

21 February 2012

ISPC Commentary on the revised proposal for CRP3.5: Grain Legumes (of February 2012)

Summary

In its commentary on the original CRP 3.5 Grain Legume (GL) proposal of 15 August 2011, the ISPC highlighted critical areas where strengthening was needed, principally in making a much stronger case for selection of GL species and the research approaches to be addressed within the CGIAR portfolio. Whereas the rationale for and impact of research on major staples such as rice, wheat and maize are evident and compelling, the case to be made for one of the GL species is more difficult because they generally play a complementary rather than dominant role in crop-based systems. Hence making a stronger case for a CRP on GLs depends on: i) providing a rigorous prioritization among GLs and the key research questions to ensure these legume crops continue to play a critical role in the consumption (nutrition), income and system-level diversity components of poor rural and urban households, and, ii) describing how the proposed CRP research outputs will be managed and communicated to lead to impact on the CGIAR's system level objectives (SLOs).

Specific recommendations in the previous ISPC commentary focused on: making arguments for research investment *de novo* in relation to developmental and research constraints (not accepting current crop choices and research topics as the status quo); presenting a disaggregated analysis that provides confidence in justifying the proposed allocation of resources i.e., moving beyond the 20% yield increase on 20% of the total planted legume area by 2020 as a basis for production, income and incremental protein benefits), and starting to discriminate across crop species, regions and the large number of constraints based on potential impacts; providing a more realistic assessment of the role of GLs in terms of growth in demand over time and their contribution to human protein; narrowing the focus of the CRP effort – to fewer product lines; elaborating the impact pathways; closer alignment with CRP 1.1; elaborating and highlighting the most promising areas of research; and providing a more streamlined management and governance structure.

In this revised version, the proponents have made attempts to address these issues, providing some additional analysis, adding sections to the narrative and including some new appendices, and there are some improvements. For the most part, however, these are not satisfactory, as they fail to adequately address the key weaknesses identified in the ISPC commentary. Details are provided in the narrative below under each of the ISPC and FC 'Must-haves'.

In our judgment, the proposal remains weak in prioritization of species to be worked on and the rationale for research on each. There must be differences across species, and in research opportunities and constraints, that would lead to differentiated impact targets. The CGIAR should not expect to provide funding for commodities like soybean until a full examination of the comparative advantage of other suppliers (private sector, NARS—including those in Latin America) and the goals for CGIAR involvement have been spelled out. The ISPC is concerned that lack of prioritization reflects continuation of existing work of contributing Centers and not the design of a new, global research program for GLs tightly focused on addressing the SLOs. While some of the issues have been addressed adequately, some of the most important ones have not.

Recommendation

The ISPC recommends that CRP 3.5 is still in need of major revision and should fully address the ISPC and FC Must-Haves (and broader commentary) that have not been adequately addressed in the revised proposal.

Detailed Discussion

ISPC Must-have 1. [Provide] a much stronger description of the potential of research on GLs to decrease poverty and hunger as a basis for prioritizing crop-region-constraint combinations.

The revised proposal falls short of making strong justification for a CRP focused on GL research in relation to its potential for achieving CGIAR SLOs as discussed below under the sub-sections:

1a. Objectively demonstrate the relative importance of these crops in the CG portfolio, drawing on information related to GL-specific producers and consumers in the different target regions

Not sufficiently addressed. The proponents have provided some additional analysis and elaboration to support the case for GLs impact on SLOs in the revised proposal. This includes some clarifications in the Demand and Supply sections (pp14-16), elaboration of the nutritional role and potential of grain legumes in the diets of the very poor (box on pp34-35), discussion of the advantages of crop diversification, and a detailed discussion of regional and national stakeholders' priorities regarding grain legumes (pp16-22). These are useful to an extent, but there is relatively little that is new or convincing to justify the investment in legumes. One is still left with the impression that the role of GLs in the revised proposal – on several fronts – is overstated, such as:

- The value comparison (rather than using area or production) is valid when single crops are being compared. But the fact that the LIFDC total production value of the 8 GLs is on par with either maize or wheat does not in itself constitute equivalent impact potential unless one can establish that the commonalities and research spillovers across the 8 GLs are strong enough to compare with a “single crop” comparison. In most cases it probably is not.
- The proposal does not provide hard numbers on the role of legumes in producer incomes.
- Drawing on Akibode and Maredia (2011, unpublished report), the proposal emphasizes a rise in per capita consumption of pulses of 9% over a 13-year period (1995-2007) across the developing world. In fact, if one considers a longer time period and focuses on the target countries of this CRP, the LIFDC, then the data show a continuously steady decline in per capita consumption of pulses since the early sixties, from 35.7 g/cap/day in 1961-63 to 17.8 g/cap/day in 2005-07 (last year available in FAOSTAT), although this appears to have leveled off since the early 1990s. The comparison of trends in pulse *versus* cereal caloric intake over time in the developing world (not LIFDC) misses the point by excluding the indirect form of cereal consumption via milk and meat products. As for the case of India, the projection by Kumar et al (2009) of a 9% increase in per capita consumption of pulses between 2011 and 2022 is certainly possible, but seems difficult to reconcile with past trends of sharply declining per capita consumption of pulses (57.1 g/cap/day in the early sixties, 42.3 in the early seventies, 36.1 in the early eighties, 33.9 in the early nineties and 32.1 presently (2005-07 average). Given those trends, the prediction by ICAR of an annual growth in demand for pulses of 3.1% through to 2027 seems grossly overestimated, given population growth of 1.3% (and declining). In short, the growth in demand for GLs (pulses) put forward in this proposal is not convincing and begs for more rigorous evaluation.

- While true that some countries – particularly in Southern and Eastern Africa – derive a large share of their protein from GLs (often 10-20% of the total and, exceptionally, 45% for Burundi - not 55%), on average for the LIFDCs GLs provide only about 6% of the total protein consumed. This is compared to about 49% from cereals and 29% from animal products. In terms of trends, the amount of protein consumed from GLs has remained constant since 1990 at about 4 g/cap/day. Cereals have fallen slightly but still remain dominant at 33 g protein/cap/day, while the amount of protein consumed from animal products has risen from 12 to 19 g/cap/day.
- The added narrative about the nutritional role of grain legumes in diets of very poor (pp34-35), especially in relation to protein and fat quality, gives general arguments but does not provide any quantitative information on the role of legumes in nutrition in specific contexts.
- The case for pulses is probably much stronger when considering the relative importance of GLs for the lowest income groups, although there is little hard evidence or analysis to conclude much at this stage (it is partial or incomplete). It is surprising not more has been done in this respect. This should be a high priority area of research for this CRP – analyzing the changes in absolute and relative importance of GLs (vis-à-vis competing caloric and protein sources) for different income deciles. Akibode and Maredia, using National Sample Survey (NSS) data from India, make a first attempt at this but it is a partial analysis and not up to date. The data suggest that for the very poorest (lowest income decile) consumption of pulses increased by 6% from 1993 to 2004 (though animal products also increased), but that for the moderately poor it has actually declined. Cereals, however, remain by far the dominant source of protein for the lowest income groups.

On the positive side, the narrative argues well that crop and dietary diversity delivered by GLs are powerful assets of great importance to CGIAR stakeholders and that CRP3.5 can theoretically exploit, provided it keeps a tight focus.

Ib. Undertake a comprehensive assessment of past research efforts and current barriers to adoption of technology, as a basis for identifying key constraints and opportunities that could be influenced by CRP 3.5 research products.

Not sufficiently addressed. The analysis of constraints to adoption and lessons learned in Chapter 4 is for the most part superficial. Only two paragraphs on p37 discuss ‘constraints’. These are very general in nature and do not provide a solid underpinning and rationale for the current scope of work proposed in this CRP, i.e., defining where the most promising areas of research now lie and why. Also, the ‘lessons learned’ are not spelled out in any detail. Appendix 10 is primarily an update on progress across the eight GL crops rather than a serious analysis of past research successes and failures leading to the identification of the most important bottlenecks in raising farmer productivity and profitability in GL and the lines of research which now are likely to alleviate those constraints. The list of bullets (constraints) and lessons learned to overcome barriers to adoption on p241 are again, too generic and the implications not clear, e.g., constraints identified as “various social and economic factors such as farmers’ perceptions, risk preferences, and access to inputs and markets”, or “inability to make the initial investment to adopt the technology, due to inadequate access to financial services”. Many of the bullets listed here are macro-level or policy related, and would appear to be beyond the domain of the research being proposed. Appendix 10 concludes with a very brief section on the constraints that remain to be addressed and the way forward. This is a good first step as it begins to identify potentially important but very generic constraints, e.g., “Soil constraints, both deficiencies and toxicities, are serious limitations that require solutions combining management and genetics” so, in almost all cases, without any accompanying analysis or history of previous efforts in this area. For example, what are the key reasons that introducing chickpea and lentils in rice fallows have not made much progress?¹ The other identified constraints and

¹ An example cited earlier in the text relates to work on insects such as *Helicoverpa* that have proven difficult to contain through plant breeding, but now focus on “IPM advances that hold considerable promise” (p. 8). No analysis is provided, yet IPM

areas in need of research (challenges) – the 11 bullets on p242 – are also presented without adequate analysis, or evidence of analysis.

