

## **ISPC Commentary on the revised proposal CRP 5: Water, Land and Ecosystems**

In its commentary on the original version of CRP5, the ISPC recognized the fundamental importance and potential of this CRP to fill a critical gap in the CGIAR research for development portfolio. The rationale remains compelling for a coordinated international research effort on water scarcity, land degradation and threats to ecosystem sustainability related to agriculture – focusing on research and outputs at the landscape to river basin scale. While the original proposal identified questions to be pursued and the outputs and outcomes expected from on-going projects, not enough was said about new science and innovative approaches that take advantage of the new CGIAR and its partners. The CRP appeared to be a collection of existing research activities placed into a Strategic Research Portfolio (SRP) without benefit of a prioritization framework to guide the amalgamation and resource allocation process. As such, the eight SRPs proposed were seen as largely independent and self-contained. The original CRP also had not provided the critical analysis, theory and narrowing of issues and hypotheses that could support a prioritization framework for the SRPs and the overall research agenda. Other issues raised in our commentary dealt with the logic of the SRP structure, variable quality of science in some SRPs, the weak IPG content of research outputs, justification of budget, and the proposed management structure. In short, the ISPC felt that a more coherent and compelling proposal could be developed, and recommended that the proposal be substantially revised and re-submitted paying particular attention to eleven key areas (summarized list below).

The revised CRP5 proposal has been substantially re-written, and is now a much tighter and much improved document. CRP5 partners have taken the concerns and issues cited above seriously and have, for the most part, addressed them satisfactorily. We agree with the proponents that the revised proposal is more focused, has a better integrating framework and proposes a set of clearer targets and deliverables. The revised proposal is also markedly different in that more emphasis is given to new directions rather than a continuation of well-established research projects. It is particularly satisfying to learn that the process of revising the document has greatly enhanced cooperation between the major partners in the CGIAR such that there is a genuine sense of common intent and focus.

Although a few concerns remain—as discussed below under each of the “Must Haves”—the ISPC considers that the CRP5 partners have taken into account the bulk of the recommendations made in the initial review process in a conscientious and adequate fashion. The result is a more cohesive overall research focus and stronger logical structure developed through a smaller number of SRPs.

**The ISPC recommends that the revised CRP 5 proposal be approved subject to minor revision taking into account the following commentary, with particular attention given to:**

- While the link to the ‘cause-effect’ thinking stated as the overall research aim of the Program is clear in some SRP components, it still needs strengthening in others and in many of the specific projects.
- A more ‘hypothesis-driven’ approach is being taken throughout the proposal; a remaining concern is that some of the hypotheses being formulated are pre-assigned beliefs for which information will be sought to provide justification, rather than undergoing rigorous, objective testing.
- The ecosystem services perspective permeates the proposal, but elements of this perspective and respective analysis are absent in problem sets in some SRPs.
- Productivity – ecosystem services trade-offs are explicitly mentioned at the ‘overall aim’ level of the proposal but are sometimes missing conceptually at the lower, project level.
- The Rainfed System SRP is better presented, but is not yet better integrated and could easily be a stand-alone CRP; it remains weak in terms of focus and likely impacts, and also in its IPG content.

- The links between the work on pastoral systems and relevant work in other CRPs should be strengthened at the design stage.
- The degree of independence of the steering committee is questionable given the Lead Center DG as a co-chair and the use of the word ‘implementing’ in relation to the prioritization process which goes further than ‘strategic oversight’.

Below is the ISPC’s assessment of how the revised proposal responds to each of the 11 ISPC “Must Haves”. In all but a few instances, the proponents have added key gap-filling sections, or re-written or re-structured the proposal to address these concerns in a comprehensive and satisfactory manner. Because there was quite a bit of coincidence and overlap between the “Must Haves” from the ISPC and the FC members commentaries (especially in terms of the need for a more coherent structure, for conducting innovative research and avoiding the *status quo*, comparative advantage issues, and the need to revise the governance structure and to provide authority to an oversight body), the FC “Must Haves” have not been listed here separately. For the most part, we believe that they too have been addressed satisfactorily.

***1. Develop a framework to establish research priorities and a SRP portfolio based on formulation of hypotheses about the causes of constraints and their potential solutions.***

Adequately addressed:

A compelling set of challenges for the program and for agriculture in the developing world is presented. Additional literature is reviewed in Chapter 1 and in the Appendices, which provides a sound basis for selection of specific natural resource management (NRM) issues to be included in CRP5 and provides the motivation for new research on water, land and ecosystems. The stated overall research aim of CRP5 is strong, innovative and vital for the evolving direction of research in developing country agriculture to address questions such as ‘how changes in production systems affect ecosystem services?’ and, ‘how to measure and use information to improve policy and management at the basin and landscape scales?’

