CGIAR CRP Plan of Work and Budget (POWB) - 2021

RICE

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Cover page

Name of the CRP: Rice

Name of the Lead CGIAR Center: IRRI

Flagship lead institutions (CGIAR Centers or lead partners):

Flagship 1: Accelerating impact and equity

Flagship 2: Upgrading rice value chains

Flagship 3: Sustainable farming systems

Flagship 4: Global Rice Array

Flagship 5: New rice varieties

Other participating CGIAR Centers: AfricaRice, CIAT (Alliance), CIRAD, IRD, JIRCAS

1 Adjustments/Changes to Your Theories of Change (ToC), if relevant (max. 500 words)

For the last year of the CRP, there is no major modification to the overall balance of the program and its ToC. Some expected outputs and milestones were adjusted for 2021 because of the covid-19 crisis (some delay in results in 2020 are picked up in 2021).

FP2 is gradually broadening its ToC from value chain upgrading towards transformation of food systems for healthier diets. The focus is shifting from rice as a commodity towards rice-based diets. Hence, FP2 increasingly affects a broader set of IDOs, such as (i) Improved diets for poor and vulnerable people; and (ii) Improved food security. Partnerships are also expanding towards A4NH, DFC Competitive Grants Programme (University of South Carolina), and national nutrition partners.

2 Plans and Expected Progress Towards Outcomes (max. 2000 words)

FP1. In the Philippines, Vietnam and Indonesia, findings from foresight analysis will be used in high level policy engagement and dialogue. In particular, simulation results of various investment scenarios will be

used to inform policymakers in the Philippines Department of Agriculture, the National Economic and Development Authority and the Department of Finance with clearly articulated options for actions to support the modernization, transformation and resilience of the rice sector to various shocks. Results from the EU-Vietnam Free Trade Agreement scenarios, will be used in policy discussion with Vietnamese policymakers to inform them about the potential effects of the policy on trade, trade diversion, production and welfare. Moreover, micro-simulation results from the distributional effects of higher yield in rice and other major crops in the Philippines will help policy makers prioritize agricultural research in different commodities to increase the poverty-reducing impact.

Foresight activities in AfricaRice will allow us to understand the dynamics and price trends in rural and urban markets to examine the impact of various food crises on price transmission on African rice markets. The analysis will assess the magnitude of the transmission by considering some critical enabling factors and agriculture policies among countries. The study will include the test of various models to consistently estimate prices' effects and derive the implications for food security. The engagement with regional policymakers will allow to i) coordinate the various regional rice programs and projects through regular regional engagements and consultations; ii) explore the development of additional regulations in the region; iii) advocate for the promotion of Climate Smart Agricultural practices in rice production; iv) develop and support the definition and implementation of regional standardized quality for rice, v) engage countries in dialogue for the effective implementation of the ECOWAS CET; vi) initiate market surveys and analysis to support a robust information system and engender a vibrant rice business in the region."

The impact assessment of stress-tolerant varieties in India and Bangladesh will continue impact assessment studies on Green Super Rice varieties will also be conducted in Asia and Africa. The impact of ASI on credit acquired by rice farmers will be conducted in Senegal. In Guinea, the Impact of iron toxicity tolerant varieties will be examined on yield and profit. A large-scale impact assessment of improved agronomic practices on yield will be conducted in several sub-Saharan African countries. Gender lenses will be added to impact assessment activities to examine the implications for labor, income and empowerment (parboiling technology in Nigeria and Benin; smart-valley approach in Togo; Mechanization (weeders, threshers) in Madagascar). Baselines measures will be established on women empowerment in Madagascar and Mozambique for parboiling project in collaboration with FP3.

FP2. After the publication of the study on the state of rice value chain upgrading in West Africa and a follow-up COVID-19 policy brief in Global Food Security, the FP2 team will prepare a global study on the state and drivers of rice value chain upgrading. The 2020 COVID-19 policy brief in Global Food Security will be followed up with another policy brief in 2021 which contributes to the debate of how policy makers can mitigate impacts of COVID-19 on domestic rice value chains and food security in West Africa. To provide further evidence on the comparative advantage in demand hypothesis, a study on rice consumers' trade-off between preferences induced by cultural and colonial heritage based on lessons from New Rice for Africa (NERICA) in Casamance, Senegal will be finalized and published.

