RESEARCH PROGRAM ON Dryland Cereals

CGIAR

A global alliance for improving food security, nutrition and economic growth for the world's most vulnerable poor.

CRP Commissioned External Evaluation of the CGIAR Research Program on Dryland Cereals

Volume 2 Annexes

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Annex 1: Evaluation matrix.

Overarching questions	Sources of evidence	Methods & tools of analysis.
1. Does the Dryland Cereals provide an effective framework and procedures for prioritizing research? Is research becoming strategically better focused on development outcomes as well as delivering the long-term high quality scientific research achievements which underpin these?	• Research prioritization and justification and alignment of outputs with intended development outcomes - in Dryland Cereals proposal, extension proposal and reports. Quality of Science analysis	Document analysis. Quality of science analysis. Synthesis of analyses by criteria below
2. Is the Dryland Cereals generating synergy among centers and improving integration among disciplines and teams? Is knowledge being shared, technologies exchanged and capacity being built across countries and partners?	• Gender strategy and reports; information on beneficiary groups, needs assessment and targeting of research, planned uptake pathways from reports and interviews with Dryland Cereals managers, scientists and national partners.	Document analysis, analysis of interviews with gender specialists, Dryland Cereals managers, scientists and national partners.
3. Is Dryland Cereals research becoming better aligned to the needs of smallholder farmers, consumers and other beneficiaries? Are gender and diversity issues being integrated into research planning and implementation and in the articulation of uptake pathways?	• Views and experience of Centers, CRP managers, regional managers, researchers and partners. Scientist and partner surveys. Dryland Cereals annual reports.	Analysis of interviews with managers, scientists and partners in Dryland Cereals, Scientist & partner surveys analysis.
4. Is the Dryland Cereals developing a broader range of partnerships which contribute to research outputs and realization of outcomes? Is this adding value and likely to enhance the global benefits from Dryland Cereals research for poor producers and consumers?	• Views and experience of CRP managers, scientists and partners. Scientist and partner surveys; annual reports, annual work plans and budget.	Analysis of interviews with managers, scientists and partners in Dryland Cereals. Scientist and partner surveys analysis.
5. How has Dryland Cereals managed resources to realize the new vision of the CRP; how have the multiple sources, levels and allocation of funding influenced incentives for bringing about change?	• Budget allocations, funding sources v planned outputs and outcomes. Views of management and scientists in Dryland Cereals.	Budget and financial analysis. Analysis of interviews with managers, scientists and partners in Dryland Cereals.
6. Are the governance and management structures, practices and reporting lines of the CRP efficient and effective? Is there clarity and a common understanding of the roles and operational procedures of different components of CRP management within the lead and partner institutions?	• Views of Steering committee and research committee members. Views of management and scientists in the Dryland Cereals and in the participating Centers.	Analysis of interviews with members of the steering committee, research committee and management interviews.

Evaluation questions/ criteria	Sources of evidence	Methods and tools.
RELEVANCE: What degree of relevance has the Dryland Cereals design and implementation achieved?		
1. **Coherence**: • Is the Dryland Cereals CRP strategically coherent and consistent with the main goals and SLOs presented in the CGIAR's Strategy and Results Framework? • Is there a clear rationale for, and coherence among the Dryland Cereals flagship projects? • What is the rationale for inclusion of the four crops in the Dryland Cereals (pearl millet, sorghum, barley and finger millet) and is there added value from this crop combination? • To what extent has the Dryland Cereals used core type funding (W1, W2) for leveraging complementary bilateral funding and alignment of bilateral projects within the program strategy? 2. **Comparative advantage:** • Is there a comparative advantage of the Dryland Cereals with respect to CGIAR's mandate of delivering international public goods and its obligations towards outcomes, in relation to other international initiatives and research efforts, including the private sector, national research institutions or development agencies? • In the different areas of research (flagship projects, Product lines/clusters of activities) does Dryland Cereals play an appropriate role as global leader, facilitator or user of research compared to partners and other research suppliers? 3. **Program design**: • Does the program target an appropriate set of Intermediate Development Outcomes (IDOs) and do the activities (in program product lines/clusters of activities) cover and/or make reasonable assumptions about the results of other actors' work for achievement of program objectives? • Do the impact pathways logically link the principal clusters of activities to the IDOs and are the IDOs linked to the SLOs through plausible theories of change that take into account trade-offs between multiple objectives? • Have constraints to outcomes and impacts been considered in the program design, for example through assessment of the assumptions and risks in reliance on policies, actions of national institutions, capacity and partnerships. • Have the Dryland Cereals research activities been adequately prioritized in line with resource availability and partner needs and with respect to climate change?	• CGIAR documentation on the CRPs: SRF 2010 and 2015. • Dryland Cereals proposal 2012 and Dryland Cereals extension proposal 2014 and comments and feedback on these documents. • Financial spreadsheets on program funding types and sources. • Interviews with Dryland Cereals Program Director, product line/cluster leaders and flagship leaders. • Views of advisors to Dryland Cereals and CGIAR on international comparative advantage • Contribution of Dryland Cereals outputs and outcomes as detailed in annual reports and product line/ cluster reports, publications list • Views of partners – national researchers, private sector, development partners on relationships and comparative advantage by region/product line/ activity cluster • Dryland Cereals proposal 2012 and Dryland Cereals extension proposal 2014 – logic and explanation of impact pathways, including the role of partnerships for achieving the 5 IDOs. • Proposals' articulation of mechanisms for targeting to the poor, rural women and children, nutritionally vulnerable, low income value chain actors and communities, smallholder women farmers. • Impact pathway diagram and theory of change description of how product line/flagships linked to IDOs and SLOs. Identification of constraints, assumptions and risks. • Dryland Cereals proposal and extension proposal, annual reports and POWB. Projects mapped to IDOs • Flagship 1: Priority setting - baseline studies reports, gap constraint analysis, gender and poverty disaggregated data. Data on crop, region, areas, people • Flagship 2: Varieties & hybrids – reports/presentations on determination of priority traits for dryland cereals breeding. • Flagship 3: Reports/presentations on crop management technologies-evidence of demand led/informed priority setting? • Flagship 4: Reports/presentations on seed system analysis and identification of strategies. • Flagship 5: Post-harvest: reports on priorities and research agenda.	Documentation review and analysis Analysis of CGIAR feedback on documents and Dryland Cereals responses Budget analysis Interviews with advisors. Interviews with researchers and flagship leaders. Interviews with partners Documentation review, impact pathway analysis and targeting. Analysis of theory of change Dryland Cereals activity/output portfolio analysis by crop region, funding, themes product lines. Review of data for research prioritization Analysis of information in annual reports, flagship and product line reports Interviews, discussions on country visits Partner and scientist survey

Evaluation questions/ criteria	Sources of evidence	Methods and tools.
EFFECTIVENESS: How far has the Dryland Cereals achieved/is likely to achieve the intended results and benefits?		
1. To what extent have the planned Outputs and Outcomes been achieved or are likely to be achieved within the planned time frame? 2. Is the theory of change being realized in practice and how valid are the assumptions? 3. How effective are the connections between the 5 flagships along the product line impact pathway? Have the flagships enhanced integration across the delivery pipeline? 4. Are research outputs reaching their intended target groups? 5. Is knowledge being shared, technologies exchanged and capacity being built across countries and partners? What outcomes demonstrate positive synergy among various centers and partners and regions in the Dryland Cereals? To what extent is Dryland Cereals creating communities of practice? 6. Is the Dryland Cereals more than the sum of its parts? Has there been value added to research brought about by the Dryland Cereals collaboration of the two Centers compared to the previous programs? 7. To what extent has Dryland Cereals achieved the right balance between research efforts and activities more directly designed to contribute to outcomes? What would assist the Dryland Cereals to enhance the delivery of outcomes'? Are the range and type of partnerships secured sufficient for that purpose? **8.** Have sufficient efforts been made to document outcomes and impact from past research and with what coverage over research areas? How have results been shared with a wide range of audiences at local, regional and international levels, including policy makers?	• Annual reports and product line/flagship reports. (Qs1-8) - Adoption studies, database information and users by target group (FL1) - Reports on use of parental material in national programs, benefits/risks of hybrids; new varieties & traits; productivity and farmer options. (FL2) - Reports on adoption of management options for each product line/region e.g. for soil health & pests and diseases. (FL3) - Reports on seed systems development and benefits, actors, variety release systems & policies, inter-country seed exchange. (FL4) - Reports on use of quality grain for processing, market sale and stover, farmer organizations & market access and information. (FL5) • Views on the connections and assumptions along the impact pathway from flagship and product line leaders, researchers and partners (Qs 2 -3) • Assessment of researchers, national researchers and development partners including private sector and farmer seed producers. (Q4) • Views of scientists (international and national) and partners in different regions working on dryland cereals crops. Records of meetings, workshops, content and frequency of posts on the Dryland Cereals web site. (Q5) Extent of program funding for projects with multiple partners/countries (Q5) • Interviews with advisors to Dryland Cereals and CGIAR, CRP and Center directors and research leaders on value added by collaboration. (Q6) • Distribution of funding (budgeted and actual) by flagship. Proportion of budgets allocated to national research and development partners. Profile of partner types. (Q7) Interviews with scientists and partners on successes and constraints to delivery of outcomes. • Interviews with Dryland Cereals Director, flagship 1 leader and communications officer. (Q8) Systems for storage and retrieval of reports, publications and data sets. Lists of publications (see also Quality of Science below), Impact studies, Communication tools /web site/ multimedia efforts used by the CRP and audience statistics	Analysis of achievements against planned outputs and outcomes by flagship and product line. Document review (adoption studies), impact and evaluation reports. Review of the theory of change. Field visits & observation Analysis of interviews with researchers, partners, private sector & farmers Review & discussion of scientists and partner presentations. Scientist and partners survey Interviews and group discussions with scientists and partners Scientist and partners survey Review of workshop reports Review of web site content. Analysis of partner composition Analysis of Interviews Scientist and partner survey Analysis of budget and actual expenditure by flagship and distribution to partners. Interviews with scientists and partners. Analysis of impact /evaluation studies Review of information management systems. Review of communication tools and analysis of audience statistics/downloads.

Evaluation questions/ criteria	Sources of evidence	Methods and tools.
QUALITY OF SCIENCE: What quality of science (including associated socio-economic, policy and gender research) has the Dryland Cereals CRP achieved in delivering its mandate:		
1. Does the research design, problem setting and choice of approaches reflect high quality and up-to-date scientific thinking, state of the art knowledge and innovative implementation? 2. Are the research outputs, such as publications and genetic material, of high quality and quantity commensurate with the program investment? 3. Are negative as well as positive findings documented and disseminated? 4. Is the quality of research staff and research leadership adequate for assuring science quality and synthesis at flagship and program level? 5. Are the internal processes, conditions and incentives sufficient to ensure high quality research and timely delivery of outputs across the program?	• Reviews of selected research proposals/studies' methodology (including social science, gender and policy research), for scientific quality, hypotheses/research questions, methodological rigor, current techniques and innovativeness. • Extent of collaboration and joint authorship in research and publication. • Citations and impact factor of CRP related publications by discipline, product line and flagship • Qualitative assessment of research outputs, including non-publication outputs, by discipline, product line and flagship projects. • Annual reports from principal researchers (product lines and flagships) • Reporting of positive and negative results and learning points • Researcher quality - publications in discipline and in product line/ flagship areas managed. • Team quality and mentorship aspects (building & supporting teams, managing multi-disciplinarity, tapping high quality from partner organizations) • Internal peer review processes in place at CRP and Center level. External quality assurance processes. Incentives for quality research and timely delivery • Facilities and resources available - labs, greenhouses, equipment, genetic materials statistics, biometrics, data management	Team member assessment of research proposals Document review of internal reviews and CRP/Center commissioned external reviews. Document review – selected publications on research outputs and annual reports. Qualitative analysis of sample of publications. Interviews with researchers and research teams Interviews with research leaders Interviews with partners Scientist survey Partners survey

Evaluation questions/ criteria	Sources of evidence	Methods and tools.
EFFICIENCY: How efficiently is the Dryland Cereals CRP being managed and delivered? With respect to:		
Institutional arrangements and governance and management mechanisms ➢ Are the institutional arrangements and governance and management mechanisms of the Dryland Cereals efficient? Do they achieve greater organizational performance and efficiency compared to previously? ➢ Is there clarity and a common understanding of the roles, operational procedures and reporting lines of different components of CRP management structure within the lead and partner institutions? ➢ To what extent have the reformed CGIAR organizational structures and processes increased (or decreased) efficiency and successful program implementation? **Resource use** ➢ Are the facilities and services used efficiently and are there areas where efficiency could be improved, for instance through outsourcing? ➢ Is there transparent allocation of resources to researchers and partners for specific activities and outputs and are the resources adequate for their expected role? ➢ **Management of risk** – is the program able to flexibly adapt in response to changes in circumstances? **Collaboration and coordination** ➢ Is the level of collaboration and coordination with other CRPs and partners appropriate and efficient for reaching maximum synergies and enhancing partner capacity? What are partners' contribution to research and management processes? ➢ Are the respective roles of the CRP and national programs clearly understood and appropriate? **Monitoring and evaluation** ➢ Is the M&E system adequate and efficient for recording, tracking and enhancing Dryland Cereals' processes, progress, and achievements? **Communication and cross learning** ➢ How efficient is interaction and communication between Dryland Cereals' management and researchers, and cross regionally among researchers and partners? ➢ Has the Dryland Cereals a clear identity and platform for sharing and promoting the program outputs and achievements?	• Dryland Cereals Proposal, extension proposal and correspondence • Perceptions of Dryland Cereals Director, Centers' Directors, lead researchers/product line and flagship coordinators. • Views of Independent Advisory Committee • Terms of reference of Dryland Cereals governance and management committees and management roles • Minutes of steering committee/advisory committee and research committee • Findings of the Review of CGIAR research program Governance and Management 2014 and consortium responses. • Interviews with Dryland Cereals Director, Centers' Directors, Regional Directors, lead scientists and partners • Interviews with Dryland Cereals Director, lead scientists and partners • Annual reports from lead scientists and partners • CRP Annual work plan and budget allocation per work area and per researcher and partner. Records of transfer of funds to partners and actual expenditure. • Annual reports, annual work plan and partner roles. Competitive grants and alignment with strategic areas. • Interviews with partners in different countries • Perceptions of researchers in lead and partner institutions and in national programs • Dryland Cereals management monitoring information. ICRISAT management information systems • Annual reports. Interview with Dryland Cereals Director. • Scientists and partners perception of communication efficiency. • Extent of visibility of Dryland Cereals and partner contributions through web site, publicity materials and media products	Document review Interviews Scientist survey Review of minutes of management and committee meetings – content analysis and decision making Interviews, Scientist survey, Partners survey Interviews, Scientist survey, Partners survey Interviews Review of reports Analysis of budget allocations and expenditure Interviews with partners and review of extent of activities and responsibilities Interviews with scientists and national program collaborators Review of management monitoring information tools Review of annual reports and budgets for changes and adaptations Scientists and partner surveys Interviews. Review of Dryland Cereals' web site content and materials. Web site statistics

Evaluation questions/ criteria	Sources of evidence	Methods and tools.
IMPACT & SUSTAINABILITY: What differences have the outputs and outcomes (of past research continued into the Dryland Cereals CRP) made to productivity, food security, consumption and nutrition and livelihoods? How likely are they to be sustained and scaled –up in the future?		
1. What evidence is there on the magnitude of impact in different geographical regions in terms of increased dryland cereal production and consumption; more resilient farming systems in the face of climate change; improved livelihoods and nutrition of vulnerable women and children and enhanced income? 2. How inclusive and equitable have research outcomes been in terms of benefits for different end users (men, women, youth, low income communities)? 3. Have adequate constraint analyses and lessons from *ex post* studies informed program design for enhancing the likelihood of impact? 4. What evidence is there on the sustainability of past benefits and the extent to which positive outcomes demonstrated at pilot or small-scale level are likely to be sustained and out-scalable? 5. Are the capacity building efforts and incentives among partners adequate for enhancing the long-term sustainability of program effects? 6. How effectively is the Drylands Cereals work being scaled up? Is it achieving the right balance between farmer level impact and policy level influence arising from its work? 7. What are the prospects for sustaining financing, for example, for long-term research programs and key partnerships? 8. How should the future sustainability of the combined Dryland Cereals and Legumes Agrifood Systems CRP be addressed?	• Ex post studies of Dryland Cereals research projects documenting outcomes and impact and coverage from past research • Discussions and presentations from scientists. • Annual reports and use of ex post studies in informing program and research project design. Interviews with scientists and partners • Ex post studies of Dryland Cereals research projects. • Partners views on adequacy of capacity and incentives for sustainability • Annual reports – strategies for scaling up and extent of communication of research results to different audiences and regions and policy makers • Interviews with Dryland Cereals managers, research leaders, partner organizations and Directors of national agricultural research institutes.	Analysis of ex post impact studies Analysis of presentations Annual reports Partners survey Interviews.

