agriculture	US	-	227	-	-	**227**
8	UOC	University of Copenhagen	Denmark	-	17	-	-	**17**
9	UOE	University Of Edinburgh	UK	-	196	-	-	**196**
10	UOO	University of Oxford	UK	-	8	-	-	**8**
11	UOT	University of Toronto	Canada	-	12	-	-	**12**
12	CIAT	International Center for Tropical Agriculture	Colombia	-	-	91	-	**91**
13	SRC	Scotland's Rural College	Scotland	-	-	2	-	**2**
14	BAU	Bangladesh Agricultural University	Bangladesh	-	-	10	-	**10**
15	CAU	China Agricultural University	China	-	-	56	-	**56**
16	CSIRO	Commonwealth Scientific And Industrial Research Organisation (CSIRO)	Australia	-	-	47	-	**47**
17	EISMV	Ecole Inter Etats des Sciences et Médecine Vétérinaires de Dakar (EISMV)	Senegal	-	-	148	-	**148**
18	EU	Enterprise Uganda	Uganda	-	-	11	-	**11**
19	FML	Faida Market Link	Tanzania	-	-	108	-	**108**
20	FORWARD Nepal	FORWARD Nepal	Nepal	-	-	42	-	**42**
21	FLI	Friedrich - Loeffler Institut, Jena, Germany	Germany	-	-	224	-	**224**
22	HI	Heifer International Tanzania	Tanzania	-	-	27	-	**27**
23	NIAH	National Institute of Animal Husbandry (NIAH)	Vietnam	-	-	10	-	**10**
24	NMAIST	Nelson Mandela African Institution Of Science And Technology (NMAIST)	Tanzania	-	-	42	-	**42**
25	SRC	Scotland's Rural College	Scotland	-	-	9	-	**9**
26	SIAR	Senegalese Institute of Agricultural Research	Senegal	-	-	3	-	**3**
27	SNV	SNV Netherlands Development Organisation	Netherlands	-	-	13	-	**13**
28	TDB	Tanzania Dairy Board	Tanzania	-	-	1	-	**1**
29	UOA	University of Agriculture, Faisalabad Pakistan	Pakistan	-	-	32	-	**32**
30	University of Bodenkultur-BO	University of Bodenkultur-BOKU	Austria	-	-	14	-	**14**
31	UOC	University of Copenhagen	Denmark	-	-	0	-	**0**
32	UOP	University of Peradeniya, Sri Lanka	Sri Lanka	-	-	34	-	**34**
33	TIH	Universitu of Vertinary Medicine Hanover-TIH	Germany	-	-	21	-	**21**
34	CIAT	International Center For Tropical Agriculture (CIAT)	Colombia	28	-	-	-	**28**
35	CAP	Centre for Agricultural Policy (CAP)	Vietnam	42	-	-	-	**42**
36	IASVN	Institute for Animal Sciences for Southern Vietnam (IASVN)	Vietnam	23	-	-	-	**23**
37	KIT	Koninklijk Instituut voor de Tropen	Netherlands	257	-	-	-	**257**
38	NIAH	National Institute of Animal Husbandry (NIAH)	Vietnam	18	-	-	-	**18**
39	RVC	Royal Veterinary College	UK	60	-	-	-	**60**
40	SUA	Sokoine University of Agriculture,Tanzania	Tanzania	25	-	-	-	**25**
41	TNU	Tay Nguyen University (TNU)	VietNama	19	-	-	-	**19**
42	INE	The Institut de l'Environnement et de Recherches Agricoles	Burkina Faso	24	-	-	-	**24**
43	NIVR	The National Institute of Vetinary Research (NIVR) under Cross-CRP Projec	Nigeria	14	-	-	-	**14**
44	UON	Unversity of New York	US	67	-	-	-	**67**
45	WGU	Wageninen University	Netherlands	77	-	-	-	**77**
46		Western Highlands Agriculture & Forestry Science Institute	Vietnam	23	-	-	-	**23**
		Total for CRP		**677**	**966**	**945**	-	**2,589**

4. WORLDFISH

Item	Institute Acronym	Institute Name	Country	Actual Expenses - This Year				
				Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1	SRC	Stockholm Resilience Centre	Sweden	3	-	-		**3**
2		University of Hannover	Germany	-	-	44		**44**
3		University of Hohenheim	Germany	-	-	35		**35**
4	BIDS	Bangladesh Institute of Development Studies	Bangladesh	-	-	7		**7**
5	HKI	Helen Keller International	Bangladesh	-	-	66		**66**
6	CARE	Care International Egypt	Egypt	-	-	104		**104**
7	RCMFSE	Research Center for Marine and Fisheries Socio Economics	Indonesia	-	-	6		**6**
8								-
		Total for CRP		**3**	-	**262**	-	**265**

TOTAL FOR CRP "X.X"

	Actual Expenses - This Year				
	Windows 1 & 2	Window 3	Bilateral	Center Funds	TOTAL
1. AFRICA RICE				-	-
2. BIOVERSITY				-	-
3. CIAT	-	30	530	-	**559**
4. CIFOR				-	-
5. CIMMYT				-	-
6. CIP				-	-
7. ICARDA	-	-	18	-	**18**
8. ICRAF				-	-
9. ICRISAT				-	-
10. IFPRI				-	-
11. IITA				-	-
12. ILRI	677	966	946	-	**2,589**
13. IRRI				-	-
14. IWMI				-	-
15. WORLDFISH	3	-	262	-	**265**
Total for CRP	**680**	**996**	**1,755**	-	**3,432**