

Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

## The Potential for Underutilised Crops to Improve Food Security in the Face of Climate Change

F.J. Massawe<sup>a\*</sup>, S. Mayes<sup>a,b</sup>, A. Cheng<sup>a</sup>, H.H. Chai<sup>a</sup>, P. Cleasby<sup>a</sup>, R. Symonds<sup>a</sup>, W.K. Ho<sup>a,b</sup>, A. Siise<sup>a</sup>, Q.N. Wong<sup>a</sup>, P. Kendabie<sup>c</sup>, Y. Yanusa<sup>a</sup>, N. Jamalluddin<sup>a</sup>, A. Singh<sup>a</sup>, R. Azman<sup>b</sup> and S.N. Azam-Ali<sup>a,b</sup>

<sup>a</sup>The University of Nottingham Malaysia Campus, Jalan Broga, Semenyih, 43500, Malaysia

<sup>b</sup>Crops For the Future, The University of Nottingham Malaysia Campus, Jalan Broga, Semenyih, 43500, Malaysia

<sup>c</sup>The University of Nottingham, Sutton Bonington Campus, Sutton Bonington, LE12 5RD, United Kingdom

### Abstract

Food production must be increased to respond to the demands of a growing world population and the challenges posed by climate change. Higher temperatures, unpredictable rainfall and weather patterns, changes in growing seasons, increased occurrences of drought and extreme weather events will exert a greater strain on agriculture. Emerging evidence suggests that climate change will cause shifts in food production and yield loss due to more unpredictable and hostile weather patterns.

A key strategy to adapt to a changing climate is the development and promotion of underutilised crop species. The world today relies on a small number of crop species for food, mainly major cereals (wheat, rice and maize), leaving an abundance of genetic resources and potentially beneficial traits neglected. Exploiting the large reservoir of minor and underutilised crop plants would provide a more diversified agricultural system and food sources necessary to address food and nutrition security concerns in the face of climate change. Underutilised crops (also known as understudied, neglected, orphan, lost or disadvantaged crops) play an important role in food security, nutrition, and income generation of many resource-poor farmers and consumers especially in the developing world.

Using specific crop examples, we discuss the potential for underutilised crops to improve food and nutrition security, increase agricultural diversification and minimise environmental degradation. We present research evidence to suggest that crop specific traits and physiological responses contribute to underutilised crops resilience in the face of climate change. We urge that in the semi-arid environments these traits and physiological responses contribute significantly to crops ability to endure periods of

\* Corresponding author. Tel.: +60 8924 8218; fax: +60 8924 8218  
E-mail address: [festo.massawe@nottingham.edu.my](mailto:festo.massawe@nottingham.edu.my)

water stress. We conclude that a key adaptation strategy to minimise the impact of climate change on crop production must be through research and development of underutilised crops with proven potential to cope with the adverse effects of climate change.

© 2015 The Authors. Published by Elsevier B.V This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of the Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

*Keywords:* Underutilised crops, Climate resilient crops, Bambara groundnut, Food security

---