CROSS CUTTING ISSUES		
Capacity strengthening 1. How are capacity building needs assessed? 2. To what extent do capacity building efforts address partners' needs? Are capacity building efforts integrated with the research mandate and delivery of the program 3. To what extent are capacity issues taken into account in the impact pathway analysis? Have capacity related assumptions and risks been identified? 4. Have there been efforts to build capacity in gender for scientists and partners? 5. Are there demonstrable outputs and outcomes of capacity building? e.g. enhanced research capacity in partner organizations, capacity for innovation and learning, capacity to work along the value chain. etc. 6. Overall capacity in Dryland Cereals to move along R4D process.	• Program proposal and extension proposal • Views of scientists and partners • Capacity strengthening, training and workshop reports Scholarship program details, applicants and acceptances • Theory of change and impact pathways • Gender training reports; Interviews with gender specialists • Evaluation of capacity strengthening • Partners views • Annual reports	Document review Scientist survey Partners surveys Field visit discussions. Impact pathway analysis Document reviews, analysis of interviews. Partners survey analysis.

CROSS CUTTING ISSUES		
Gender and diversity 1. Have the respective roles and needs of men, women and youth been adequately identified through gender analysis and have these informed the setting of research objectives and priorities? 2. Have the intended users of research outputs and different categories of beneficiaries of research - men and women farmers, consumers, agro enterprises, researchers (national and international), policy makers etc. been clearly identified along the impact pathway? 3. Have research processes involved women's participation in technology testing, evaluation and selection. 4. Has research resulted in benefits for men and women, enhancing the livelihoods and nutrition of women and children and increasing income from market sales? 5. Have capacity-building needs for men and women been adequately identified and their differential needs taken into account in targeting and designing capacity building activities? Has information on capacity building opportunities incorporated specific encouragement for women applicants? With what outcomes? 6. Are scientists and partners throughout the Dryland Cereals aware of the gender strategy and have they incorporated gender awareness in their research design and practice (including collection of gender disaggregated data) and technology uptake? 7. What are the respective proportions of men and women scientists in the Dryland Cereals as researchers, managers and in governance roles?	• Program proposal and extension proposal • Interviews with gender specialists • Report of the Gender working group meeting April 2015 • Interviews with Scientists • Scientists' presentations on their research. • Reports on needs assessment, priority setting and visibility in impact pathway analysis. • Annual reports of product lines and flagships • Gender case studies • Impact evaluation reports. • Training and capacity building reports. Information on training opportunities, training events, scholarship schemes • Scientists and partners responses to on line survey questions on gender • Gender strategy and performance. Gender as a proportion of the budget • Staff lists and roles, management and governance committees.	Analysis of gender related content of documents and presentations. Thematic analysis of interviews. Analysis of gender and participation Analysis of outcomes impacts by gender. Review of training reports and information materials Analysis of on line surveys Budget analysis, performance against gender targets Analysis of composition of staff and committees
Partnerships: 1. Are the range of partners required to achieve the program objectives present? 2. To what extent are the Dryland Cereals partnerships relevant and target critical roles and linkages in the impact pathways? 3. Are partnerships managed so as to maximize efficiency for results?	• Annual reports – range of partners, researchers, development partners, private sector, input suppliers, farmer associations, value chain actors, farmer researchers etc. • Quality of partnerships - roles and decision making and extent of shared vision and contribution, management roles and segment of value chain. • Transaction costs and results	Analysis of partnership composition and fund allocation Competitive grants allocation Interviews with partners Scientists survey Partner surveys Discussions on field visits.

Annex 2: Countries visited and people consulted:

INDIA: 7-17 June 2015	
ICRISAT Patancheru (7–11 June 2015) CCEE Team members: Adrienne Martin, Rory Hillocks, Ravinder Kumar, Jonathan Robinson, Paul Thangata	
NAME	**DESIGNATION**
Dr Shoba Sivasankar	Director of Dryland Cereals CRP.
Joanna Kane-Potaka	Director Strategic Marketing and Communication. ICRISAT.
Dr Stefania Grando	Research Program Director – Dryland Cereals. ICRISAT
Dr Peter S Carberry	Deputy Director General – Research. ICRISAT
Dr G G Koppa	Senior Program Manager, CRPs Dryland Cereals and Grain Legumes, ICRISAT
Nagalakshmi Dronavalli	CRP office – logistics
Sharud Kumar	Human Resources, ICRISAT.
Dr S K Gupta	Senior Scientist (Pearl Millet Breeding). Dryland Cereals CRP Coordinator cluster activity 6, Pearl Millet S Asia and E Africa. ICRISAT.
Dr A. Ashok Kumar	Senior Scientist (Sorghum breeding). Dryland Cereals. ICRISAT. CRP coordinator cluster 5 Sorghum
Dr Kiran K Sharma	CEO Agribusiness and Innovation Platform. (Leader CRP Dryland Cereals flagship 5) ICRISAT
Dr Saikat Datta Mazumdar	Chief operating officer, NutriPlus Knowledge (NPK) Program, Agribusiness and Innovation Platform (AIP). ICRISAT
Food processing entrepreneurs	Two women entrepreneurs producing snack products and cereals from pearl millet.
Rajesh Agrawal	Assistant Director General – Finance. ICRISAT
Girish Chander	Agronomist ICRISAT Development Center. Flagship 3 Crop Management, Coordinator
Prof Anthony M Whitbread	Research Program Director – Resilient Dryland Systems. ICRISAT.
Dr Rajeev K Varshney	Research Program Director, Grain Legumes and Director, Center of Excellence in Genomics. ICRISAT.
Dr Noel Ellis	Director, CGIAR Research Program on Grain Legumes
Dr R S Mahala	Research Director, Multi Crop Research Centre, Pioneer Hi-Bred Private Limited, Telangana. Member of the Dryland Cereals CRP Steering Committee
Moinuddin H Haroon	Director, R&D, Hytech Seed India Private Limited. Hyderabad
Dr Suhas P Wani	Director, ICRISAT Development Centre (IDC). ICRISAT
Supriya Bansal	Financial Controller. ICRISAT
Satish Nagaraji	Communications manager Dryland Cereals CRP.
Dr HV Kalpande	Officer in charge & Sorghum Breeder. PI CRP Project. All India Coordinated Sorghum Improvement Project, Sorghum Research Station VNMKV Parbhani. Maharashtra.
Dr R.L Aundhekar	Co-PI for HOPE and CRP Project, VNMKV Parbhani, Maharashtra.

Dr S R Gadakh	Senior Sorghum Breeder. All India Coordinated Sorghum Improvement Project, MPKV Rahuri 413722 Dist. Ahmednagar, Maharashtra.
Dr. U D Charan	Co-PI CRP & HOPE project, Senior Cereal Food Technologist, MKVR, Rahuri, Ahmednagar, Maharashtra.
Dr Padmaja Ravula	Scientist (Gender Research) Markets, Institutions, Policies. ICRISAT
Dr Abhishek Rathore	Senior Scientist, Biometrics Unit, Center of Excellence in Genomics, ICRISAT.
Dr Vincent Vadez	Assistant Research Program Director & Principal Scientist, Dryland Cereals. Plant Physiology
Jaipur, Rajasthan (11- 13 June 2015) Rajasthan Agricultural Research Institute. CCEE Team: Adrienne Martin, Rory Hillocks, Ravinder Kumar, Jonathan Robinson, Paul Thangata	
Dr L.D. Sharma	Professor & in charge, Pearl Millet Project & Professor & Plant breeder Millets (SKNAU Jobner). Rajasthan Agricultural Research Institute (RARI) Durgapura
Ashok Shamali	Director of RARI
Prof A C Mathur	Plant Pathology
Sunita Gupta	Plant Pathology
N K Gupta	Seed Technology Research
New Delhi (13 – 15 June 2015) CCEE Team: Adrienne Martin, Rory Hillocks, Jonathan Robinson, Paul Thangata	
Dr Tara Satyavathi	Principal Scientist (Pearl Millet Genetics), Division of Genetics, Indian Agricultural Research Institute (IARI), Pusa Campus, New Delhi. 110 -012
Dr S K Jha	Principal Scientist Food Science and Post Harvest Technology, IARI Pusa.
Dr S P Singh	Senior Scientist Div of Genetics IARI Pusa
Dr R S Bana	Scientist, Division of Agronomy. IARI Pusa
Dr Arun Kumar MB	Senior Scientist, Division of Seed Science and technology. IARI Pusa
Dr N Srinvasa	Scientist, Division of Plant Pathology. IARI Pusa
Dr A.K. Singh	Head, Division of Genetics. IARI Pusa
Dr S. Ayyappan	Secretary (Directorate of Agricultural Research and Education) and Director General ICAR, Krishi Bhaven, New Delhi, 110 001
Dr Virendra S Deora	Senior Scientist, Pearl Millet. Metahelix Life Sciences Limited, Bangalore. Field visit to pearl millet trials.
Karnal 15/16 June 2015 ICAR – Indian Institute of Wheat and Barley Research, Karnal (IIWBR), PO Box 158, Kunjpura Road, Karnal 132 001 India. CCEE Team: Adrienne Martin, Rory Hillocks, Jonathan Robinson	
Dr Ramesh PS Verma	Barley Breeder, ICARDA, Rabat, Morocco. (Coordinator, Barley, Dryland Cereals CRP).
Dinesh Kumar	Principal Scientist, Barley quality - barley malt & food biochemical & molecular aspects
Anil Khippal	Barley Agronomist, IIWBR, Karnal
Dr Anuj Kumar	Senior Scientist (Agricultural Extension). Baseline database creation
Sendhil R	Economist IIWBR. (Baseline data collection)
Vishnu Kumar	Barley breeder. Malt barley breeding
Jogendra Singh	Barley breeder Feed and food barley
Sudheer Kumar	Plant pathologist, identification of disease resistance sources

INDIA: 7-17 June 2015 (Cont.)	
Shimla 16 June 2015 Regional Station, ICAR – Indian Institute of Wheat and Barley Research, Flowerdale, Shimla. CCEE Team: Adrienne Martin, Rory Hillocks, Jonathan Robinson	
Dr Subhash Bhjardwaj	Principal Scientist & in charge
Dr Om Prakash Gangwar	Scientist, Plant Pathology
Pramod Prasad	Scientist Plant Pathology
Hanif Khan	Scientist (GPB)
Dr Dharam Pal	Principal Scientist, (Plant Breeding) from ICAR – Indian Agricultural research Institute, Regional Station, Tutikandi Facility, Shimla, 171004 HP.

MOROCCO 28 June -2 July 2015	
ICARDA, Rabat, 28 June – 2 July 2015 Field visits to Settat Research Station and Marchouche Farm CCEE team: Adrienne Martin, Rory Hillocks	
Sanjaya Gyawali	ICARDA Barley Breeder (Low potential areas)
Andrea Visioni	ICARDA Barley breeder Post-doctoral Fellow
Somanagouda B. Patil	ICARDA Agronomist, Food legumes. Post-doctoral Fellow
Michael Baum	ICARDA Director Biodiversity and Integrated Gene Management Programme (BIGM)
Ahmed Amri	ICARDA Head of Genetic Resources Section. Deputy head BIGM
Mustapha El Bouhssini	ICARDA, Principal Entomologist, (BIGM)
Seid Ahmed	ICARDA Legume pathologist
Sajid Rehman	ICARDA Cereals pathology. Post-doctoral Fellow
Elizabeth Mendy	Research student
Amezrou Reda	ICARDA Research Assistant.
Jilal Abderrazek	INRA Morocco, Barley Breeder.
Brahim El Yousfi	INRA Morocco, Pathologist. Settat
Abdelali Laamari	INRA Morocco, Economist. Settat

ETHIOPIA 5-8 July 2015	
ICRISAT & ICARDA, Addis Ababa, Ethiopia. 5 -8 July. CCEE team – Adrienne Martin & Rory Hillocks.	
Dr KPC Rao	ICRISAT Country Representative Ethiopia
Zewdie Bishaw	ICARDA, head of Seed Unit. Dryland Cereals CRP Flagship 4 Seed Systems leader
Barbara Rischkowsky	ICARDA Senior Livestock Scientist
Abdalla Mohamed	ICRISAT Cereals Breeder.
Asnake Fikre	EIAR, Director Crop Research Addis Ababa
Girma Fana	OARI/Sinana. Barley Project Coordinator.

ETHIOPIA 5-8 July 2015 (cont).	
Field visit to Holetta Research station. 6 July 2015. CCEE team – Adrienne Martin & Rory Hillocks	
Berhane Lakew	EIAR/ Holetta, Barley Breeder
Wondimu Fekedu	EIAR/ Holetta, Barley breeder
Fekadu Amsaiu	EIAR/ Holetta, Breeder, Seed Multiplication
Tugist Shiferaw	EIAR/ Holetta, Breeder
Dereje Hamra	AAU/ICARDA PhD Student
Berhanu Bekale	EIAR/AmboPPRC PhD Student
Mekonen Haile	EIAR/ Holetta, seed technologist
Gemechu Keneni	EIAR/ Holetta, Pulse breeder.
Liyusew Ayalew	EIAR/ Holetta, Extensionist
Yadesa Abeshu	EIAR/ Holetta, Quality Laboratory
Legesse Admasu	EIAR/ Holetta, Agronomist
Daniel Ayele	EIAR/ Holetta, Extensionist
Aselefech Telila, Tewabach Diriba	Men farmer seed producers from R/Gebeya Peasant Association -
Dereje Dagne, Tamiru Damana	Women farmer seed producers from Telecho Peasant Association
Visit to Melkassa Research station. 7 July 2015 CCEE team – Adrienne Martin & Rory Hillocks	
Asfaw Adugna	Advanta Seed International
Adane G/Johannes	EIAR Sorghum breeder
Kinde Nouh	EIAR
Alemu Tirfessa	PhD Student
Habte Nida	EIAR Ethiopia. Sorghum
Jemila Usmael	Farmer (woman)
Damitew Autachew and Getachew Alemu	Sorghum farmers (men)
Visit to Assela Malt Factory. 7 July 2015 CCEE team – Adrienne Martin & Rory Hillocks	
Tadesse Sefera	Director, Kulumsa Agricultural Research Centre KARC
Hussien Sareta	KARC Crop protection
Bedada Begne	Socio economics, extension
Bekele Hundie	KARC
Shimelis Gezahegu	KARC
Lidiya Tilahun	KARC
Adane Choferie	KARC
Kassafe Hussen	KARC
Tolesa Alemu	KARC
Enyew Gebeyehu	Asella Malt factory, senior quality controller.
Mekonnen Abera	Asella Malt factory Planning Director.

KENYA – 8-12 July, 2015.	
Meeting in ICRISAT Office, Nairobi 9-July, 2015. CCEE team Adrienne Martin, Rory Hillocks, Jonathan Robinson.	
Moses Siambi	Agronomist and ICRISAT Regional Director
Henry Ojulong	Breeder, ICRISAT – Finger millet, (sorghum & pearl millet)
Eric Manyasa	Breeder, ICRISAT – Sorghum & other cereals
Damaris Odeny	Molecular biologist, ICRISAT
Patrick Audi	Socio-economics, Seed Systems, ICRISAT
Esther Njuguna Mungai	Gender Specialist, ICRISAT
Dyutiman Choudhary	Economist, ICRISAT. Technology Uptake, Integrated markets for Development
Kai Mausch	Economist, ICRISAT
Albert Gierend	Agricultural Economist, ICRISAT
Clement Kamau	Kenyan Agriculture and Livestock Research Organisation (KALRO) Sorghum breeder
Paul Kimurto	Egerton University
Taylor Mburu	Africa Harvest, Business Development
Doreen Marangu	Africa Harvest. Agricultural economist.
Rhoda Nunga	KALRO – Nutrition, home economics. Finger millets in Kenya
Nelson Wanyera	NARO Uganda, Finger millet breeder.
Elias Letayo	Hombolo Agricultural Research institute, Tanzania – sorghum breeder
Brian Isabirye	ASARECA. Sustainable Agriculture, food security and nutrition theme.
R Paliwal	ICRISAT Post-Doctoral Fellow.
Field Trip to Kiboko, 10 -11 July, 2015. CCEE team Adrienne Martin, Rory Hillocks, Jonathan Robinson.	
Peter Kiboko	Officer in charge Kiboko
Patrick Sheunda	ICRISAT – field officer Kiboko
Joseph Kibuka	ICRISAT– field officer Kiboko
Paul Mwikya	Sorghum farmer, Mtito Andei
Onesmus Kithuka	Sorghum & pearl millet farmer, Mtito Andei
Joshua Nzeki	Sorghum farmer, Kibwezi
Everlyne Kamae	Mwailu Enterprises, Quality seed control manager. Kibwezi
Mary Mathuli	Sorghum Farmer, Muvau Farmers' self-help Group. Wote.
Benson Kyalo	Fish farmer and sorghum farmer. Kiboko

SENEGAL –12 - 14 July, 2015	
Meeting at CERAAS, Theis. 13 July 2015: CCEE team Adrienne Martin, Jonathan Robinson	
Ndiaga Cisse	CERASS Sorghum WCA. Crop Cluster coordinator.
C. Tom Hash	Breeder – pearl millet. Niger
George Okwach	ICRISAT Assistant Director West & Central Africa, Project Manager HOPE for Sorghum & Millets. Dryland Cereals Program, Mali
Malick Ba	Entomologist. ICRISAT Country rep Niger
Fred Rattunde	Sorghum breeder, Mali
Meeting at HQ of Farmers' Association, Theis. 14 July 2015 Adrienne Martin, Jonathan Robinson	
Ablaye Ndur	Réseau Cooperatif des Organisation Paysannes et Pastorales du Senegal.

