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CGIAR Research Program on Livestock Capacity Development Strategy

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


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Introduction

Capacity development is a critical enabler to the achievement of development outcomes and impacts. It is embedded in the Livestock CRP strategy, theory of change and impact pathways.

The Capacity Development Strategy aims to respond and contribute to the achievement of the Livestock CRP theory of change by focusing on enabling capacity development actions. To bring about change, strategic capacity development interventions are critical to enable individuals and institutions to develop knowledge and skills to plan, implement and review flagship research for development processes.

In line with the CRP proposal, the CapDev work of the CRP focused on a few key elements of the CGIAR Capacity Development Framework, and notably capacity need assessments, innovative training materials and approaches, and the ongoing development of future research leaders through fellowships. The relevant sections of the proposal are provided as reference materials in the annex of this strategy, and a summary of CapDev key activities supported by the CRP during the 2017-2021 period is provided below. It is worth noting that there was a major reduction in W1/2 in 2017 that limited activity in that year; and that the CRP has subsequently been shortened by a year to end in Dec 2021.



The Capacity Development Strategy is informed by country Capacity Needs Assessments (CNAs) conducted in Ethiopia, Uganda, Tanzania, Tunisia and Nicaragua. The CNAs diagnosed capacity assets and needs by core capacity areas which are critical for the Livestock CRP Flagships. Country CNA reports identified capacity needs in knowledge, partnership, implementation and policy capacities addressing capacity issues at the individual, organization and system level.

Based on CNA results and recommendations, which are also aligned with the CGIAR Capacity Development Framework and the Livestock CRP theory of change, the Capacity Development Strategy focuses on interventions which the CRP prioritized for implementation.

Finally, the last section highlights key opportunities and challenges for a successful implementation of this capacity development strategy.

1. Capacity Needs Assessment and Strategy Design

1.1. Capacity needs assessment process

This strategy design was preceded by a capacity needs assessment (CNA) process for five Livestock CRP countries – Ethiopia, Uganda, Nicaragua, Tanzania and Tunisia. The CNA looked at the gap between where capacities stand and where they need to be to scale competencies in the CRP through strategic interventions recommended in this document.

The major focus in developing the CNA methodology including tools was to develop a process which was detailed enough to provide CRP focused insights, yet generic enough to allow use by a variety of projects in different countries and in different languages. For a more detailed account of the process you can find the methodology and tools online ([here](#)).

The units of analysis in the CNA were the five priority countries and results are also consolidated by flagship. The capacities were assessed at three levels: systemic, organisation and individual capacity, and the areas of focus were partnerships, knowledge, implementation and policy.

The CNA process started with developing a methodology and data collection tools (framework, Focus Group Discussions (FGD), Key Informant Interviews (KII)) that were tested on the Africa Rising project in Mali and Ethiopia before wider use in the CRP. A total of 103 people were interviewed as part of 34 key informant interviews and 17 FGDs conducted across the five countries. Individual country reports for the five countries and one consolidated report for the Livestock CRP¹ have informed this Livestock CRP strategy document.

1.2. Findings and recommendations of country CNA reports

The need for strengthening training methodology and learning capacity comes out strongly throughout country reports. The reports identified that partner staff have limited learning opportunities and access to knowledge and information.


Centre staff who are implementing the CRP (Flagships), as well as CRP partners (those jointly implementing the program) have good technical skills, but limited skills in the design and facilitation of effective learning processes, which are critical to research for development projects to share and capture knowledge beyond technical knowledge. In addition, partnership, communication and project management skills emerged as another improvement area, both for CRP (staff implementing flagships / priority countries) and its partners. Process documentation of planning, implementation and review processes are

¹ Kangethe, E., Symekher, L., Lemma, M., Sambati, P. and Dror, I. 2018. Capacity needs assessment of Livestock CRP. Nairobi, Kenya: ILRI. Available from <https://cgspace.cgiar.org/handle/10568/98967>

highlighted as particularly important to strengthen institutional and capacities in this context.

