

Diffuser dynamic model

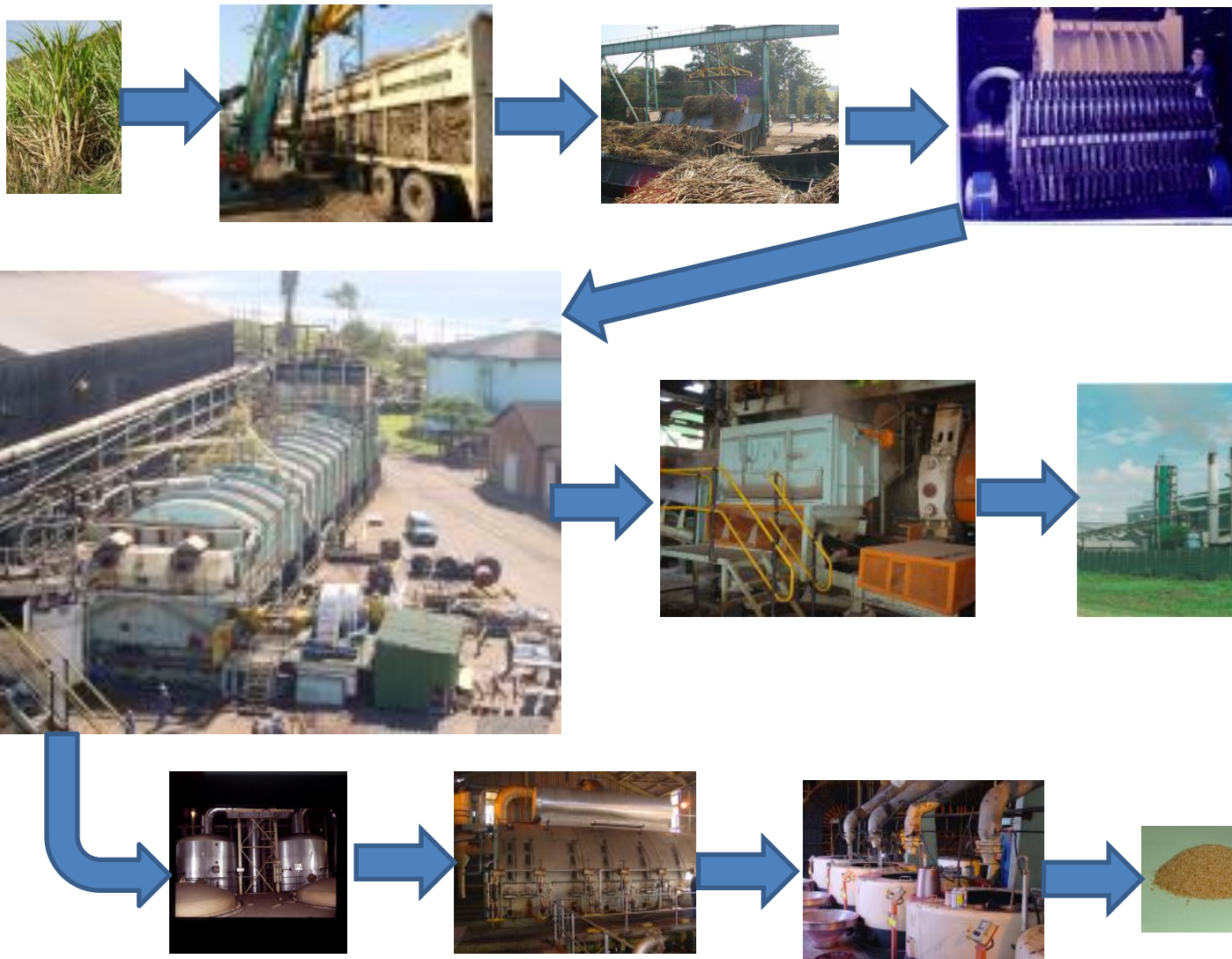
Industry Representative:
Dr Richard C Loubser

