

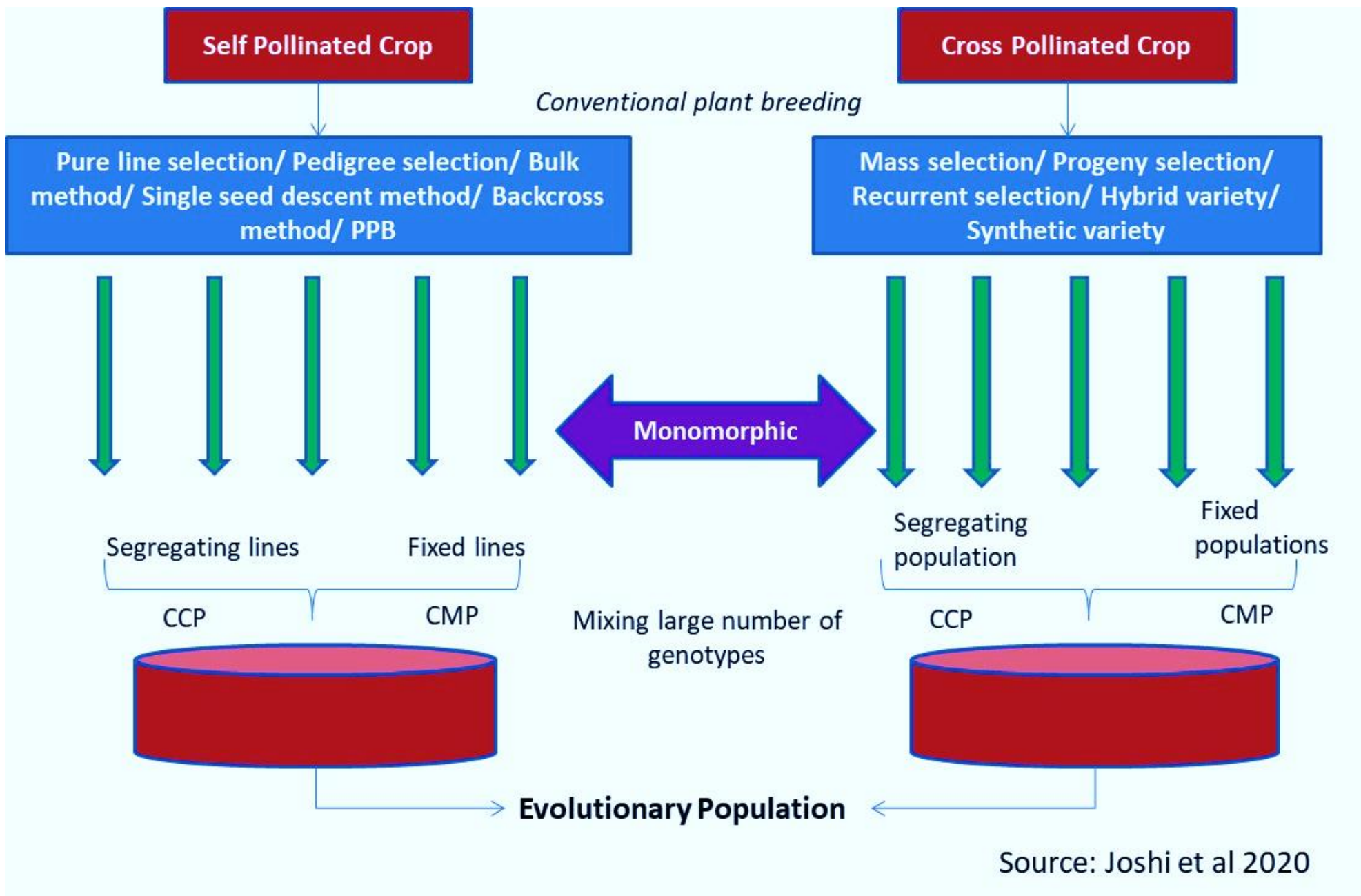
An Evolutionary Plant Breeding (EPB) in Nepal

