

ISPC Commentary on the DCLAS Phase-II – Pre-proposal (2017-2022)

Summary

Given the extent and importance of the challenges facing dryland regions of the world, the ISPC accepts the premise that research on major dryland crops and systems will be critical to achieving the SRF. However, the current CRP pre-proposal on Dryland Cereals and Legumes Agri-food Systems (DCLAS) fails to provide a useful framework that convincingly links dryland cereals and global legumes. With its overarching orientation towards improving agricultural systems in dryland areas (pp 4-5 and especially Tables 1 & 2), the case is very weak for having a coordinated effort on key legume crops of both dryland and humid-tropic geographies under a single umbrella. The ISPC has a number of additional concerns on the structure and content of the overall CRP and also of several flagships.

The ISPC accepts that there is a very strong justification for including within the CGIAR portfolio a proposal which addresses such a geographically, demographically and ecologically important environment as that targeted by the DCLAS pre-proposal. Proponents of three different Phase I CRPs, i.e., Dryland Cereals (DC), Grain Legumes (GL) and Dryland Systems (DS) have brought together their resources and collective expertise in developing the DCLAS CRP for delivery of impact at scale. This is a daunting task – especially considering the short time frame the proponents had for this, and the complexity of the issues and systems to be tackled by the new CRP. The initial effort is to be commended as it represents an advance on the three previous Phase I CRPs offering, potentially, a useful systems perspective to help contextualize this extremely broad and complex agenda. DCLAS has also thought carefully about the relevance of particular partners for specific activities.

While the pre-proposal articulates a convincing case for a dedicated program of CGIAR research in the dryland regions, considerably more remains to be done before this pre-proposal should go forward. At this stage, the proposal is still quite generic, lacking the level of specificity that would allow a proper assessment of its potential value. The proposed structure and sequence of flagships (FPs) and clusters of activity (CoA) also has deficiencies. There are fundamental questions to answer regarding the advantages of trying to combine a mix of 12 cereal and leguminous crops into one CRP – and especially concerning the inclusion of several crops that are of lesser relative importance in the drylands. There are also questions about the comparative advantage of this CRP to take on a leadership role of some topics included in this pre-proposal, e.g., seed systems. Above all, there is an urgent need for the partner centres to undertake a comprehensive priority assessment exercise, to define the thrust and focus of the CRP.

In successive reviews of the Phase 1 and Extension proposals of DC and GL, the ISPC consistently emphasized the need to undertake relevant sets of supply and demand analyses as a basis for setting priorities. If this was done, it is not clear in the pre-proposal which appears to have compounded the problem of prioritization even further, by combining the specific challenges of commodity-based agri-food systems with the wider issues and inherent complexities of the dryland agroecosystems. The rigor and credibility of the whole DCLAS CRP would be improved through prioritization and focus.

Recommendation: The ISPC considers that this pre-proposal will need to address significant issues before moving to the full proposal stage. The **major concerns** that should be addressed in a re-submission of the pre-proposal include:

- Clarify and consistently present throughout the narrative the target domain of this CRP - whether primarily defined as an ecosystem based program targeting specific crops (and why those), or a commodity-based program that targets dryland areas. In either case, the justification for including humid-tropics legumes must be convincingly made on the basis of scientific opportunities; and the rationale for (i.e., added value of) combining the 12 crops together clearly explained. As currently presented, the ISPC is not persuaded that all legume crops belong in this CRP.
- A related point is that this proposal must fulfil its commitment to establishing priorities and focusing the 12-crop/dryland system research agenda – defining a timeline and sequence of activities that will be undertaken over the course of the first year (or more) of the Phase II CRP to arrive at a narrower set of crop, trait, and region-specific priorities for this CRP;
- Develop a sequencing and feedback strategy for FP2 and FP3, such that evidence and information emerging from FP1, FP5 and FP6 can inform other FP priorities;
- Identify and justify a set of essential activities under FP2 and FP3 (trait discovery and breeding) that must be maintained until such time as there is sufficient information to identify clear and well-justified priority targets for pre-breeding and breeding. , That is, large expenditures on pre-breeding and breeding activities should wait until the CRP can complete a comprehensive foresight and priority setting exercise. The key activities that can (and must) be carried out to retain critical functionality and personnel within the CRP should be justified based on past studies and lessons learnt, as well as on the need to maintain human and physical capacity.
- Merge FP4 with FP3 or consolidate with other CRP FPs dealing with seed systems.