content

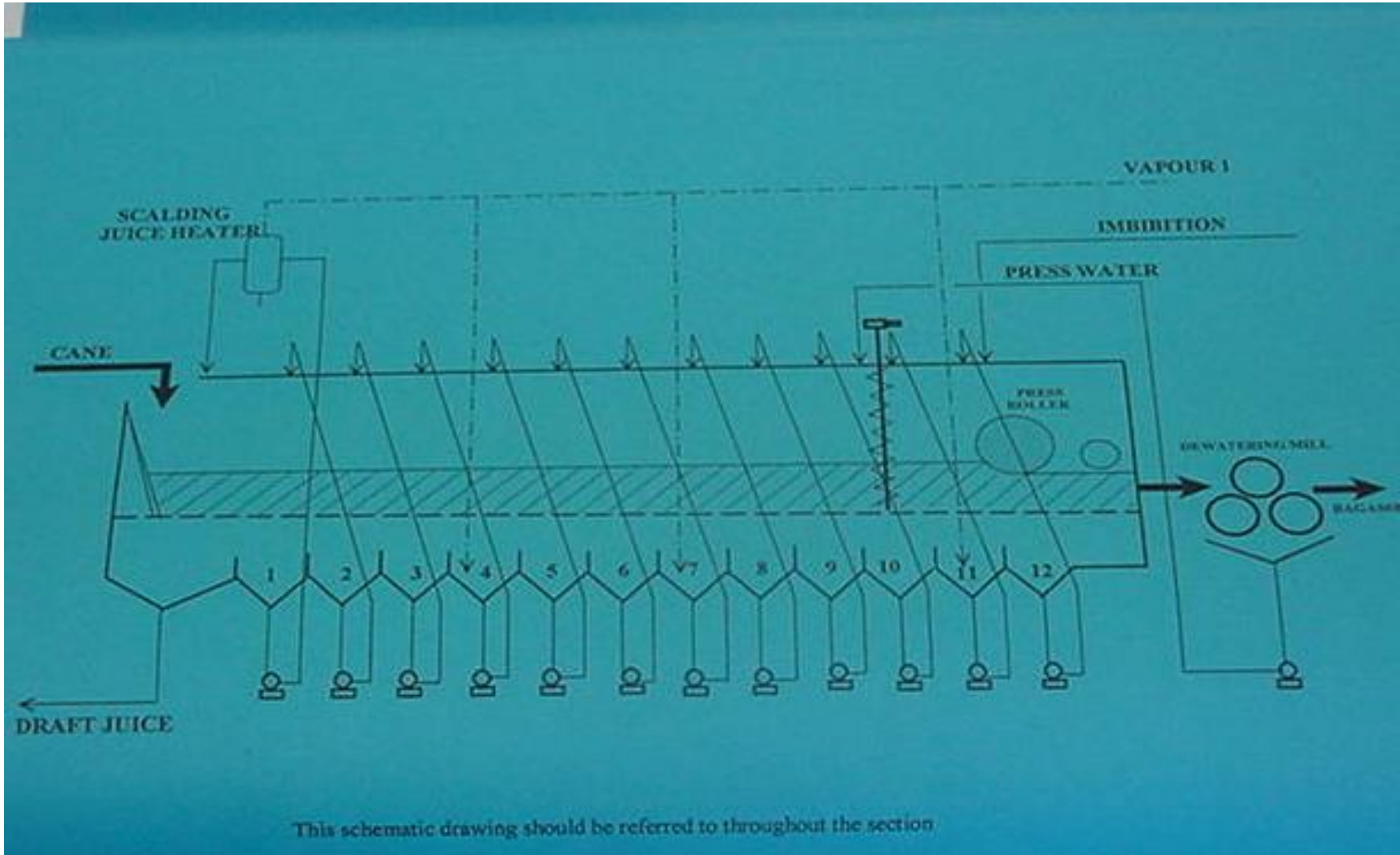
- Background - Extraction of sugar
- Elements of a diffuser
- Operating constraints
 - Flooding
 - Dry bed operation
- Context of problem
 - Changes in operation – rerouting of pipe flows
 - Operational practices – pumps etc.
 - Training
- Desired outcomes



