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Prospects and progress for gene-edited Brassicas

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Is there reason for optimism about yield and food security against a backdrop of combinatorial challenges of climate change, reduced rates of genetic gain, degraded soils, and competition for land that face the agric-tech sector? Opposing this backdrop of challenges there are suites of new technologies from digital agriculture to genomic selection and gene editing. With respect to gene editing, in the space of a few short years the technological road-blocks for deletion edits (SDN1) in plants are being overcome, but challenges for insertions (SDN2,3) and stacked changes, alongside efficient delivery in difficult to transform crops remain areas for further development. Similarly, the international landscape for regulatory approval has shifted in favour of SDN1, but insertions, no matter how small are likely to remain classified as GMOs in many countries.

The ARC Training Centre for Future Crops seeks to accelerate development and deployment of new technologies to advance trait improvement in crops alongside contributing to (inter) national dialogues on the appropriate level of regulation and elucidating the attitudes of societies and stakeholders to advanced genetic technologies. Consequently, our vision includes training a new generation of R&D leaders to be cognizant of the need to co-design with industry and societies technologies and traits that can deliver socially-responsible climate resilient crops for healthier foods, feeds, and alternative fuels. Strategies include research into different CRSPR enzymes, tuning transformation technologies ranging from developmental regulators to nanotechnology.

Rapid deployment of complex traits in canola and accelerating the adoption of B. carinata for alternative products are Centre foci and thus progress, plans, constraints and opportunities for the Centre, the sector and society will be presented.