Country reports identified implementation capacity needs related to knowledge and skills. Extension workers (and other stakeholders who may be scaling out) require capacity to facilitate interaction and effectively communicate with farmers / pastoralists. The application of digital extension solutions was raised as both a need and an opportunity to address some of the traditional limitations of conventional extension.

The main summary recommendations of country CNA reports are reproduced below.

 Recommendations Summary
1. Develop training methodology capacity
2. Develop partnership management capacity (support to the ongoing partnership work).
3. Develop capacity of extension workers to overcome barriers to communicating with farmers / pastoralists
4. Develop digital extension solutions to enhance current (low) extension capacities.
5. Develop and disseminate targeted advocacy messages (linked to the GLAD work)
6. Training on project management and communication skills targeting implementation level staff

Given the need to prioritize and focus on areas that are realistic for the CRP's mandate and available resources, the CRP focused on several key capacity development activities, detailed in the following section.

The CRP also chose not to act on several of the recommendations, either because the CRP is not the best actor to address it or resource constraints. These include:

Recommendation 2: Develop partnership management capacity – while partnerships are key to the CRP's success, there is already an effort on enhancing these skills led by the CRP Management.
Recommendation 5: Develop and disseminate targeted advocacy messages - Similarly to the above, there is an ongoing project (GLAD) that has this as its explicit objective. The CRP should link up and integrate GLAD outputs into its work.
Recommendation 6: Training on project management skills targeting implementation level staff: these 'soft' skills are important, and the CRP should be aware (internally and amongst partners) of any critical skill gaps that may influence its ability to deliver. At the same time, we question whether it is the CRP's role to provide such general trainings on a wide-range of 'soft' skills, and whether the CRP has a comparative advantage in this area. Therefore, when engaging with partners, the CRP recommends that their projects include provision for getting this type of training from the multiple providers out there.

It is interesting to note that specific capacities to engage with the private sector, which we generally see as a gap in CRPs, did not come up as a major recommendation from the CNAs – the CRP may explore that further as part of more scaling plans for specific innovations / integrated packages of livestock technologies.

2. Strategic focus

Based on the recommendations of the CNAs, the CRP prioritized the following thematic CapDev areas:

<i>Recommendation 1: Develop training methodology capacity</i>
<i>Recommendation 3. Develop capacity of extension workers to overcome barriers to communicating with farmers / pastoralists</i>
<i>Recommendation 4. Develop digital extension solutions to enhance current (low) extension capacities.</i>

2.1. Support extension officers and other key implementing partners in CRP core work areas

The CRP will invest in a range of activities that can support the CRP partners (those jointly implementing the program) or the wider stakeholders, especially those who may be involved in scaling research solutions such as extension officers. This work is derived from the CRP flagships work (health, feeds etc.) and leverages its ongoing investments and expertise in technical livestock areas.

Key activities in this area of work include:

- Capacity needs assessments, including assessment of extension officers' livestock knowledge and extension & communication skills
- Development of learning/training modules. This includes the development of extension materials, job aids, community conversation modules, toolkits, 'how to' guides etc.
- Facilitation and documentation of training events and other learning events (including multi-stakeholder platforms).
- Gender capacity assessments of Livestock CRP partners (in collaboration with the Gender team)

There are several different adult learning methodologies that can, and should, be used when designing, developing and conducting training initiatives. These include having clear learning objectives, adapting the medium to the experience level of the trainees, considering appropriate blended and asynchronous learning sessions to reinforce retention, etc. The CRP will therefore include instructional design strategies to support experiential learning practices where learning and training content links to concrete experiences together with reflective learning practices.

2.2. Create and deploy high-quality livestock content development across multiple digital channels (Digital extension)

The CRP has broad experience in developing and repurposing content from traditional formats (research outputs, study reports, brochures, etc.) to high quality, consumer facing and mobile/ICT ready content formats that is contextualized to the intended country.

We will produce high-quality digital content, defined as being technically accurate while also taking into consideration local needs, motivation and barriers to change factors that are necessary for influencing behaviour through digital technology. To achieve this, the CRP should develop content using a strict quality assurance process that guarantees only the appropriate sources of information are used through checking for rigor of evidence base, information and sources used to inform the curation process.