[Score: C]

Overall analysis as an integral part of the CRP portfolio [Score: B]

This CRP pre-proposal argues a strong and convincing case for a dedicated program of CGIAR research targeting the drylands. In general, the DCLAS pre-proposal represents an advance on the 3 previous Phase 1 CRPs offering, potentially, a useful systems perspective to help contextualize an extremely broad and complex agenda. The pre-proposal includes seven FPs: (1) Priority Setting & Impact Acceleration, (2) Pre-Breeding & Trait Discovery, (3) Variety & Hybrid Development, (4) Seed Systems & Input Services, (5) Integrated Land, Water & Crop Management, (6) Improved Rural Livelihood Systems, and (7) Post-harvest Value Addition & Output Markets.

The pre-proposal claims that this CRP follows an integrated systems approach that builds on primary value chains of dryland cereals, legumes and livestock, pursues a sustainable intensification of agriculture, and seeks economic opportunity options for the poorest segment of rural society living in drylands, particularly in SSA and South Asia. However, the DCLAS CRP, as proposed, fails to present a truly integrative CRP that offers more value than the sum of its FPs. There are two reasons for this. Firstly, the pre-proposal does not elaborate on how it follows an agri-food system based methodology. Indeed, there is an unsettled tension between a primary systems focus (drylands) and a commodity focus, e.g., legumes globally. This needs resolution.

Secondly, a truly integrated approach to advancing productivity, sustainability and resilience would not split the FPs in what amounts to nearly disciplinary divisions. At present, FP2 and

FP3 appear to be largely devoted to biological science, while FP1, FP5, and FP6 are largely social science. There also appears to be a disconnect between the FPs that are essentially exploratory in nature (FP1, FP5, FP6) and those that have a more defined research agenda (FP2, FP3, FP4).

FP1 on priority setting spells out a set of important questions about where and how research can make a difference within dryland agri-food systems. Yet, other parts of the pre-proposal, e.g. FP2, FP3, and FP4, sketch out agendas for ambitious and costly research activities that would clearly be better informed by having answers to the questions in FP1. The teams writing each of these FPs do not appear to have had sufficient engagement with one another, an impression reinforced by the lists of the team members involved in preparation of each FP.

It is disappointing to see the lack of priority identification considering the strong recommendations made in earlier ISPC commentaries about the need to gather key data and undertake relevant demand and constraint analyses to help set priorities and focus the agenda. DCLAS proposes to work on 12 crops: barley, chickpea, common bean, faba bean, finger millet, groundnut, lentil, pearl millet, pigeon pea, sorghum and soybean. Are there no results from Phase 1 activities to guide priorities at this stage? Statements in the document such as “agriculture is a priority for livelihoods in these areas” need to be underpinned by serious analysis. Are these really the most important commodities? Is it realistic to think about irrigating dryland cereals and grain legumes? Missing is any reference to financial and economic feasibility studies to support the claims on irrigation, mechanization, and breeding priorities. Where are the social and environmental impact studies on these issues?

Importantly, there is no explicit discussion of the added value from integrating three previous CRPs. Does the new CRP offer more value than the sum of its parts? Key questions that need to be addressed include “How will DCLAS operate as an integrated program – at the programmatic, strategy, inter-center and management levels?”; “How will the implementation of DCLAS realize synergies and complementarities from Centers working more closely together”; and “Will integration improve DCLAS prospects of achieving its objectives and contributing more effectively towards the program’s IDOs?”

Lessons learned from previous research are not referenced to any extent in the pre-proposal, nor does the document address many issues raised by previous ISPC reviews of DC, GL and DS. In addition to prioritization of research and lack of clarity in targeting specific crops in specific geographical areas as already mentioned, these include: integration of research across different crops through cross-cutting CoAs and the need for fewer crop x trait targets (in GL there were 61 - in DCLAS there are hundreds). DCLAS, like its predecessor CRPs, has not taken these key issues seriously, and merging the three CRPs has compounded them further. The RTB experience with priority setting (and taking tough decisions) may be relevant here and would be a good model for DCLAS to consider, as it is the only other multi-crop CRP.

