Participatory plant breeding (PPB) is a new concept but is an improved version of old practice. Farmers have contributed to crop improvement for thousands of years through domestication of crop plants, cultivating landraces for generations, and active involvement in modern agriculture. PPB is defined in terms of technical and social dimensions more than ever before. There is an increasing trend in PPB publications and citations in international journals in recent years. In the breeding programs of Local Initiatives for Biodiversity, Research and Development (LI-BIRD), we refined PPB into client-oriented breeding (COB) and grass-roots breeding. These breeding programs were located in Nepal and had collaborations with University of Wales, UK, Bioversity International, and Participatory Research and Gender Analysis (PRGA). We redefined PPB to make it more client oriented and efficient in terms of working with stakeholders, primarily farmers. We demonstrated these programs can be successful at improving the genetic potential of complex traits such as grain yield, maturity, disease resistance, and quality. Our PPB programs were based on a combination low cross (fewer carefully selected/limited number of crosses) and high population size (number of individuals in segregating [F2-F4] generations) approach. Two case studies will be presented: development of the rice cultivars ‘Jethobudho’ and ‘Judi’ for lodging tolerance, blast resistance, and quality traits; and breeding of maize cultivars ‘Resunga Composite’ and ‘Gulmi-2’ for lodging tolerance and quality traits. In rice breeding, modified bulk and pure line from the bulk were the most effective. In maize, recurrent selection was found best fit under farmers’ conditions. We showed how PPB programs, based on this approach, can be even better than conventional breeding programs. These case studies demonstrated that both COB and grass roots breeding programs can be highly effective under farmers production conditions.
Brief introduction of Sanjaya Gyawali

Sanjaya Gyawali grew up in a small farm in a rural area in Nepal. He obtained his BS and MS degrees in plant breeding in Nepal. After completion of his MS degree, Sanjaya taught plant breeding courses at the Tribhuwon University in 2000. He then joined the participatory plant breeding (PPB) program of the Local Initiatives for Biodiversity, Research and Development (LI-BIRD) in Nepal in 2001. Sanjaya worked with Dr. John R. Witcombe and the late Dr. Bhuwon R. Sthapit, with whom he contributed to refining PPB concepts. He has co-authored several seminal papers on PPB and client-oriented breeding (COB). He released two rice varieties before he joined North Dakota State University for a PhD degree in plant pathology. Several of Sanjaya’s rice selections were released (registered) later by succeeding breeders in Nepal. Several of the PPB rice genotypes selected by Sanjaya were released and have been adopted by growers in several states in India and Bangladesh. In 2009, Dr. Gyawali received the Young Scientist Award (highest award for young/emerging scientists in Nepal) for his contributions to crop breeding in Nepal and South Asia while he was pursuing his PhD in the USA. Dr. Gyawali received a Natural Science and Engineering Research Council of Canada (NSERC) Fellowship in 2010 in Canada, and then joined International Center for Agricultural Research in Dry Areas (ICARDA) ICARDA (one of the CG center (Consultative Group for International Agricultural Research) as a barley breeder in 2012 under Dr. Sanjaya Rajaram’s mentorship. Dr. Gyawali successfully established ICARDA’s Global Barley Breeding Program for feed and food barley in Morocco. He returned to North America to join his family in Canada in 2016 and join Dr. Dilantha Fernando’s lab at the University of Manitoba to work on Fusarium head blight (FHB) resistance of wheat and barley. Since January 2018, Dr. Gyawali is working with Dr. Lindsey du Toit, Vegetable Seed Pathology based at the WSU Mount Vernon NWREC. His expertise is in foliar and soil-borne diseases, Fusarium wilt of spinach, plant breeding, and genome wide association studies (GWAS). His project at WSU is funded by the USDA NIFA Specialty Crops Research Initiative, and is focused on GWAS for resistance in spinach to Fusarium wilt caused by Fusarium oxysporum f. sp. spinaciae.