Interviews via Skype

Alastair Orr – ICRISAT Assistant Director Eastern and Southern Africa. Economist (with Ravinder Kumar)

Eva Weltzien – ICRISAT Sorghum breeder, Mali (with Adrienne Martin)

Ramadjita Tabo, ICRISAT Director West & Central Africa (with Adrienne Martin)

Wenda Bauchspies – ICRISAT Senior gender specialist (with Adrienne Martin

Annex 3: Evaluation team profiles

Adrienne Martin is the Director of Programme Development at the Natural Resources Institute, University of Greenwich and a Social and Institutional Development and Evaluation Specialist. She has forty years' experience in international development and research relating to agriculture, natural resources, value chain development and gender and diversity. She has conducted many reviews and evaluations of agricultural research projects and programmes, as team leader and team member. She has designed and managed impact evaluations using quantitative, qualitative and mixed method designs. From 2003 to 2011 she conducted five reviews of EC funded projects at CGIAR centres. Recent work has included the management and coordination of the monitoring and evaluation and gender and diversity components of the Cassava; Adding Value for Africa (C:AVA) project which is working to improve rural incomes by linking cassava producers and processors into commercial value chains. She was team leader for the Monitoring and Evaluation of the continental scale (34 countries in Africa) Promotion of Science and Technology for Agricultural Development in Africa Project (PSTAD), for FARA/AfDB (2011-2014). She was a team member for the meta impact analysis of the Irrigated Rice Research Consortium IRRC, responsible for examining social, cultural and institutional impacts, process analysis, impact pathways and the consortium's influence on national research and extension policy (IRRI/SDC) (2013). Adrienne was a member of the review team for the CCER on Social, Economic and Policy Research across ICARDA (2014).

Jonathan Robinson is an independent consultant and also the Adjunct Professor at University of Helsinki, Department of Plant Biology. Jonathan has carried out many reviews and evaluations at CGIAR centres, especially in the area of biotechnology, plant genetic resources and gene bank health, for IPGRI/Bioversity International and FAO. He carried out a scoping study on evaluating the impact of genebanks and genetic conservation through case studies of various mandate crops (for CGIAR Science Council Secretariat). He was team leader for impact assessment case studies at CIAT, CIP and CIMMYT for the CGIAR Science Council Standing Panel on Impact Assessment, and for the Independent external evaluation of the Generation Challenge Programme. His early career was in agricultural research for development with long term overseas experience in South Sudan and Sudan on agricultural development projects. He spent 3 years as an associate scientist in the wheat programme at CIMMYT, Mexico, researching on small grain cereal resistance to Russian wheat aphid. He worked for 6 years as a senior researcher in the Department of Plant Breeding Research, Agricultural Research Centre of Finland, mainly working on barley. He is a prolific writer, editor and translator on topics associated with genetic resources conservation, policy and use, and on capacity development for plant breeding and biotechnology programmes.

Ravinder Kumar: is an experienced evaluator, researcher, implementer and learning facilitator in Agriculture, Value Chains, Natural Resource Management, Climate Adaptation and Local Economic Development sectors. He has been involved in more than 40 programme/impact evaluations, design of monitoring and evaluation systems and management information systems. He has experience in the experimental/quasi-experimental as well as theory based empowerment evaluation methodologies of impact assessment. He has conducted large scale, complex /multi-country statistical analysis and qualitative assessments, e.g. evaluation of the Global Research Project of the Global Development Network, a research based policy outreach initiative funded by the Bill & Melinda Gates Foundation; Impact evaluation of a large scale, multi-component and empowerment based programme (DFID funded Poorest Areas Civil Society Program in India); and longitudinal evaluations of private sector led development initiatives. He has conducted evaluations of large national programmes e.g. Sustainable Community Based Approaches for Livelihoods Enhancement (SCALE) by Aga Khan Foundation; evaluations of innovations and evaluation of international agriculture research e.g. evaluation of the Promotion of Science and Technology for Agricultural Development in Africa (PSTAD); Evaluation /research studies of initiatives for improving better management practices in cotton in India.

Rory Hillocks: 36 years' experience in agricultural research for development. He initially worked in Tanzania and Zimbabwe as member of a Technical Cooperation team, supporting local agricultural scientists in the National Agricultural Research Systems. Since 1989, he has been managing agricultural research projects involving a wide range of crops and smallholder farming systems from a base in the UK, making short-term visits to Kenya, Uganda, Malawi, Mozambique, Tanzania, Zambia and Botswana. Collaborative research projects have involved a range of partners including African NARS and the CGIAR. In 2011 he set-up the European Centre for IPM at NRI, as a platform to extend IPM know-how to European agriculture, in support of EU policies to decrease the use of conventional pesticides. Dr Hillocks has undertaken numerous consultancies on aspects of crop management and crop protection and agricultural research for development. He has been a regular member of the consultancy team that each year evaluates some of the CGIAR projects funded by the EC. These include a

review of EU funding for coffee research in Uganda; a review of EU support to the Generation Challenge Programme (2008), the review of EU support to ICARDA (2009) and the review of EU support to the CIAT cassava programme (2010).

Paul Thangata has extensive experience in project management and implementation, evaluations, policy analysis, institutional development, designing strategic and operational plans for agricultural institutions. From 2008 to 2012, Paul was a Research Fellow with IFPRI based in Addis Ababa, Ethiopia where he conducted policy and capacity development research on organizational efficiency and effectiveness of agricultural R&D institutions. Before this he was the Agricultural Economist (based in Botswana) for the SADC Secretariat's SADC MAPP program and the creation of the Centre for Agricultural Research and Development for Southern Africa (CARDESA, now CCARDESA). Paul previously worked at the World Agroforestry Centre (ICRAF), based in Zimbabwe, where he coordinated the economics of Gender and HIV/AIDS and scaling up strategies for SADC regional projects. While with ICRISAT in Malawi (1992---1995), Paul was instrumental in the scaling up of new groundnut varieties and the promotion of income generating activities to reduce malnutrition, especially in female--headed households and other vulnerable groups. From 1988---1992, Paul worked with Malawi's Department of Agricultural Research, where he conducted research in genetic and agronomic evaluation of rice, sorghum and millet. Paul is a Malawi national and holds a Ph.D from the University of Florida, Gainesville, USA, and an M.S. degree in Rural Development from Edinburgh University, Scotland.

George Rothschild: has many years of experience in CGIAR research oversight gained as a former Director General of the International Rice Research Institute (IRRI) and former Board chair of the CGIAR Challenge Programme for Water and Food (CPWF). He is currently a board member of the International Water Management Institute (IWMI). In addition, he has experience of the CGIAR from 1989 to the present through roles that include:(i) Former Director of the Australian Centre for International Research (ACIAR) and leader of the Australian donor delegation to the CGIAR; (ii) A lead consultant for the CG reform process; (iii) As current Board member of IWMI, he is involved with the IEA review of CRP5; (iv) Reviewed all 15 CRPs and Gene bank programme for EIARD, the collective European donor group; (v) Led team to conduct review for EC/IFAD of EC-funded ICRISAT project on sorghum multiple use in East Africa (part of CRP Drylands Cereals programme). He was formerly principal adviser on natural resources in development to the Australian Foreign Minister, the Overseas Development Minister and the Minister for Primary Industries and Energy and is currently Chair of support committee to the UK All Party Parliamentary Group on Food & Agriculture in Development.

Team Members Roles and Responsibilities

Team member	Main areas of responsibility
Adrienne Martin	Team leadership – overall responsibility for evaluation design, delivery and reporting. Flagship 4, Seed systems. Flagship 5 Post-Harvest. Cross-cutting gender synthesis. Support to on line surveys and management and governance analysis
Ravinder Kumar	Flagship 1 Priority setting, adoption and uptake, M&E systems, communications, data management. Support to partnerships and capacity building.
Jonathan Robinson	Flagship 2 Crop Improvement, Quality of science and support to Crop management and institutional assessment
Rory Hillocks	Flagship 3 Crop Management. Support to Crop improvement and Seed systems
Paul Thangata	Governance, management and institutional issues. Partnerships. Finance and resource allocation. Capacity building. Design and management of on line surveys
George Rothschild	Advice on CGIAR system issues and context, governance and management of CRPs, CRPs interrelationship etc.

Annex 4–Oversight Committee for CCEE

Sl No	Names with Designation	Particulars
1	Chandra A. Madramootoo Dean, Agricultural and Environmental Sciences McGill University, Montreal, Canada Email: chandra.madramootoo@mcgill.ca	Chairman (Chair, ICRISAT Governing Board)
2	Bernard Hubert, President, Agropolis (IRD/CIRAD) Email: bernard.hubert@avignon.inra.fr	Member (Member, DC SC)
3	Greg Edmeades, Independent Consultant from New Zealand Email: greg_edmeades@msn.com	Member (Member, DC IAC)
4	Urs Zollinger or King Alison, CGIAR- IEA , c/o FAO Rome, Italy Email: info@kingzollinger.ch	Member (IEA Representative)
5	Ivan Rwomushana, Program Manager, Staple Crops Programme, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) Email: i.rwomushana@asareca.org	Member (Member, DC IAC)
6	Ndiaga Cisse, Director of Research, CERAAS, Senegal Email: ncisse@refer.sn	Member (Member, DC RMC)
7	Serge Braconnier, Senior Eco physiologist, CIRAD (French Agricultural Research Centre for International Development) Email: serge.braconnier@cirad.fr	Member
8	Shoba Sivasankar, Program Director, CRP-Dryland Cereals ICRISAT, Patancheru, 502 324, Telangana State, India Email: s.sivasankar@cgiar.org	Member and Convener
9	CCEE Manager: G G Koppa, Senior Program Manager CRP-Dryland Cereals, ICRISAT, Patancheru, 502 324, Telangana, India Email: g.koppa@cgiar.org	Member

Annex 5: Scientist survey

5.1 Scientist survey invitation and questionnaire

UNIVERSITY of GREENWICH | Natural Resources Institute

COMMISSIONED EXTERNAL EVALUATION OF THE DRYLAND CEREALS CRP

CGIAR Research Program (CRP) Dryland Cereals: CRP Commissioned External

Researchers and Scientists Survey

Dear Scientist/Researcher:

The survey solicits your feedback and perspectives on the achievements and lessons from designing and implementing the Dryland Cereals CRP (DC CRP). Given your association with and contributions to the CRP, your views and perspectives will be critical in undertaking a successful evaluation. The DC CRP has commissioned a team led by Natural Resources Institute (NRI), a specialist institute of the University of Greenwich to undertake the CCEE. To know more about NRI, please visit http://www.nri.org/

The purpose of this survey is to accurately represent your experiences and perceptions relating to various aspects of working with the DC CRP, including:

1. Research relevance and priorities
2. Research effectiveness and management
3. Research outcomes
4. CRP structure, governance and management
5. Partnerships, gender and capacity building
6. Value added

The survey will take less than 20 minutes of your time and the information provided by you will remain confidential. The findings will be presented in aggregate. We will not attribute views to specific individuals or organisations.

Please contact us with any questions or comments,

Thank you in advance for your thoughtful consideration, time and effort in contributing to the assessment.

Adrienne Martin (A.M.Martin@greenwich.ac.uk), Team Leader
Jonathan Robinson
Rory Hillocks
Paul Thangata
Ravinder Kumar

Scientist_SurveyMonkey_DCCRP.pdf

5.2 Results of Scientists Survey

The scientist survey was sent out on 12 August 2015 to 90 scientists – a list compiled by the evaluation team from names provided by Dryland Cereals CRP management, suggestions from flagship/crop cluster leaders, and scientists met on the country visits. Two follow up reminders were sent and the survey closed on 18 September 2015. A total of 36 people, or 40% of those sent the questionnaire, responded and around three quarters completed the survey in full. Responses were received from different categories of scientists (Q3), although somewhat weighted towards principal scientists and managers compared to the list sent out (principal scientists and managers constituted 47.2% of the responses compared to 33.3% of the total list).

Q1 Contact details: 36 scientists responded to the survey, of whom 32 filled in their contact details

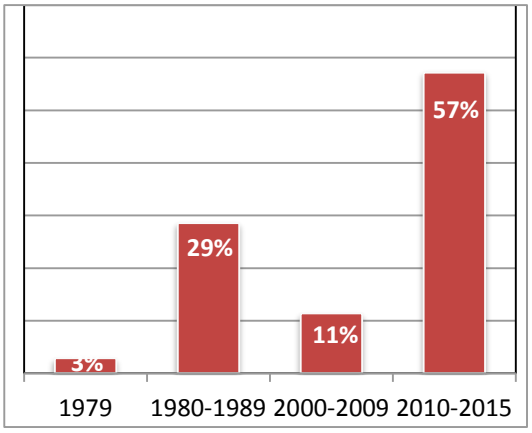
Q2 Home institution:

	Response count	%
ICRISAT	28	77.8%
ICARDA	8	22.2%

Q3 Job designation

	Response count	%
Scientists	13	36.1%
Senior scientist	6	16.7%
Principal Scientist	10	27.8%
Managers	7	19.4%

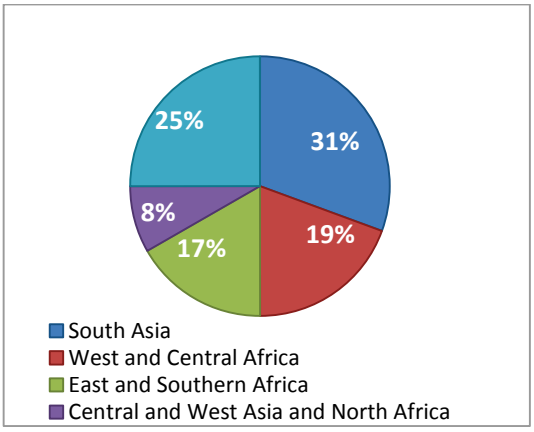
Q4 Year joined (n=36)



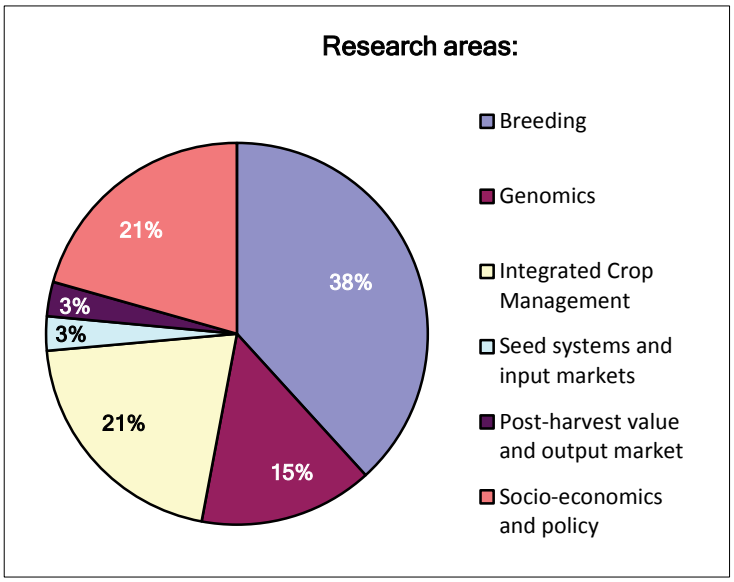
Q5 Highest Education level: 97% of respondents have PhDs, 3% MSc. (n= 36)

Q6 Gender: 86% men, 14% women (n= 36)

Q7 Region in which respondents work: (n=36)



Q 8. Research areas (n=34)



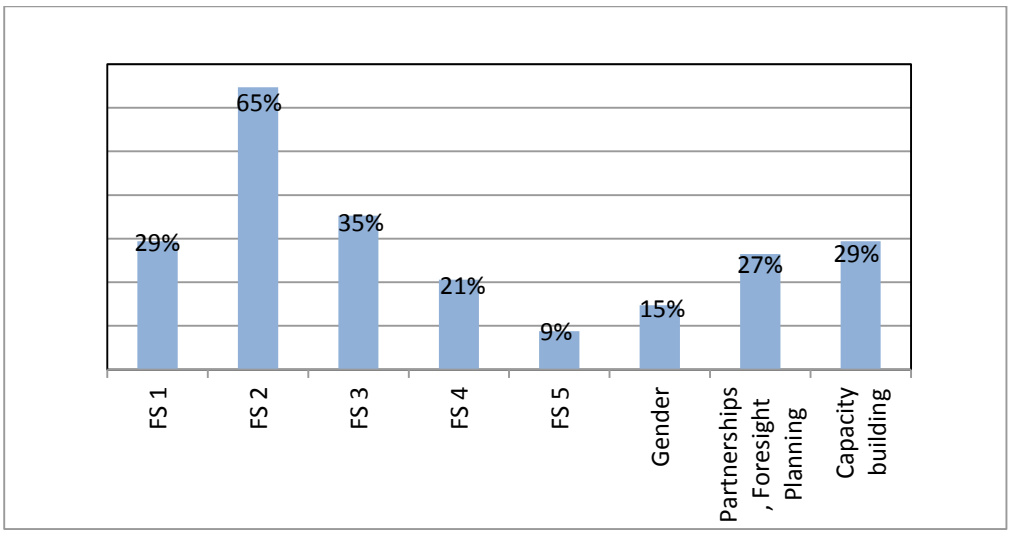
12 respondents made further comments: indicating secondary areas of work, including biotechnology, gender research, integrated pest management, crop protection, plant pathology, crop systems biologist, conservation and sustainable use of agrobiodiversity, seed systems, crop management and nutrition and post-harvest value (malting quality enhancement). Three people additionally reported being involved in management and coordination.

