

## IC PROJECT REPORTING TEMPLATE AS PART OF THE STRATEGY AND PROCESS ON HOW THE IC REVIEWS AND ANALYSES ICD PROJECTS

**Project Title:** Improving Productivity of Maize and Developing Resistance to Fall Armyworm Using Radiation-Induced Novel Genetic Diversity — Phase II

**Reporter (name, position):** S Sivasankar, Section Head, Plant Breeding and Genetics, CJN

**Project Code (if applicable):** CAF5015

<b>1. Project Profile</b>	
<b>Recipient Region(s)/ Countries</b>	Central African Republic
<b>Donor/ Resource Partner</b>	IAEA/TC
<b>Collaboration / Participating Organizations</b>	IAEA/ University of Bangui, Central African Republic
<b>Project Budget (detailed funds and/or in-kind)</b>	€ 101,425
<b>Project Timing</b>	Jan 2022 - Dec 2023
<b>2. Summary of Project (Scope, Relevance to the IPPC, Main outputs, Success and challenges)</b>	
<p>Maize is a major cereal crop feeding 80% of the population of the Central African Republic (CAF). According to the Food and Agricultural Organization of the United Nations (FAO) statistics of 2018, the crop has grown close to 100 000 ha in the country with an annual production of about 87 000 tons, indicating a low average yield of the crop. The area under maize in CAF has been fluctuating in recent years, although overall, the country has seen an increasing trend in the maize area harvested over the last fifty years. However, the country is not yet self-sufficient in its maize need and continues to rely partially on imports. Exacerbating this situation is the recent invasive spread of the fall armyworm (FAW), <i>Spodoptera frugiperda</i>, since 2016, which has been decimating the crop, leading to drastic yield losses. Various control measures continue to be tested globally for the control of FAW, including chemical control; biological control using microbial organisms and predatory insects that attack FAW; the use of genetically modified crops with Bt genes; and integrated pest management. However, developing genetic resistance in maize against the pest remains under-explored. Induced genetic variation leads to a widened and novel genetic base for selecting traits of interest. A preceding project acting as a phase I effort focuses on initiating mutation breeding in maize in CAF. The current project will continue to focus on radiation-induced mutagenesis in maize, thereby expanding the germplasm base, selected for increased productivity and resistance to FAW; advance improved mutant lines towards variety registration; and initiate the identification of molecular variants responsible for FAW resistance in resistant mutants.</p> <p>Project Objective: To increase resistance to fall armyworm in maize to enhance productivity through induced genetic variation, mutation breeding and the development and release of improved varieties.</p> <p>Project Outcome: Enhanced genetic resistance to FAW from existing accessions, and through induced genetic variation and mutation breeding.</p>	
<b>3. Project Supporting Materials [e.g. hyperlinks]</b>	
Not applicable.	

<b>4. List project technical resources (i.e. guides, training materials, tools) that could be useful and used by other stakeholders</b>
FAO/IAEA (2021) Mutation Breeding, Genetic Diversity and Crop Adaptation to Climate Change. <a href="https://www.cabi.org/cabebooks/FullTextPDF/2021/20210424108.pdf">https://www.cabi.org/cabebooks/FullTextPDF/2021/20210424108.pdf</a>
FAO/IAEA (2021) Manual on Mutation Breeding – Third Edition ( <b>Spanish Version</b> ) <a href="#">Manual de mejoramiento por mutaciones (fao.org)</a>
FAO/IAEA (2021) Manual on Mutation Breeding – Third Edition ( <b>French Version</b> ) <a href="#">Manuel d'amélioration des plantes par mutation (fao.org)</a>
FAO/IAEA (2021) A Low-Cost Genotyping Protocol and Kit for Marker-Assisted Selection of Orange Lemma (rob1.a), a Feed Quality Trait in Barley ( <i>Hordeum Vulgare</i> L.) <a href="#">nafa-pbg-manual-diagnostic-marker-assay-ol-barleymay2021.pdf (iaea.org)</a>
FAO/IAEA (2018) Manual on Mutation Breeding – Third Edition ( <b>English Version</b> ) <a href="#">Manual on Mutation Breeding – Third Edition   IAEA</a>
FAO/IAEA (2018) Pre-Field Screening Protocols for Heat-Tolerant Mutants in Rice <a href="#">Pre-Field Screening Protocols for Heat-Tolerant Mutants in Rice   SpringerLink</a>
FAO/IAEA (2017) Biotechnologies for Plant Mutation Breeding <a href="#">Biotechnologies for Plant Mutation Breeding   SpringerLink</a>
<b>5. Provide a list of project experts that could be recommended to other stakeholders and describe why</b>
Ms S Sivasankar
<b>6. List targeted beneficiaries [i.e. regions, countries, RPPOs, NPPOs and other institutions]</b>
Central African Republic, Africa