FP2 will generate better knowledge of urban consumer demand in Senegal. The demand of urban consumers for quality of rice is evolving; the relative importance of subjective or objective criteria such as imported versus local rice, white, unbroken versus broken, fragrant versus non-fragrant etc. must be

updated to help producers and processors to propose the adapted rice for the urban market. A quantitative survey of consumer demand in Dakar will be performed; several imported and local rice varieties with different characteristics will be compared. It will enable identifying the determinants of the demand for quality in urban area and propose guidance for local producers and processors.
Several technologies and tools will be developed, piloted and/or scaled out in Asia and Africa:
- Rice husk fueled dryer and low Glycemic Index rice technologies will be piloted in two innovation platforms in Cote d'Ivoire.
- Tool for financial / cost benefit and carbon footprint analyses for mechanization and postharvest services.
- GrainSafe (instore drying combined hermetic storage) technology will be piloted.
- Mobile flatbed dryers.
- EasyHarvest for optimized combine harvester scheduling.
- Mechanized residue composting.
- Rice straw based biodegradable product manufacturing.
- Tool for optimized rice straw logistics.

Product development will continue at JIRCAS in collaboration with Kasetsart University, Thailand and AfricaRice to utilize novel starch properties in high temperature for simple preparation of pop-rice among all rice varieties, and on improvement of simple pop-rice producing equipment at AfricaRice for "proof of concept".

FP3. Impact of training on good agricultural practices will be assessed using multidimensional sustainability indicators in Nigeria and Burkina Faso, and the results will be communicated to national partners for up-scaling. A wide range of innovations developed will be scaled out in South and South-East Asia, Africa, and Latin America. In partnership with CIMMYT and IFPRI, we will disseminate best bet agronomy through agro-advisory systems of public and private sector organizations in Bihar, India. In partnership with the Philippines government, IRRI will disseminate scalable technologies to improve production efficiency of rice-based system in Philippines. Various practices of direct-seeded rice system will be validated and disseminated under public-private partnership through Direct Seeded Rice Consortium platform in South and South-East Asia. Resource efficient technologies will be disseminated for reducing yield gap and improving income through in north-eastern India (e.g. Assam). Together with various partners in Africa, FP3 will disseminate scalable technologies, including RiceAdvice (Nigeria, Senegal, Mali, and Burkina Faso), SMART-valleys (Burkina Faso, Mali), climate smart agriculture including AWD (Mali, Côte d'Ivoire), good agricultural practices (Madagascar, Senegal, Rwanda), salinity management options. Mechanical seeders and motorized weeders will be jointly evaluated with both male and female farmers, and potential benefits in labor saving especially for women will be quantified in Madagascar. On-farm field test will be conducted to verify the accuracy of the prediction given by WeRise for target sites in Madagascar. JIRCAS will support partnership development to facilitate the use of the developed soil assessment and localized P application techniques (P-dipping). In collaboration with the SODAGRI in South Senegal, technical support tools and guidance for lowland development and lowland rice cultivation will be validated. Minimum tillage and water harvesting will be scaled in Nicaragua and Ecuador.

Together with WorldFish and IWMI, IRRI will study different functions of sustainable food systems in Myanmar. Site-specific diversification options in lowland rice-based cropping systems will be tested in Battambang Province, Cambodia. Farm diversification options will be introduced to farmers in Côte d'Ivoire, Madagascar, and Senegal, and will be assessed in terms of income generation and farm diet diversification. Data from a participative controlled experiment over a 3-year period in Madagascar will be analyzed to identify most suitable options for legume crop rotation with upland rice. JIRCAS will provide evidence on the enhanced P-cycling and nutrient use efficiencies using stylosanthes (*Stylosanthes guianensis*) in upland rice-based cropping systems. This analysis will take into account social acceptance by farmers and multiple criteria. In Nicaragua, rice-soybean rotation will be piloted.