The target countries for DCLAS are presented in Annexes 2 and 3 with separate identification of countries for site integration efforts and of countries for DCLAS FP activities. Selection of countries for Phase II is purportedly based on six criteria that appear to be highly relevant, but the connection between the criteria used and the final selection of crop x country x research focus combination is not at all apparent. In particular, the justification – from a strategic point of view – for selecting sites in Central America (Nicaragua), North Africa (Morocco) and Central Asia (Uzbekistan) is not clear.

With respect to addressing the grand challenges, this CRP focuses on some of the world’s poorest and most disadvantaged people and those who will be most affected by climate change. The expected cumulative impacts in 2022 are 8m families exiting poverty (SLO1),

21m families escaping malnutrition (SLO2) and 27m ha of land saved from degradation. The performance indicator matrix aligns with relevant SRF IDOs and sub-IDOs, while Annex 13 relates them to output target indicators for each flagship in the three priority countries, namely Ethiopia, India and Nigeria. These are extraordinarily ambitious targets for such a short timeline. The justification for the targets should be made more explicit in the full proposal.

There is a very good discussion of collaborative potential and overlaps with other CRPs, and Annex 7 details the proposed linkages between DCLAS and other CRPs under each FP and CoA. These include extensive activities with CCAFS through learning platforms as well as PIM, A4NH and WLE (as IWMI). DCLAS also plans to work with Livestock and FTA. It would be useful to identify which of these linkages were active under the previous CRPs and which will be new. Plans for integration with other CRPs are in place but further thought is needed on the priority activities after DCLAS completes a priority assessment exercise.

The rigor and credibility of the scientific arguments underpinning the rationale for the pre-proposal are difficult to assess at the CRP level. The scientific arguments for the research proposed are dealt with under each FP, and some appear to be quite strong, e.g., for breeding and pre-breeding. It also comes through in the thoughtful discussions of priority setting and management of land and water resources.

Theory of Change and Impact Pathway [Score: B]

Annex 4 provides a diagram of the overall ToC and impact pathway. It shows consistency with the SRF and identifies IDOs to which FPs and CoAs will contribute; hence, it is aligned with the SRF IDOs. The associated table provides information on assumptions, risks, behavioral and capacity change for each FP as well as links with other CRPs. A great deal of information has been summarized in these two pages. However, without more detail, the ToC and the impact pathway remain at a very generic level. Many of the ToCs and impact pathways for the individual FPs do not satisfy the criteria. They simply show how the various FPs and CoAs link or contribute to each other. They do not relate to either sub-IDOs or IDOs (although there is mention of these in the summary). Hence it is not easy to relate the overall CRP ToC and impact pathways to the FP ToCs and impact pathways. This reduces the ability to realistically assess plausibility and feasibility. In addition, there is an absence of real testable hypotheses on implementation. Uncritical underlying assumptions are incapable of guiding R4D research toward an adaptive learning process that will improve prospects both for large scale impact on SLOs and for IPGs.

Cross-cutting themes

The gender strategy is mainstreamed throughout the FPs but is housed within FP1 for housekeeping and to facilitate strategic gender research related to improved livelihoods based on accumulated gender-disaggregated data. The youth strategy is linked to Digital Agriculture to encourage youth to pursue a technology-driven agriculture. Capacity building includes courses, distance learning and fellowships.

One area where the proposal is particularly weak is with respect to the consideration of the enabling environment for the seed systems FP (discussed below).

Annex 14 presents details of DCLAS's plans for capacity development showing that the CapDev Framework will be adopted. DCLAS adopts a comprehensive definition here that goes beyond the traditional one of trainings and workshops to include communications and media, mentoring, coaching, internships, degree and non-degree research, policy and process development, governance restructuring, partnership mediation, strategy development, fund raising, project management cycle and monitoring and evaluation. Conceptually, this is

sound, but the challenge is to operationalize it within the context of clear priorities and assessments of tradeoffs.