The prioritizing framework (Chapter 2) is based on global visioning of the key issues (water scarcity, land degradation and ecosystem decline) surrounding agricultural intensification and their environmental impacts. Regional consultations and strategic reasoning underpin the definition of the researchable problems that can be dealt with in the next 5-10 years. More emphasis is now given to how solutions can be developed to deal with NRM and ecosystem services constraints on sustainable intensification and a number of major ‘problem sets’ have been defined based on theories of change and research questions (hypotheses).

The choice of the eight sets of river basins in section 2.8 reflects the need to capitalize on past and current work by the CGIAR and its partners. There is little doubt that the basins chosen are major river basins with a total population approaching one billion, and that the long-term nature of NRM work makes it desirable to fully exploit past research activities. It is therefore not surprising that the selected basins are those where Centers and the CPWF have been working until now. The motivation for the research to be undertaken is adequately described in the presentation of these basins (p38-55).

CRP5 gives every indication of being a great opportunity to explore the ‘cause-effect’ relationships between production systems and the full suite of their outcomes: one of these is the ecosystem services outcomes but also of significance (and importance in understanding incentives for up-take) are the financial (especially the impacts on farm costs and revenues – and thus profits) and social (gender and equity issues) impacts. In most of the research projects proposed, there is a link to this ‘cause-effect’ thinking, and hence the overall research aim of the Program. However, it is not sufficiently well developed in some elements of the SRPs and in many of the specific projects.

It is pleasing to see a more ‘hypothesis-driven’ approach being taken throughout the proposal. That together with the development of research priorities through more evaluation work and the inputs of the Steering Committee should see a more ‘science-based’ and ‘policy-driven’ research agenda. A remaining concern is that at times the hypotheses being formulated appear to be based on beliefs for which information will be sought to provide justification. This is possibly a function of the way the CRP5 proposal sets out the

anticipated outcomes of the research work. By its nature, research is a process of enquiry in which the hypothesis should be the target of falsification not justification. Nowhere is this more (potentially) problematic than in the research agenda for groundwater. In Problem Set 3 (p75) the focus is on the ‘over-draft’ of groundwater in South Asia.<sup>1</sup> The proposition is put forth that the problem has been the result of subsidized electricity prices. The solution to the problem is envisaged to be through the electricity sector (rather than on other options such as conservation agriculture or choice of different crops). Yet in the fourth problem set that focuses on the Ganges Basin, it appears that the envisaged solution is to subsidise electricity supplies. Why is the solution in one system described as the problem in an adjacent basin? A preferable way of framing the research is to propose numerous management strategies as options and test them against a base of doing nothing. The common property nature of the groundwater resource is not addressed in either case, yet alternative management strategies could be framed around that condition.

In this light, it would be constructive to ensure that each component research project has a sound hypothesis that relates back to ‘cause-effect’ theory and that research methods are designed explicitly to seek the falsification of the hypothesis. In each case, this process should be focused on the specific issue / problem to be considered, the establishment of a range of potential solutions, the testing of those alternatives in the context of the overall ‘cause-effect’ aim of the CRP, consistent with a specific hypothesis and the drawing of conclusions that are relevant to the established issue / problem. In a similar way the goal expressed on p143 that River Basins can be managed ‘to maximise the value of ecosystem services and benefits’ seems to miss the point that there are trade-offs involved. These trade-offs are explicitly mentioned at the ‘overall aim’ of the proposal but are sometimes missing conceptually at the lower, project level. For instance, it is not necessarily desirable to seek maximum ecosystem services from a basin when that means losses in financial and social benefits. The critical question that the overall CRP5 is addressing is how to come up with resource management solutions that maximise social well-being, given that this comprises ecological, financial and social contributions. Put simply, the overall aim of CRP5 is laudable but it has yet to be sufficiently ‘infused’ throughout all levels of the SRPs – to the problem sets and the individual research projects.

The ISPC hopes that the above considerations are taken into account during the prioritization process (described in Chapter 3) where, it is understood, the Steering Committee will guide selection of future problem sets over the next six months, and also in the implementation phase, at which time the specific activities to be undertaken will be delineated in detail.