FP4. Key goals for 2021 are to consolidate all pant, soil, and climate data from the antenna (42) and reference (17) panels, and to finalize statistical analyses within and across sites accounting for GxE with the reference panel. For the antenna Panel, Cirad and IRRI will perform the GxE analysis in order to characterize the sites (yield potential, variability and abiotic stresses). This site characterization will also be used by AgMIP to characterize the sites for future scenarios using crop models.
Further genomic analyses of pathogens in Asia and Africa (e.g. blast) will be undertaken to develop markers that can be used for tracing. The PathoTracer web tool will be expanded to include recommendations of resistance profiles for target regions. AfricaRice will develop a molecular diagnostic tool to detect rice yellow mottle virus (RYMV) infection and characterize additional races of pathogens such blast endemic to Africa. CIAT will caracterize blast isolates collected in farmers' fields and evaluate the antenna GRA panel in a hotspot for foliar diseases. IRD and local partners in West Africa will monitor rice diseases (mostly viral and bacterial diseases) in order to identify hotspots where the deployment of control methods should be prioritized. Besides, IRD will study root associated microbiomes favoring rice soil and plant health will be identify in the GRA trial (Bama-West Africa) and in farmers' fields in Burkina Faso.
Tools for GWAS and GxE are available from the open Crop Galaxy platform http://cropgalaxy.excellenceinbreeding.org. For capacity development, we will develop and improve training materials on these tools and make them publicly accessible via the Galaxy community. We will conduct training on use of the tools in an online course through IRRI Education. GWAS analyses of the reference panel data will be finalized using the GBS genotyping data, and target QTL regions identified for use by breeding programs.
Curated phenotypic datasets with adjusted means from activities 1 and 2 will be made available in Galaxy for use in GWAS and other analyses. The Data Hub will be developed, tested and deployed so that all phenotypic datasets from the antenna and reference panels will be publicly available through a web interface. IRD and Cirad aim at integrating in a web interface the analysis of rice genetic data. Available datasets in this 'Rice Genome Hub' will include both transcriptome and SNP data. The platform will allow exploring these datasets. In particular, using 'Rice Genome Hub', it will be possible to identify specific genes activated in different contexts (such as abiotic and biotic stresses).

FP5. It can be expected from FP5.1 to deliver publications on GWAS from diverse germplasm for at least anaerobic germination and stagnant flooding. On consultation with breeders, donors for drought prone

direct seeded rice will be identified from a best-of-the-best panel chosen from prior screening of diverse germplasm.
Genetic gain analyses of the breeding program based on historical datasets, and varietal development/advancement based on significantly better performance than IRRI 154 will be conducted for favorable lowland ecosystems on a routine basis. The intensive systems cluster also aims to reduce the breeding cycle by the use of only elite x elite crossing strategy, and recurrent selection using predictive breeding in line with the OneRice breeding strategy and framework.
The unfavorable ecosystems cluster will develop a well characterized elite core panel for direct seeded conditions, will test elite breeding lines across South Asia and East Africa under direct seeded conditions, and new crosses will be initiated for the development of the next generation of direct seeded rice varieties.
FP5.5 will help to overcome the limitation of breeding materials by improving cooking quality traits to add the value to rice consumers. The superior rice varieties matching good texture are likely to create a pathway for replacing the old mega varieties. In addition, the emphasis on nutritional quality by mainstreaming Zn content in the breeding material will help to overcome malnutrition, and developing pre-breeding low GI lines will help to fine tune the staple to populations suffering from obesity and diabetes. In addition, the outcome will likely to increase the scientific credibility.
On the over-all, there will be comprehensive trial planning with IRRI, AfricaRice, CIAT, and private companies for trial establishment in the wet season of 2021 in trial locations in Asia, Africa, and Latin America.

3 Financial Plan for the coming year, including use of W1/2 (max. 500 words)

The provided budgets and their breakdowns are our best estimates at the time of writing, and budgets can change during the year.

The change in funding window from W2 to W3/bilateral by USAID, and its restricted use of those funds (breeding activities by AfricaRice and IRRI only) complicated financial management of RICE considerably and undermines faith that major CGIAR donors will support W1W2 type of initiatives in the future.

FP1.
- Foresight studies and policy engagement activities in Asia and Africa
- Assessing viable employment and entrepreneurial opportunities for youth in rice-based food systems in two locations (one in Africa and one in Asia). The W1W2 budget will be used to support research activities that emerged from the recently developed Youth Strategy in Agri-food systems.
- Implementation of the Impact-oriented Monitoring, Evaluation and Learning system at IRRI
- Households surveys in Madagascar (330 households), and the third round of the Rice Monitoring Survey in India and Bangladesh.

FP2.