Throughout the CRP narrative considerable emphasis is placed on policy biases against GLs, but information is not provided as to how the CRP will address these policy issues. More importantly, arguing that GLs have received low levels of policy support is only partially true, and too much is made of this in the proposal (even for India)². The proposal claims the ‘slow pace of growth in production and yield of grain legumes over recent decades is largely due to less policy and institutional support compared to other commodities, causing a shift of GL cultivation to less productive environments and lower use of fertilizer, irrigation and improved seed’ (p16). It must be expected that crops for which yield potential has risen due to research success are likely to attract higher levels of input use and then often shift to more favorable environments. GLs are shifting to marginal areas because the return on land, labor and capital under those production systems are lower than for cereals and other crops that have witnessed faster rates of technological progress, offering farmers higher remuneration. For example, it was the success in wheat breeding and capitalizing on irrigation and fertilizer use that favored wheat area expansion in northern and central India at the expense of the traditional (and relatively unimproved) chickpea crop.

1c. Establish targets for outcomes in a crop by region matrix to account for actual situations and current status from a regional and crop species perspective, and strengthen capacity to prioritize allocation of resources for GL research within this CRP and within the CGIAR

Not sufficiently addressed. The proposal identifies a specific overall outcome target against which the success of the CRP can be measured, e.g., adoption of improved varieties on 20% yield increase on 20% of GL area by 2020. The ISPC again questions how a generic and rather simplistic target was developed when considerably more data and information were apparently available to provide more nuanced target setting. A detailed table of poverty and projected benefits, disaggregated by crops and regions has been added (Table 5.3, Appendix 5) but this is simply a mechanistic translation based on the 20% yield improvement on 20% of the area planted to each of the GLs in each region valued at current or projected prices. Uniform estimates of potential impact were a key criticism of the original proposal by the ISPC³ because it begs the question of whether the effects of G x E interaction on the crops are understood. The additional material therefore offers little insight into identifying where the best prospects are for increased research investment or major success. Yield gap and constraint analysis should be used as a tool for identifying where the greatest opportunities may be found for increasing productivity. Instead, it appears that priorities and resources are being allocated based on past investments, which is a missed opportunity.

The new section on the priority setting process (pp24-25) does not fully explain the basis for selecting these 8 GL crops (from 13 originally considered) and how potential trade-offs between deepening the investment in a GL crop with huge potential (e.g., chickpea grown on 12.6 m ha) and reducing or

approaches have been researched in the field for 20 years or more. The proposal fails to elaborate on the key lessons, and which recent advances in IPM hold considerable promise, and why?

² Some statements are so off-track that it questions the credibility of the overall analysis, e.g., African farmers only receive 10-20% of the retail price for legumes.

³ The previous ISPC commentary was very strong on this point: “The use of a 20% yield increase on 20% of the total planted legume area by 2020 as a basis for production, income and incremental protein benefits fails to make use of any discrimination across crops and their constraints and their regions. There is no detailed analysis of the contribution of the various SOs in each of the crops or regions to this target, and no justification of the allocation of resources based on any such analysis. This is a significant deficiency in the plausibility of the targeted impacts, and undermines the credibility of the targets. For example, how much of the target will be met by improved seed systems, or by improved agronomic practices and systems? Greater differentiation should be used to calculate expected yield gains for each crop and region (based on tables of yield loss, expected yield recovery, yield gap etc.) and valued accordingly.”

eliminating the investment in a GL crop with much less potential (e.g., fababean grown on 1.1 m ha) plays out. What role, for example, did good prospects for research success and the potential for possible spillovers to other regions play when priorities and resource allocation decisions were made? It appears that it is current Center investments that primarily dictate choices. The rationale for excluding mungbean from the priority set is not convincing – “based on domain issues”. If mungbean is of significant importance to poor households in SSEA, AVRDC should be considered as a partner in the CRP.

A detailed discussion has been included of complementary efforts and recent activities by governments and projects showing high priority on legumes (pp16-22). Commitment by these countries reflects the demand and potential for research, and hence should go hand in hand with priority setting by CRP3.5, to maximize return on investment (in terms of SLOs). CRP3.5 should reflect this in being more discriminating in selecting crops, constraints and countries where it works. The current narrative leads a reader to conclude that the lion’s share of effort should be in West & Central and Southern & Eastern Africa, and comparatively little to Central & West Asia and North Africa – based on prospects for large scale success. It is important that CRP3.5 does not give the impression that it merely continues to support the same level of research in the same locations as the four CGIAR Centers had been doing previously. In summary, the elaboration of complementary efforts and government commitments could potentially be very useful in helping set priorities as it sets the stage for understanding the effective demand for research and expectations about utilization. It does not, however, appear to have been used in setting CRP3.5 priorities or resource allocation.

