

DNA fingerprinting of wheat varieties at farm level across Bangladesh and Nepal reveals regional varietal preferences

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Abstract

- The objective of this study was to determine the varietal adoption of wheat in Nepal and Bangladesh using DNA fingerprinting technology. Breeders seeds including landraces and denotified varieties were genotyped for reference library construction. Wheat grain samples collected from farmers' field were genotyped using DArTseq-based single nucleotide polymorphism (SNP) markers and mapped to the reference library
- Project associated with Bangladesh Wheat and Maize Research Institute (BWMRI) and Nepal Agricultural Research Council (NARC) for sample collection and processing and Diversity Arrays Technology Pty Ltd (DArT) for genotyping services
- Bangladesh:** The findings of this study revealed that BARI Gom 25 (29%) was the most common variety preferred amongst farmers and was found in all six divisions under study. This variety is leaf rust and blight resistant and can tolerate high salinity and heat. The next most common varieties were BARI Gom 24 (23%) also known as "Prodip" and BARI Gom 26 (16%) followed by the less common varieties, Pavon 76, BARI Gom 28, BARI Gom 30, and others
- Nepal:** The findings revealed that Gautam (20%) and Vijay (19%) were the most popularly grown wheat varieties. Gautam exhibits resistance to leaf rust and yellow rust and is tolerant to spot blotch whereas Vijay is Ug99 and leaf rust resistant

Adoption studies contribute to the understanding of the impact of crop improvement and income growth, and aid in research prioritization and informed variety replacement strategies

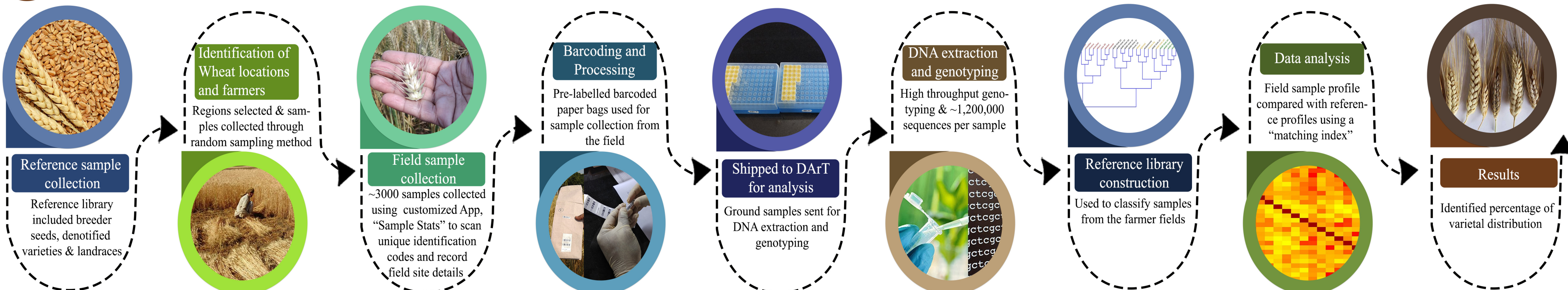


Background

- Wheat is one of the major cereal crops in Bangladesh and Nepal
- Development, dissemination, and adoption of improved wheat varieties are absolute imperatives for national food and nutritional security
- Awareness of varietal distribution across these countries has a huge impact on determining replacement strategies for new varieties, and in developing and implementing newer agricultural policies
- Traditional impact assessment methods are inconsistent and not reliable
- DNA fingerprinting was the first of its kind study applied to get an accurate assessment of wheat variety adoption in Bangladesh and Nepal
- Study was done during the main Wheat growing season of 2018-19



Methodology



Sathguru Management Consultants engaged in end to end support- Conceptualization, constant monitoring and capacity building to ensure data integrity and sample purity

