SUSTAINABLE INTENSIFICATION OF CROPPING SYSTEMS BY CLIMATE SMART AND PARTICIPATORY BREEDING STRATEGIES

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ABSTRACT

Climate smart agriculture was coined first by FAO in 2009 and it is defined as 'agriculture that sustainably increases productivity, resilience, reduces or removes Greenhouse Gases (GHGs), and enhances achievement of national food security and development goals'. In other words, Climate Smart Agriculture strategies are those that achieve so called "triple wins" of adaptation, mitigation and development. Sustainable agriculture is a concept or a philosophy of resource use and management intended to meet humans' present needs without compromising the resource for future generations. In fact, it arose from the "unsustainable ways" to the natural systems to increase unit area yield by improper-agricultural practices such as unbalanced pesticide use, intensive use of fertilizers and irrigation water where available causing infertility in the long run. Consequently, the early approaches to sustainable agriculture have avoided using the term "intensification", rather suggested "maintaining yield levels achieved for the favor of environmental quality and safety". However, there is an urgent need to intensify crop production systems for food security in ecologically sound, economically viable and, sustainable manners by participatory paradigm. Antalya Mutation Project aims to develop plant types and cultivars suited to sustainable agriculture. The key for the success in mutation breeding is to grow large populations, which are restricted by resources. These restrictions are overcome by growing mutated populations on production fields. Farmer participatory approaches and on-farm tests make it easy adoption of the cultivars and provide interaction with the end-users and scientists. We mostly stand on farmer participation in our targeted work for farmers in dry-lands and it is an efficient way of taking outputs of research into the practice. The students are also involved in real research activities and interact with the farmers' need and thus they produce during learning in an unconventional way. The efficient outcomes of our approaches are demonstrated in this communication from the sub-projects on drought tolerant barley, cold tolerant chickpea and non-shattering sesame. By adopting novel cultivars and related technologies efficiently through participation and benefiting from a triple win in agriculture, it is possible to get higher yields, improving the resilience of the crops to environmental stresses and creating stronger soils that sequester more carbon in different agro-climatic zones.

Keywords: Breeding for stress tolerance, induced mutagenesis, on-farm research, participatory paradigm, rural development, sustainable agriculture