Once high-quality content for core CRP commodities (dairy, pig, small-ruminants) is available, we will prioritize multichannel digitisation to reach the different audiences who use different media for information and entertainment—mobile (SMS/voice), radio, mobile, online and offline apps, etc.

3. Priority capacity development activities 2019-2021

Focus on CRP Priority countries for cross-cutting CapDev work

The selection process to reduce the number of Livestock CRP priority countries was completed in late 2018. The CRP is now able to implement a key feature of its Theory of Change as country-level strategies integrating activities from all five Flagships in Ethiopia, Tanzania, Uganda and Vietnam.

The cross-cutting themes of gender, capacity development, youth, agri-business development, monitoring, evaluation and impact assessment are all particularly relevant and important in the priority country work.

For capacity development, the integrated and more intense work in priority countries presents opportunities to support activities across all flagships in the country and help achieve a more coherent capacity development intervention in these countries. Therefore, we are prioritizing support to priority countries, through a coordinated effort with the country leadership and in consultation with all flagships. In 2019, detailed planning took place for CapDev work in the Ethiopia, Tanzania and Uganda priority countries. Priority activities include:

Uganda:

1. Develop training methodology capacity

- Facilitate access of farmer to existing mobile interactive voice response (IVR) biosecurity audio messages. Channels will include a farmer paid IVR service, Farm Radio Uganda and appropriate social media channels targeting extension agents e.g., Facebook, YouTube, WhatsApp etc.

2. Develop capacity of extension workers to overcome barriers to communicating with farmers / pastoralists

- Facilitate forage use awareness through animated series accessible on smart mobile phones but also useful as audio only files for sharing in voice channels like vernacular radio and tv stations.
- Develop and distribute animated clips on biosecurity and best practices of use and management of veterinary drugs (especially antimicrobials) through such channels like WhatsApp/FB sharing, YouTube downloads; these channels will mainly target extension agents as job aids to use during farmer visits and are especially inclusive for the youth. The related audio files will also be available for use on mobile and radio channels.
- Develop pig heat stress awareness tools/job aids—audio with animation to show how an elevated pen improves air flow, discuss providing water ad lib, mixing feed with water and pig swimming/wallowing (needs careful demystifying as might sound ostentatious at first), pouring water on the skin etc.

3. Develop digital extension solutions to enhance current (low) extension capacities

- In partnership with local digital solutions providers and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the CRP will support the design and deployment of an ecosystem of digital CapDev solutions to support the various value chain actors with knowledge on best practices including practical tools like feed calculator, disease reporting channels etc. This combination of solutions will form the PigSMART platform.
- Develop farmer and extension guide tool/cards for feeding pigs considering the target body weight and cost effectiveness of the feeds.
- Develop and feed composting mobile and or web app for feed processors on standard feed formulation catering for different desired feed weight and quality outputs
- Designing mobile/web app to facilitate disease reporting to the platform

Tanzania:

1. Develop training methodology capacity

- Develop a training needs assessment tool to be embedded to the baseline HH survey data collection tool
- Develop a training needs assessment plan in the form of report recommendations to inform the capacity building plan
- A mapping of current capacity development approaches and actors currently in use in the project area
- Synthesis of capacity building approaches with promising potential to target agripreneurs on various capacity needs identified in the project

2. Develop capacity of extension workers to overcome barriers to communicating with farmers / pastoralists

- Develop and deploy an eLearning training course on dairy cow management that includes breeding, feeding and health (adapted from similar work from the Kenya Crops and Dairy Markets Development project partnership with ILRI)
- Develop and deploy a training package on soft skills adapted from EMPRETEC targeting farmer groups, agripreneurs on business management skills, interpersonal skills etc.
- Develop multimedia/digitised extension communication materials (animation videos, skit audios, messages) for use as extension tools for producers and agripreneurs

3. Develop digital extension solutions to enhance current (low) extension capacities

- A synthesis report on the role of the various digital advisory services in promoting uptake of integrated technology packages for upgrading the dairy value chain
- A tool to assess the effectiveness of various digital capacity building solutions deployed in the project
- Assessment report on effectiveness of the various digital capacity building solutions deployed in the project

Ethiopia:

1. Develop training methodology capacity

- Capacity development of partners. This includes development of a generic module on training of farmers and development agents (i.e. training/communication skills). It also includes development of training/community conversation modules that reflect latest methodological and didactic insights in adult learning.
- Design and delivery of a training of trainers (ToT) program for Continuous Professional Development (CPD) program for in-service veterinarians trainers in adult training skills and CPD module development (instructional design)

2. Develop capacity of extension workers to overcome barriers to communicating with farmers / pastoralists

- Assessment of Development Agents (DA) livestock knowledge, digital literacy, market and extension communication skills including review of DA curriculum/job description to establish desired capacity level
- Development of learning/training modules/materials on various livestock management topics (livestock breeding, small ruminant reproductive management and diseases, respiratory diseases, biosecurity and housing/management, targeted feeding) including development of training/community conversation modules for farmer and DA training, participatory livestock extension toolkit, and how-to-guide on multi-stakeholder platforms
- Facilitation and documentation of group learning events (including multi-stakeholder platforms, stakeholder workshops, community conversations, etc.). This involves production of process-based reports with key reflections and recommendations/action points and follow-up strategy and documentation of change stories and synthesis of experiences and lessons learned on various capacity development related interventions.
- Gender capacity assessments of Livestock CRP partners and delivery of participatory, experiential training activities and action plan for knowledge transfer/application, supportive supervision and mentoring of partners, and evaluation and documentation of change stories.
- Develop animal health extension packages for female livestock owners (HEARD project). This includes review of extension materials and packages in view of gender responsiveness, needs/situation assessment in 2 districts (Livestock CRP sites) to identify women specific livestock health management issues; identify content and structure for animal health extension packages; development and testing of animal health extension packages, and training of field level extension workers and female livestock owners.
- Produce and disseminate animal health extension materials (HEARD project). This includes development of various animal health extension materials, such as participatory gender inclusive extension methods; gender transformative community conversation

approach; guidelines on how to develop extension messages/materials; animal health extension campaign approach; animal health school clubs; animal health field days; the farmer trainer and mentor approach in animal health; community action and learning groups in animal health; and gender inclusive market-oriented livestock extension approach. This category of activity aims to increase uptake of research outputs through development and dissemination of gender responsive extension materials and improve animal health extension delivery and training system in Ethiopia.

3. Create and deploy high-quality livestock content development across multiple digital channels

- Development of community conversation eLearning modules for Development Agents. This involves situation assessment and identification of suitable learning and community conversation modules/content and format for eLearning and development of animated clips, mobile learning, job aids, audio visual materials, etc.
- Develop e-based CPD modules for the [HEARD](#) project

4. Implementation considerations

4.1. Partnerships

Some of this work requires skillsets complementary to those that we have in-house at the CRP (e.g. instruction design, app development etc.) – there is therefore a facilitation function that the CapDev team plays to identify suitable providers and help manage the co-creation process. We plan on partnering with both global and national companies and organizations working on similar projects in the priority countries. Through these partnerships, we hope to better address sustainability concerns and be able to have CRP content reach many more stakeholders than we could on our own. Some examples here include ongoing collaborations with global learning firms (e.g. Sonata Learning), supporting local IT start-ups (e.g. work with Jaguza and others in Uganda) and collaboration with digital extension projects with an active interest in livestock (e.g. FarmStack in Ethiopia).

4.2. A de-centralized approach to CapDev

With modest resources to support cross-cutting CapDev work in the CRP, other than the work in priority countries, the CapDev team will track and assess activities taking place in the flagships, both in W1/2 activities and in bilateral projects that relate to the priority CapDev activities identified above. Key learnings from the CRP's CapDev experiences will be synthesized in 2021. This approach will help in reporting on CapDev work and achievements for the POWB and annual reports, quality assurance for the CapDev tagging of milestones and deliverables, and lessons learned for future projects. In addition, more technical CapDev activities and reviews are undertaken in the flagships – for example the [health flagship conducted a review of its CapDev activities](#). These should be seen as complementary activities - build-up of knowledge in relevant areas involving hands-on training of the field extension workers, and on the other hand the introduction and establishment of learning and communication tools around CapDev more broadly for the CRP.