Q 9. Main crop worked on: (n=34)

	Response count	%
Barley	8	24%
Sorghum	19	56%
Pearl millet	5	15%
Finger millet	2	6%

Several respondents noted that they work on other crops in addition to their main crop, 2 are also working on legumes.

Q 10. To which flagship and/or cross cutting issues do the projects you work/worked on contribute? (more than one answer is possible) (n=34)



Three other responses mentioned a role in coordination across flagships for a bilateral project, focal person for crop, and overall oversight.

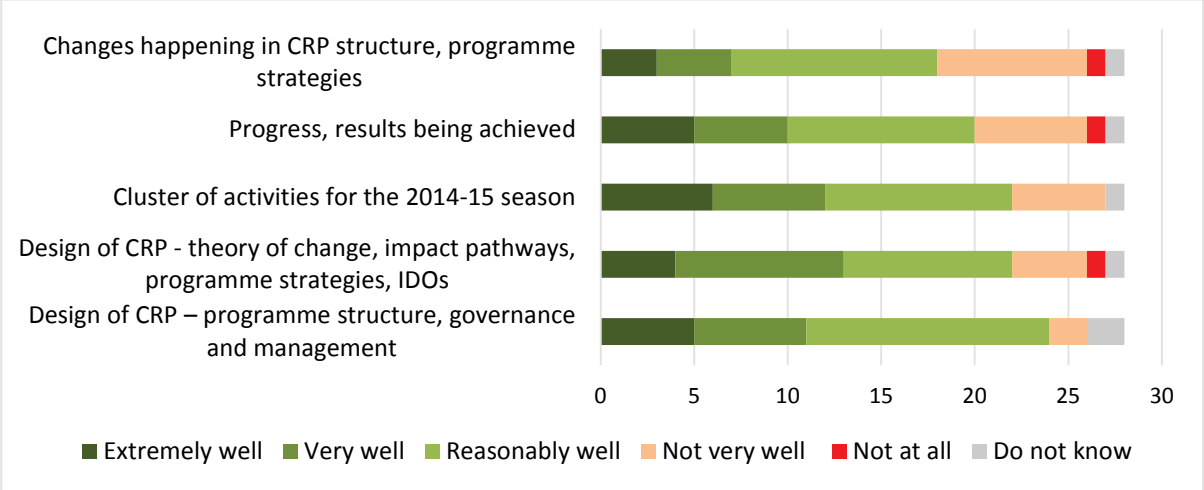
Q 11. The flagships are a useful way to organize Dryland Cereals CRP (n=34)

Strongly agree	Agree	Disagree	Strongly disagree	Don't Know
20.6%	61.8%	2.9%	8.8%	5.9%

Q 12. Did you work with ICRISAT/ICARDA before the Dryland Cereals CRP? (n=34)

	Response Percent	Response Count
Yes	67.6%	23
No	32.4%	11

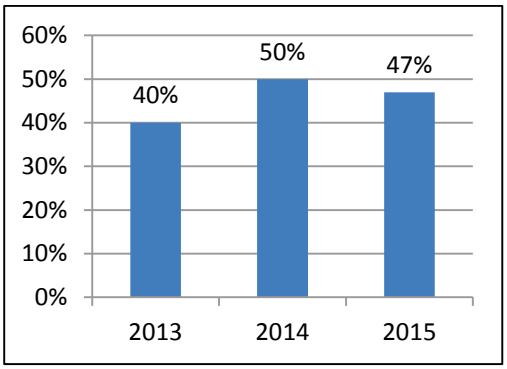
Q 13. How well do you know the Dryland Cereals CRP? (n=34)



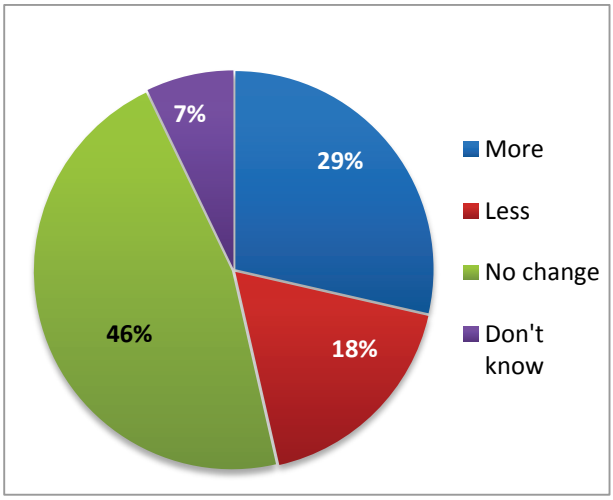
Five respondents made other comments.

- My work as a project coordinator is not directly and closely linked to CRP activities and operations
- I contributed to the writing of the 1st phase, and am now in the management group
- Too frequent changes in the CRP are difficult to be aware of
- Because the organization is continuously changing, I rather focus on research than again and again trying to understand the structure
- There is frequent changes for each design which causes confusion at times

Q 14. What share (percentage) of your working time was dedicated to Dryland Cereals CRP in 2013, 2014 and 2015? (n=28)



Q 15. Has the change to CRP made your work more or less difficult or no change? (n=28)



Q 16. What would you consider as the most important incentive used in your Center to enhance the quality of science? (n=28)

Incentive	Responses
Annual performance assessment and salary increments	7
Recognition of individual scientists and teams by management, or peers or both, e.g. scientist of the year award	6
High quality scientific publications, public display of papers published	3
Scientific freedom - freedom to work and plan experiments	2
Broad expertise available (science and economics, inclusive market oriented development, impact assessment)	2
Access to operational resources, office, equipment, lab facilities	2
Good coordination, Interaction with Program Director	2
Well funded research	1
Collaboration with advanced institutes such as USDA and universities	1
High expectations of our National partners that ICRISAT deliver useful results	1
None/ no clear incentives	2

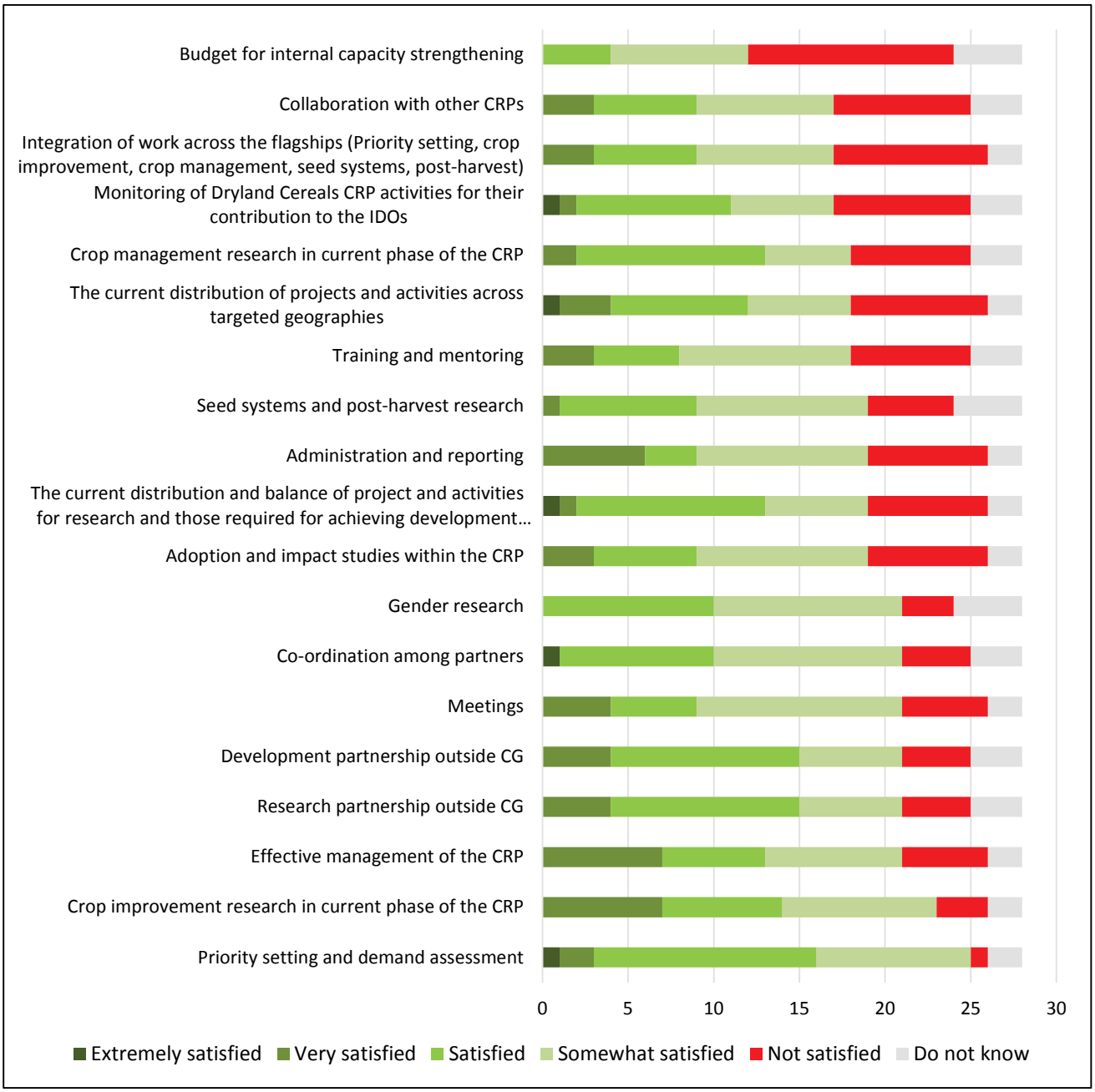
Other comments:

- There should be other measures that the CRP should be able to put in place, but uncertain budgets and limited program durations (3 years of phase I, two years of extension etc.) make it difficult to implement suitable measures.
- ICRISAT should cut inefficiency, non professionality and make the management structure in the most simple transparent way (without overlaying management). I am tired of filing the similar forms 10 times every reporting season - but in 10 different structures!

Q 17. The Dryland Cereals CRP activities are monitored for their contribution to the CRP's theory of change. (n= 28)

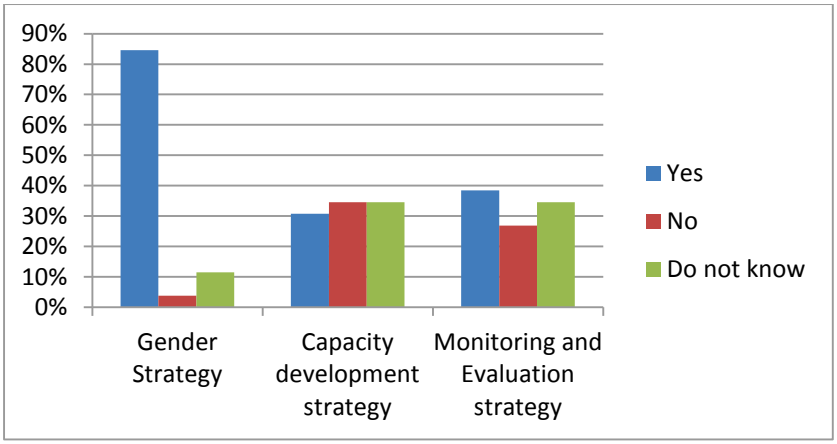
	Strongly agree	Agree	Disagree	Strongly disagree	Do not know
count	1	17	6	2	2
%	3.6%	60.7%	21.4%	7.1%	7.1%

Q 18. How satisfied are you with ...? (n=28)



Q 19. As far as you are aware, does the CRP have gender, capacity development and M&E strategies? (n=26)

	Yes	No	Do not know
Gender Strategy	22	1	3
Capacity development strategy	8	9	9
Monitoring and Evaluation strategy	10	7	9

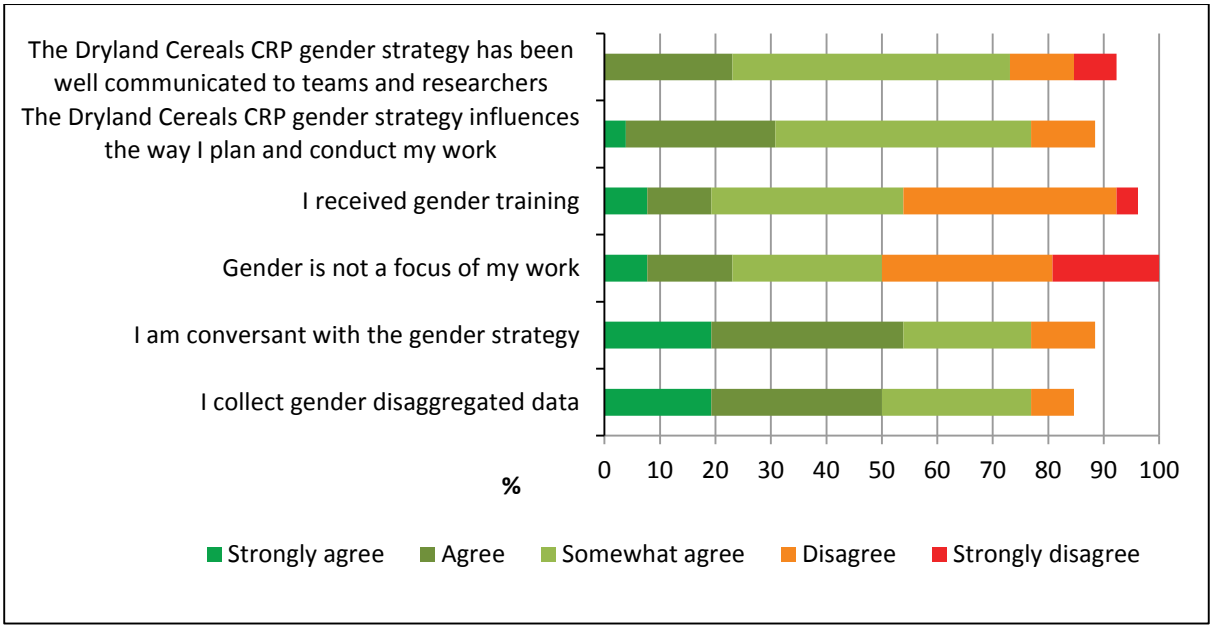


Q 20. Please indicate your response to the following statements? (n=26)

The Drylands Cereals CRP	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree	Do not know	% +ve
- supports capacity development needs in developing countries	5	9	9	0	0	3	88%
- targets both men and women for training	4	14	5	0	0	3	88%
- provides for institutional staff training needs	1	4	12	6	0	3	65%
- has sufficient capacity building funds for partners	1	2	9	10	1	3	46%
- has sufficient capacity building funds for staff	0	0	7	15	2	2	27%

Q 21. Please indicate your response to the following statements – (n=26)

	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree	Do not know	% +ve
- I collect gender disaggregated data	5	8	7	2	0	4	77%
- I am conversant with the gender strategy	5	9	6	3	0	3	77%
- Gender is not a focus of my research	2	4	7	8	5	0	50%
- I received gender training	2	3	9	10	1	1	54%
- The Dryland Cereals CRP gender strategy influences the way I plan and conduct my work	1	7	12	3	0	3	77%
- The Dryland Cereals CRP gender strategy has been well communicated to teams and researchers	0	6	13	3	2	2	73%



Q 22. To which other CRPs other than Drylands Cereals CRP (CRP3.6) are you currently contributing? (n=26)

	Response Percent	Response Count
Dryland Systems (CRP1.1)	50%	13
Grain Legumes (CRP3.5)	42%	11
Policies, Institutions and Markets (CRP2)	27%	7
Agriculture for Nutrition and Health A4NH (CRP4)	27%	7
Climate Change Agriculture and Food Security CAFS (CRP7)	15%	4
Livestock and Fish (CRP3.7)	12%	3
Wheat (CRP3.1)	8%	2
Global Rice science partnership GRiSP (CRP3.3)	4%	1
Aquatic Agricultural Systems (CRP1.3)	4%	1
Humid Tropics (CRP1.2)	0%	0
Maize (CRP3.2)	0%	0
Roots Tubers and Bananas (CRP3.4)	0%	0
Water, Land, Environment (CRP5)	0%	0
Forests, Trees and Agroforestry (CRP6)	0%	0

One respondent mentioned Genebanks

Q 23. How satisfied are you with the collaboration with other CRPs (n=26)

Very Satisfied	Satisfied	Not Sure/Don't Know	Dissatisfied	Very dissatisfied
1	13	6	6	0

Other comments:

- Researchers are generally not able to collaborate transparently, everyone is afraid to share expertise, data, tools and resources. This is the situation I am facing across CRPs.
- Collaboration between CRPs is on paper only
- As each CRP has heavy reporting and planning requirements it s actually difficult to effectively contribute to more than 1 CRP.

