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Round table feedback: Bast fibre product recovery

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The round table session aimed to answer key questions around bast fibre product recovery and local development of the industry. The key questions focused on opportunities in the fibre industry, the current challenges on processing and manufacturing, the key selection criteria for products and the status of current local developments.

Opportunities in the fibre industry

Discussions at the table highlighted opportunities in various aspects of the fibre industry, namely the potential demand for products, as well as processing and manufacturing options;

- The natural fibre composites sector is the fastest growing demand of fibre, especially for use in the automotive and aerospace industries. This presents an opportunity to produce bio-composites which are natural fibre reinforced polymer composites. European legislations on the recyclability of auto components, fuel economy standards and carbon dioxide emission values are pushing the demand for natural fibre composites.
- Kenaf, hemp and flax have all been applied in natural fibre composites, but flax is a much stronger fibre.
- Various automotive manufacturers in South Africa are already importing natural fibre composites products for parts like door panels and boot liners. Mercedes is importing flax based nonwovens for use as doorliners from Germany.
- The manufacturing of final products (or conversion of fibre to end-products) uses various existing production methods, for example equipment used to manufacture glass fibre composites and can also be used for natural fibre composites. The paper industry is also another example of where existing manufacturing capacity can be transitioned to using pulp from other sources (i.e. bast fibre plants) to produce paper. However, the processing of plants to extract fibres requires more specialised techniques.

Current challenges on processing and manufacturing

The main challenges highlighted were on the sensitivity of processing fibre parameters and the high-level skills or expertise required for harvesting and processing various bast fibre plants. The following points were made;

- Most primary products such as textiles and composites require fibres exhibiting tensile strength of 30-35 MPa. While the tensile strength of natural fibres is proportional to cellulosic content in fibres, the use of longer fibres (higher aspect ratio) improves reinforcement in composites. In the case of composites, longer fibres allow for the manufacture of composites containing woven fabrics and nonwoven mats which are

stronger in comparison with short fibre reinforced composites. The quality of the fibres are determined by various factors such as the type of processing, retting parameters, harvest timing and the length of the stems which is in turn is affected by cultivation factors.

- Retting is an important processing step as the type of retting method controls the fibre properties and parameters tend to vary for the different bast fibre plants. Therefore retting techniques are vital to control fibre output, for example the Winterton plant closed due to difficulties with managing kenaf harvest timing and the dew retting process to optimise fibre strength and length.
- The lack of technical and/or specialised skills on how to harvest and process fibres for specific uses continues to hold back development of the local fibre industry. The more complex/ high-end products such as natural fibre composites require more specialised skill sets. The lack of skills transference and knowledge sharing is also a limiting factor in the industry.

Key product selection criteria

Various factors were noted at the round table discussions on which selection criteria would be the most important. The factors that were put forward are as follows;

- The number of multiple/diverse products – plant fibre and manufacturing processes which can produce the highest number of different products would maximise plant to product ratio and promote new economies.
- The level of complexity of products – more output of higher-end primary products or complex products would increase South Africa's fibre market advantage and export potential.
- The availability of skills – more high-end products would require higher skills levels and workforce may need specialised training. (Winterton plant had to import skilled consultants to build and train at the plant).
- Job creation potential – the potential amount of jobs created from making certain products and using certain processes could affect product and process selection for development in mining area which have more low-level skilled labour profiles.
- Products from contaminated sites would have limited capabilities – intensive metal removal/extraction processes would weaken the fibres making them only suitable for low-end products such as insulation boards. There may also be legal barriers for products from contaminated sites, as legal restrictions are not well defined for such instances.

The status of current developments

- No processing plants are currently operational – Winterton plant has been idled since 2007, plans to change if from a kenaf to hemp processing plant were tabled last year.
- Most retailers are importing finished products such as fabrics, hemp oil, protein powder. Examples are House of Hemp.