Annexes

CRP proposal – section 1.0.10 (Capacity development)

Capacity development role in impact pathway			
At CRP level, capacity development is identified as an enabler of the impact pathway, focusing on the ability of individuals and organizations to undertake research and use its results. This should result in accelerated progress towards IDOs and SLOs. At flagship level, analysis has been done, based on each flagship's ToC, to identify the key areas where capacity development will most be needed. This analysis has informed the strategic actions and budgets outlined below.			
Strategic capacity development actions			Please indicate any indicators that could be used to track progress and contribution to CapDev sub-IDOs
Intensity of implementation of chosen elements (Please indicate High, Medium, Low)		Give an indication of <u>how</u> chosen elements will be implemented	
1. Capacity needs assessment and intervention strategy design	High	All flagships will invest in detailed capacity needs assessments and intervention strategy design at the start of the CRP2 cycle, and when additional large projects come on board during the 2018-2022 period.	<ul style="list-style-type: none"> • (Adapted) needs assessment methodologies available in published form for each CRP. • Proportion of CRP flagships using capacity needs assessment methodologies. • Proportion of CapDev budget allocated to interventions consistent with capacity needs assessment recommendations (disaggregated by organization, CRP, flagship).
2. Design and delivery of innovative learning materials and approaches	High	Numerous projects across all flagships will produce training materials using instructional design expertise and harnessing cutting-edge learning technologies.	<ul style="list-style-type: none"> • No. of partner organizations using materials and approaches. • No. of training or learning events where the materials and approaches are used. • No. of people trained (disaggregated by sex, job/role, location, literacy). • Cost-effectiveness of materials and approaches. • Proportion of training events/workshops where knowledge and skills of participants increase significantly.
3. Develop CRPs and centres' partnering capacities	Medium	Some of the flagships (and especially the Livestock Livelihoods and Agri-Food Systems flagship) will invest in systematic efforts to identify and broker partnerships and to apply the resulting models as part of scaling up. One new area for the CRP could	<ul style="list-style-type: none"> • No. of assessments of suitability, capacity, and complementarity of potential partner organizations conducted. • No. of research outputs resulting from partnerships that are successfully scaled up. • No. of technologies/tools adopted across partner organizations.

		include alignment with business management in commercial agriculture, and partnering with the private sector.	
4. Develop future research leaders through fellowships	High	There will be both 'traditional' MSc and PhD fellowships throughout the flagships and specific opportunities at the BecA-ILRI Hub (notably with the Africa Biosciences Challenge Fund fellowship program) and the Mazingira Centre (on a range of environmental and climate change issues). This area also builds on the many existing partnerships with higher education institutions in developing and developed regions.	<ul style="list-style-type: none"> • Amount of funding for fellowship programs • No. of fellowship places provided (disaggregated by level, gender, department). • No. of scientific publications accepted. • Funding allocations for research programs involving returned fellows/post-docs.
5. Apply gender-sensitive approaches throughout capacity development	Medium	In partnership with the gender teams, ensure gender dimension is incorporated into capacity development activities throughout the CRP.	<ul style="list-style-type: none"> • Proportion of capacity needs assessments that proactively target women. • No. of capacity development activities in gender approaches/toolkits initiated (disaggregated by type).
6. Institutional strengthening	Medium	Several flagships will work to develop the capacity of decision-makers to use research outputs and to inform policy design and reform.	<ul style="list-style-type: none"> • No. of institutional assessments conducted with national programs. • No. of strategic plans for institutional strengthening formulated based on such assessments. • No. of policy-oriented knowledge sharing/training activities targeting human resources in national programs (disaggregated by focus—policy, technical) • No. of strategic plan recommendations implemented (disaggregated by agency).