## ***2. Narrow the focus and improve the clarity and plausibility of SRP research outputs and outcomes, and the descriptions of the impact pathways;***

### Adequately addressed:

This is achieved primarily through development of the specific problem sets to be tackled in the first five years. Problem sets are defined through analysis of previous work in the area, the specification of theories of change, research hypotheses to be tested, partnership strategies and outputs, outcomes and contributions to the SLOs of the CGIAR Strategy and Results Framework. A concern is that key problem sets that are established underneath the overall goal of the CRP are sometimes disconnected from it. This is particularly the case for SRP1 where hardly any mention is made of the linkages between production and ecosystem services. A good test for the CRP5 proponents would be to require every problem set and every research issue to show how it addresses the overall CRP aim.

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<sup>1</sup> Questionable research structures are also apparent in other problem sets. For example: On p105: ‘we will help pastoralists secure rights and access to resources’. Why do the rights of pastoralists trump the interests of others? The issue should be one of investigating the consequences (or effects: financial, ecosystem, social) of alternative rights allocations (the cause). And on p146 it is ‘decided’ that groundwater use is to be increased by 30% in SSA. Why is this the ‘answer’? Rather, alternative strategies for groundwater use should be investigated (cause and effect) and the analysis so undertaken should be used to provide policy advice regarding the development of the groundwater resource. Again, are there ecosystem services implications, along with financial and social impacts?

Generally, however, the narratives in Chapters 4-9 describe the activities to be undertaken in adequate detail, and provide justification for the problem sets chosen under each of the SRPs—presumably selected in the consultation, vision and strategic thinking process described in Chapter 2. In Chapter 4 on Irrigated Systems, five problem sets are listed for the first five years. It is hard to argue about the relevance of the problem sets chosen, given the vast experience of the CGIAR Centers working on this topic. Impact pathways are more clearly delineated, and the specification of levers of change and uptake strategies (Table 3.1) is a very positive development in this proposal. However, uptake strategies will need further development and detail (e.g., ‘sit at the table with policymakers’ is itself a major milestone... how to ensure CRP5 gets a seat at the policymaker’s table is also an issue. The only criticism, which is problem set dependent, is that research outputs are often quite modest relative to the ambitious nature of the goals addressed in the write-up. For example, see Table 4.2 on the expected outputs for ensuring the success of irrigation in Africa. Other problem sets are more focused and have more tangible outputs, such as the one on the role of energy in managing groundwater overdraft.

The proponents emphasize that annual work plans will keep the work focused and on track with respect to time. In addition, the priority setting processes and more detailed listing of deliverables and critical operational aspects (e.g., interactions with the other CRPs; identification of indicators, etc.) will be specified during the implementation phase.

### ***3. Identify the new and the value added contained in the SRPs, and provide a plan for phase-in of new and phase-out of current activities.***

#### Adequately addressed:

The revised CRP5 gives considerably more attention to the critical question of whether or not we can intensify and expand agriculture without significant environmental consequences. The program also introduces the concept of using ecosystem services to monitor agricultural impacts. The proponents do acknowledge that the proposal builds (rightly) on past work of the Centers and CPWF, but at the same time introduces innovative approaches and integration between Centers and partners. Thus, while the program builds on IWMI and CPWF work on river basin management, it will integrate soil and water information in a manner not yet attempted in the CGIAR. It also builds on other successful initiatives such as the African Soil Information System, IWMI’s water productivity and drought assessment work, ICRISAT’s watershed studies and ICARDA’s water harvesting work. CRP5 plans to integrate some of this single Center type activity into new projects to deliver greater value. In theory, this program should provide a single point of access for all CGIAR water, land, soil, ecosystem and environmental information, which in combination with the FAO, will enhance the CGIAR’s capability to deliver authoritative global and regional resource and environmental assessments related to the impacts of agriculture.

Appendix 3 is helpful in envisaging how much will be new and how much is a continuation of current work by the centers and CPWF. Given it is impossible to end the current work abruptly, projects will continue for 15-18 months and there will be a gradual merging of relevant follow-up activities into the CRP5. The plan is to ensure continuity as the CRP5 is launched to such an extent that the advisory committee of the CPWF will be merged into the new Steering Committee of the CRP5. Whether this specific plan would prevent innovative approaches, relative to the more conservative ones based on the continuity of CPWF, is a serious risk that must be carefully assessed by the CGIAR. A brief Work plan is presented in the Appendix, and guiding principles for phasing out old activities and phasing in new ones are provided. Such principles are sufficient and quite reasonable, but here the key issue is to apply them with rigor.