• Baseline and impact assessment studies;
• On-station adaptive research (rapid rice cutter, straw shredder, development of carbohydrate sources for infant formulas);
• Enhancing capacity on mechanization support services for Africa;
• Capturing and exchanging the lessons learned on mechanization support services in Asia-Africa;
• Transferring technologies and building capacity on Grainsafe drying and mobile flatbed dryers;
• Piloting EasyHarvest in the Philippines and Vietnam to reduce postharvest losses;
• Promoting sustainable straw management in Africa and Asia;
• Transferring technologies on residue composting and biodegradable products;
• Research on rice straw logistics;
• Generating better knowledge of urban consumer demand in Senegal;
• Conducting research on improved processing and use of parboiled rice;

FP3.
- IRRI: capture the synergies with the plethora of relevant bilateral. This includes part-covering some staff time and facilitating field activities. They will also be used to support lesson learning from the Rice CRP on impact pathways and theories of change.
- AfricaRice: planned research including cross-cutting activities (gender, youth, and capacity development) and continuing to capture synergies between key bilateral projects and FP3. In Madagascar, impact of good agricultural practices, mechanization options, and farm diversification options will be assessed. In Nigeria and Burkina Faso, impact of training on good agricultural practices will be assessed.
- JIRCAS: support of key staff, trip costs from Japan to Madagascar, consumables for conducting field trials, and capacity development of partners in Madagascar.
- CIRAD: activities on integrated *Striga asiatica* management and mycorhizal inoculation for P cycling improvement in Madagascar. In Cambodia, Burkina Faso and Senegal, they will be mainly used to contribute to field activities and modeling development in addition to bilateral projects.

FP4.
Funds will be used to support some remaining global rice array trials, data consolidation, statistical and GWAS analyses, training, workshops, and publication.

FP5.
Support the modernized and unified breeding initiative with components such as a unified breeding network, delivering best genetics through native trait discovery and deployment, product management systems to increase variety turn-over, monitoring genetic gains, and development of biotech products.

Additional explanations for table 3 (optional):

TABLES

Table 2A: Planned Milestones

FP	Mapped to Sub-IDO	2022 FP outcomes	Milestones	Indicate of the following	Means of verification	CGIAR Cross-Cutting Markers for the milestone				Assessment of risk to achieve that milestone (L/M/H)	For medium/high please select the main risk from the list
						for gender	for youth	for CapDev	for CC		
F1	CC Increased capacity for innovations in partner research organizations	F1 Outcome: Foresight analyses and priority setting used by RICE and partner scientists to develop and target technology options	2021 - Updated rice supply-demand scenario analyses used as inputs into the 2022-2024 business plan	Reworded/ rephrased from proposal	Reports, targets domain maps	0	0	0	0	Low	
	Optimized consumption of diverse nutrient-rich foods	F1 Outcome: Improved role in decision making by women and youth in rice value chains as evidenced by empowerment	2021 - Evaluation of the changes in women's and youth's role in decision making conducted, and feedback provided to project leaders, national partners and donors.	Reworded/ rephrased from proposal	Women empowerment indicators; case stories; reports	2	2	1	0	Low	

		measures at key action sites									
	CC Increased capacity for innovation in partner development organizations and in poor and vulnerable communities	F1 Outcome: Collective innovation and seed systems	2021 - 100% of key regions have at least one functional multistakeholder platform at key action sites		Bilateral project reports, STRASA, GSR, others	0	0	1	0	Medium	3. Partnership
	CC Enhanced individual capacity in partner research organizations through training and exchange • CC Increase capacity of beneficiaries to adopt research outputs	F1 Outcome: Effective networks and mechanisms to provide policy makers with up-to -date and evidence-based information on the rice sector	2021 - At least 2 agrifood policies informed by recommendation from rice science are adopted in Asia, Africa and Latin America and Caribbean	New/ changed	Policy documents; peer-reviewed publication	0	0	0	0	Low	
	CC Increase capacity of beneficiaries to adopt research outputs	F1 Outcome: Impacts and adoption of RICE technologies assessed and published	2021 - Cross-regional analysis and comparison of impact of adoption of RICE-developed technologies to date		Impact and adoption reports; outcome stories; peer-reviewed publication	0	0	1	1	Medium	7. Other

	CC Increased capacity for innovations in partner research organizations	F1 Outcome: Functional and effective results-based management system for RICE and its partners	2021 - Reflective learnings of RICE to date synthesized and used as inputs in the 2022-2024 business plan	Reworded/ rephrased from proposal	Reports	1	1	1	1	High	7. Other
F2	Diversified enterprise opportunities	F2 Outcome: Diversified enterprise opportunities through upgraded value chains at six action sites (Indonesia, Myanmar, Vietnam; Cote d'Ivoire, Nigeria, Tanzania)	2021 - Value chains upgraded at three action sites upgrading strategy expanded with lessons captured in three additional action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories	0	0	0	0	Medium	7. Other
	Improved access to financial and other services	F2 Outcome: Income by value-chain actors increased by 10% at six action sites through improved access to financial and other services (Indonesia, Myanmar, Vietnam; Cote d'Ivoire, Nigeria, Tanzania)	2021 - Income by value-chain actors increased by 10% at six action sites because of increased value chain services	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories	1	1	2	1	Medium	7. Other
	Reduce pre- and post-harvest losses, including	F2 Outcome: Income by value-chain actors increased by 15%	2021 - Pilot users at six action sites increase income from rice by 15% through adoption of at	Identical to proposal	Reports, case study documentation, significant change	2	2	2	2	Medium	7. Other

