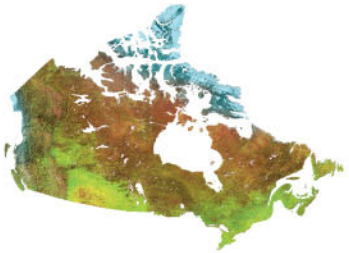
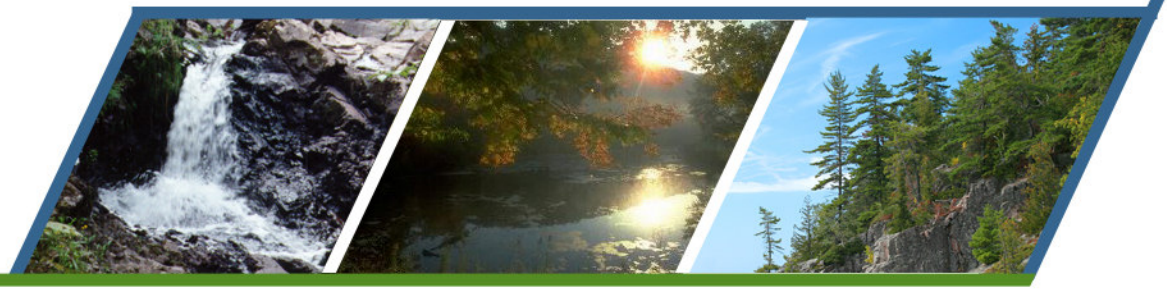




Experience using The Natural Step Framework for Strategic Sustainable Development of Canada's Flax Industry

Sra. Maria Wellisch, NRCan
Mary Beckie, University of Alberta
Linda Braun, SaskFlax
Sarah Brooks, The Natural Step Canada

International Conference on Sustainability Measurement and Modelling
Terrassa, Spain - Nov 5, 2009

Natural Resources Canada Ressources naturelles Canada

Canada

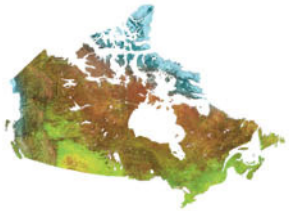
International Year of Natural Fibres 2009

- Año Internacional de las Fibras Naturales

  http://www.naturalfibres2009.org/es/fibras/lino.html

Discover
natural
fibres
2009

This is a story about …



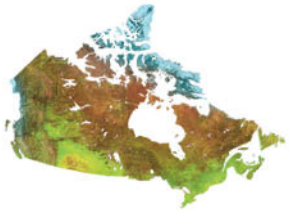
- Experience with Sustainability Planning
- Application – agricultural value chain in Canada (crop: oilseed or linseed flax)
- Goal: to help guide Canada's flax industry in the development of sustainable value chains for both the seed and straw components

  - Context
  - Tool: The Natural Step Framework
  - Process (highlights only – details are in the paper)
  - Results, including the challenges and "success factors"

Oilseed (linseed) Flax –
in Canada, mainly grown for flax seed

Flax seeds are mainly crushed for oil and meal that are used in industrial + food/feed/ nutritional applications.

Canada – Prairie Provinces



Canada is the world's leader in the production and export of flaxseed

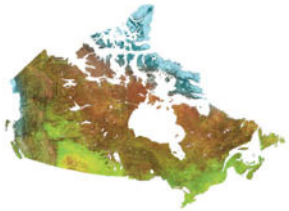
Grown in:

- Saskatchewan: 350,000 - 450,000 ha (512,000 t/yr)
- Manitoba (105,000 t/yr)
- Alberta (16,000 t/yr)

Canada ships 60% of its flax exports to the EU, 30% to the United States, and 4% to Japan.

* Values for 2007/08

Situation: Oilseed Flax



- Oilseed flax production is not new - 100+ years in Prairies
- Grown in rotation with other crops (1/3 or 4 yrs)
- Flax seeds – oil has special properties (paints, linoleum, chemicals); and omega 3s and fibre (health and wellness)
- Straw – chopped and spread on field, some burned, 10% used
- SaskFlax has been studying how to increase value from the straw (i.e. bast fibres)
  - Want to do this sustainability!