Budget

The budget is based on the approved total 2016 budget for the extension phase of the component CRPs, DC, DS and GL. Whether it has been able to “capture all possible synergies and efficiencies in management, R4D operations, partnerships, gender, youth and capacity development” as claimed is impossible to assess. The overall synthesis of the budget and the details of arriving at the current combined annual budget of \$137 m from the proposed 3-CRP total annual budget of \$145 m are presented in Annex 12. After accounting for some of the DS CRP budget being allocated to WHEAT, the combined budget of DCLAS is more or less the sum of the relevant budgets of the three CRPs that make up DCLAS. Hence there has been limited success in seeking savings through integration.

As submitted the budget seems to be high for some FPs, e.g. > US\$ 300 million on genetic enhancement FPs; i.e., about US\$ 4 million per year for each commodity included, or about 8 SSY if using an average of US\$ 0.5 million. This appears to be on the high side in the early years, when there are important unanswered questions about the breeding targets. It might make sense to proceed more slowly in breeding until there is more clarity on the priority problems to be addressed through plant science and the resources and approaches that will be brought to bear. Funding across FPs varies without indicating if this results from priority setting within the CRP (unlikely) or just from aggregating activity-based budgets. Priority setting should be driving the resource allocation.

Governance and management [Score: C]

DCLAS is still transitioning to its governance and management structure. By January 2016, a new Steering and Advisory Committee from representatives of the current individual programs is expected to be in place. Limitations to program efficacy due to the existing governance and management structures have been identified and recommendations have been provided by (1) the individual ‘CRP Commissioned External Evaluations’ of DC, DS and GL, and (2) the CO Internal Audit of DC and GL.

The proposed new CRP governance and management structure, following IEA guidelines, is presented in Annex 9. Partnerships are key for this CRP, hence, DCLAS involves partners on R & D undertakings and in the management and oversight of this program. This CRP will also seek public-private partnerships for up-scaling accessing novel cutting-edge technology. The membership of a donor in the governance and management of the CRP has the potential to lead to conflicts of interest. Leaders are not yet in place for DCLAS but the pre-proposal provides sound terms of reference for recruiting leaders of FPs and CoAs.

Although no partnership strategy document was included, the section on strategic fit of partners clearly indicates that DCLAS has put a lot of thought into the relevance of particular partners for specific activities. For example, for pre-breeding, research links with ARIs are strong, while for seed systems research the importance of the private sector as a partner is highlighted. The section on stakeholder commitment shows that partners are engaged and committed. Ongoing national-level discussions are strengthened by historical partnerships of participating centres, and newer partnerships are being established across public and private multinational organizations. New partners are also being sought. Each FP has a sub-section on the kinds of partners that will be involved in research activities. For the full proposal it would be helpful to see partner lists refined so that they are showing the most important collaborators, as opposed to a fairly exhaustive list of which other groups are involved.

FP 1: Priority Setting and Impact Acceleration [Score: A]

This FP asks all the right questions that this CRP needs to address but it is surprising that these questions – or at least some of them – have not previously been addressed by the three Phase 1 CRPs (for their respective domains). Still, this work needs to be done. An important question is whether it makes sense to proceed with other FPs – and if so, at what level of engagement and investment – before some key questions posed here have been answered.

Despite the importance of this priority setting work, the pre-proposal is somewhat vague as to *how* these important questions will be answered. The list of questions is better than the discussion of methods and approaches. Some references to modelling work raise more questions than they answer. Also, links of expected outputs with national and regional priorities and initiatives are not given. The feasibility of the impact pathways are hard to judge based on the text and supporting graphs.

The FP leadership team has not yet been identified, but short briefings of those involved in drafting the pre-proposal are provided. Publications are listed but without reference to the CRP research. The lessons learned are unclear since there was no reference on how things have changed or even been dropped on the basis of past CRP learning.

Generic statements about comparative advantage are given based on having ‘critical mass’ rather than showing professional expertise and profile available and noting areas in which skills will be sought through new partnerships. There would certainly be some advantages to working with IFPRI/PIM on this work, as well as with some external teams. But ultimately it is not clear that anyone else will do this work. The CoA in FP1 on climate change impact analysis proposes that DCLAS will work intensively with CCAFS, but this is not given the same level of prominence in the CCAFS proposal where DCLAS is listed as a collaborator on one topic only.