Q 24. To what extent do the following factors influence the choice of research topics in the DC CRP? (n=24)

	Great extent	Large extent	Moderate extent	Small extent	Not at all	Do not know	% +ve
Expressed needs of clients or beneficiaries	5	7	8	4	0	1	96%
Donor priorities	7	12	4	1	0	1	96%
Funding availability	6	15	3	0	0	1	96%
Dryland Cereals strategies	3	11	9	1	0	1	96%
Centre strategies	7	11	4	1	0	2	92%
Scientists interests	5	7	10	1	0	2	92%
Perceived knowledge gaps	2	8	9	4	0	2	92%

3 additional comments –

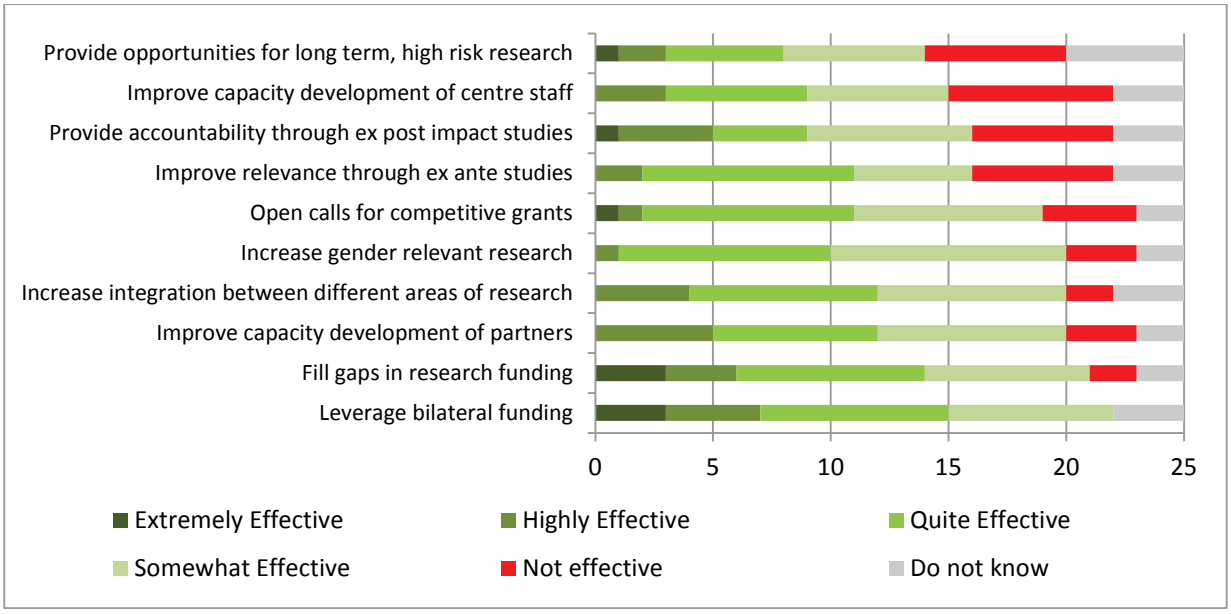
- I am not closely involved in CRP DC operations
- This distribution is in the process of being changed
- Most activities are donor driven

Q 25. The CRP receives funding from different sources where the Windows 1 and 2 are of the least restricted type. What is your view of how W1/2 funds are used in Drylands Cereals CRP? (n=25)

Answer Options	Extremely Effective	Highly Effective	Quite Effective	Somewhat Effective	Not effective	Do not know
Increase integration between different areas of research	0	4	8	8	2	3
Leverage bilateral funding	3	4	8	7	0	3
Fill gaps in research funding	3	3	8	7	2	2
Provide opportunities for long term, high risk research	1	2	5	6	6	5
Open calls for competitive grants	1	1	9	8	4	2
Increase gender relevant research	0	1	9	10	3	2
Improve capacity development of partners	0	5	7	8	3	2
Improve relevance through ex ante studies	0	2	9	5	6	3
Provide accountability through ex post impact studies	1	4	4	7	6	3
Improve capacity development of centre staff	0	3	6	6	7	3
Any other (specify in box below and score on this line)	1	2	5	2	3	12

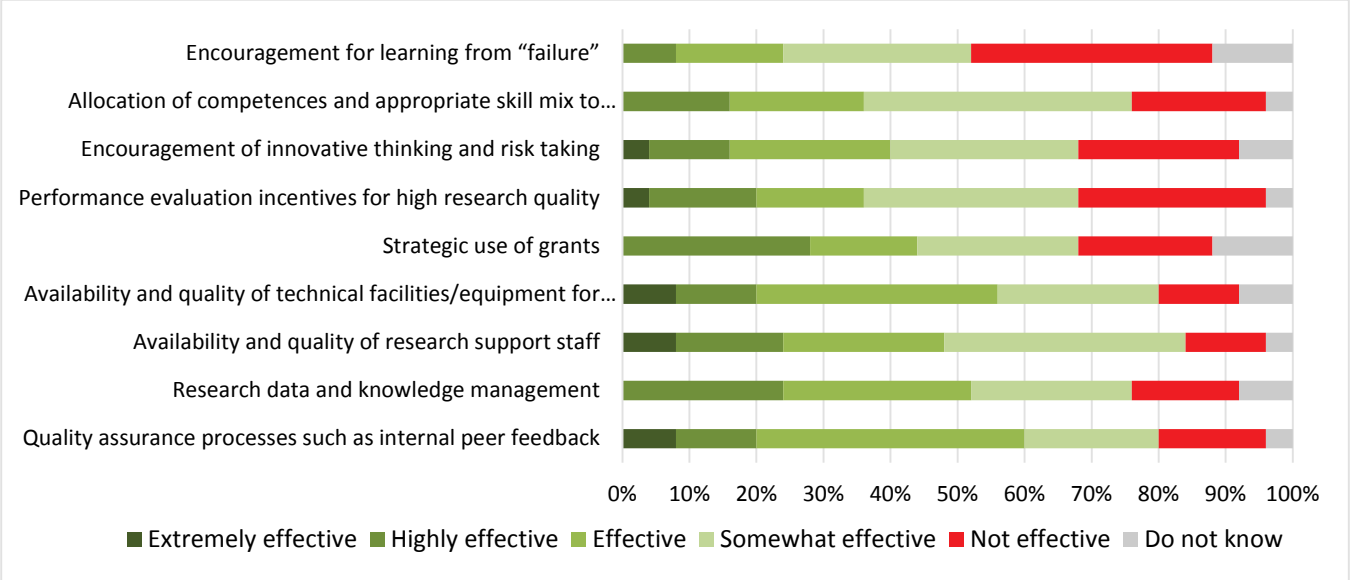
Other

- country strategy and demand driven research
- Improve capacity of National research partners
- Concentrating on research and less worries for fund raising
- I really feel the W1/2 is generally used as a buffer for missing funding.
- Center salaries
- Untimely budget allocation



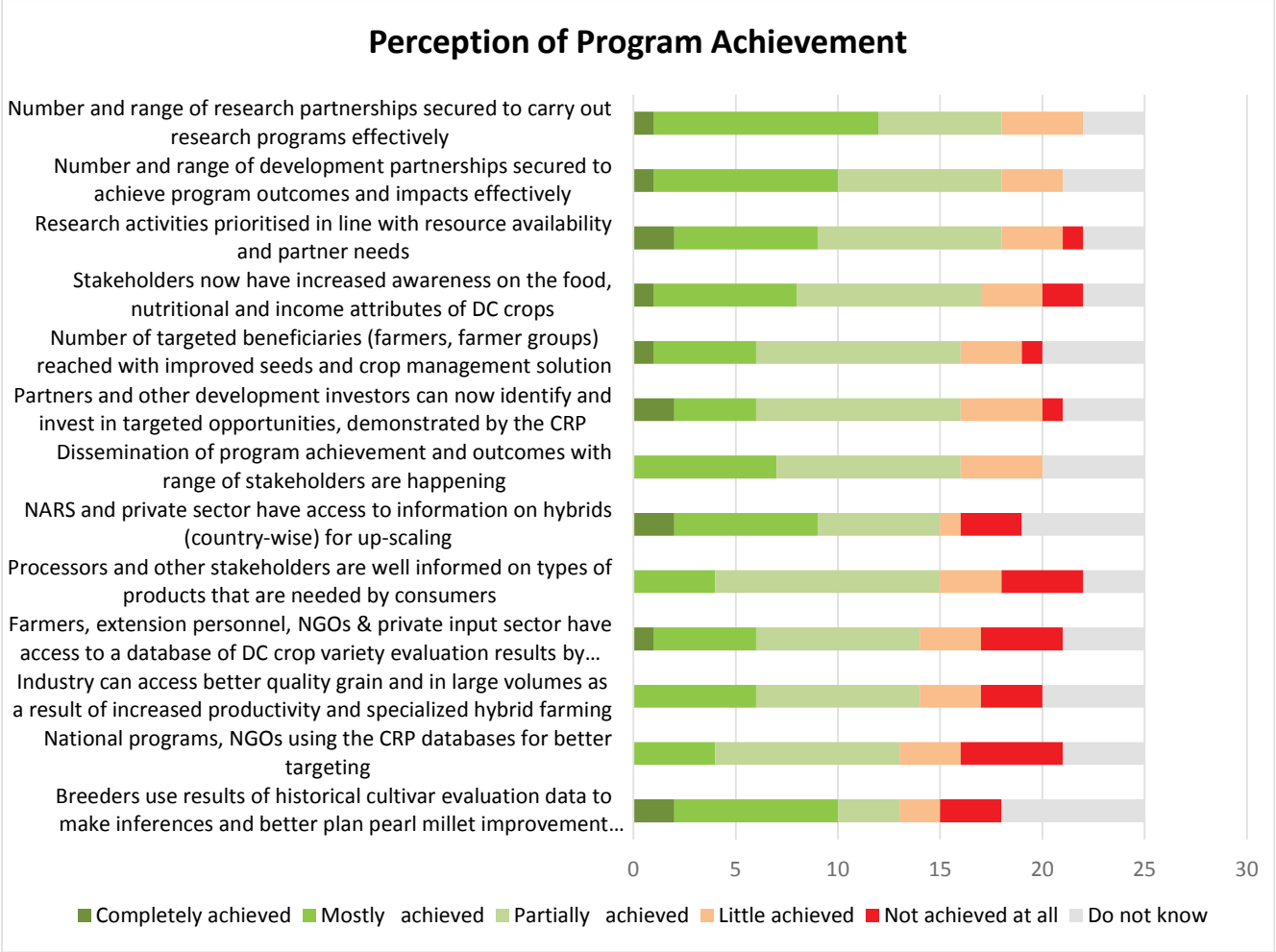
Q 26. In your view how EFFECTIVELY has the quality of research under the CRP been ensured, according to the following parameters? (n=25)

	Extremely effective	Highly effective	Effective	Somewhat effective	Not effective	Do not know
Quality assurance processes such as internal peer feedback	2	3	10	5	4	1
Research data and knowledge management	0	6	7	6	4	2
Availability & quality of research support staff	2	4	6	9	3	1
Availability and quality of technical facilities/equipment for high quality science	2	3	9	6	3	2
Strategic use of grants	0	7	4	6	5	3
Performance evaluation incentives for high research quality	1	4	4	8	7	1
Encouragement of innovative thinking and risk taking	1	3	6	7	6	2
Allocation of competences and appropriate skill mix to research teams	0	4	5	10	5	1
Encouragement for learning from “failure”	0	2	4	7	9	3

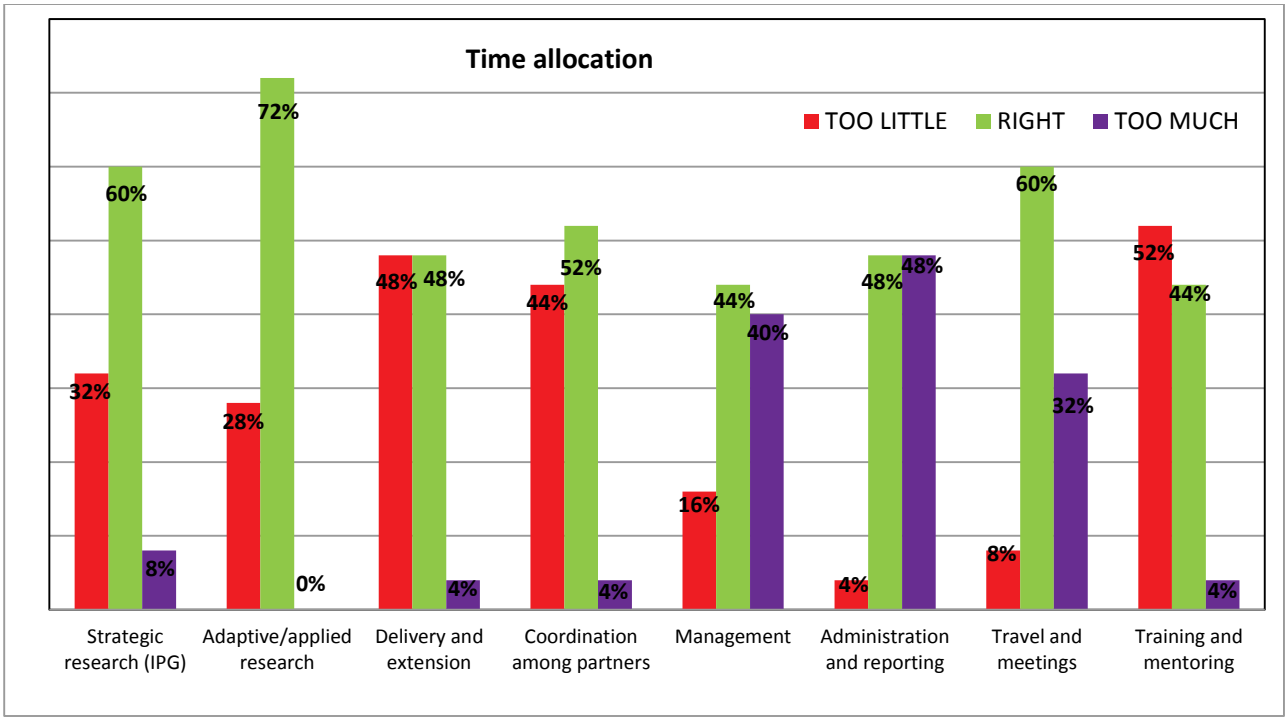


Q 27. To what extent were the following achieved: (n=25)

	Completely achieved	Mostly achieved	Partially achieved	Little achieved	Not achieved at all	Do not know
Number and range of research partnerships secured to carry out research programs effectively	1	11	6	4	0	3
Number and range of development partnerships secured to achieve program outcomes and impacts effectively	1	9	8	3	0	4
Number of targeted beneficiaries (farmers, farmer groups) reached with improved seeds and crop management solution	1	5	10	3	1	5
Research activities prioritised in line with resource availability and partner needs	2	7	9	3	1	3
Partners and other development investors can now identify and invest in targeted opportunities, demonstrated by the CRP	2	4	10	4	1	4
Farmers, extension personnel, NGOs & private input sector have access to a database of DC crop variety evaluation results by site & year, in a user-friendly format	1	5	8	3	4	4
National programs, NGOs using the CRP databases for better targeting	0	4	9	3	5	4
Stakeholders now have increased awareness on the food, nutritional and income attributes of DC crops	1	7	9	3	2	3
Processors and other stakeholders are well informed on types of products that are needed by consumers	0	4	11	3	4	3
Breeders use results of historical cultivar evaluation data to make inferences and better plan pearl millet improvement program	2	8	3	2	3	7
NARS and private sector have access to information on hybrids (country-wise) for up-scaling	2	7	6	1	3	6
Industry can access better quality grain and in large volumes as a result of increased productivity and specialized hybrid farming	0	6	8	3	3	5
Dissemination of program achievement and outcomes with range of stakeholders is happening	0	7	9	4	0	5



Q 28. Please indicate your judgement about time allocation under the DC CRP. (too little, about right, too much) (n=25)



Q 29. The DC CRP has a budget for internal capacity strengthening (n=25)

Yes	4%
No	28%
Don't Know	56%

- If projects have planned for courses, or Phd or MSc Scholarships, the CRP has a competitive scholarship program, but winners have not been announced.
- Training of scientific and technical staff involved from center or NARS
- Research Evaluation and priority Setting Methods, Advanced data analyses

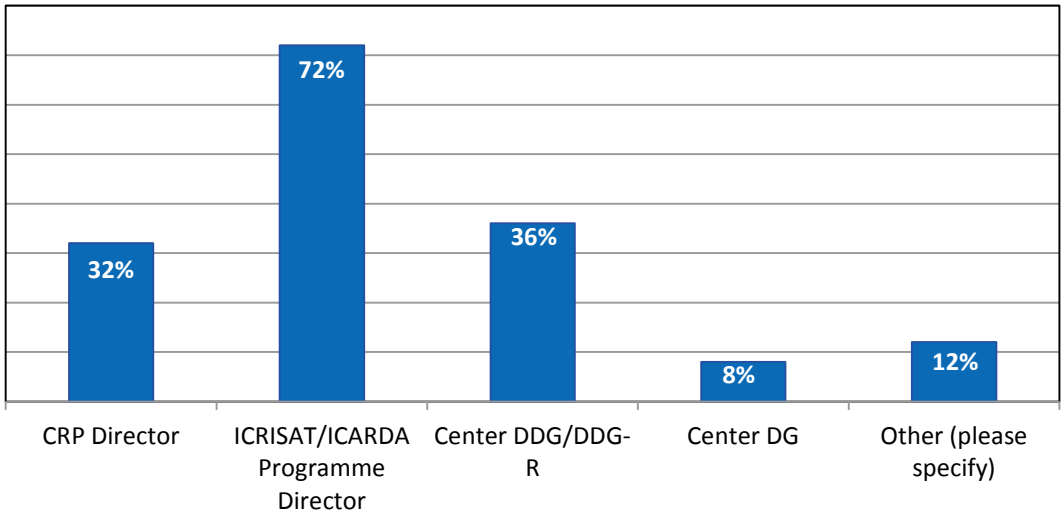
Q 30. I am involved in the planning of CRP research activities. (n=25)

Yes	80%
No	20%

Q 31. To whom are researchers accountable to for the quality of their research outputs under the CRP? (Please tick all that apply - in case there is double accountability) (n=25)