Transition To

New Value Chains
Biorefineries

complete crop utilization,
more $,
less env impact,
social benefits

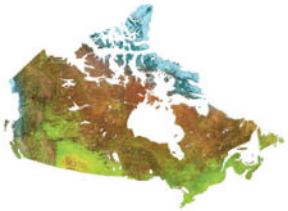
Moving from a Single to Multiple Purpose Crop

Seeds - for industrial and food markets

500-5,000 kg straw/ha could be collected and transformed into a variety of higher value products (e.g. building materials, composites, insulation, textiles, etc.)

Source of values: AEGP June 2008

NAFGEN Research Network (New Flax and Hemp Value Chains)



National Biofibre Advisory Board

NAFGEN Steering Committee
Lead: Flax 2015

- Flax 2015
- NRC
- AAFC
- AB Ag
- Saskflax
- CIC
- UofT

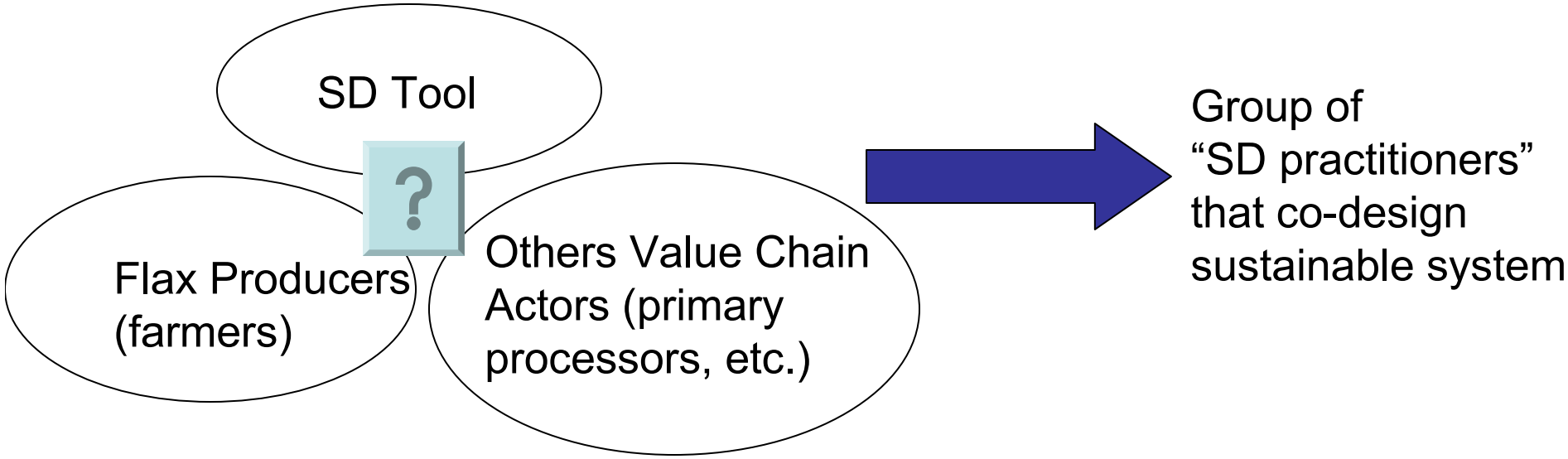
7 Platforms

- Agriculture Feedstock Flax Hemp
- Bioresource Engineering
- Straw Processing & Fibre Properties
- Materials & Manufacturing
- Primary Fractiona-tion & Processing
- Further Processing & Bioconversion