	those caused by climate change	through adoption of at least one of the postharvest or value addition practices or technologies at six action sites (Bangladesh, Cambodia, Indonesia; Benin, Cote d'Ivoire, Nigeria)	least one of the postharvest or value addition practices or technologies		stories					
	Increased value capture by producers	F2 Outcome: Functional value chains for improved processing and novel products from rice at six action sites (Bangladesh, Cambodia, Indonesia; Benin, Cote d'Ivoire, Nigeria)	2021 - Farm-to-market strategies for improved processing and novel rice products at six action sites		Existence of new products and processing technologies, Reports, case study documentation, significant change stories	1	1	2	2	Medium	7. Other
F3	Closed yield gaps through improved agronomic and animal husbandry practices	F3 Outcome: Improved management practices that reduce yield gap by 10-15% developed and disseminated at eight action sites (Nigeria, Senegal, Tanzania, Madagascar, Vietnam,	2021 - Top 10% of farmers in social groups reduce rice yield gaps by 10-15% at six action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	1	1	1	0	Low	

		Indonesia, Bangladesh, Myanmar)									
	More efficient use of inputs Enhanced conservation of habitats and resources More productive and equitable management of natural resources	F3 Outcome: Improved management practices that increase input use efficiency by 5% developed and disseminated at eight action sites (Nigeria, Senegal, Tanzania, Madagascar, Vietnam, Indonesia, Bangladesh, Myanmar)	2021 - Top 10% of farmers in social groups increase input use efficiencies by 5% at six action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	1	1	1	0	Low	
	Increased livelihood opportunities	F3 Outcome: Options to diversity rice farms with other crops, animals, or trees developed and disseminated at six action sites (Cote d?Ivoire, Madagascar, Tanzania, India, Bangladesh, Myanmar) (together with other CRPs)	2021 - Top 10% of farmers in social groups participating in demonstration realize 15% increase in farm-derived income through diversification at four action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	1	0	1	0	Low	

	Increased access to diverse nutrient-rich foods	F3 Outcome: Diversified on-farm diets sourced through diversified farming systems at four action sites (Cote d'Ivoire, Madagascar, Bangladesh, Myanmar) (together with other CRPs)	2021 - Farmers adopting diversified farming systems have diversified diets at four action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	1	0	1	0	Low	
	Reduced net greenhouse gas emissions from agriculture, forests and other forms of land-use (More sustainably managed agro-ecosystems). CC Reduced net greenhouse gas emissions from agriculture, forests and other forms of land-use (Mitigation and adaptation achieved)	F3 Outcome: Improved rice management practices that reduce GHG by 5% disseminated at three action sites (Bangladesh, Philippines, Vietnam)	2021 - Functional outscaling networks and policy support for rice climate-smart technologies that reduce GHG emissions in SE Asia (through CCAFS collaboration)	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	0	0	0	2	Low	

	CC Enhanced capacity to deal with climatic risks and extremes (Mitigation and adaptation achieved)	F3 Outcome: Results of completed farming systems analyses used to focus development activities on key opportunities for adapting to climate risks at eight action sites (Nigeria, Senegal, Tanzania, Madagascar, Vietnam, Indonesia, Bangladesh, Myanmar)	2021 - In collaboration with the Sustainable Rice Platform, results of assessment of multidimensional sustainability indicators communicated to national policy framework	New/ changed	Reports, case study documentation, significant change stories, management option dissemination materials	0	0	0	1	Low	
	CC Technologies that reduce women`s labor and energy expenditure adopted	F3 Outcome: Value chain actors including farmers and service providers using new mechanization options designed to increase women's labor productivity at seven action sites (Nigeria, Senegal, Tanzania, Vietnam, Indonesia, Bangladesh, Myanmar)	2021 - Top 10% female farmers benefit from labor-saving technologies at two action sites	Reworded/ rephrased from proposal	Reports, case study documentation, significant change stories, management option dissemination materials	1	0	1	0	Low	
F4	Enhanced adaptive capacity	F4 Outcome: Information on the	2021 - GxE analysis of the	Reworded/ rephrased	Predicted global rice production risks						