Answer Options	Response Percent
CRP Director	32%
ICRISAT/ICARDA Programme Director	72%
Center DDG/DDG-R	36%
Center DG	8%
Other (please specify)	12%

Others are
Regional Director
Superior at ESA Office in scientific matters
CRP Focal person at ICARDA



Q 32. We have a formal system for regular staff performance assessment in our institution (n=25):

Yes	88%
No	8%
Don't Know	4%

Q 33. I am involved in the performance assessment of my research activities (n=25)

Yes	64%	16
No	24%	6
Other (please add any information you may want to share)	12%	3

- Not always.
- While scientists fill out the forms for the annual self-assessments, for the last4 or 5 years I have not received any feedback on this report. There has been no discussion with the program Director nor the Regional Director.
- Have not had opportunity to directly review my performance with my Program Director for several years due to e-connectivity, time and travel constraints

Q 34. The CRP Governance structure works well for the CRP (n=25)

Yes	52%	13
No	28%	7
Other (please add any information you may want to share)	20%	5

Other comments:

- This needs to be revisited since we need transparency and promptness in communications
- There may be need to streamline and clarify roles by the CRP Director and the Centre's Programme Director
- Need greater integration of the CRP Governance structure with that of the Center.
- I have no particular insights. Too far away from the Regional Office in Nairobi
- Not at all times

Q 35. The CRP Management structure works well for the CRP (n=25)

Yes	44%	11
No	32%	8
Other (please add any information you may want to share)	24%	6

Other comments:

- There may be need to streamline and clarify roles by the CRP Director and the Centre's Programme Director
- Coordination within the region/countries across disciplines and partners is weak, and really only happens between people who work on the same special donor funded projects.
- Much of our efforts would more effectively be organized on a regional basis than on a flagship basis, in order to simplify planning and reporting for the scientists involved in implementation of the research and development activities of this CRP
- Well, I still don't know in detail how decision making and process management and is shared between Programme Director and CRP Director
- Not at all times

Q 36. Overall, in your opinion, what are the three main areas for improvement for DC CRP (n=24)

24 respondents made 70 suggestions (72 when disaggregated)

Budget and finance (19) • Consistent and timely allocation of research funds for continuity of research (4) • Increased funding (for flagships, for strategic and high risk research, for global multiple crop program) (3) • Funding (3) • Reduce overhead costs (2) • Adequate allocation and targeting of resources (2) • Increase operational funding so it is commensurate with targets (1) • The decline in budgets for agreed activities (1) • Equal and priority based fund allotment for research within CRP (1) • Realistic levels of support for national program partners (1) • Risk Management (1)	**Governance and Management and coordination (16)** • CRP management and governance (4) • Cross integration and learning across FPs, crops and regions (2) • Integration with DS CRP (1) • Strong coordination after merger of CRPs DS, TL and DC that drives country R4D agenda (1) • Coordination across disciplines and with development partners within the regions/countries (1) • Timely and transparent communication to stakeholders (1) • Transparent and collective management of research agenda (1) • Decentralise managerial functions away from HQ towards Regional Offices (1) • CRP structure has to be simplified, digitalized, transparent (1) • Greater integration of CRPs and Center's management (1) • CRP management Structure: there should be no overlapping roles between CRP-director and Directors of Center (1) • Efficient use of scientist and manager time (1)
Focus and targeting (8) • Prioritization of research needs (3) • Clear targeting of research for window 1 and 2 (1) • Focus on productivity and competitiveness of DC crops (1), on creation of demand for dryland cereals (1) and on value addition and exports (1) • Link with user needs (1)	**Research areas (5)** • Need to evolve a platform to strengthen processing side of our crops • Marketing • Breeding • Collaboration with Genebanks CRP mainly for effective mining of the collections • Emphasis required on Biotechnological approaches to improve the crop improvement
Planning (5) • Research planning • Strategic planning • Involve scientists in research planning • Thinking more in Country strategies rather than CRP strategies • Bilateral projects mapping	**Program balance (5)** • Need for a fair balance between barley and other crops • Balance for research and developmental aspects • Balance biophysical and socioeconomic aspects • The interdisciplinary research &partnership has to be strategically strengthened • [Reduce] frequent changes in programme designs
M&E and data management (3) **Reporting and feedback (3)**	**Science Quality (3)** • Science quality and exchange (2) • The quality of research has to be tremendously improved (1

Capacity Strengthening (3)	Communication (2)
• Valuing young scientists • Capacity development and training • Strategic partnership with advanced institutes	• Well advanced communication (1-2 weeks) for thinking and preparation • Need to increase global visibility of CRP-DC; let's not just develop the project and then sit and run it- go beyond the boundaries and make it visible to global community and attract funding beyond CG system

Q 37. Any other comments?

- Young scientists are to be mentored properly, timely, equally. These scientists are the next-generation leads and need to concentrate more on research and development activities rather than the generating funding in first 5-6 years. The current CRPs planned for such case but no more such plans operating. Young people are spending time in computers to prepare/submitting fund proposals; they have to be at field for more time. Such conditions will lead to dangerous situation in future science in all fields.
- CRPs were structured/supposed to integrate different centers and CRPs for sharing of resources, knowledge- which never happened, programs are still running in silos.
- There are areas which are not a yes and no, but rather need some hybridization or comprise
- As the largest portion of CRP DC research portfolio is funded through bilateral projects; the implementation and management of CRP DC reporting is big burden on researchers in terms of time. This needs more managed at CRP-CO level utilizing the bilateral project reports and other institute level archival.
- I am sorry to say, but to me the current structure is very chaotic.
- Need to reconsider the geographic extent for this CRP to include also CWANA (central, West Asia and North Africa) drylands where these crops are contributing to the livelihoods of local farming and pastoral communities and also to the resilience of production systems.
- But lot of new research initiatives have happened with the coming of CRPs (which were not there earlier) which will need adequate funding support in future

Annex 6: Partners Survey

6.1 Partners' survey invitation and questionnaire

UNIVERSITY of GREENWICH | Natural Resources Institute

CGIAR RESEARCH PROGRAM (CRP) COMMISSIONED EXTERNAL EVALUATION OF THE DRYLAND CEREALS PROGRAM

DRYLAND CEREALS PARTNER SURVEY

CRP COMMISSIONED EXTERNAL EVALUATION OF THE DRYLAND CEREALS PROGRAM

Dear Drylands Cereals CRP Partner:

The survey solicits your feedback and perspectives on the achievements and lessons from designing and implementing the Dryland Cereals CRP. Given your association with and contributions to the CRP, your views and perspectives will be critical in undertaking a successful evaluation. The DC CRP has commissioned a team led by Natural Resources Institute (NRI), a specialist institute of the University of Greenwich to undertake the CCEE. To know more about NRI, please visit http://www.nri.org/.

The purpose of this survey is to accurately represent your experiences and perceptions relating to various aspects of working with the DC CRP.

The survey will take less than 10 minutes of your time and the information provided by you will remain confidential. The findings will be presented in aggregate. We will not attribute views to specific individuals or organisations.

Please contact us with any questions or comments.

Thank you in advance for your thoughtful consideration, time and effort in contributing to the assessment.

Adrienne Martin (A.M.Martin@greenwich.ac.uk), Team Leader
Jonathan Robinson
Rory Hillocks
Paul Thangata
Ravinder Kumar

UNIVERSITY of GREENWICH | Natural Resources Institute

CGIAR RESEARCH PROGRAM (CRP) COMMISSIONED EXTERNAL EVALUATION OF THE DRYLAND CEREALS PROGRAM

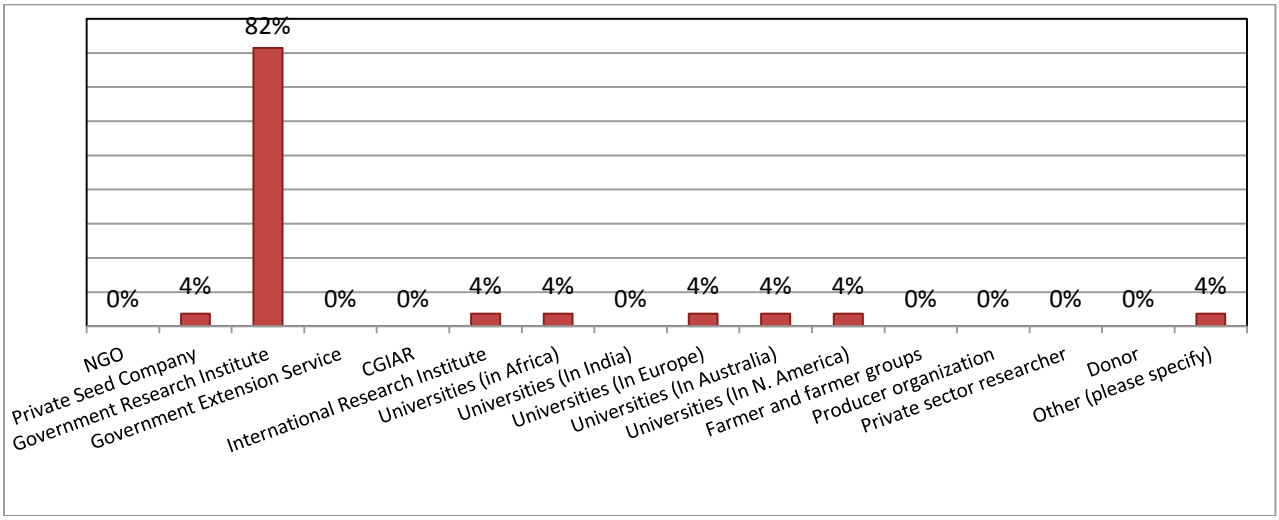
Partner_SurveyMonkey_DCCRP.pdf

6.2 Results of the Partners Survey

The partner survey was sent out on 1st September 2015 to 86 partners. The list was compiled by the evaluation team from names provided by Dryland Cereals CRP management, suggestions from flagship/crop cluster leaders, and partners met on the country visits. A reminder was sent on 30 September and the survey closed on 4 October 2015. 27 partners responded - a rate of 31%. Government research partners (Q2) constituted 82% of the responses, although they were only 56% of the total partners listed. Universities (17% of those contacted) and private sector partners (10.5% of those contacted) were underrepresented.

1. CONTACT DETAILS
26 of 27 respondents provided full contact details.
24 men 2 women.

2. What is the type of your institution? (27 responses)
82% of responses were from partners in Government Research Institutes. There were single individual responses from a private seed company, an International Research Institute, Universities in Africa, Europe, Australia, North America, and one 'other' response. There were no responses from NGOs, Government extension services, Universities in India, farmer or farmer groups, producer organisations, private sector researchers or donors.



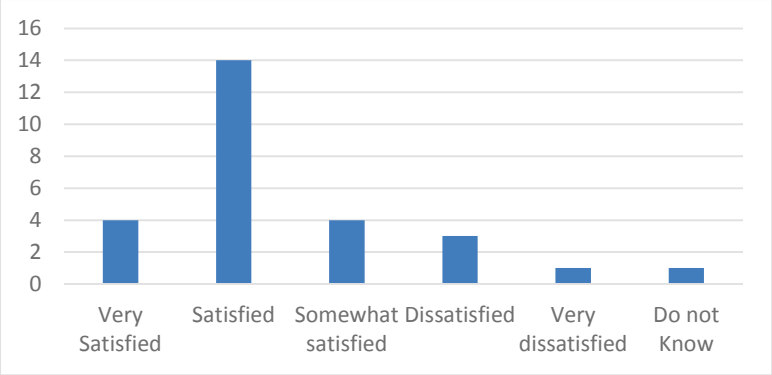
3. My organization mostly collaborates with (27 responses)

	Response Percent	Response Count
ICARDA	19%	5
ICRISAT	67%	18
Both ICARDA and ICRISAT	26%	7
Other (please specify)	19%	5

4. My organization is involved in: (n=27)

	Yes	No	Do not know	Rating Average
The management and oversight of the Dryland Cereals CRP	12	9	6	44%
Cereals Research funded by the Dryland Cereals CRP	21	4	2	78%

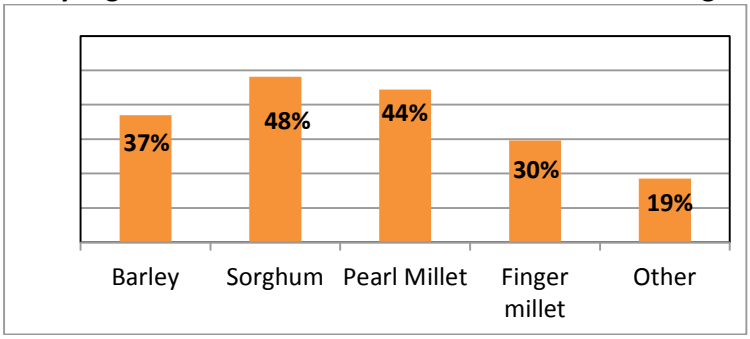
5. How satisfied are you with the collaboration with Drylands Cereals CRP. (n=27)



6. As a partner, were you allocated a budget by the Dryland Cereals CRP to implement activities? (n=27)

	Response Percent	Response Count
Yes	63.0%	17
No	33.3%	9
Other	3.7%	1

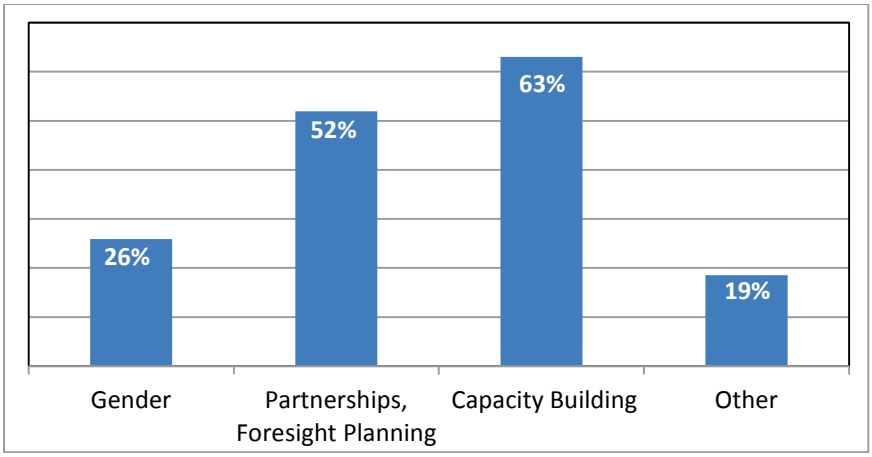
7. My organization is involved in research on the following crops (n=27)



8. Under what Flagship do the activities mentioned above fall? (n=27)

	Response Percent	Response Count
Flagship 1: Data, Knowledge & communication	33%	9
Flagship 2: Improved Varieties & Hybrids	67%	18
Flagship 3: Integrated Crop Management	48%	13
Flagship 4: Seed Systems & Input Markets	33%	9
Flagship 5: Post-harvest Value & Output Markets	26%	7
Other	7%	2

9. Please indicate the Crosscutting activities you are involved in?

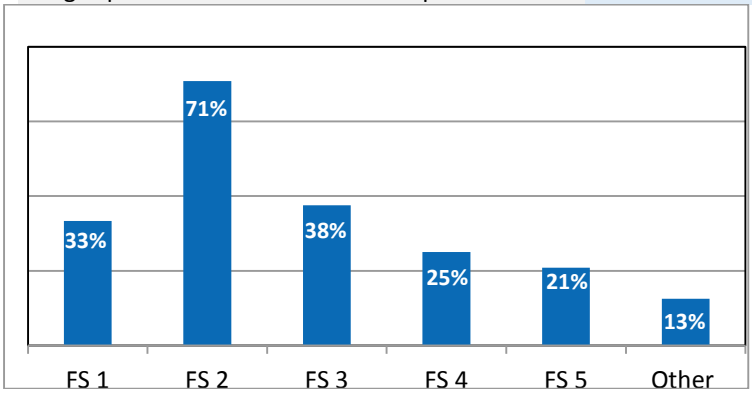


10. As a partner, did you get funding through a competitive grant? (n=27)

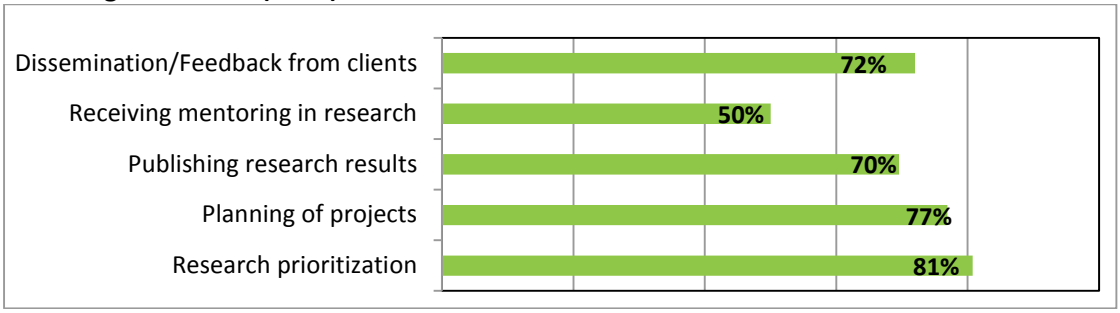
Answer Options	Response Percent	Response Count
Yes	33%	9
No	41%	11
Don't Know	7%	2
Other	19%	5