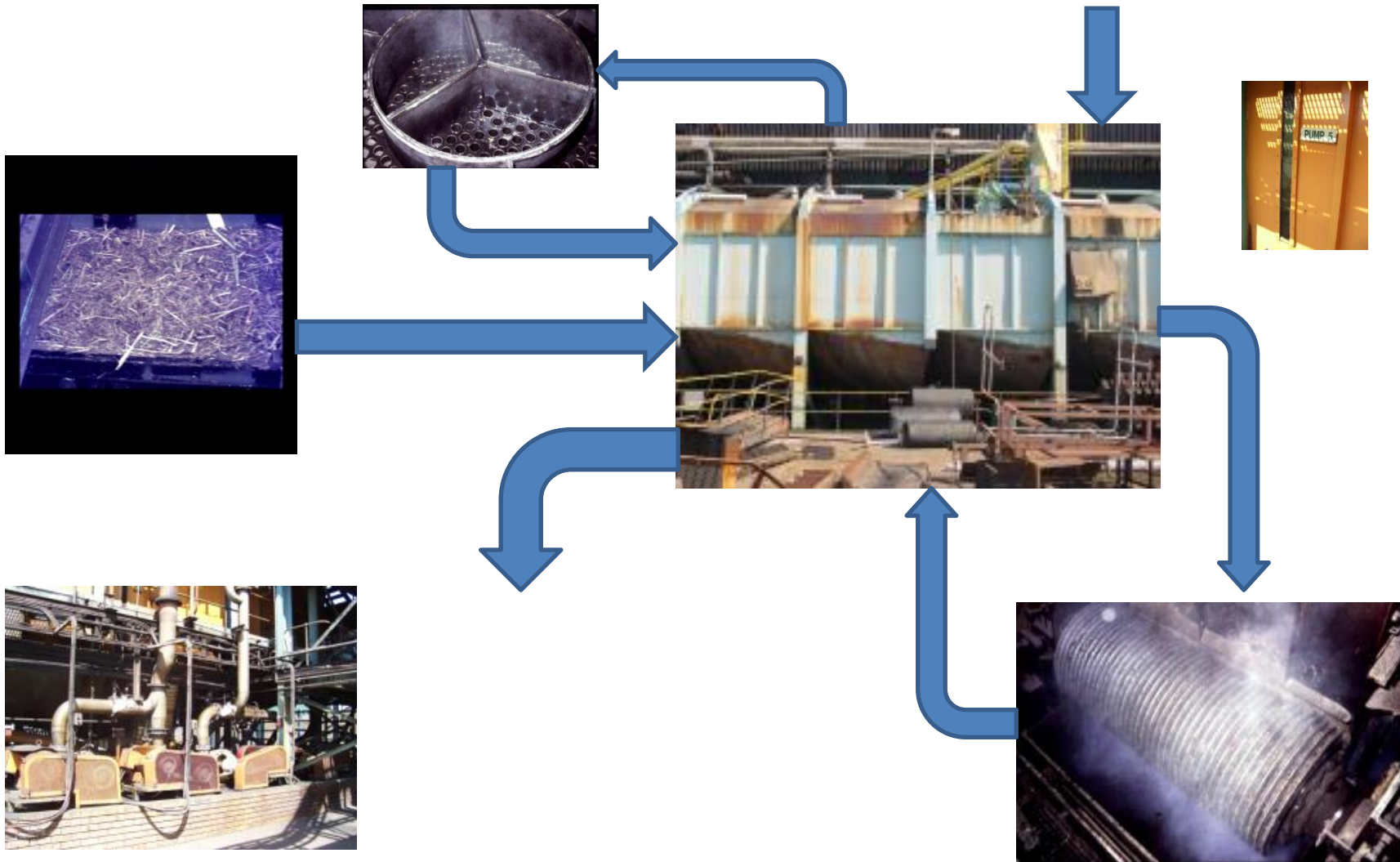
Extraction of sugar




Elements of a diffuser



Elements of a diffuser



Operating constraints

- 
- Sucrose in plant cells
 - Diffusion
 - time dependent
 - concentration gradient
 - wetting
 - Sucrose on fibre surface
 - Washing (Lixiviation)
 - mixing
 - juice velocity
 - wetting

Operating constraints

- Flooding
 - Bypassing of stages
 - Mixing of concentration profiles
 - Loss of juice
- Dry bed operation
 - Poor contacting of sugar cane and juice
 - Loss of extraction
 - Operators seldom act



Context of problem

- Change of configuration
 - Reduce residence time
 - Improve wetting of cane – control recycle
 - Improve juice quality
- Operational practices
 - Model consequences of actions such as stopping pump to cure flooding
 - Procedure for priming of pumps
- Model based training
 - Show operators consequences of interventions

Desired outcomes

- Modelling of filling and draining of cane bed
 - Juice introduced through spray at surface
 - Juice spreads out as it enters bed
 - Juice migrates through bed
 - Juice interacts with adjacent sprays
- Modelling of delay factors
 - Trays
 - Heaters
 - Pumps
 - Pipework
 - Drying mills

Bonus outcomes

- Prediction of extraction
 - Juice velocity
 - Concentration difference



Outcomes