	to climate risks (More sustainably managed agro-ecosystems)	impact of environmental factors (climate, soil, biotic stress) on rice production used to predict global rice production risks and to guide development and deployment of climate smart technologies.	antenna data is completed	from proposal	used to guide development and targeting of climate change-adapted technologies at least for the most vulnerable rice agroecosystems	N/A	N/A	N/A	1	Low	
	Adoption of CGIAR materials with enhanced genetic gains	F4 Outcome: A functional global phenotyping network composed of 30% non-CRP partners (including self-sponsored), and genetic donors (>10) and ideotypes (2-4) adopted by breeding programs to develop climate-smart rice varieties	2021 - Global phenotyping data curated and made available to global community through the integrative rice data hub and genetic donors made available to breeding programs	Reworded/ rephrased from proposal	A functional global phenotyping network composed to 30% by non-CRP partners (including self-sponsored) adopted by breeding programs to develop climate-smart rice varieties	N/A	N/A	1	1	Low	
	CC Enhanced capacity to deal with climatic risks and extremes (Mitigation and	F4 Outcome: Characterized pathogens populations and diversity used to predict varietal	2021 - Efficiency of available disease (RYMV, Blast, BLS and BLB) resistance genes validated and characterized soil microbiome for specific sites.	New/ changed	Reports	N/A	N/A	1	1	Low	

	adaptation achieved)	deployment for at least 3 major rice diseases									
	Adoption of CGIAR materials with enhanced genetic gains	F4 Outcome: At least 5 major QTLs/genes that are stable across environment and management, for all rice mega-environments, integrated in the respective varietal development pipelines	2021 - Candidate genes identified and QTL/genes and donors validated across environments	Reworded/ rephrased from proposal	At least 5 major QTLs/genes that are stable across environment for lowland conditions are integrated in the respective varietal development pipelines	N/A	N/A	1	1	Low	
	Increased conservation and use of genetic resources	F4 Outcome: A functional open access rice data hub that allows Global users to fast track their research by exploiting available phenotypic and genotypic information and data analysis tools	2021 - Analytical tools to enable predictive and decision-making processes and completely curated datasets are integrated in the rice data hub and made accessible to the global community	Reworded/ rephrased from proposal	A functional rice data hub providing open access phenotypic and genotypic information and data analysis tools to global users	N/A	N/A	1	1	Low	
F5		F5 Outcome: Rice diversity in rice gene banks used globally for identification of	2021 - 60% of targeted traits/donors/QTLs/genes identification achieved, 100% of the new diversity analysis	New/ changed	Genes, markers etc described in publications and reports, and curated	N/A	N/A	N/A	1	Medium	4. Internal resources

		traits and discovery of new genes	accessions sequenced		in open access databases (eg SNP-Seek)					
		F5 Outcome: Novel tools for precision biotech breeding based on genetic diversity shared open access and globally, including protocols for gene editing and genetic transformation	2021 - 75% of the targeted breeding tools and resources developed and used in breeding programs. Use of gene editing for the validation of the RHBV virus disease resistance gene for LAC based on genetic diversity studies	New/ changed	Tools described in publications and reports, available online, documented use in reports	N/A	N/A	N/A	N/A	Medium	2. Financial
	Adoption of CGIAR materials with enhanced genetic gains	F5 Outcome: New rice varieties resulting in 1.3 % genetic gain in intensive systems	2021 - Genetic gains at the end of the breeding cycle of 1% compared to 2016; 10 varieties released with 10% higher yield, and meeting national quality requirements, in intensive systems.	Reworded/ rephrased from proposal	Existence of lines and new varieties	1	N/A	0	1	Medium	3. Partnership
	CC Enhanced capacity to deal with climatic risks and extremes (Mitigation and adaptation achieved)	F5 Outcome: Rice varieties with 20, 15, 10% reduction in yield loss caused by factors induced by climate change, in mega deltas, rainfed lowlands, and uplands, respectively	2021 - 20, 15, 10% reduction in risk of yield loss in elite cultivars at the end of breeding cycle caused by factors induced by climate change, in mega deltas, rainfed lowlands, and uplands, respectively	Reworded/ rephrased from proposal	Existence of lines and new varieties	1	0	0	1	Medium	3. Partnership