7. Monitoring and evaluation (M&E) of capacity development	Low	The CRP will probably limit itself to the requirements of the CRP2 overall reporting, see Annex 3.2.	<ul style="list-style-type: none"> No. of workshops/discussions organized on methods and reflections on outcomes of evaluations conducted. Proportion of capacity development activities for which monitoring reports are produced.
8. Organizational development	Medium	Flagships that invest in this element will focus on strengthening boundary partners for research uptake, as part of a delivery/scaling up strategy. One example is the work of the BecA-ILRI Hub on upstream research and laboratory management, which develops organizational capacities across Eastern and Central Africa, and aligning the CRPs work with national and regional research priorities (including the Comprehensive Africa Agriculture Development Program).	<ul style="list-style-type: none"> No. of workshops or trainings provided on research management Increase in funded research projects led by national programs and other partners Increase in funded time for national staff for research planning, management and uptake activities Implementation of incentive and reward system for engaging in uptake activities
9. Research on capacity development	Low	At this stage, specific research on capacity development is not a priority for the CRP.	<ul style="list-style-type: none"> % of initiatives where implementers can show evidence of incremental improvement in course content and delivery. Proportion of budget allocated to research on capacity development.
10. Capacity to innovate	High	Flagship projects will continuously identify and prioritize problems and opportunities, mostly through engagement with multi-stakeholder platforms.	<ul style="list-style-type: none"> No. of groups and multi-stakeholder (innovation) platforms facilitated by CRP (disaggregated by gender, socio-economic status, organizational affiliation). Composite index measuring rate and quality of group, platform or household experimentation with new ideas and technologies, including degree and source of innovation, quality of selection process and who is involved in making it.

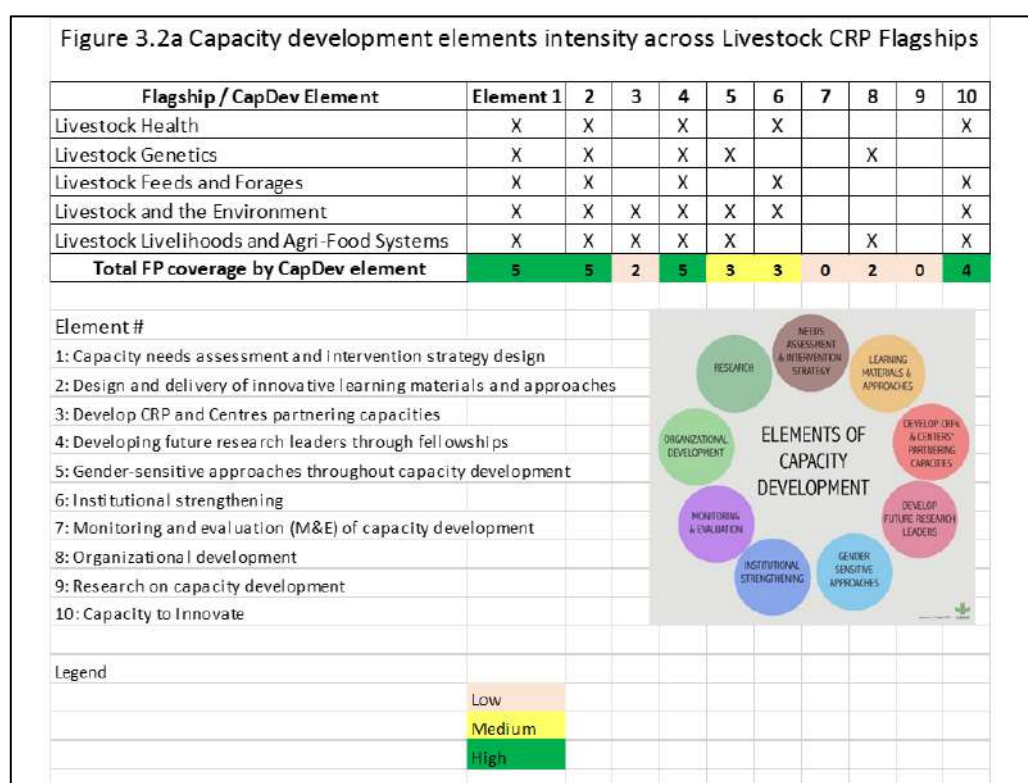
Annex 3.2 Capacity development strategy

Role in impact pathway

At the CRP level, capacity development is seen as an enabler of the impact pathway, focusing on individuals' and organizations' capacity to undertake and to use research. This will result in the enhanced ability of our research and development partners to make progress towards the IDOs and SLOs. At flagship level, analysis has been done to identify the key areas where capacity development will be needed most. This exercise has informed the strategic actions and budgets outlined below.