The discussion of priority farming systems across regions (pp26-30) also shows that GLs are relatively more important in the farming systems of WCA and ESA than elsewhere. In most farming systems of WCA and ESA, GLs are grown on 50 to 90% of crop area at some point in the rotation, especially in areas with large numbers of poor. This too argues for a much greater effort on GL improvement in WCA and ESA. None of this appears to be explicitly reflected in the priorities or research allocations across crops and regions.

ISPC Must-have 2. A work plan with more focus and fewer product lines: that this CRP concluded with such a large number of product lines (61 crop/traits for genetic improvement) indicates the difficulty of moving from individual programs to a global program within a CRP

Not sufficiently addressed. The work plan for CRP 3.5 is provided in Appendix 11, but neither the revised narrative nor Appendix 11 suggests that the proposal now has more focus with fewer traits for genetic improvement being worked on. Indeed, very few changes were noted in the revised proposal. Few of the suggestions in the earlier ISPC commentary to re-consider various aspects of work in the SOs in order to enhance the likelihood of impact (under the *Delivery focus and plausibility of impact* section) were embraced.

The CRP now lists 24 major output sets over the 6 strategic objectives, and comprises 198 major activities across the 8 GL crops with 133 key milestones identified. While continuing the work of on-going special projects is expected and justified, the transition to a well conceived set of activities with a narrower focus over the next three years is not yet evident.

ISPC Must-have 3. Given limited success to date in the adoption of improved GL technologies, demonstrate feasible impact pathways, citing relevant references and documentation

Not sufficiently addressed. The proponents claim (p6) that the opportunity for impact in CRP 3.5 is evidenced by numerous examples of rapid increases in GL production stimulated by improved varieties and management, and driven by strong market and export demand. Increasing prices have played a role in expansion in some legume crop areas, but the evidence of impact (or even adoption) of improved legume varieties and management has been relatively sparse, as concluded by Tripp (2011), which is why SPIA is embarking on a legume improvement research impact analysis currently. The ISPC considers, as stated in the previous commentary, that most of the examples cited in the proposal (pp33-34) are relatively small-scale success stories or based on projections from *ex-ante* assessments⁴. The six examples of success described on pp38-39 are more recent cases and not yet fully documented.

A more convincing case for the likely impact lies with completing a thorough GL adoption constraint analysis. The impact pathway frameworks, which should describe the process by which research outputs under each strategic objective are translated into outcomes and ultimate impacts, are still too generic and fail to identify where the key binding constraints are and what mechanisms or strategies will be employed to overcome these. It assumes that by emphasizing partners, policies and capacity building a smooth flow from outputs to impacts occurs, much as previous research plans did. In the case of management research, for example, nothing is presented to show how one can achieve impacts in a system with poor extension, high risks and marginal growing conditions.

ISPC Must-have 4. This CRP should be closely allied to and integrated into the system CRPs, and particularly CRP 1.1

Not sufficiently addressed. Neither the revised proposal nor the proponents' response show convincingly that adequate discussion had taken place. Rather it gives the impression that the proponents had considered where there might be links, but not how best to ensure these would materialize. Appendix 12 mentioned potential mechanisms to ensure interactions but, realizing that CRP 1.1 still has much development to do, it should have been possible to outline a set of principles such as joint participatory processes to identify priority research questions and understand context and constraints, participation in each other's planning meetings, etc. The suggestions given were very tentative.

ISPC Must-have 5. Highlight the new and most promising areas of research: the list of innovation initiatives and cross-learning opportunities on p122-123 are ambitious and commendable and deserve a more prominent place in the proposal, with an explanation of the value that would be generated by succeeding in each of these initiatives

Met. The section on Innovations (Chapter 8) has been revised, and elaborated, and explains how each of the innovations integrates with CRP 3.5 Strategic Objectives and the potential benefits of innovations.

ISPC Must-have 6. In management and governance, a more streamlined structure is needed that provides for independence in decision making, monitoring and evaluation. (i) Advisory Panel needs to be more appropriately structured and resourced with formal oversight by Lead Center Board; (ii) redundancies in the Steering Committee and the Program Management Team need to be addressed;

⁴ The lentils boom in SA story: Lentil yields in India (dominant producer) have only risen slightly in the last two decades. In Bangladesh and Nepal much of the increase in area and productivity is due to favorable prices.