	Increased access to diverse nutrient-rich foods	F5 Outcome: High quality and high nutritious rice varieties that are preferred by men and women farmers and consumers	2021 - Slower digestable and low glycemic index rice lines and process products donors utilized to identify loci affecting low GI	New/ changed	Existence of lines and new varieties	N/A	N/A	0	0	Low	
	Increased conservation and use of genetic resources	F5 Outcome: Standardized design, data collection, analysis and management implemented across the program	2021 - Atlas of variety turn-over rates in farmers' fields for major rice growing regions of the world. Indicators for the breeding program and genetic gains according to product profiles	New/ changed	Baseline data sets, reports, official product profiles	N/A	N/A	0	0	Medium	3. Partnership

Table 2B: Planned Evaluations/Reviews, Impact Assessments and Learning Exercises

CRP	FP	Status	Planned studies/learning exercises in the coming year	Geographic scope	Who is commissioning this study
Rice	F1	On Going	Empowerment of rural women in Senegal, Cote d'Ivoire and Madagascar	Multi-national, Côte d'Ivoire, Madagascar, Senegal	Flagship project 1
Rice	F1	On Going	Seed and variety dissemination roadmaps in Africa	Multi-national, Burkina Faso, Ethiopia, Gambia (the), Guinea, Madagascar, Mali, Niger (the), Sierra Leone, Uganda, Senegal	RICE flagship project 1
Rice	F1	On Going	Promotion of youth employment in the rice value chain in Africa	Multi-national, Senegal	RICE, PII, AfricaRice
Rice	F1	On Going	Impact of ASI on credit acquired by rice farmers	National, Senegal	CRP
Rice	F1	On Going	Impact of iron toxicity tolerant varieties on yield and profit	National, Guinea	CRP
Rice	F1	On Going	Impact assessment of improved agronomic practices on yield	Regional	CRP
Rice	F1	On Going	Impact assessment of stress-tolerant rice varieties: Evaluating impact through remote sensing and econometric methods	Multi-national, Bangladesh, India	SPIA
Rice	F1	On Going	Impact of COVID 19 on rice sector: simulation of different economic slowdown and recovery scenarios	Global	CRP
Rice	F1	On Going	Effect of abolishing policy distortions on rice sector performance of specific countries	Regional	CRP
Rice	F1	On Going	Identification of policy priorities and reforms to support the transformation, modernization, and resilience to shocks	Regional	CRP

Rice	F1	On Going	Potential effects of the EU-Vietnam Free Trade Agreement on rice trade and welfare	Global	CRP
Rice	F1	On Going	An ex ante analysis of the distributional effects of higher rice yield in the Philippines	National, Philippines (the)	CRP
Rice	F1	On Going	Modelling the Impacts of Agricultural Policy Support on GHG Emissions in the rice sector	Global	CRP
Rice	F1	On Going	Assessing the decline in real food price: Case of rice	Global	CRP
Rice	F1	On Going	Randomized control trial (RCT) to assess alternative delivery pathways to enhance the uptake of RCM	National, Philippines (the)	CRP
Rice	F1	On Going	Impact of crises on rice markets and food security in West Africa	Regional	RICE, PII, AfricaRice
Rice	F1	On Going	Support for the creation of service businesses by young people	National, Senegal	GIZ in collaboration with AfricaRice and Manobi Africa
Rice	F1	On Going	Social impacts of chemical weed management	National, India	CRP
Rice	F1	On Going	DSR adoption and impact of residue burning	National, India	CRP
Rice	F1	On Going	Efecto de la pandemia del COVID-19 en el sector arrocero de America Latina y el Caribe	Regional	CIAT, HarvestPlus, FLAR, CRP
Rice	F1	On Going	Salt-tolerant rice variety adoption in the Mekong River Delta: Farmer adaptation to sea-level rise	National, Viet Nam	IFAD

Table 2C: Planned major new collaborations (CGIAR internal, or with non-CGIAR collaborators)