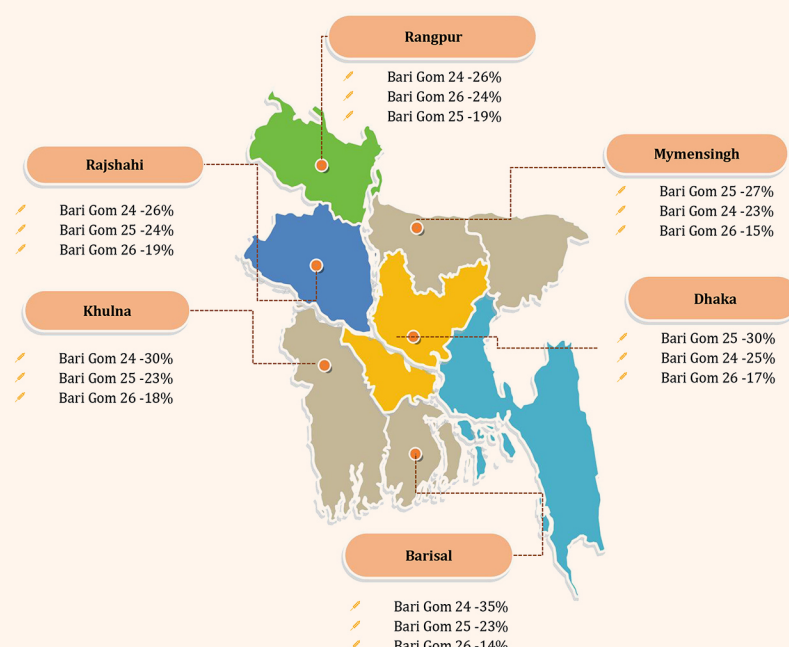


Results

Bangladesh

BARI Gom 25, BARI Gom 24, BARI Gom 26 are the most commonly grown varieties in Bangladesh

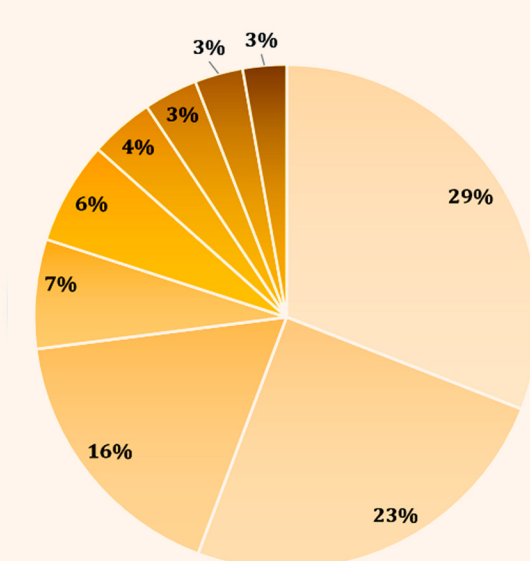
Prominent Wheat varieties cultivated in the six divisions of the country



① Field samples matched 19 of the 28 released varieties from reference library

② BARI Gom 25 (29%), found in all the six regions

Percentage of varietal distribution among the field samples collected from farmers fields