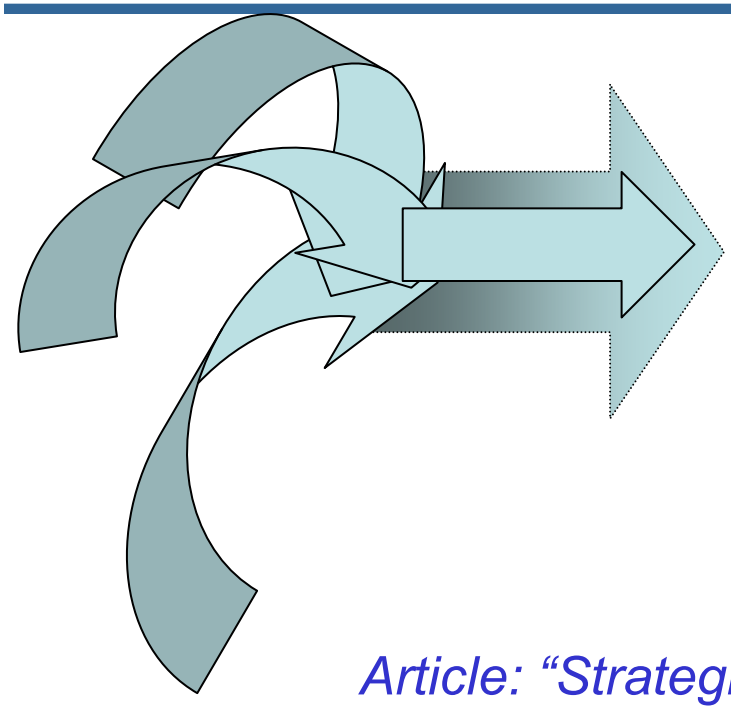
Bast Biorefineries – Sustainable Systems Design

Sustainability Work
Some of the Challenges

- Voluntary Context (i.e. sustainable development is not mandatory)
- Time (3 month window; “everyone is busy”)
- Limited funds (that had to be fought hard for!)
- Long distances
- Sustainability “unlearning”



How ? Strategic Sustainable Development (SSD)



Approach that includes:

- *Sustainability Definition/ Vision/Planning (strategic)*
- *Sustainability Assessment (modelling & measurement)*

Article: "Strategic sustainable development — selection, design and synergies of applied tools" by K-H. Robèrt, B. Schmidt-Bleek, J. Aloisi de Larderel, G. Basile, J. L. Jansen, R. Kuehr, P. Price Thomas, M. Suzuki, P. Hawken and M. Wackernagel
Journal of Cleaner Production (2002)

Strategic Sustainable Development - 5 Level Model

Level 4: Actions
R&D Program; Policy; Mitigation; Community Development, etc.

Impacts of 4 on 1

Level 5: Monitoring & Assessment
Environmental monitoring, SAFT, SD 21000, LCA, ASTM D 7075, LCA, socio-economic analysis, measurement of indicators

Level 3 Strategy – Process to Reach Goal (2)
Process/Guiding Principles/Mechanisms re: Investment/Social Engagement/Public Policy: Common Vision; Backcasting from Principles; Dialogue & Transparency; Flexible Platforms; Adequate ROI

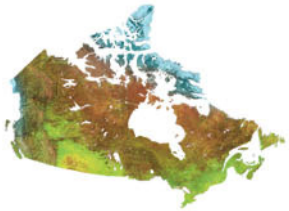
Level 2 SD Goal / What is "Success" ?
Definition & High Level Principles for Sustainability

Level 1 Ultimate Outcome: Laws of Thermodynamics, Biogeochemical Cycles, Social Order – Planet Earth

The Natural Step Framework

- Strategizing and planning process for sustainability
  - Visioning exercise – process of backcasting from principles (vs. scenarios)
  - Based on 4 sustainability principles, referred to by TNS as the system conditions
  - High level, fundamental principles that define the goal of sustainable development

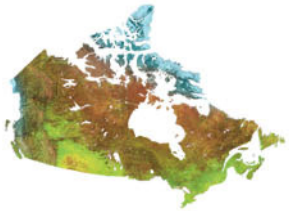
TNS System Conditions for a sustainable society