Issues of gender are dealt with very well here (CoAs deal with gender & youth issues and enabling environment), and there is some good discussion of how priorities should reflect the difficulties in the enabling environment. However, capacity building is not really emphasized.

The budget seems reasonable; and perhaps could be increased relative to the other FPs. The resources sought are about 10% of the CRP total budget for six expected outcomes related to priority setting, value chains, climate change, innovation systems, drivers of adoption, and M&E, which may be on the low side within the CRP allocation. Arguably this is money well spent, as it will help with the whole targeting of the CRP.

FP 2: Pre-Breeding and Trait Discovery [Score: B]

This FP proposes strategic investments on genomic-led breeding for 4 dryland cereals and 8 food legumes. Unfortunately the text and graph in the annex do not elaborate further on how the research translates into impacts. The argument is made effectively that genetic resources in these crops have been underexploited and are not well characterized, and there are clear claims for the strategic relevance of this research and the ways it will feed into a range of genetic improvements that will lead to IDO and SLO outcomes. A matrix indicating the priority traits that align to demand in target agro-eco-zones could be very useful to have, particularly if showing *ex ante* impacts, which may be further used for resource allocation across crops, traits and target population of environments.

The problem, however, is that if FP1 arguments are correct (i.e., that priority region-specific traits are not yet known), then this FP2 work appears unfocused. It is possible that there is still some work for this FP that would make sense to carry out even in the absence of a

coherent set of priorities, but these should be identified and justified in the proposal, leaving much of the rest of the work to wait until after FP1 has identified clear avenues of priority.

This FP builds on advances in genomics and phenotyping. In addition, it aims to capitalize on comparative biology within crop clusters: dryland cereals and legumes. The scientific quality of this FP is high. The members of the writing team have their skills and track record for engaging in this CRP, as noted in their CVs and publication lists. The lessons learnt are noted clearly in the text and how, based on them, this FP was built. Although it provides a partner list, it does not indicate their value regarding contributions that lead to impacts. It only divides them into those delivering knowledge and expertise for the deployment of genetic resources in breeding (namely ARIs as per examples given) or those assisting in development and delivery of outputs to useful outcome (selected NARS).

There are some statements referring to breeding of traits relevant to women in dryland systems but, generally little or no emphasis has been given to other cross cutting issues such as enabling environments and capacity development.

This is important work, but it would not be prudent to spend the \$22m per year budgeted on pre-breeding and trait discovery without a more focused understanding of which traits are desired. One possibility, then, is that the revised pre-proposal should make the case that the targets are indeed already well understood (in contrast to FP1). Alternatively, the proponents should come back with a pre-proposal showing how the research outputs of FP1 will inform a sequenced build-up of FP2. In this latter case, the FP2 budget in initial years would remain relatively small, with work focused on upstream science and on developing capacity. Then in subsequent years, activities would expand, focused on the newly identified priorities.

FP 3: Variety and Hybrid Development [Score: C]

The pre-proposal includes a generic impact pathway for plant breeding contributing to improved productivity that leads to lower prices and, in turn, to higher per capita consumption and nutritional benefits among the poor. It does not elaborate, however, on the links of expected outputs with national or regional priorities. The same issues noted above for FP2 apply here, perhaps more so. It would seem pointless to develop varieties and hybrids without a richer understanding of the targets. If the traits desired by farmers and consumers are not yet well specified, the benefit of pursuing this FP at this stage is not clear.

The proposers of this FP claim that the anchor crops of this CRP are “orphan crops” without providing evidence. Soybean (widely viewed as a model legume species and with significant investments by the private seed sector) can surely not be viewed in this light. For that matter, neither barley nor sorghum can be regarded in this category. As a side note, it would be interesting to know why barley is included in this CRP rather than grouped with wheat, given that both belong to the Triticeae and share to a large extent the breeding approach and methods.

There are real issues around comparative advantage here, particularly since the FP envisions a move wholly into hybrids. In this sphere, there are other providers, including private sector and public sector entities. Although the FP does speak to potential partnerships, *there are real questions about what role this CRP can/should play at various stages of hybrid development. There are undoubtedly lessons to be learned here from the Maize CRP and from the previous experience of public sector institutions in countries like India that have developed hybrids in sorghum and millet. It would be useful to see that these lessons have been taken on board in this CRP.* A partner list is given in pre-proposal as well as the strategy to select them.