Name of Platform/CRP or non-CGIAR collaborator	Brief description of collaboration (give and take among CRPs/Platforms/non-CGIAR collaborator) and value added (e.g. scientific or efficiency benefits)
AU - University of Antananarivo / Université d'Antananarivo	internships supervision, data collection and reporting about governance on new rice seed provision
AU - University of Antananarivo / Université d'Antananarivo	Internship supervision, reporting
AbacusBio - Abacus Bio	Collaboration started in 2020 to partner in the assessment of economic trait valuation to develop social and gender-responsive varietal product profiles and breeding programs. This collaboration will continue in 2021.
BADC - Bangladesh Agricultural Development Corporation	IRRI will support BADC in terms of technical support, capacity building, access to improved varieties, and access to information for rice R&D. BADC will support to IRRI in terms of providing seeds and helping to conduct on-farm testing of new rice lines.
CNRA - Centre national de recherche agronomique	Collaboration on the impact assessment of parboiling technologies for women in Nigeria and Cote d'Ivoire. The survey will also include a comparative analysis between the two countries.
DLG - Deutsche Landwirtschaftsgesellschaft / German agriculture society	The German Agricultural Society, commonly known as DLG, is an international non-profit organisation for agricultural industry in Germany. Collaboration will involve mechanization and post-harvest technologies.
FOFIFA - Centre National de Recherche Appliqué au Développement Rural	Collaboration on governance criteria about new rice seed provision, innovation governance at different levels (project, technology)
Graduate Institute of Geneva	To work on farmer valuation of African landrace varieties. It is funded by Crop Trust
Hue University	Collaboration on rice straw management and food safety.

INERA - Institut de l'Environnement et de Recherches Agricoles (Burkina Faso)	Collaboration on governance criteria about new rice seed provision, innovation governance at different levels (project, technology)
Ministry of Agriculture and Rural Development (Mozambique)	AfricaRice, MADER, and FOFIFA will conduct joint activities to measure women's empowerment in the rice sector in Madagascar and Mozambique. The activity is supported through the bilateral project (ESA Parboil)
Ministry of Agriculture and Rural Development (Mozambique)	Collaboration on value chain upgrading.
NCRI - National Cereals Research Institute	Collaboration on the impact assessment of parboiling technologies in Nigeria and Cote d'Ivoire. The survey will also include a comparative analysis between the two countries.
NLU - Nong Lam University	Collaboration on rice straw management.
The University of Sydney	To conduct a pilot survey on the Two-row Adapted Motorized Paddy Weeder (AMW) potential impact. The proposal is submitted to SPIA
UC - University of California	To conduct a pilot survey on the Two-row Adapted Motorized Paddy Weeder (AMW) potential impact. The proposal is submitted to SPIA
UFCL - United Fertilizers Company Limited	Ufertilizer AfricaRice- UNITED FERTILIZERS COMPANY LIMITED (UFCL) Co-operation in research on fertilizer management, rice productivity and profitability of the African rice sector
UG - University of Ghana	Collaboration on rice value chain upgrading.
Université de Ouagadougou	internships supervision, data collection, and reporting
CCAFS	As part of the CCADS, Two Degree initiative, IRRI will continue to facilitate the formation of trans-disciplinary networks to address the challenges of sea level rice in Asian mega-deltas.
Kyoto University	FP3 will provide with data on yield and digital images on rice plants at harvest. Kyoto university will apply machine learning technique for yield estimation.
ISRA - Institut Senegalais de Recherche	FP3 (Cirad) will jointly conduct research activities on water management in lowland rice systems in South Senegal.

Agricole	
IITA	FP3 in RICE CRP will provide with technical knowledge and information related to site-specific nutrient management. New agronomy research tools and services will be provided by EiA 2030. In Asia, IRRI will lead two use cases in Cambodia and India for developing scaling strategies for mechanized and precise DSR; and developing algorithm for dynamic agro advisory for rice planting dates.
JIRCAS - Japan International Research Center for Agricultural Sciences	Together with SATREPS Fy Vary (bilateral project funding to JIRCAS), FP3 in Rice CRP will support partnership development to facilitate the use of the soil assessment and localized P application techniques (P-dipping) and of the information on human nutrition and food consumption in Madagascar.
SODAGRI - Société de développement agricole et industriel du Sénégal	FP3 (CIARD) will jointly conduct research activities on water management in lowland rice systems in South Senegal.
USAID - U.S. Agency for International Development	Shift to W3

Table 3: Planned Budget

	Planned Budget				Comments on major changes
	W1/W2	W3/Bilateral	Center Own fund	Total	
F1	$2,359,275.00	$13,519,166.00	$0.00	$15,878,441.00	
F2	$1,205,908.00	$2,792,191.00	$0.00	$3,998,099.00	
F3	$2,013,516.00	$13,876,964.00	$0.00	$15,890,480.00	
F4	$2,115,973.00	$1,739,698.00	$0.00	$3,855,671.00	
F5	$2,038,707.00	$34,801,213.00	$0.00	$36,839,920.00	
Strategic Competitive Research grant	$0.00	$0.00	$0.00	$0.00	
CRP Management & Support Cost	$936,622.00	$0.00	$0.00	$936,622.00	
CRP Total	$10,670,001.00	$66,729,232.00	$0.00	$77,399,233.00	