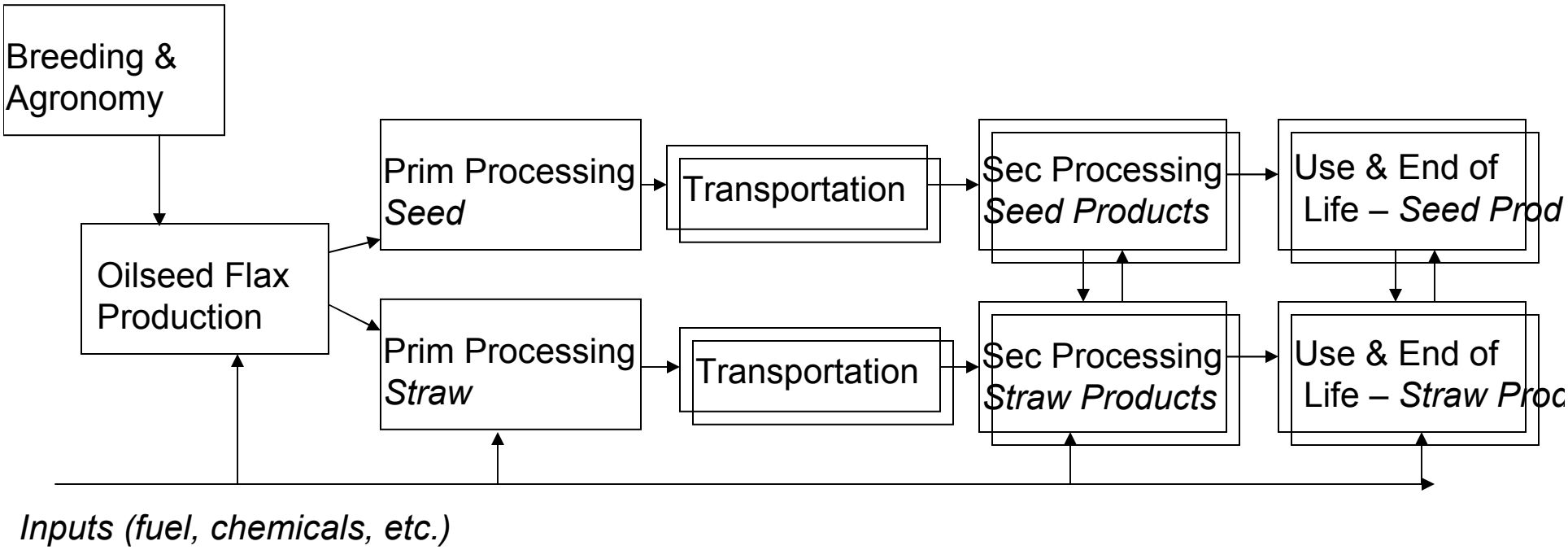


Ultimate sustainability objectives are to:

1. …eliminate our contribution to systematic increases in concentrations of substances from the Earth's crust.
2. …eliminate our contribution to systematic increases in concentrations of substances produced by society.
3. …eliminate our contribution to systematic physical degradation of nature through over-harvesting, introductions and other forms of modification.
4. …eliminate our contribution to conditions that undermine people's capacity to meet their needs.

Define General Value Chain





Phase 1 - Expertise (participants)