I. Evolutionary Plant Breeding

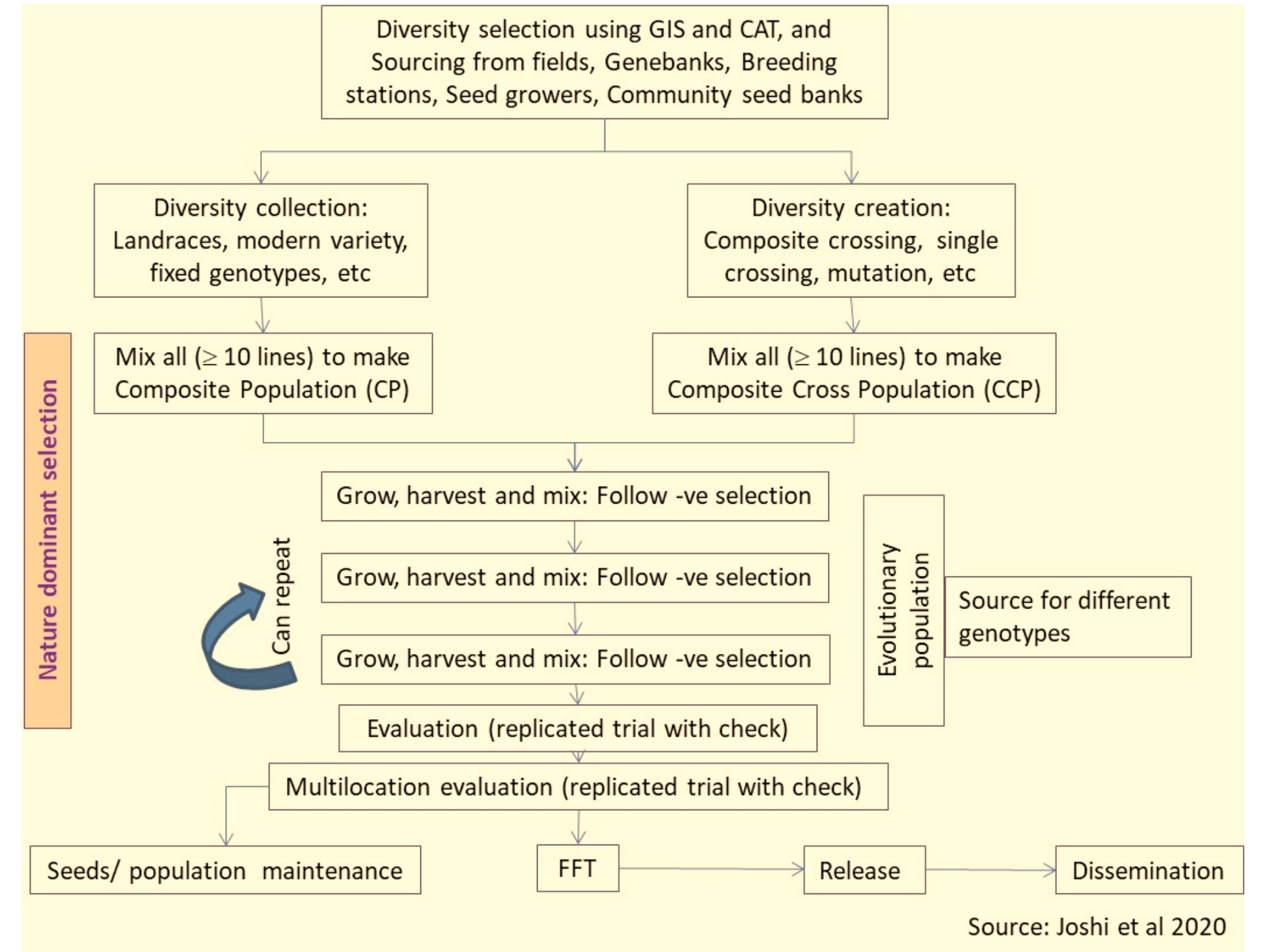
- A method of crop improvement that utilizes natural selection and genetic diversity to develop new varieties of crops that are better adapted to changing environments and have increased genetic resilience, resist pests and diseases, and produce high yields with fewer inputs.
- It can be of participatory evolutionary plant breeding (PEPB) and EPB (on-station).
- Evolutionary population (EP) is developed through growing a large number of cultivars (varieties and landraces) mixing together in the field.

II. Evolutionary plant breeding process

EP types and formulation



Steps of Evolutionary Plant Breeding



III. Advantages of evolutionary plant breeding

- Increase genetic diversity and resilience
- Conserve genetic diversity through uses. Farmers can maintain seeds themselves
- Reduce need for chemical fertilizers and pesticides
- Lower production costs for farmers and consumers
- Improve ecological services and nutritional values

IV. EPB in Nepal

- EPB was initiated in Jumli Marshi since 2015 in Khumaltar. Participatory Evolutionary Plant Breeding (PEPB) has been successfully implemented in both Jumla and Lamjung districts in rice and common bean in 2019 and 2020. Landraces were selected based on analog sites of target environments.
- EPs on rice with 1-66 different cultivars (landraces and varieties) in Jumla, and 1-56 different cultivars in Lamjung, and 1-48 bean cultivars in Jumla were evaluated in RCBD with 3 replications in 2019 and 2020.
- Evaluated EPs for their yields, nutritional quality, farmers preference and their consumption values.



V. Key observations

- The EPs constructed mostly from local landraces of both rice and bean performed well.
- The stability analyses reveals the higher mean and stability of EPs compared to local and improved check.
- The nutritional values were also found higher in EPs compared to local and improved check.
- The organoleptic taste in terms of aroma, taste and cooking quality demonstrated the farmers' preference towards EPs.

VI. Future directions for evolutionary plant breeding

- Utilizing genetic diversity and developing effective population in the context of climate changes
- Developing self-dependent agriculture system, more resilient populations and agro-ecosystems.
- Utilizing in organic farming and applicable to all types of crops and growing environments.

VII. Conclusion

- EPs are an extended form of cultivar mixtures and very easy to establish in both on-farm and on-station. These are resilient to both abiotic and biotic stresses.
- EPB is a reliable and simple approach for food, health and nutritional security of smallholder farmers along with environment security.
- Farmers growing EPs can maintain seeds themselves and there is a possibility of getting higher yield over the years.
- Building capacity of researchers, extension officials and farmers are necessary to effectively implement the EPB.



References

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By BK Joshi, SP Neupane, SK Shrestha and D Gauchan. 2023.