



THE CRAWFORD FUND
For a Food Secure World

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MINING FOR CLIMATE CHANGE SOLUTIONS

The Australian who achieved international attention as “The Seed Hunter” is spearheading the development of innovative technologies to mine genebanks for unique traits that will allow our crops to withstand the threats of climate change and other challenges, for the benefit of farmers in Australia and developing countries.

As “The Seed Hunter” in the internationally acclaimed documentary of the same name, Dr Ken Street collected ancient farmer varieties and crop wild relatives in far-flung regions of the world to assemble the genetic variation our crops need to meet a challenging future. He is now using cutting edge technologies to mine the genebanks that hold these unique seeds.

Dr Street is speaking at *‘Transforming Lives and Livelihoods: The Digital Revolution in Agriculture’*, the 2017 Crawford Fund annual conference in Canberra on 07-08 August at Parliament House. It will be opened by The Hon Barnaby Joyce, Deputy Prime Minister.

“I used to travel to the wilds of the trans-Caucuses and all the ‘Stans’ of central Asia to hunt for plants likely to have traits that farmers need. Now I can do it from the safety of Australia, mining the world’s genebanks for seeds that have those traits,” said Dr Street, who had to leave war-torn Syria and his position as genebank curator at the International Centre for Agricultural Research in the Dry Areas.

“Mining the millions of entries in genebanks could be like the proverbial ‘trying to find a needle in a haystack’ but using big data, my field experience and GIS to identify the most likely regions where traits we need will have been naturally selected by the environment, I can mine with the internet and my computer,” said Dr Street, who is now a lead scientist for the development of the Focused Identification of Germplasm Strategy (FIGS), funded by the Australian Grains Research and Development Corporation.

“We know that agriculture in Australia and in many developing countries face real threats. We need to work as quickly as we can to use genetic resource collections to identify traits that will future-proof our crop plants.”

“And it’s not just climate change – there’s dwindling water supplies, rising energy costs, the emergence of new pests and diseases, loss of arable land and population growth that mean that our crop plants will need to yield more on less land, with fewer inputs under increasingly harsh conditions.”

“We don’t have the time or money to evaluate enormous genetic resource collections. We need effective tools to identify small subsets of germplasm that have a high probability of containing the traits we need.”

The Focused Identification of Germplasm Strategy (FIGS) was developed to help unlock the variation in genebanks and make it more accessible to the plant breeding community.

“It’s a bit like high tech meets simple guesses, but it works brilliantly,” said Dr Street, who uses his knowledge of ecological drivers, which create genetic variation, to develop the FIGS technology.

Already the FIGS approach has uncovered sought after resistances to pests and diseases that ravage crop production worldwide such as Russian Wheat Aphid, Sun Pest, Leaf Miner, Powdery Mildew, Yellow Rust, Stem Rust, Net Blotch, Barley Yellow Dwarf Virus. Further, FIGS has been effectively used to identifying material that is boron, salt, heat and drought tolerant. Work is currently underway in Australia to search for frost tolerance in wheat using the FIGS approach to identify candidate plants for evaluation.

“It’s these technologies, from the simple to the super-sophisticated and the marrying of them, that offers such opportunity for better crops for farmers and consumers the world over,” he concluded.