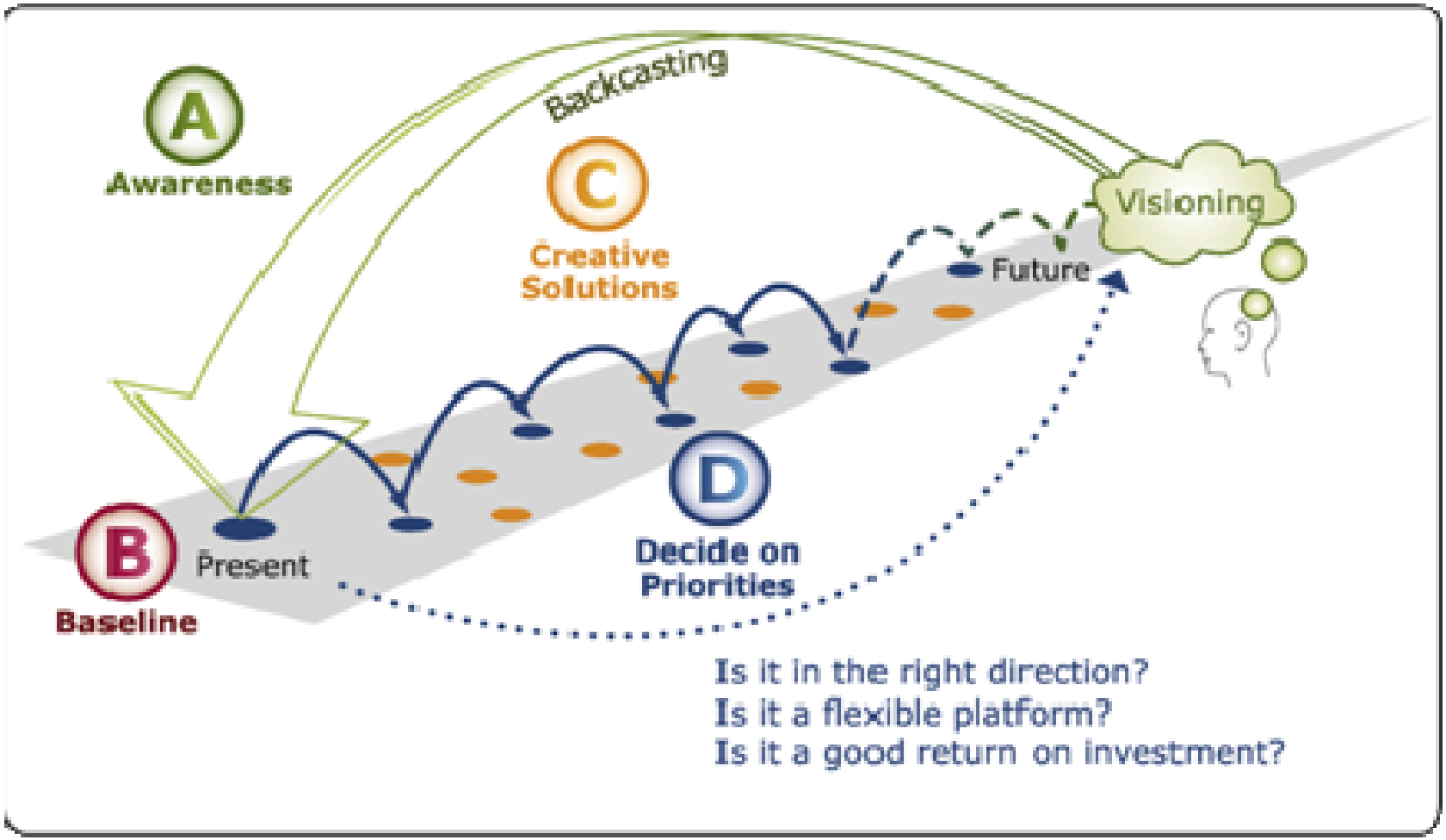
"Walk the Talk"
Exercise itself does not cause harm

- Light environmental footprint
  - Telephone & Conference Calls
  - Learning: internet or CD
  - Minimal paper use
  - One face-to-face meeting
    - Limit use of air & car travel
    - Green meeting re: material use

- Participatory
  - All participants had the opportunity to express their views
  - Created atmosphere of "doing this together" – but did not force consensus

- Not carried out at anyone's expense !

TNS: Overview of the ABCD Process



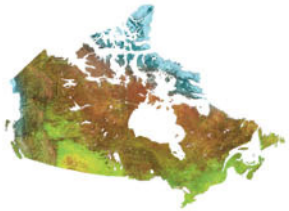
Step A: Awareness

- TNS interviewed participants (telephone)
- "A" = Awareness Building
  - all participants completed TNS e-learning course
  - 4 teleconference sessions (learning was reinforced; opportunity to ask questions; people got to know one another by voice)

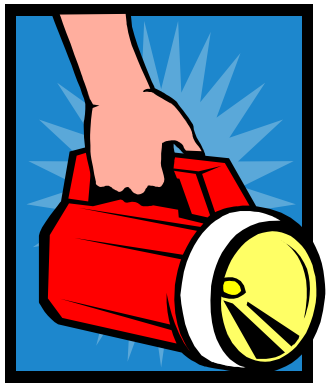
  - Course available from The Natural Step website:
    - Sustainability: Step by Natural Step™
    - $120 for a one year license
    - http://www.thenaturalstep.org/elearning

highly recommended!