(iii) the role and authority of the CRP Director needs to be strengthened; and (iv) CRP management functions central to the success of the program, including communications, resource mobilization, and program evaluation, need to be clarified, adequately resourced and managed.

Met. The revised structure is much improved: the CRP Director role and authority have been strengthened and reporting lines and role of the Independent Advisory Committee appear appropriate. Removal of the Steering Committee is welcomed and clarified roles of the research management team appear sound. Explicit reference to the Lead Center DG working with fellow DGs in the recruitment and management of the CRP Director also gives the sense of a CRP responding to the need for close collaboration among Centers. Budgetary changes to adequately resource program management are welcome, although there was a lack of response on the request for increased clarity of the pertinent management functions. The budget has now been revised upward by \$2.3 million to accommodate the changes in CRP Management.

FC Must-have 1. Higher degree of prioritization, both at the thematic and at the geographic levels, is required

This is covered under ISPC Must-haves 1b and 1c.

FC Must-have 2. Further attention should be given to M&E system

It appears the only response to this request is to suggest waiting for the Consortium Report on the new M&E System. Given that response, the first Annual Report of this CRP needs to include a report of how the recommendations of that report have been incorporated into the operational plan for the CRP.

FC Must-have 3. Farmers' organizations, extension workers and NGOs are under-represented; need to provide details on specific organizations and their role, especially in SSA; proposal needs to show evidence of involvement of sub-regional organizations and their networks

Appendix 13 has been included which specifically lays out the roles of farmers' organizations, extension workers, NGOs and sub-regional organizations and networks.

FC Must-have 4. Specify practical commitments and investments required of other partners engaged

Appendix 14 has been added which provides a detailed elaboration of the commitments and investments required of other partners.

FC Must-have 5. Further analysis is needed on possible trade-offs implied by the new emphasis on value chains; proponents need to consider location specificity that IPGs may be difficult to generate in deciding on which value chains to select for intensive research

The proponents have responded by revising Strategic Objective 5 (pp101-111). The soybean value chain analysis was amended to include the ESA region (although it was also in the previous version) to ensure its IPG nature. Explanations on the possible trade-offs implied by the new emphasis on value chains and location specificity of IPGs in value chains given in Appendix 15 seem reasonable.

FC Must-have 6. Participatory technology development through enhanced on-farm research, with farmers managing their own fields, is recommended to be part of the program; it needs to refocus SO3 to include cropping systems research on farm and with farmers

SO 3 was revised (pp76-88) to ensure that participatory technology development is emphasized.

FC Must-have 7. Need better integration of the crop improvement aspects with resource management

Appendix 16 was added to address this *Must have*. It highlights several ways in which genetic improvement of GL crops in CRP3.5 might lead to improved resource management. However, all of the examples, with the exception of a focus on improving symbiotic N fixation, are indirect outcomes from crop improvement and there is no explicit research in CRP3.5 to validate assumptions about these indirect NRM impacts. While this situation allows a focus on genetic improvement and seems reasonable for CRP3.5, it will require close collaboration on research conducted in system-level CRP 1.1, 1.2 and commodity CRP 3.1, 3.2, 3.3, and 3.6 to ensure that benefits on the environment and ecosystem services assumed to occur as a result of genetic improvement of GL crops and their inclusion in crop rotations actually occur in practice. It is not clear, however, that there are explicit plans for testing the underpinning hypotheses in collaboration with these other CRPs.

FC Must-have 8. Provide description of the relationship with other initiatives like Tropical Legumes I and II (TL I and TL II)

This concern has been handled by inclusion of a detailed section on CRP 3.5's links with a number of key initiatives in the specific regions (pp16-21), such as the TL1 and TL2, N2Africa and Feed the Future, and also a separate write-up on TL1 and TL2 linkages is provided in Appendix 17.

FC Must-have 9. Links to CRP 2 could be better articulated on the issue of policy bias against small farm enterprises, which generally characterize grain legume production

A detailed account of the links of CRP 3.5 with CRP 2, especially on areas related to policies, markets, value chains, innovations, strategic foresight and future scenarios has been provided in Appendix 18.

FC Must-have 10. Budget allocations for SO1 (Genetic resources) for CRP 3.5 should be differentiated from the budget allocation that was made for the Genebanks

According to the proponents, the Genebank funding proposal covers only acquisition, conservation, and distribution of germplasm and database management for the genebank. It does not cover identification of gaps, collecting, training and developing germplasm subsets. Chapter 14 on *Budgets* has now been revised to reflect these statements (pp164-166).