### ***4. Develop a more coherent and systematic organizing structure to achieve better integration across SRPs***

#### Mostly addressed:

The organizing structure (Figs 1.1 to 1.3 on p16 and 17) is now much clearer and coherent, with the integration shown in Fig. 2.1 on p26. The structure ensures a narrowing of the focus of the research program and groups research issues logically where there are significant ‘spillovers’. It will also allow greater transparency of the research being carried out, both for that within the CRP5 and in other CRPs. This structure of five research portfolios appears to have enabled the team to see ‘*an exciting opportunity to conduct research across a wide range of critical topics within a single research program*’.

The choice of the five SRPs and decision to mainstream ecosystem services perspectives across all SRPs are generally consistent with the conceptual framework and responds adequately to specific suggestions of the ISPC, though not completely. The SRP structure is not actually a nested one with Basins as the highest order, but the Irrigation and Groundwater SRPs and the Dryland and Pastoral Systems SRPs were merged, and the Information and Resource Use and Recovery are stand-alone. The CRP 5 partners have made an effort to integrate the work on ecosystem services across CRP5 by developing some guiding principles. The criticism that the SRP may remain largely independent and self-contained is addressed in section 2.5, where a number of examples are provided to highlight the possible interactions among SRPs. Such interactions are plausible but will only occur if there is a coherent program, driven by a Steering Committee with sufficient authority to foster cooperative work among the SRPs. CGIAR scientists working on NRM understand that research alone is not enough, and this point is well highlighted in section 2.6, which describes the “research to impact philosophy” and the scope of the Program.

CRP5 is now built around a series of river basins and these make sense as priorities. The SRP that is still an outlier is SRP2 on rainfed systems. Although this SRP is now much better presented, it is not better integrated and it could easily be a stand-alone CRP. Landscapes are barely mentioned and so the link between landscapes and basins is not evident, which leaves considerable potential for overlap and duplication with other CRPs. The clear distinguishing features to avoid such overlap is that the other CRPs should address on-farm productivity issues in rainfed farming, while CRP5 should focus at the landscape level.

***5. Mainstream the ecosystem services perspective across all SRPs and give greater attention to better understanding trade-offs between productivity and other environmental services.***

Adequately addressed:

The ecosystem services perspective, broadly speaking, permeates the proposal. Chapters 2 and 3 in particular give adequate attention to the definition of ecosystem services (supported by Appendix 1). However, because elements of this perspective and analysis appear to be absent in some SRPs and problem sets, it would be useful, as suggested above, to test to see that every problem set has adequately addressed the trade-offs between productivity and environmental services in an appropriate fashion.

***6. Clarify the value added of research activities in the Rainfed SRP and the production of IPGs, with a tighter focus of proposed activities.***

Not adequately addressed:

The Rainfed System SRP is still the weakest in terms of focus and likely impacts. The IPG element is also fairly weak although the revised proposal indicates that tools and methods will be the IPGs. Some of the activities, however, such as providing supplementary irrigation to farmers are clearly not IPGs.

Five problem sets are defined in this SRP. The first one addresses the restoration of the fertility of African soils and the reduction of land degradation. It focuses solely on the nutrient limitation and the access to fertilizers. Research outputs are quite general and vague (Table 5.2). The next two problem sets are also quite undefined and lack focus. The one on revitalizing productivity of responsive soils proposes to identify soils of high production potential that are not fully exploited. Here is an opportunity to develop and concentrate on innovative approaches for yield gap analysis, an issue that is mentioned as one of the research outputs but that deserves considerably more attention in the work planned in this proposal. The third problem set aimed at increasing agricultural production while enhancing biodiversity is even more general than the previous one, and is based on the hypothesis that it is possible to increase agricultural output and enhance biodiversity in rainfed areas through improvements in soil and water management practices. The activities planned here are too general. The last two problem sets are more specific and have a clear focus. One of these deals with availability and access to water and land for pastoralists, while the other expands on past successes in extending supplemental irrigation into rainfed areas. Both are well defined and have a clear pathway to impact.

Overall, the earlier criticisms of the Rainfed SRP are only partially resolved. Because CRP5 concerns land and water, the overall focus should be the management of both rainfed and pastoral systems. It is imperative to address the water and soil components of rainfed agriculture to raise the very low efficiencies of resource use,

and to protect the fragile ecosystems. Two of the five problem sets are quite diffuse and the proponents have been less successful in defining relevant problem sets than in the irrigated systems. It is puzzling that the concept of conservation agriculture (even the term) is not mentioned. Is it because it is covered under a different CRP, or that the subject is not amenable to a landscape-level analysis? Given that conservation agriculture proponents often exaggerate its benefits, it is an approach that cannot be ruled out for productivity enhancement and resource conservation in some situations, including some in small-holder agriculture. Beyond the farm level, there are issues at the landscape and higher levels that need to be researched.