Strategic actions

The five flagships have identified 5 to 7 capacity development elements each that they will be focusing on. When aggregated, these give an indication of the CRP's priority areas, as can be seen in Figure 3.2a below.



In terms of specific priorities of the flagships, the following key activities have been identified.

Livestock Genetics

Capacity development of individuals, organizations and institutions to take research results to scale and ensure sustainability of genetic interventions will be based on needs assessment and involve the use of innovative learning materials and approaches that are gender sensitive.

The impact of capacity development activities will be monitored and evaluated, such that they can be adjusted if needed and can be used to derive lessons learned for sharing with others. Stakeholder groups targeted for capacity development include livestock keepers, national agricultural system partners, development partners, private-sector partners, information service providers, decision makers (including policy makers), and research partners, among others.

The flagship will also develop the capacity of future research leaders in animal genetics through graduate fellowships for research training, in collaboration with institutions within and outside the targeted countries (e.g. academic institutions), and through mentorship and on-the-job training. This will include training supported by the African Biosciences Challenge Fund (ABCF) of the Biosciences east and central Africa (BecA)-ILRI hub.

Additionally, curricula and training modules targeted at higher education programs in animal breeding, genomics and genetics for African regions will be developed, based on needs identified by the ILRI–SLU training program.

Livestock Health

Capacity development is a key component of all clusters of this flagship, each with different priorities and each addressing several elements of the CGIAR capacity development framework. There are two tracks for capacity development in the flagship, one addressing capacity to undertake research and one to use and apply research outputs, including awareness and delivery dimensions. Key elements per cluster are as follows:

In Cluster 1, we will need to develop the capacity of farmers to recognize diseases and measure their impact. In addition, research will be conducted with national partners who will require training in relevant research methods in epidemiology and impact measurement. Thus, this cluster will depend heavily on capacity development of partner institutions in both technical and social aspects in order to achieve intended outcomes.

Cluster 2 activities require substantial engagement of livestock producers and vets in the development of herd health packages. This offers exciting opportunities for R4D engagement during on-farm trials for women, men and young people, thereby fostering their capacity to innovate. Community animal health workers (CAHWs) and vets will need capacity development in how to use developed tools and packages. The key to achieving the necessary capacity will be the development of innovative learning materials and approaches based on adult learning theory combined with instructional design. All activities in this cluster also need to be gender sensitive.

Capacity development related to Cluster 3 will focus on fellowships, both as traditional MSc or PhD projects and in collaboration with BecA-ILRI Hub/ABCF Fellows. It will thus support the development of future research leaders in cutting-edge bioscience topics.

Cluster 4, which looks at delivery models for animal health products and services, depends on training for various audiences ranging from farmers, through CAHWs and vets, to policy makers. Besides the development of learning materials (printed and electronic), this cluster offers exciting possibilities for enhanced ICT4Ag work, including use of emerging technologies (e.g. Unmanned Aerial Vehicles) to deliver animal health products and services.

Livestock Feeds and Forages

Capacity development in this flagship will build on approaches developed during Phase 1 of the CRPs. It will focus primarily on two of the elements described in the CGIAR capacity development framework, namely **Design and delivery of innovative learning materials and approaches** and **Development of future research leaders** through fellowships.

Learning approaches, including blended learning for farmers and development practitioners, which is being developed for use in conjunction with decision support tools (e.g. FEAST/TechFit, SoFT), will be extended, while the efficiency and reach of these tools will be improved by using novel ICT approaches. Training of trainers will be addressed through capacity development events that focus on selected CRP sites and by incorporating approaches such as new instructional design. Big data approaches will be brought into play to support a broad audience ranging from development, research and education institutions, to policy makers, the private sector and farmers/farmer associations. Within the CRP, we will continuously train PhD, MSc and undergraduate students, while also receiving inputs from them and their supervisors that will enrich our research and contribute strongly towards its outputs.