Steps BCD

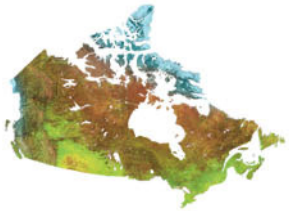


- **B**aseline, **C**ompelling Vision – **C**reative Solutions, **D**ecide on Priorities
- Backcasting Workshop was held in Saskatoon on March 9-10, 2009 (*brrr … -40 C*)
- Facilitated by The Natural Step Canada



Focus = oilseed flax industry

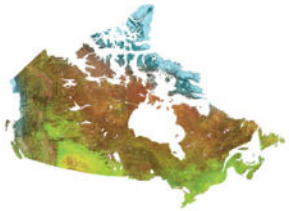
Results – *summarized in report*



- Identified sustainability opportunity for the value chain
- Identified sustainability challenges
- Asset mapping – what had been done already, and what assets could be used to take the next steps
- Named stakeholders in value chain that could be affected by or influence the success of implementing the sustainability vision

Drafted Sustainability Vision
Drafted Actions for each stage of value chain

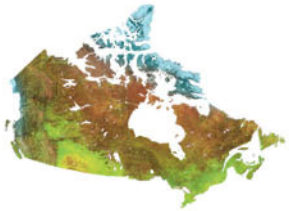
Draft Sustainability Vision



- Flax is a profitable crop that is produced and transformed in environmentally sound ways into products that are beneficial to society and the environment.

- *This vision is realized by:*
  1. Complete plant utilization
  2. Flax and flax products are solutions for sustainability
  3. Flax is considered by producers to be a “crop of choice”
  4. Production and transformation have a net positive impact on natural and social systems
  5. Regional transformation of flax seed and straw
  6. Development of necessary human capital and leadership

From Principles to Actions



Flax Industry Value Chain

Pr 1

Pr 2

Pr 3

Pr 4

Complete plant utilization

Flax and flax products are solutions for sustainability

Flax is considered by producers to be a "crop of choice"

Production and transformation have a net positive impact on natural and social systems

Regional transformation of flax seed and straw

ACTIONS
-short/medium/long Term
-monitored and measured for progress

Success Factors

- Need the basics: $, tools, people, time and physical space
- Six “success” factors:
    1. Dedicated champion
    2. Committed people
    3. Right timing
    4. Practical tools and process
    5. SD practitioner & Liaison
    6. Continuous communication (to keep engagement)

1. Need a dedicated champion !

Saskatchewan Flax Development Commission

Project wouldn't have happened without an industry champion

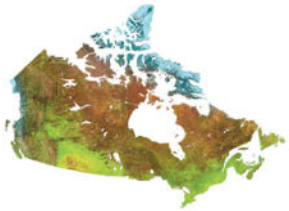
On the ground champions:

Linda Braun,
Executive Dir.

Penny Eaton, Consultant

- *Committed to the project*
- *Answering the questions from participants - Why are we doing this ? What will we get out of it ?*

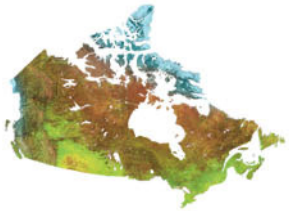
2. “Right People”



- Group that is ‘willing and able’ to participate (e.g. learn new, discuss with new people, think out of the box)
- Group of women and men with diverse backgrounds
- Not all same view of sustainability; not all knew one another
- People with life experience and common sense
- Committed people (e.g. 7-8 days of time, did “homework”, actively participated, etc.)
- Reflective people