This SRP has the largest share of the budget - 40% of the total CRP program budget (\$28.5m out of a total of \$71.6 m in 2011) and retains that share (with total budget rising) over the 3 years. Curiously, in the original proposal, the combined Rainfed + Pastoral Systems SRP budget was only 31% of the total, so the relative importance here has grown. The proponents are apparently open to revisiting the resource allocation but it is now locked into special project funding. In any event, as it is such a large program, it deserves a very much stronger and more compelling research program than currently described.

***7. Explicit linkages needed between the Pastoral SRP and other CRPs with livestock systems research.***

Not adequately addressed:

Section 5.7 provides some discussion on the links between the work on pastoral systems and other CRPs, but generally the response is disappointing. The ISPC recognizes the difficulties of describing in detail the links between CRPs while most are still at an early planning stage, but the text in section 5.7 emphasizes use of results from one CRP in another, whereas it might be more effective to engage in joint planning of research. In fact, interacting at an early stage to ensure that the results will add value to respective CRP outputs seems a better bet. The question raised above about conservation agriculture may be answered by the planned cooperation with CRP1.1.

***8. [Improve] coherence and coordination across CGIAR and CRP sentinel research sites.***

Adequately addressed:

Connections with sentinel sites are now addressed adequately. In their response on this issue, the proponents indicate they are currently engaged with World Agroforestry and other CRPs to ensure that this happens. Reference is also made to expecting guidance on methods and monitoring opportunities from outcomes of the ISPC NRM workshop in Beijing in October. At the same time, the ISPC agrees with the proponents' suggestion that leadership from the Consortium Board and Office would be useful here.

It would also be useful for the overall aim of the CRP5 to be better linked to those of the other CRPs. How do 'cause-effect' relationships explored in CRP5 manifest themselves as inputs to the other CRPs? For instance, such inputs would be particularly appropriate as considerations in CRP 2 (policy) as they would in CRP 6 (climate change). In short, the overall aim of CRP5 is very powerful and could be more explicitly linked across to the other CRPs and down to the project level within CRP5.

***9. [Develop] a vision for irrigated agriculture to support agricultural development in SSA.***

Adequately addressed:

This issue is adequately covered in the revised proposal as a specific problem set under the Irrigated Systems SRP.

***10. Proposed research and development partnerships better justified and integrated into the narratives***

Adequately addressed:

The description of the partnership strategy at the program level is more focused and there is evidence within each SRP of a more focused (and strategic) approach to new partnerships than was apparent in the original version. The partnership strategy is built around the concept of having core research partners, implementing partners and outreach partners. Each SRP lists existing and potential partners by region. The Irrigation, Resource Recovery and Reuse, Basins, and Information SRPs include specific examples of how partnerships will work in terms of roles and responsibilities.

***11. Program management and governance should give greater emphasis to management effectiveness rather than cost.***

Partly addressed:

Figure 13.1 (p187) illustrates a good response to the first 2 points in this recommendation. The Steering Committee, now merged with the advisory committee, has a long list of responsibilities including oversight of strategic direction and partnerships and developing and implementing the prioritisation process. It will be co-chaired by the Lead Center DG and an independent member, reports to the Lead Center Board and only appears to be scheduled to meet once per year—which would seem too infrequently. It will provide ‘independent scientific advice and strategic oversight’ for CRP5, but its independence is questionable given that the Lead Centre DG is a co-chair and the use of the word ‘implementing’ in relation to the prioritisation process goes further than ‘strategic oversight’. Surely implementation should be left to the Management Committee? Also, the composition of the steering committee should include scientists of international reputation that are not involved in ongoing programs, such as CPWF. This will not be easy given the wide involvement of the scientific community in CPWF and IWMI research, but it should be attempted. In summary, a strong and independent Steering Committee is a prerequisite for such an ambitious CRP.

The description of monitoring is expansive and includes the setting up of a Monitoring, evaluation and learning unit to provide support to managers across the program. Reference is made to the importance of ‘learning’ and providing ‘an adaptive environment, but there is not an explicit statement of how and who will be responsible for adjusting research design and focus within projects in response to the results of monitoring.