11. Under what Flagship do the activities for the grant mentioned above fall? (n=24)

Answer Options	Response Percent	Response Count
FS 1	33%	8
Flagship 1: Data, Knowledge & communication	71%	17
Flagship 2: Improved Varieties & Hybrids	38%	9
Flagship 3: Integrated Crop Management	25%	6
Flagship 4:Seed Systems & Input Markets	21%	5
Flagship 5:Post-harvest Value & Output Markets	13%	3



12. To what extent are you/ your organisation as a Drylands Cereals partner involved in the following activities? (n=27)



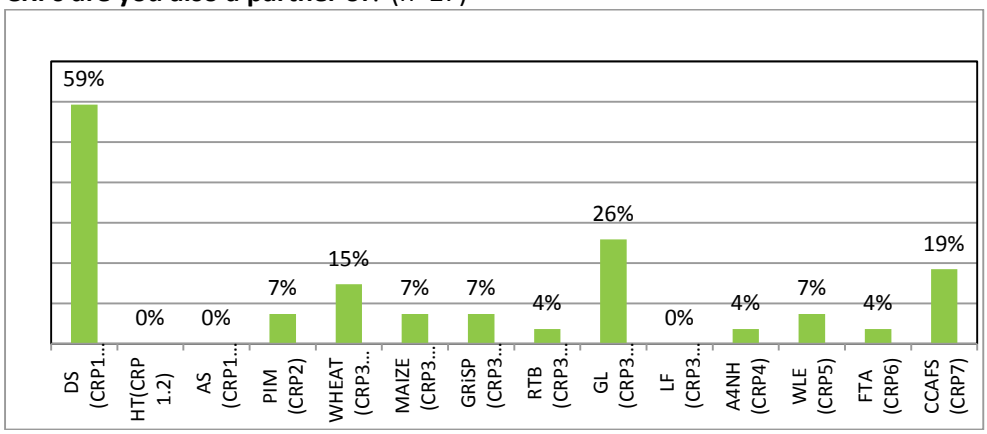
13. To whom do you send CRP related activity reports? (n=26)

	Response Percent	Response Count
CRP Director	23%	6
Center DG	4%	1
Center DDG/DDG-R	0%	0
Product line /crop cluster leader	58%	15
Other	42%	11

14. Please state whether you agree or not with the following statements regarding the Drylands Cereals activities: (n=27)

	Yes	No	Don't Not Know
I have attended training organized by the CRP	62%	38%	0
Another member of my institution has received training by the CRP	56%	32%	3

15. Are you also a partner of other CRPs other than Dryland Cereals CRP (CRP3.6)? If yes, what CRPs are you also a partner of? (n=27)



16. If you collaborate with other CRPs, how satisfied are you with the collaboration? (n=27)
15 out of 27 responses (55%) indicated satisfaction.

17. Any other comments?

- I think the new organization of the collaboration with CG centers through CRPs is good but needs more training on the philosophy of the management, reporting and involvement of CG partners
- It is very interesting and perspective to collaborate with other CRP programme (legumes and sorghum, especially for preparing genotyping data base).
- I do collaborate on millet, sorghum and pearl millet. On grain legumes I participate mainly on cowpeas.
- During the initial formation of the CRP there was quite a bit of discussion about building collaborations with advanced research groups in developed countries. At least in our case (and I suspect more generally) this has been minimal.
- Kenya is not a mainstream player on the program

- There is a confusion in management of CRP by CGIAR; there is no leadership structure, however competitive grants are good for those who are not in the main CRP program
- We are allocated funds but the regional office is not able to get the funds approved by our head office. How can this be overcome. Funds from CCAF do come through

- Funding for planned activities is very low. Improve the funding from CRP to have better results
- The project is implemented late, the report is expected on time and project ends on due date. Under such conditions, it is difficult to ensure commitment and delivery of results. The project should be at least for three years for better utilization of funds and delivery of products.
- Very good experience with CRP Dryland Cereals during last 2 years. One lacking was that the grant or project was given for short term (one year) and then again for one year.

- Your questionnaire is not very clear because your questions sometimes concern the person, sometimes the institution.
- The survey has not asked any probing questions.

Annex 7 Dryland Cereals Publications

ICARDA (Barley)

Journal Articles

1. Alessandro Tondelli, Enrico Francia, A. Visioni, J. Comadran, A. M. Mastrangelo, T. Akar, A. Al-Yassin, S. Ceccarelli, S. Grando, A. Benbelkacem, F. A. van Eeuwijk, W. T. B. Thomas, A. M. Stanca, I. Romagosa, N. Pecchioni. 2014. QTLs for barley yield adaptation to Mediterranean environments in the 'Nure' × 'Tremois' biparental population. Euphytica , 197, (1), 73-86.

2. Ganggang Guo, Dawa Dondup, Xingmiao Yuan , Fanghong Gu, Deliang Wang, Fengchao Jia, Zhiping Lin, Michael Baum and Jing Zhang. 2014. Rare allele of HvLox-1 associated with lipoxygenase activity in barley (Hordeum vulgare L.). Theor Appl Genet (2014) 127:2095–2103

3. Kumar V, A Khippal, J Singh, R Selvakumar, R Malik, D Kumar, AS, Kharub, RPS, Verma and I Sharma. 2014. Barley research in India: Retrospect & Prospects. Journal of Wheat Research, 6(1):1-20.

4. Narwal S, D Kumar, RPS Verma and I Sharma. 2014. Identification of barley genotypes with high antioxidant activity. Journal of Wheat Research, 6(1):96-97.

5. Neha Jain, R. Malik, R. Selvakumar, R. Kumar, V. Pande and R.P.S. Verma. 2014. Screening of barley germplasm for leaf blight (Bipolaris sorokiniana) resistance. Indian J. Agric. Res., 48 (1): 67 -71.

6. R. Selvakumar, Madhu Meeta, P.S. Shekhawat, R.P.S. Verma and Indu Sharma. 2014. Management stripe rust of barley using fungicides. Indian Phytopathology, 67 (2): 2-6.

7. Sarkar, B., R. C. Sharma, R. P. S. Verma, A. Sarkar and Indu Sharma. 2014. Identifying superior feed barley genotypes using GGE bi-plot for diverse environments in India. Indian J. Genet., 74(1): 26-33.

8. Singh, M., A. AL-Yassin and S. Omer (2015) Bayesian estimation of genotypes means, precision and genetic gain due to selection from routinely used barley trials. Crop Science, 55. doi: 10.2135/cropsci2014.02.0111

9. Siraj Osman Omer, Abdelwahab Hassan Abdalla, Salvatore Ceccarelli, Stefania Grando and Murari Singh (2014). Bayesian estimation of heritability and genetic gain for subsets of genotypes evaluated in a larger set of genotypes in a block design. European Journal of Experimental Biology, 2014, 4(3): 566-575

International symposium presentations

1. R. Malik, R.P.S. Verma, R. Kumar, N. Jain, H. Sharma and I. Sharma. 2014. Localization of genomic region conferring corn leaf aphid resistance in barley. In: 21st Biennial International Plant Resistance to Insects Workshop. Marrakech, Morocco, 14-I8 April. 1st International workshop on barley leaf diseases. Salsomaggiore Terme, Italy, 03-06 June 2014

2. S. Rehman, A. Visioni, M. El-Hadi Maatougui, S. Gyawali, R.P.S. Verma. 2014. Mitigating barley foliar diseases at global scale through germplasm enhancement at ICARDA. In: 1st International workshop on barley leaf diseases. Salsomaggiore Terme, Italy, 03-06 June 2014

ICRISAT (Finger Millet, Pearl Millet and Sorghum)

Journal Articles

1. Akbar SMD, Aurade RM, Sharma HC, JAYALAKSHMI SK and Sreeramulu K. 2014. Mitochondrial P-glycoprotein ATPase contributes to insecticide resistance in the cotton bollworm, Helicoverpa armigera (Noctuidae: Lepidoptera). Cell Biochemistry and Biophysics 70(1): 651-660. 2. APARNA K, Hash Cat, Yadav RS and Vadez V. 2014. Seed number and 100-seed weight of pearlmillet (Pennisetum glaucum L.) respond differently to low soil moisture in genotypes contrasting for drought tolerance. Journal of Agronomy and Crop Science 200(2):119-131 doi:10.1111/jac.12052.

2. Ba NM, Kabore A, Baoua IB, Laouali A, Oumarou M, DABIRE-BINSO C and Sanon A. 2014. Augmentative on-farm delivery methods for the parasitoid Habrobracon hebetor Say (Hymenoptera: Braconidae) to control the millet head miner Heliocheilus albipunctella (de Joannis) (Lepidoptera: Noctuidae) in Burkina Faso and Niger. Biocontrol 59: 689-696

3. Blümmel M, Haileslassie A, Samireddypalle A, Vadez V and NOTENBAERT A 2014. Livestock water productivity: feed resourcing, feeding and coupled feed-water resource data bases. Animal Production Science, 54, 1584–1593.

4. Deu M, WELTZIEN E, Calatayud C, Traoré Y, Bazile D, Gozé E, Trouche G and K. vom Brocke. 2014. How an improved sorghum variety evolves in a traditional seed system in Mali: Effects of farmers' practices on the maintenance of phenotype and genetic composition. Field Crops Research. 167: 131–142. doi:10.1016/j.fcr.2014.06.021.

5. GEMENET DC, Hash CT, Sy O, Zangre RG, Sanogo MD, Leiser WL and HAUSSMANN BIG. 2015. Genetic variation under low phosphorus conditions in West African pearl millet inbred lines: Seedling and mature plant phosphorus uptake and utilization efficiency. Field Crops Research 171(1):56-64.

6. GEMENET DC, Hash CT, Sy O, Zangre RG, Sanogo MD, Leiser WL, Parzies HK and HAUSSMANN BIG. 2014a. Pearl millet inbred and testcross performance under low phosphorus in West Africa. Crop Science 54(6): 2574-2585.

7. Gupta SK, Rai KN, Singh Piara, Ameta VL, Gupta Suresh K, JAYALEKHA AK, Mahala RS, Pareek S, Swami ML, Verma YS. 2014. Seed set variability under high temperatures during flowering period in pearl millet (Pennisetum glaucum L. (R.) Br.). Field Crops Research. doi. 10.1016/j.fcr.2014.11.005 171: 41–53.

8. Hufnagel B, de Sousa SM, Assis L, Guimaraes CT, Leiser W, Azevedo GC, Negri B, Larson BG, Shaff JE, Pastina MM, Barros BA, WELTZIEN E, Rattunde HFW, Viana JH, Clark RT, Falcao A, Gazaffi R, Garcia AAF, Schaffert RE, Kochian LV and Magalhaes JV. 2014. Duplicate and Conquer: Multiple Homologs of PHOSPHORUS-STARVATION TOLERANCE1 Enhance Phosphorus Acquisition and Sorghum Performance on Low-Phosphorus Soils. Plant Physiology 166:659–677. doi:10.1104/pp.114.243949.

9. Hussain B, War AR and Sharma HC. 2014. Jasmonic and salicylic acid induced resistance in sorghum against stem borer, Chillo partellus (Swinhoe) (Lepidoptera; Pyralidae) infestation. Phytoparasitica 42: 99-108.

10. Ibrahim A, Pasternak D and Fatondji D. 2014. Impact of depth of placement of mineral fertilizer micro-dosing on growth, yield and partial nutrient balance in pearl millet cropping system in the Sahel. Journal of Agricultural Science. doi:10.1017/S0021859614001075

11. Jones K, Glenna LL and WELTZIEN E. 2014. Assessing participatory processes and outcomes in agricultural research for development from participants' perspectives. Journal of Rural Studies. 35: 91–100. doi:10.1016/j.jrurstud.2014.04.010.

12. KHOLOVA J, Murugesan T, Kaliamoorthy S, Malayee S, Baddam R, Hammer GL, McLean G, Deshpande SP, Hash CT, Craufurd PQ and Vadez V. 2014. Modelling the effect of plant water use traits on yield and stay-green expression in sorghum. Functional Plant Biology 41: 1019-1034. doi: 10.1071/FP13355.

13. Krishnamurthy L, Upadhyaya HD, Gowda CLL, Kashiwagi J, Purushothaman R, Sube Singh and Vadez V. 2014. Large variation for salinity tolerance in the core collection of foxtail millet (Setaria italica (L.) P. Beauv.) germplasm. Crop and Pasture Science 65: 353-361.

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Annex 8 Progress towards IDOs – outputs, outcomes and impact of Dryland Cereals (to end 2014)

[Sources: CRP Annual Reports 2013 and 2014, HOPE website, In-country presentations to Evaluators]

IDO1: Improved productivity of dryland cereals in smallholder farming systems in Africa and Asia

[Means of verification: Increase in yields on farm and increase in profits from industrial uses]

Crop	Location	Target	Reported Achievements
1. Sorghum	WCA	30-40% increase in grain yield in 600,000 farmer fields in of which 50% of the increase is in women farmers' fields	Across a broad range of management conditions on farmers' fields in Mali, the estimated average yield advantage associated with newly released sorghum hybrids is 30%.
2. Pearl millet	WCA & ESA	20-30% increase in yield in 800,000 farmer fields in WCA and ESA of which 50% increase in women farmers' fields	
3. Sorghum	ESA	30-40% increase in grain yield in 600,000 farmer fields in of which 50% of the increase is in women farmers' fields 10-20% increase in profitability for industrial use Nigeria, Kenya and Tanzania	A Regional Sorghum Hybrid Trial in Kenya including 25 hybrids identified four as superior performers, and a participatory hybrid selection trial with three hybrids repeated in Tanzania for the second time in 2014 resulted in the selection of two farmer-preferred hybrids. Two hybrids (IESH 22012 and ATX 623 x Macia) were released in December 2013 by Namburi Agricultural Company with the name NACO SH1 and NACO SH2. The two hybrids have a yield advantage of 30-60% over the improved OPVs. These are the first sorghum hybrids to be released in Tanzania. Of 81 medium-maturing sorghum lines tested at Kiboko, Kenya, thirteen were identified for drought tolerance and yield potential for the dry lowlands, and one (ICSV 24029 SH) with high yield and tolerance to leaf disease and Striga was identified for promotion and entry into National Performance Trial (NPT) in 2015, targeting the sub-humid agro-ecologies
4. Finger millet	ESA Ethiopia, Tanzania, Uganda and Kenya	30-50% increase in grain yield in 300,000 farmer fields, and 20% increase in premium quality marketable grain	Finger millet yields were increased by >60% across Uganda, Kenya, Tanzania and Ethiopia by using improved variety together with fertilizer micro-dosing and row planting, relative to local cultivar and local cultivation practices. Micro-dosing is proving to give significant economic returns from fertiliser application rates that are one third of the full recommendation and are affordable to smallholders. The most favourable nitrogen and phosphorus fertilizer recommendation for optimal finger millet yield relative to cost of production in the finger-millet growing regions of Shalla, Ethiopia, was identified to be 23 kg ha^{-1}

			In 2014 three finger millet varieties were released in Ethiopia and the early maturing, higher-yielding pearl millet variety, Jira-Ne (meaning "Hunger Breaker") was released in Nigeria. In 2014 training of farmers, 70% of them women, on finger millet production, postharvest handling and value addition resulted in increased grain productivity from an average of 4 bags (90 kg each) to 8 bags per acre. Grain quality also improved with buyers and processors reporting less dirt, sand and stones in the traded grain, which in turn has led to increased gate prices for finger millet.
5. Barley	Ethiopia, India, Iran, Morocco Kazakhstan, and Turkey Ethiopia, India, Iran and Morocco	20-30% increase in yield in 300,000 farmer fields. 15-25% increase in profitability for industrial use	Germplasm with higher level of tolerance to abiotic and biotic stresses was shared with national programs - 341 sets of international nurseries distributed to 64 collaborators in 37 countries.
6. Pearl millet	ESA SA (India)	20-30% increase in pearl millet yield in farmer fields in ECA of which 50% increase in women farmers' fields 15-20% increase in grain and 5-10% stover yield (in 3 million ha - sorghum and millet) in SA	Pearl millet hybrid trials in ESA demonstrated 30 to 50% yield superiority over the best cultivars of the region.
7. Sorghum	SA (India)		In India, improved post-rainy sorghum varieties and technologies were disseminated to about 300,000 farmers in Maharashtra during this same period under the HOPE project, leading to an increase in grain yield by 35-40% and stover yield by 20% in participating farmers' fields. Early adoption studies in India indicated that HOPE interventions enhanced technology adoption rates, reduced yield gaps (by 30%), increased productivity and gave higher returns to farmers (35-44%).

IDO2: Increased and stable access to dryland cereal food, feed and fodder by the poor, especially rural women and children

[Means of Verification: Increase in supply of crops for food, feed and market, price stability for sorghum due to more reliable production, decrease in length of hunger period,]

Crop	Location	Target	Achievement
1. Sorghum	WCA Mali, Niger, Nigeria and Burkina Faso	50% decrease in the length of the hunger period for 500,000 rural poor households producing these crops	An economic assessment of sorghum improvement in Mali during the HOPE project years of 2009 to 2013 reported that improved varieties and newly released hybrids represented 32% of all sorghum area by 2013. Hybrid sorghum seed production tripled in a year to a total of 30 tons in Mali, and hybrid sorghum is now grown by about 10,000 farmers in WCA, contributing to increased productivity, food security, and potentially income. The number of seed producers for hybrid sorghum in Mali has also been steadily increasing. Farmer seed producers trained in Nigeria and linked to National Agricultural Seed council for certification. The promotion of seed min-packs facilitates seed purchases and adoption of new varieties. Sale of mini-pack sorghum seeds has been doubling annually in recent years in Mali, Niger, Burkina Faso and Nigeria to reach 4471 in 2013. Dissemination supported by training of development agents, farmer field schools and use of range of media.