Gender integration is elaborated in the FP text, which also includes some scattered statements on the importance of the enabling environment. Capacity development is based on scientific training, both on genomics and phenotyping, but indicators or country targets are not given. Not too much thought has been given to cross-cutting issues generally.

This FP aims for 16.7% of the proposed budget, which seems appropriate if this is pursued at full scale. But, as per the case of FP2, *it may make sense to pursue a smaller and more narrowly targeted program of breeding and development of hybrid varieties, until such time as the CRP's breeding objectives can be more fully articulated and various development hypotheses tested.*

FP 4: Seed Systems and Input Services [Score: D]

The pre-proposal makes a reasonable case that seed systems need to be changed as part of the overall pathway to impact for this CRP. It is not clear, however, that the CGIAR has any real ability to influence the design or functioning of seed systems at the national level. To the extent that this can be done, it will also not be done solely within this CRP, but through collaboration with other crop CRPs. So even if one is convinced of the ToC as presented, it is not altogether clear that this is a sensible area for this CRP to be spending its own resources on. Furthermore, the ToC needs to be questioned. The argument is (a) varieties are not being adopted, so (b) we need to improve seed delivery. But there are many reasons why varieties are not adopted. Perhaps they are not suited to farmers needs. Maybe farmers make more money doing other things than growing those crops. Have these possibilities been sufficiently examined? Here again, FP1 activity is a necessary precursor to this FP.

There do not appear to be any issues of scientific quality here, although there are some questions to be explored about how best to deliver high-quality seed in the environments under consideration. This FP includes two research question clusters, but it does not elaborate on the novelty of the approach or how it builds on lessons learnt.

This CRP has no obvious comparative advantage in addressing the problems of seed system development, management, or regulation. They can identify this as a constraint, but either they need to get around the problem by developing hybrid platforms that are sufficiently interesting that the private sector will get engaged in a big way (as has happened in some countries), or they need to work on OPVs that do not rely so much on effective seed systems. There are lots of strategic questions here, but the notion that this CRP is going to deliver research findings to governments that will convince them to develop high-functioning seed systems is not realistic.

This FP accounts for almost 12% of the proposed budget, which translates into an average of 23 SSY. Spending US\$13 million per year on this FP is, in the ISPC judgement, a poor use of resources. It would be more strategic to undertake this work as an integrative activity across commodities, rather than to repeat it commodity by commodity. The answers might be similar across different commodities, but the contrasts would help sharpen the conclusions while extending the scope of relevance of the findings (i.e., produce IPGs). For this and other issues cited above, the ISPC believes that this work should be merged with other CRP FPs dealing with seed systems. This might result in a single FP, possibly within PIM.

FP 5: Integrated Land, Water and Crop Management [Score: B]

This FP shows a feasible impact pathway in a diagram with supporting text indicating its alignment with sub-IDs and expected outcomes. Its clusters address grand challenges such as adopting climate-resilient agricultural practices, reducing risk, improving food security and combating land degradation. This FP seems to be the real intellectual nexus of the CRP. How can land, water, trees, and crops (and livestock – the omission of which from this FP is

puzzling) be integrated into effective dryland systems? The FP offers well posed questions (p. 57) that seem central to the work of the CRP. As with FP1, however, it is somewhat odd that this work is seen as distinct from FP2 and FP3. The systems work should be driving the targets for those FPs. At the moment, that does not come through in the CRP proposal or in any of the respective FP sections. While the ToC for this FP is not yet convincing, this is strategically important for this CRP; FP1 and FP5 (and FP 6) are logical precursors to FP2 and FP3. FP5 is a huge program of research and prioritization, and focus is needed.

The questions are well articulated here. What is less clear is *how* the questions are to be answered, and what has been learned from the past. The systems questions are difficult and complex. How will the FP make progress in understanding which interventions are crucial for altering dryland systems? Will this be trial and error? How much will it depend on modelling? Are there any innovative approaches that can be or have been used to guide the process of altering the system? The writing team for this flagship shows appropriate technical competency as per CVs and publications but does not mention what they achieved in previous CRPs. Its text does not indicate what the lessons learnt from previous work on CRPs was for developing further this pre-proposal.