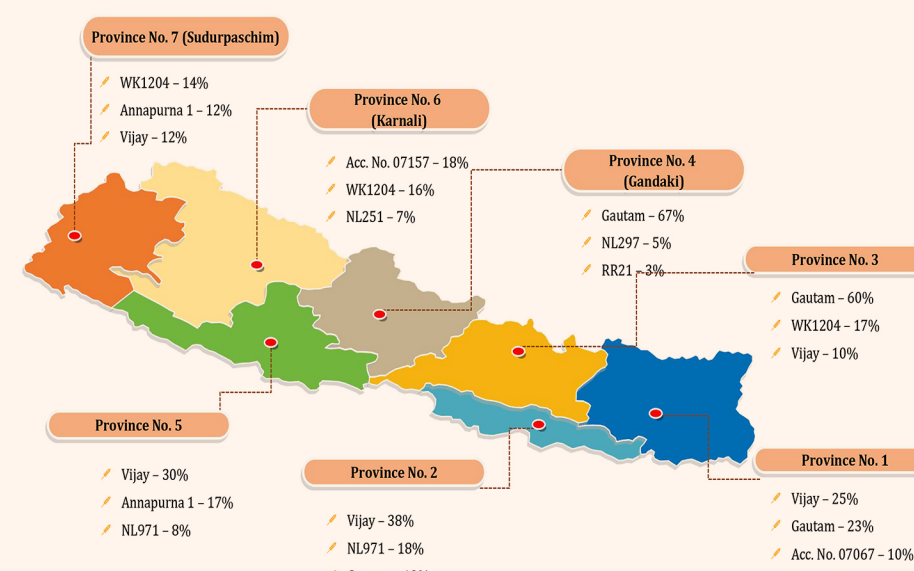


① BARI Gom 24 (23%) also known as "Prodip" is the second most common variety

② BARI Gom 26 (16%) followed by the less common varieties Pavon 76, BARI Gom 28 and BARI Gom 30

Nepal

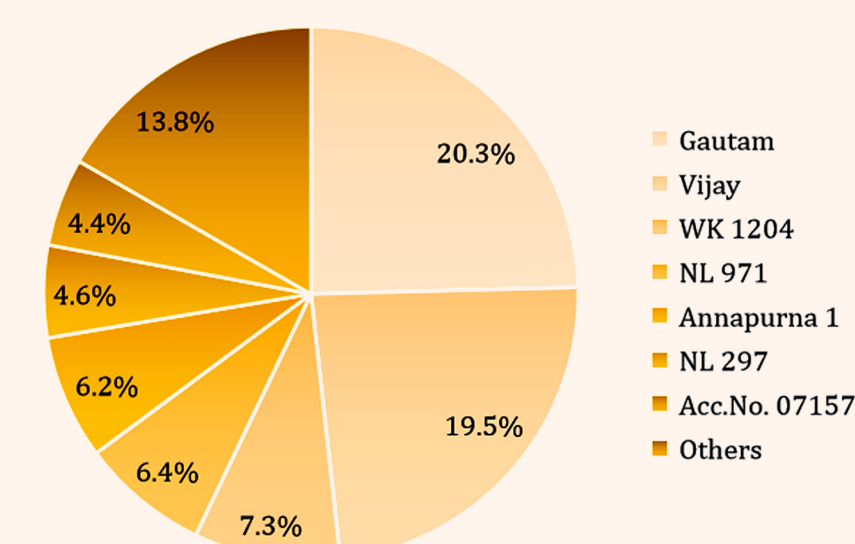
Gautam and Vijay were the most popularly grown wheat varieties in Nepal



① Field samples matched 45 released varieties and 13 landraces from the reference library

② Ug99 resistant Vijay variety is quite popular across five of the seven provinces in Nepal with 19.5% area coverage

Distribution of the top varieties identified in the farmer fields



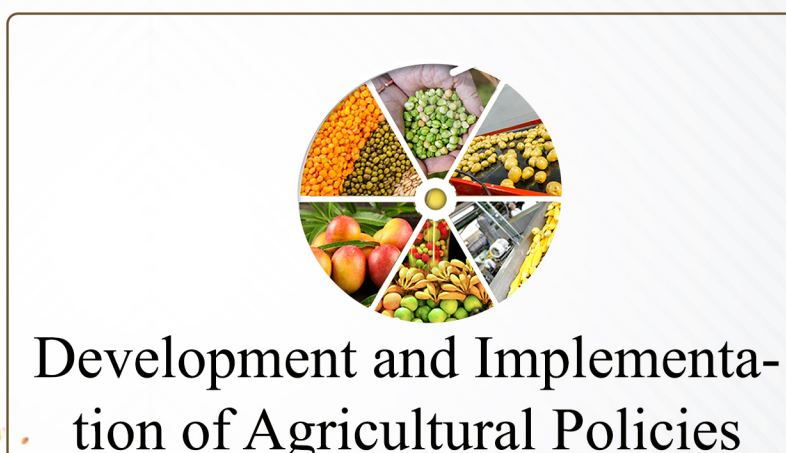
① Gautam (20.3%) and Vijay (19.5%) were the most popular and their area coverage is more than double compared to other varieties in the farmer fields

② WKL 1204 is the next popular variety followed by NL 971



Conclusions

The study enables the government to encourage farmers to adopt new varieties based on many considerations, notably yield potential, disease resistance, end-use quality, and agronomic fit to their cropping system



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