			Seed production and dissemination capacity has been enhanced in Mali for hybrid seed production, and in Burkina Faso and Niger for variety seed production.
2. Pearl millet	WCA Mali, Niger, Nigeria and Burkina Faso		The potential for development of villages specializing in seed multiplication in the Sahel was demonstrated by the production and marketing of 85 tons of pearl millet seed of three improved open-pollinated varieties by farm-union members in Niger.
3. Sorghum	ESA		Three sorghum varieties are candidates for NPT trials in Kenya and were recommended for release in 2014. Three hybrids were released in Tanzania in December 2013 by the NACO Seed Company. One hybrid was recommended for release in Kenya in 2013 by the Kenya Seed Company. Farmers' role in seed delivery improved. The practicality of hybrid sorghum seed production with a common restorer (Macia) was established in collaboration with private seed companies in Tanzania. Overall out of the 5000 mini-seed packs distributed to agro-vets, 62.9% were sold. Dissemination supported by use of range of media – brochures, radio, field days.
4. Finger millet	ESA Ethiopia, Tanzania and Uganda	20% increase in the stock of FM prior to harvest period for 250,000 rural poor households producing FM	In 2014 finger millet seed mini-packs of 0.5 kg were distributed for the varieties U15 (2000 packs) and P224 (2000 bags) in western Kenya. In the Rombo and Kondoa districts of Tanzania in 2014, 3144 (63%) of the 5000 mini-packs distributed to agro-dealers were sold.
5. Barley	Ethiopia, India, Iran, Kazakhstan, Morocco and Turkey	20% increase in the availability of food barley (grain), feed barley (grain and straw) and industrial use at more stable market prices in CRP focal countries.	A country report for barley in Morocco included baseline status of barley in the arid and semi-arid regions of Morocco, scope for barley production in Morocco both at the national level and in the arid zone, and analysis of agricultural policies in Morocco, specifically agricultural trading policies. The strength of this country information supported a Morocco national workshop on seed delivery, facilitated by Dryland Cereals, which in turn led to the re-evaluation of the Green Morocco Plan by the Moroccan Ministry of Agriculture and Fisheries, to include barley with the target to increase the production of certified seed from the current 1%, of all seed types produced, to 22% by 2020. In Ethiopia 240 farmers were engaged in small-scale community-based seed production of food and malt barley over 57 ha, as a pre-scaling of newly released varieties for utilization during the cropping season of 2014. 177.97 tons of seed produced for local exchange with farmers
6. Pearl millet	India	15-20% reduction in price volatility (measured by CV in price) influenced by stable supply of	An impact study conducted with 563 pearl millet growers in the Indian states of Gujarat, Rajasthan and UP indicated that improved hybrids based on ICRISAT-bred hybrid parents covered more than 50% area in 2013-14, a direct tribute to the Hybrid Parent Research Consortium of ICRISAT that has been in operation in India since the year, 2000. Analysis of monthly per capita consumption of pearl millet in India. Socio economic discussion paper on consumer demand and specific traits, 6 tons of hybrid seed for drought prone environments distributed to farmers for up scaling demand (2014)

7. Sorghum	India	pearl millet and sorghum	In India, a total of 30 tons of seed of the improved post-rainy sorghum cultivars were produced in 2013 for dissemination. In India, an innovative 'Seed Consortium' was formed and large-scale seed production is underway currently in >500 ha under this Consortium targeting a coverage of 100,000 ha with improved sorghum seeds in the post-rainy season of 2014.

IDO3: Increased consumption of nutritious dryland cereals by the poor, especially among nutritionally vulnerable women and children

[Means of verification: Increase in iron and zinc intake by women and children, increase in consumption of sorghum and millets]

Crop	Location	Target	Achievement
1 &3 Sorghum	WCA and ESA,	30-50% increase in iron and zinc intake levels from nutrient-dense sorghum by women and children in WCA and ESA	Training conducted for women's groups in Mali with nutrition focus. Nutrition field schools with lesson plans combining nutrition, food processing and crop diversity training for women with young children organised with local partners
2. Pearl Millet	WCA	Pearl millet 15-25% increase in iron and zinc intake levels from nutrient-dense PM by women and children in WCA	
3. Sorghum,	Ethiopia, Kenya, Sudan, Tanzania, Uganda	30% increase in consumption sorghum products especially by women and children	
4. Finger millet	Ethiopia, Kenya, Tanzania and Uganda	Finger millet 30-50% increase in iron, zinc and calcium intake levels from nutrient-dense FM by women and children 30% increase in consumption of finger millet products especially by women and children	Finger millet accessions that can provide both high micronutrient content and high grain yields were identified from 638 finger millet accessions within the mini-core and farmer-preferred accessions in East Africa, amongst which significant variability existed in the content of eleven micronutrients. *Results show it is necessary to test nutrient content of accessions in target environments.*
5. Barley	India, Iran, Ethiopia and Morocco	10% increase in the use of iron and zinc fortified barley grain as food by nutritionally vulnerable women and children in rural and urban areas and for individuals with special dietary requirements	*Working with women's cooperatives in Morocco and Ethiopia on barley products* *High beta glucan and protein genotypes for food use.*

6. Pearl millet	India	15-25% increase in iron and zinc intake levels in areas where high iron hybrids were adopted in India 30% increase in consumption of, pearl millet products especially by women and children	The development and release of the variety Dhanashakti, biofortified for increased iron and zinc based on breeding material developed by Dryland Cereals, is the first committed step towards improving nutritional health, especially of women and children. Early scientific studies supported by HarvestPlus have shown increased bioavailability of iron and zinc from bio-fortified pearl millet. In 2014 'Dhanashakthi' was up-scaled by A4NH, and planted on 30,000 ha in Maharashtra, India and the seed company, Nirmal Seeds Pvt. Ltd., sold more than 300 tons of its seed. A high-yielding, high-iron pearl millet hybrid ICMH 1201 as "Shakti 1201" was released in India with a first-year commercial distribution in 2014 of 10 tons of its seed. Selection was directly supported by A4NH, while its hybrid parents were bred with direct support from Dryland Cereals. SMART food campaign promoting millet and sorghum
7. Sorghum	India	15-20% increase in predominantly sorghum consuming population	In 2014 the bio-fortified sorghum line, ICSR 14001, entered national testing, and two new hybrids were identified for high yield and high Fe and Zn based on multi-location testing.

IDO4: Increased and more equitable income from marketing dryland cereal grain, fodder and products by low income value chain actors, especially smallholder women farmers

[Means of Verification: Increased income for growers and processors, increased income from industrial uses]

Crop	Location	Target	Achievement
1. Sorghum	Burkina Faso, Mali, Nigeria,	25% increase in income of sorghum , pearl millet, and finger millet growers and processors with 35% of the income by women processors	Market studies and value chain analysis under HOPE
2.Pearl millet	Burkina Faso, Mali, Nigeria Ethiopia, Kenya, Tanzania and Uganda,		Producer- and consumer-preferred traits of pearl millet were mapped for Eastern and Southern Africa (Tanzania, Kenya, Eritrea and Sudan) to help prioritize traits in regional breeding programs.
3. Sorghum	Ethiopia, Kenya, Tanzania and Uganda		Sorghum scoping study completed. 2014 Through the Co-business incubation strategy, the Sorghum Value Chain Development Consortium (SVCDC) at Jomo-Kenyatta University of Agricultural technology (JKUAT) in Kenya is being mentored on the Seed Business Incubation model of ABI-ICRISAT operated in India.
4. Finger millet	Ethiopia, Kenya, Tanzania and Uganda		Modified sorghum threshers tested with finger millet with women farmer groups in Tanzania, Ethiopia and Kenya.
5. Barley	Ethiopia, India, Iran and Morocco	20% increase in income of growers from industrial uses	Hydroponic barley has potential as a quality feed for livestock in both Morocco and Ethiopia. Results of the study prompted the identification of two associations of rural women to start pilot activities on hydroponic barley, with potential expansion to the production of homemade barley bread in Morocco and Besso in Ethiopia.

		with 20% of the income by women processing barley for local food and other industrial	Working with agricultural industry - 150,000 ha malt barley were planted in Ethiopia
6 & 7 Pearl millet and sorghum	India, targeted regions	20-30% increase in income for pearl millet and sorghum growers and processors with 15-20% of the income by women growers and processors	The NutriPlus Knowledge Program of the Agribusiness and Innovation Platform at ICRISAT initiated the development of affordable therapeutic premixes using pearl millet, to address malnutrition and micronutrient deficiency in women and children. The major constraint to wider marketing of pearl millet flour is its short shelf-life, as whole-grain flour of many varieties turns rancid in 4-5 days. To strengthen screening systems for this trait, modifications were made to standard protocols for assessing rancidity indicators, namely, Peroxide Value and Acid Value, using the variety, Raj 171. Significant genetic variability was identified for the shelf-life of pearl millet flour based on rancidity factor determined by an acid value and a peroxide value, and blanching of grain was shown to increase shelf life by one month, a technique that was imparted in training of 200 women farmers in the Gujarat and Rajasthan states of India. Pearl millet value chains were mapped for Gujarat, Haryana and Maharashtra, to provide input towards increasing farm income. Producer- and consumer-preferred traits of pearl millet were mapped for south Asia (Rajasthan, Haryana and Gujarat states of India), and Eastern and Southern Africa (Tanzania, Kenya, Eritrea and Sudan) to help prioritize traits in regional breeding programs. The intervention of ICRISAT's Agribusiness & Innovation Platform led to the initial marketing of two sorghum- and millet-based food products, Sorghum Crispies and Smart Brkfast, in India. Sorghum Crispies was commercialized in Hyderabad in December 2014 by Ind Millet Foods in two flavours, tomato and masala, marketed under the brand name of 'Rigdam'. The ICRISAT-developed Smart Brkfast is a single-serve, ready-to-eat, breakfast-cereal concept, the main ingredients of which are roasted flakes made from sorghum and pearl millet. The all natural, gluten- and sugar-free product, which is also a source of pre-biotics, was commercialized through M/s Mathesis Engineering Pvt. Ltd. under the brand name of "Navya Smart BrkFast", available in the market from December 2014

IDO5: Increased capacity to adapt to environmental variability and longer term changes in low income communities in Africa and Asia

[*Means of Verification: Numbers adopting drought tolerant, pest and disease resistant varieties and numbers adopting integrated crop and pest management practices, number of additional varieties grown and decrease in need for re-sowing]*

Crop	Location	Target	Achievement
Dryland cereals	WCA, ESA and India	20% decrease in acreage of dryland cereals fields requiring re-sowing 25% reduction in acreage (and/or frequency) of failed dryland cereal crops	Pearl millet grain yields on Niger were increased by >50% through the alleviation of poor plant stands using seed treatment with the systemic pesticide, Apron StarTM 42 WS. Poor plant stand is the most important cause for low grain and stover yields for pearl millet in WCA, and is caused by a combination of biotic and abiotic factors. Seed treatment alone can overcome this, while a combination of seed treatment and basal fertilizer application can have an even greater impact
1.Sorghum 2. Pearl millet	WCA ECA	Increase by at least one the number of cultivars grown (400,000 pearl millet and sorghum farmers) Increase by at least one the number of cultivars grown by 25% of the farmers	Sorghum yields were increased by 21 to 131 % in Mali using on-farm crop-management interventions including integrated Striga and soil-fertility management with different combinations of thinning, micro dosing and intercropping (with cowpea, groundnut, corn). Trials for more than four years identified three different best-bet fertilizer management options for pearl millet in the lowest fertility regions in Niger Experimental pearl millet varieties were created for West and Central Africa (WCA), with combinations of host plant resistance to Striga hermonthica and Sclerospora graminicola, together with good grain yield.
3. Sorghum	Ethiopia, Sudan and Tanzania	Increase by at least one the number of cultivars grown by 25% of the farmers	
4. Finger millet	Ethiopia, Tanzania and Uganda	Increase by at least one the number of cultivars grown by 30% of the farmers	Finger millet on-station trials in Kenya, Uganda, Tanzania and Ethiopia demonstrated that pre-emergence herbicide application combined with single weeding and micro-dose fertilizer application, or two weedings plus micro-dosing were the most effective integrated weed and fertilizer management options. In 2014, two finger millet accessions out of 63 tested in Uganda and four out of 25 tested in Kenya were identified as resistant to blast. Eight finger millet accessions were selected for inclusion in the multi-trait regional trial based on yield and resistance to Striga. Five finger millet accessions with potential for drought tolerance, good agronomics and yield were identified for inclusion in Participatory Variety Trials (PVT) in the drier finger millet growing areas of Tanzania, Uganda and Kenya.
5. Barley	Ethiopia, Iran, India	5% of acreage is grown using enhanced water productivity technologies in rotation with	Seed treatment with Celest Top and/or Apron Star 45WS was identified as an important component of Integrated Pest Management in barley for reduced incidence of Barley Yellow Dwarf Virus – PAV and Barley Stem Saw Fly, and reduction of associated yield losses

	and Morocco	legumes and with conservation agriculture practices	In 2014, 360 highly drought-tolerant barley lines identified from more than 2000 advanced breeding lines were increased for international trials and nurseries, and selected drought tolerant genotypes were shared with partners 2014 - releases of the drought-tolerant, yellow-rust resistant, barley variety, BHS 400, for the northern hill states of India, and the cold- and drought-tolerant winter barley variety, Ansar, for the cold drylands of Iran. Two more barley varieties were released in China from barley germplasm supplied by ICARDA
6. Pearl Millet	India ESA	Pearl millet Increase by at least one the number of cultivars grown by 100,000 farmers	Eight pearl millet hybrids were identified in India for promising performance under drought-prone environments from large-scale on-farm evaluations
7. Sorghum	India	150,000 households adopting improved cultivars and management practices to mitigate environmental variability India	For post-rainy sorghum in India, ten shoot-fly and grain-mould resistant parents were identified in 2014 and genotyping by Sequencing, followed by Genome-Wide Association Studies, involving roughly 100 sorghum lines, associated SNP markers with anthracnose or leaf blight resistance.

Annex 9: DRYLAND CEREALS – CHECK LIST FOR INTERVIEWS

For interviews with individual researchers and research teams:

INTRODUCTION

- Explanation of the objectives of the evaluation and purpose of meeting.
- Introduction to evaluation team.
- Introductions from participant/s.

BACKGROUND INFORMATION

- Length of time researchers have been associated with ICRISAT/ICARDA and Dryland Cereals CRP.
- Nature of their role and relationship with Dryland Cereals CRP (in relation to management and research on flagships and crops) and with ICRISAT/ICARDA.

RELEVANCE

- What is the justification for the combination of the four crops in the Dryland Cereals?
- How are research priorities determined? Have the intended users and target groups for research outputs been clearly identified along the impact pathway?
- Has the CRP facilitated interaction between priority setting, breeding, crop management, seed systems and post-harvest research areas?

SCIENCE QUALITY (for research partners)

- What factors influence the quality of science in Dryland Cereals?
- How is science quality monitored and enhanced among CRP researchers? Who has responsibility for this?
- What interaction is there among breeders across the crops in the CRP?
- What emphasis is put on publications and what positively or negatively influences your publication record?
- Are staff skills and research facilities adequate to ensure high quality research?

EFFECTIVENESS

- Have planned outputs been achieved? What has promoted or inhibited achievement of outputs?
- How have outputs contributed to positive outcomes? (examples for each flagship/crop cluster)
- Are there differences in effectiveness of Dryland Cereals and ICRISAT/ICARDA research done previously? Does the CRP add value? Does it have a comparative advantage?
- What are the main obstacles to effectiveness in the DC CRP/project?

EFFICIENCY

- What are the main projects and sources of funding relevant to the work of participants (individual projects, bilateral projects, W1 &2 etc). How is W1 and W2 funding allocated?

- What is the work planning and budgeting process and how are you involved?
- What are the main reporting lines and responsibilities (Lead center, partner center, regional and country offices)
- What is your view of the suitability of a) Dryland Cereals governance structures? b) Dryland Cereals management structures?
- What effect have CRP reforms had on planning, implementation and reporting of research?
- What mechanisms are in place for M&E? Is the M&E system adequate for tracking progress and assessing achievements?

PARTNERSHIPS

- Did you play role in the design of CRP flagships and activities?
- How well linked are you with other Dryland Cereals partners? Is the CRP creating synergy among participating partners?
- Do you have an appropriate range of partners at different levels to achieve the CRP objectives?
- Have partnerships changed since the start of the CRP? What are the incentives or disincentives for partnership?

GENDER

- Are you aware of the Dryland Cereals gender strategy? Have the respective roles, constraints and needs of men, women and youth been adequately identified?
- Has gender analysis informed the planning of research activities, data collection and the inclusion of women in relevant aspects of technology testing, evaluation and selection?
- Have you and/or your partners received any gender related training?

CAPACITY DEVELOPMENT

- Has Dryland Cereals contributed to your/ your organizations capacity development?
- Are resources available for capacity strengthening?
- How could capacity development be improved?

COMMUNICATIONS AND CROSS LEARNING

- How effective is interaction and communication and learning between Dryland Cereals' management and researchers, cross regionally among researchers and partners and to the wider research community?

Any other issues?