

## Ag Plastics - Case Study 3

The Queensland horticulture industry is a significant user of a variety of plastic products within its production systems, in particular single use irrigation drip tape and plastic mulch for weed management and product quality, which face ongoing disposal issues.

The Queensland pilot was established to address the issue of the plastic mulch and drip tape supply chain across Southern, Central and Northern Queensland. Specifically, the pilot sought to investigate and address the following problems:

- awareness and knowledge of agricultural plastic recovery and recycling options
- on-farm retrieval, source separation and contaminant minimisation of irrigation tape and plastic mulch in horticultural production systems

- strong support for local and regional recycling of agricultural plastics but limited processor capacity
- lack of coordination in collecting and recycling plastic mulch and drip tape across the supply chain

To assist the horticulture industry address a range of disposal issues, the Queensland pilot sought to engage growers to ensure a greater proportion of waste material could be recycled in the future.

Through delivery of the pilot process the project sought to gain an understanding of the types of on-farm retrieval methodologies and plastic quality specifications. On farm assessments enabled the pilot to review and document the cost and time implications of current compared to revised retrieval methods to stress test barriers to adoption of recovering plastic mulch and drip tape on-farm.

### Case Study: 1.0 Ha block of Capsicums in Stanthorpe during June 2022.

- The plastic mulch used on farm was 40um black/white (unknown brand) and each 80 kg roll held 2300m x 1.2 m

Single laterals of Rivulus drip tape was used per bed and laid underneath the plastic mulch To retrieve the plastic mulch and drip tape from the Capsicum beds the grower completes two passes.

- 1st pass was to lift the plastic mulch using a purpose built implement fitted via 3pl to a Dorado 100 tractor and to break-up the soil holding the plastic in place
  - also removes the root stock from protruding through the plastic that can cause hang-ups and tearing of the mulch plastic.
- 2nd pass was to retrieve the plastic mulch and drip tape collectively For the 2nd pass a modified hydraulic conical roller, fit for purpose, fitted to a Kubota M7040 tractor was used.

The collective rolled bales, once retrieved averaged 4.5 rolls to the tonne. The variability in the bales was associated with the levels of dirt and organic contamination.

With assistance from the grower an attempt to retrieve drip tape separately from plastic mulch was undertaken. An assessment of this process resulted in the grower spending an additional 120% of time to retrieve a similar bale volume. The additional time spent was due to the extra passes needed to retrieve and the time taken to capture the drip tape on the roller as there was no provision to concentrate the tape on the roll. Discussions with the grower indicated that modifications would be required however, any modifications made could not inhibit the implements' ability to do what it currently does as a retrieval unit.

Potentially there are opportunities to refine the retrieval process in this instance by incorporating the processes of lifting and rolling. There is also the possibility of adding a separate roller to the existing implement framework to retrieve the drip tape separately. Generalised findings from on-farm evaluations of retrieval methodologies and adaptations

- Retrieval equipment used by growers on-farm varies due to:
  - Difficulty and cost in adapting some existing equipment
  - Engineering new single pass equipment would improve on-farm retrieval
- Challenges to retrieval separation include:
  - Limited change of practice would be supported by further awareness raising and training
  - Opportunity to improve acceptable levels of contamination
  - Collection point assessment of contamination (pre-processing, shredding to reduce contamination)
  - Transport mass reduction to improve cost efficiency (bailing, compacting, pre-processing)
- Outcomes / Opportunities for future irrigation tape and plastic mulch recycling:
  - Growers are currently ill-equipped to separate drip tape from plastic mulch
  - High volumes of organic material and soil contaminate the used plastic and reduce its potential to be recycled
  - Currently there is no collection points for recycling of plastic mulch, with all going to landfill
  - Current landfill costs are acceptable with growers willing and able to pay at \$250-300/tonne
  - Overall low volumes of retrieved plastic in Queensland are not attractive to recyclers.