It is difficult to see who else could possibly do this work and thus this CRP has a clear comparative advantage. However, partners are named in generic terms without indicating how they add value either through scientific contribution or by enhancing the probability of impact. Excellent attention is given to issues of gender and youth. Capacity building is a little further down the list.

The resources sought are about 23% of the DCLAS budget, which translates to 50 SSY, though there is no indication of where they will be working or what they will be doing. The largest and smallest budget allocations were given to expected outcomes related to integrated pest management and land/water conservation, respectively, while the other four expected outcomes share about the same funding. It remains unclear whether this partial uneven budgeting per expected output emerged from a sound priority setting. Consideration should be given to prioritizing this FP in the early years. This work is surely the basis on which the future work of the CRP will rest.

FP 6: Improved Rural Livelihood Systems [Score: B]

The strategic relevance of this section is excellent, although it is not entirely clear why it is distinct from FP5 or FP7. It would make good sense to combine some or all of these. The key here is thinking about the income-generating side of dryland grain and legume production as well as the increased direct consumption. The questions (p. 66) are well posed although, as with FP5, it is not clear *how* they will be answered. Assuming they can be, these broader livelihoods questions can and must be used as an input to priority setting for the breeding programs. The FP shows a plausible ToC showing links between its outcomes – ensuing from research output delivery – to the sub-IDOs. FP6 is well-constructed and no doubt benefits from the intensive and comprehensive exercise carried out by the DS CRP during 2014-2015 in terms of developing a systems approach and prioritization.

The scientific capacity of the team seems strong and the quality of the questions posed is high. As with FP5, there is concern about the approaches that will be used to answer these questions, which are difficult and methodologically challenging. With respect to comparative advantage, it is not clear who else would realistically carry out this work. Gender is well discussed here, whereas capacity building is not very well handled, and the enabling environment does not get too much attention. Attention is given to data management/big data.

FP6 might be another candidate for prioritizing early on in Phase 2 of this CRP, before shifting resources heavily to the breeding side. There might be budgetary synergies in combining this work with FP1, FP5, and FP7. While integrating FPs 1, 5 and 6 and front loading those efforts makes sense, an important qualifier is the likely mismatch with current human resources: breeders are unlikely to have the inclinations and professional expertise to undertake the required socio/economic/policy/political research needed.

FP 7: *Post-harvest Value Addition and Output Markets* [Score: B]

The ToC of this FP aligns various sub-DOs and DOs, links them to results of outcomes, and indicates target countries and key assumptions. The diagram included in the annex for this FP shows feasible impact pathways. However, this needs to be considered within the context of livelihoods overall. Otherwise there is a risk of creating a lot more dead end projects. This also is an opportunity to consider building relationships with some very unconventional, very exciting partners in the private sector, and among serious NGOs and academics.

This FP brings back timely postharvest research to the CGIAR using multidisciplinary and inter-institutional approaches, involving broad strategic partnerships. The writing team members show professional expertise on researching postharvest related issues, and benefit from lessons learnt on on-going CRPs (A4NH, DC and GL) that provide platforms and learning experiences for linking agriculture to improved nutrition. It also builds on exploratory research on product development and diversification in the two commodity CRPs noted above. Here again, it is not clear *how* the questions will be answered. It would be nice to see something other than a trial and error process in which different interventions are tried and then evaluated. Perhaps this links to FP1?

FP7 needs to be set in a value chain context to give it focus and may be more effectively done by responding to the interests of entrepreneurs and private firms (and perhaps also NGOs) as opposed to trying to drive the process from the supply end (i.e., from a research establishment). Priorities are needed. The cluster on business incubation for entrepreneurship is relevant as a CRP level activity rather than confined to this cluster. Gender and enabling environments are dealt with effectively; this is less true of capacity building.

This is the smallest FP budget by a considerable margin, and as noted above, it might make sense to merge this into FP6 and FP1 in some fashion in the revised pre-proposal. Is this FP of sufficient size and scale to be effective?