

Livelihood enhancement through IARI-improved wheat varieties in North Western Plain Zone and Central Zone of India

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The present study's goal was to ascertain the function of the Indian Agricultural Research Institute (IARI)-improved wheat varieties on the livelihood enhancement of farmers in India's Central Zone (CZ) and North Western Plain Zone (NWPZ). A study was carried out in 2023, utilising a multi-stage sampling method to select 240 farmers, comprising 120 adopters of IARI wheat varieties and 120 non-adopters. Using the normalised ranking method, scale values were assigned to the indicators of livelihood security and livelihood assets. Subsequently, a livelihood security index (LSI) and a livelihood asset index (LAI) were constructed to analyse the effect of these factors on the farmers' livelihoods. Results showed that farmers of NWPZ who adopted IARI-improved wheat varieties had a mean LSI score of 0.81 and an LAI score of 0.97, and the mean LSI and LAI scores of CZ farmers who adopted IARI-improved wheat varieties were 0.83 and 1.02, respectively. Conversely, non-adopters of IARI-improved wheat varieties in NWPZ displayed a lower mean LSI score and mean LAI score of 0.65 and 0.86, respectively, while non-adopters in CZ had a mean LSI and LAI score of 0.65 and 0.93, respectively. Moreover, a strong correlation ($r = 0.89$ in NWPZ, $r = 0.86$ in CZ, $p < 0.05$) was found between LSI and LAI, highlighting the role of IARI varieties in enhancing livelihood security and assets, particularly in food and financial security. These findings may help researchers to determine how a single variety, as well as a value chain, affects the subsistence and overall livelihood of farmers.

Keywords: Central Zone, livelihood asset index, livelihood security index, normalised ranking method, North Western Plain Zone.

and activities necessary for sustaining life⁴. A livelihood is deemed sustainable when it can withstand stresses and shocks while maintaining a resource base for future use⁵.

Livelihood enhancement refers to strategies aimed at improving economic conditions and the overall well-being of individuals. The introduction of Indian Agricultural Research Institute (IARI)-improved wheat varieties in the Central Zone (CZ) as well as in the North Western Plain Zone (NWPZ) has made a significant contribution in this area. In NWPZ, varieties such as HD 2967 have an average yield of 54 q/ha, 35–40 inch plant height, and take 129–134 days to mature, while HD 3086 has an average yield of 54.6 q/ha^{6,7}. Furthermore, HD 3237 registered an average yield of 48.4 q/ha and 7.98/10 chapati score⁸. In CZ, varieties like HI 8759 exceed 75 q/ha in potential yield and have a high level of tolerance to stem and leaf rusts⁹. HI 8663, an older variety, provides an average yield of 44.58 q/ha¹⁰ and is impressive for fast food. These varieties have enhanced farm output and, in turn, the income of the farmers.

Despite the availability of IARI-improved wheat varieties, their adoption levels vary, affecting livelihoods variably between non-adopters and adopters. Previous studies have outlined factors influencing livelihood enhancement, such as the relationship between the National Rural Livelihoods Mission and livelihood enhancement¹¹, training and livelihood enhancement¹², and the effect of farm diversification on livelihood^{13,14}. However, no similar research has been found that links IARI-improved wheat varieties with livelihood enhancement. Thus, it's important to understand how IARI wheat varieties influence the livelihood outcomes of the two groups, which differ in terms of livelihood assets and livelihood security.

Livelihood security is defined as having sufficient and long-term access to meet basic human needs, including food, healthcare, education, housing, and social inclusion¹⁵. However, rural farmers face significant