

# **Why the Plant Breeding Innovation System Causes Crop Genetic Erosion – A Case Study for Germany**

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*Keywords: Plant Genetic Resources; Crop Genetic Erosion; Innovation System; Crop Genetic Diversity*

## **1. BACKGROUND AND OBJECTIVES**

Genetic erosion in modern crops is regarded as a serious threat for the resilience of agricultural production systems and therefore for food security. Society and (international) policy share the perception that genetic diversity in modern crops is shrinking to an extent where agricultural production systems' unsustainability accelerates and their vulnerability to changing climate conditions increases. Against this background, this study tries to answer the question why the current plant breeding innovation system causes genetic erosion in crops.

## **2. METHODOLOGY**

As a methodological approach, a conceptual framework of a sectoral innovation system for the breeding sector was derived from past literature findings and the theory of sectoral innovation systems. Based on this conceptual framework, the case of Germany was investigated by the qualitative analysis of semi-structured expert interviews. To answer the research question, the German case study was drawn against evidence of past literature, the theory of sectoral innovation systems, and the conceptual framework.

## **3. RESULTS & IMPLICATIONS**

Five overall factors were identified to cause genetic erosion in crops. 1.) The attempted commodification of plant genetic resources while the (transaction) costs for the accession of those resources is prohibitive. 2.) Breeding companies lack incentives to establish own pre-breeding programs. 3.) The lack of available information on molecular characteristics of plant genetic resources. 4.) Increased opportunity costs of utilization of genetic diversity due to restrictions on the use of technological inputs. 5.) The agricultural production & consumption system does not demand a socially desirable amount of genetic diversity in crops. The study has demonstrated that the utilization of genetic diversity is a breeding incentive dilemma. Thus, genetic erosion in crops can be altered by changing several variables in the sectoral innovation system of the breeding sector (e.g. easing restrictions on technological inputs).