Livestock and the Environment

The flagship recognizes a particular need for capacity development, as the concepts and interventions for implementing environmental management of /and through livestock production systems are not yet well established in many of the CRP's target countries. So this is a priority.

A capacity needs assessment will be the starting point, and will enable the refinement of a capacity development agenda that is expected to include:

- Design of training materials and approaches for environmental impact assessment frameworks and methods developed under Cluster 1 and the interventions developed under Cluster 2. Care will be taken to develop gender-sensitive approaches.
- A range of activities designed to enable women and young people to act as agents of change. The flagship's theory of change builds on the assumption that this can work.

In addition, capacity development will be instrumental in reaching: 1) environmental managers and staff in national development agencies, enabling them to design and implement a program of activities in this new field; and 2) the national and global research community, with a view to increasing their ability to use research outputs.

In order to influence policy changes, the flagship will test different partnership models, including seconding staff to line ministries, joining consultative forums (e.g. on climate-smart agriculture), and offering fellowships or study opportunities to national partner staff.

In terms of developing future research leaders, the flagship will support a number of fellowships (Msc and PhD), some of them through the Mazingira center.

Livestock Livelihoods and Agri-Food Systems

Capacity development in this flagship will start with conducting and formulating a **Capacity needs assessment and intervention strategy** in order to determine the gaps between existing and required competencies of both research and development partners and work

out ways of closing the gaps. Activities related to **Capacity to innovate** will be implemented in four clusters. For example, in Clusters 4 and 5 on understanding how change comes about in sites where new institutional arrangements will be promoted, and on applying monitoring and learning systems that embed research activity in ongoing processes of change.

Gender-sensitive approaches will be pursued in three clusters, especially in areas where the 'gender lens' has been less frequently applied, for example in the foresight work in Clusters 2, 4 and 5.

Institutional strengthening will take place in at least three clusters, including Cluster 5 in relation to facilitating and engaging in multi-stakeholder dialogues as well as in Cluster 1 with respect to development of the capacity of policy makers to use CRP research outputs.

Finally, at least two clusters will directly develop CRP and centres' **Partnering capacities**. For example, Cluster 5 will identify the most appropriate partnership models, including public–private partnerships. At least two clusters will also work on organizational development, including Cluster 4 on supporting delivery mechanisms for rural advisory services in selected sites in priority countries.

All clusters will also engage in the more traditional capacity development activities by Developing future research leaders through fellowships and by embedding students in research activities from the start, in collaboration with universities from the priority countries and partner universities from the North.

Specific engagements within the BecA-ILRI Hub and Mazingira Centre

As mentioned above, all flagships will engage in the development of future leaders through fellowships. However, there are two specific innovative approaches that we would like to highlight in this regard, namely the African Biosciences Challenge Fund (ABCF) of the BecA-ILRI Hub, and various opportunities for fellows at the Mazingira Centre to study climate-smart agriculture.

The ABCF is a visiting scientist program targeting scientists from African national programs, who are invited to undertake biosciences research-for-development projects at the BecA-ILRI Hub, using high-end facilities and equipment. It contributes strongly to the development of bioscience capacities in national programs through activities at both an individual and an organizational level. This includes identifying where specific capacities already exist and facilitating their connection to others for shared learning, resource mobilization and other multi-country, multi-disciplinary initiatives. We estimate around US\$ 1 million of funding for ABCF-related activities in the livestock CRP in 2017.

The Mazingira Centre, the first of its kind in Africa, works on mitigating livestock's environmental footprint and establishing baseline data for GHG emissions from livestock systems in and for Africa. It provides accurate and verifiable data for both crop and livestock production practices and land-use changes. Capacity development here will include drawing MSc and PhD students from across Africa, training local technicians, and mentoring Africa's future environmental and agricultural production scientists through sabbaticals and workshops.

Budget

Capacity development investments for the CRP as a whole total USD22.625 million, amounting to 7.6% of the proposed total CRP budget; USD20.575 million of which is within flagships. This amounts to 7.8% of total flagship budgets (refer to budget narratives for further explanation, including plans to grow this through new bilateral projects). The CRP will also invest in capacity development activities using the strategic investment fund (section 1.0.11).