Key when you have a Voluntary Context

3. Right Time "stars aligned"



- Sustainability is "hot" right now
  - Public expectation and demand for healthy and green products
- Existing industry looking for new opportunities (i.e. not a hypothetical case)
  - Several fibre industry start up attempts
  - Pilot plant (Crop Fibres Canada)
  - Developing grading standards
  - Market intelligence – potential products from bast fibre and shives
- Lots of R&D in the pipeline
- Large financial commitments have not yet been made (e.g. not locked in; capital not yet invested for a commercial plant)

Solution Space

4. Practical, effective tools

- The Natural Step framework: effective strategizing and planning process
- E-learning tool: cost effective way to develop a common language regarding sustainability
- Well recognized tool, with an increasing number of industrial applications – Interface modular carpet company, Rohm and Haas chemical company, etc.
- Process can be delivered in 4 month time frame (*but this should be considered as the minimum*)
- TNS did a great job developing the program
  - people were actively engaged and had fun!
  - program delivered using flexible “responsive” design

5. Need for SD Practitioner / Liaison

- *Because it was new* … need for go-between
  - Farmers –SD Consultants (NGO)
  - Visioning group – research network
  - Other industry partners

- Resource person
  - SD Practitioner – ensure 3 dimensions are addressed; not “flavour of the month”; address misconceptions
  - Biorefinery Design

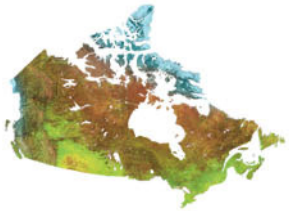
- Provide some continuity re: implementation

6. Communicate, communicate!

- Competition for time (*everyone is busy*)
- Keep interest
- Engagement
- Understand their issues
- Make the work relevant

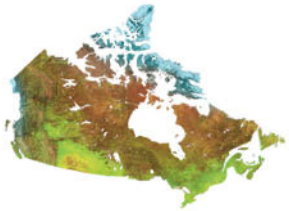
SaskFlax – Website: www.saskflax.com
Communication is part of the organization's mandate

Other Lessons Learned



- Participants learned that there was much more to sustainability than first imagined
- Time commitment of participants was greater than anticipated (but value was recognized)
- Not quite enough time to digest vision and prioritize actions (will complete this work in Phase 2)
- e-learning required “high speed internet access” – was not available on all farms (rural areas)
- Perception that agriculture was a “buy guy” had to be addressed to get “buy in”
  - *We were “not starting from zero”; agricultural practices have been improving – reducing environmental footprint; farmers consider themselves to be good stewards – their soil is their wealth and future*.

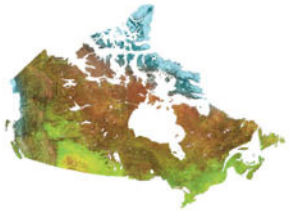
Could Sustainability be a Driver for Innovation ?



Idea: Explore the opportunities for sustainability to serve as a driver of innovation to help realize the Saskatchewan (and by extension Canada's) flax industry's vision.

Sustainability Visioning and Planning Project

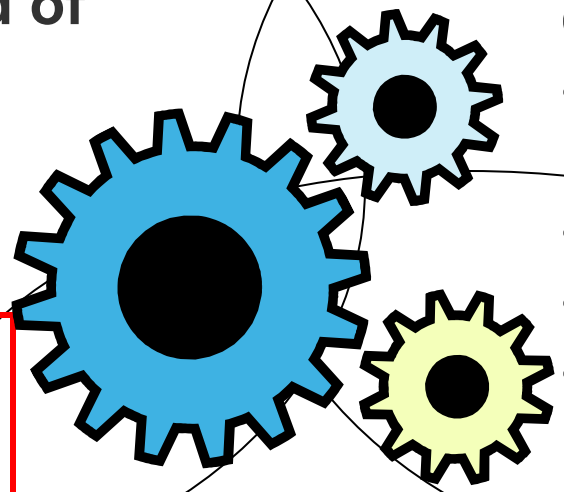
Answer: yes, with this in place:



Case Study/Sponsor:

- **Saskflax Board of Directors**
- Linda Braun
- Penny Eaton

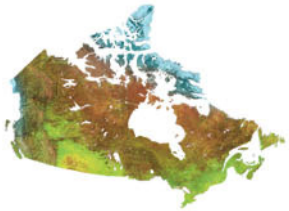
Participants – donating their time, sharing their experience



Resources ($, venue):
Agriculture and Agri-Food Canada
• (NAFGEN Research Network)
•Saskflax
•Natural Resources Canada
•National Research Council

SD Framework & Tools:
Natural Resources Canada and
The Natural Step Canada

Need to “plan for” sustainability



- **What is it that you want to achieve ?**
- **How are you defining sustainability for your context ?**
- Requires:
  - ✓ Understanding of where you are + have come from
  - ✓ Use of a common language
  - ✓ Resist the pressure to “complete the sustainability indicator checklist” too early
  - ✓ Industry champion and committed participants
    - ✓ Make the time to participate in a “thinking, discussing, planning” exercise
    - ✓ Involve external stakeholders in your discussions (people who have no vested interest, potential consumers)

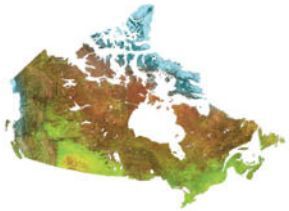
TNS can be used for sustainable design

- The Natural Step Framework - backcasting with respect to sustainability principles can be very useful planning tool

- Fundamental core principles can be used to identify:
  - Sustainability issues – opportunities and challenges
  - Actors along the chain – people to engage, to convince
  - Direction need to head; vision and goals
  - Actions that will allow you to get there

- Can be applied for Sustainable Design
  - Point in time when things are still maleable
  - Used to establish parameters that will influence design

Next Steps:
Refining and Action!



- Reviewing draft vision and actions
  - Delving deeper and “going from pencil to ink”
    - More detailed design (seed and straw)
      - Forbo Linoleum; Advanced Fibernomics; etc.
    - Bring in all of the necessary actors / stakeholders
    - Link to work of the S&T research platforms
    - Visit the farms to understand their issues, priorities, needs
    - Address new issues; e.g. GMO flax

- Get ready to hand it off – who will own it, champion it, make it their baby ?

Acknowledgments

- Agriculture and Agri-Food Canada (ABIP Program)
- Dr. Gordon Neish – *believing in this work*
- NAFGEN Steering Committee
- Saskatchewan Flax Development Commission
- Natural Resources Canada, CanmetENERGY
- NRC, Plant Biotechnology Institute
- The Natural Step (Chad Park, Pong Leung, John Purkis, Mary Beckie, Sarah Brooks)
- Alan Barton, formerly with Rohm and Haas

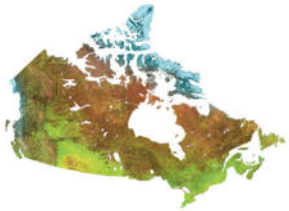
Acknowledgments

- Industry Champion:
  - Saskatchewan Flax Development Commission
    - Linda Braun, Executive Director
    - Penny Eaton, Project Consultant

- "Super Group": Gregor Beck, Linda Braun, Barbara Cox-Lloyd, Chris Hale, Erwin Hanley, Joe Hogue, Allen Kuhlman, Glenn Payne, Lee Pengilly, Gordon Rowland, Leslie Sanders, Dave Sefton, Lyle Simonsen, Leah Soroka Demkiw, Allen Sturko, Alvin Ulrich, Venkata Vakulabharanam

- *… et Jean, Helene et Popov (en France)*

Moltos Gracias, Muchos Grazias



- Maria Wellisch, Natural Resources Canada

maria.wellisch@nrcan.gc.ca

- Dr. Mary Beckie, University of Alberta, mary.beckie@ualberta.ca
- Linda Braun, Executive Director, Saskatchewan Flax Development Commission

saskflax@saskflax.com

- The Natural Step Canada (Chad Park, Pong Leung, Sarah Brooks)

  http://www.thenaturalstep.org/en/canada/

  or TNS International **www.naturalstep.org.nz/a-u-tns-international.asp**

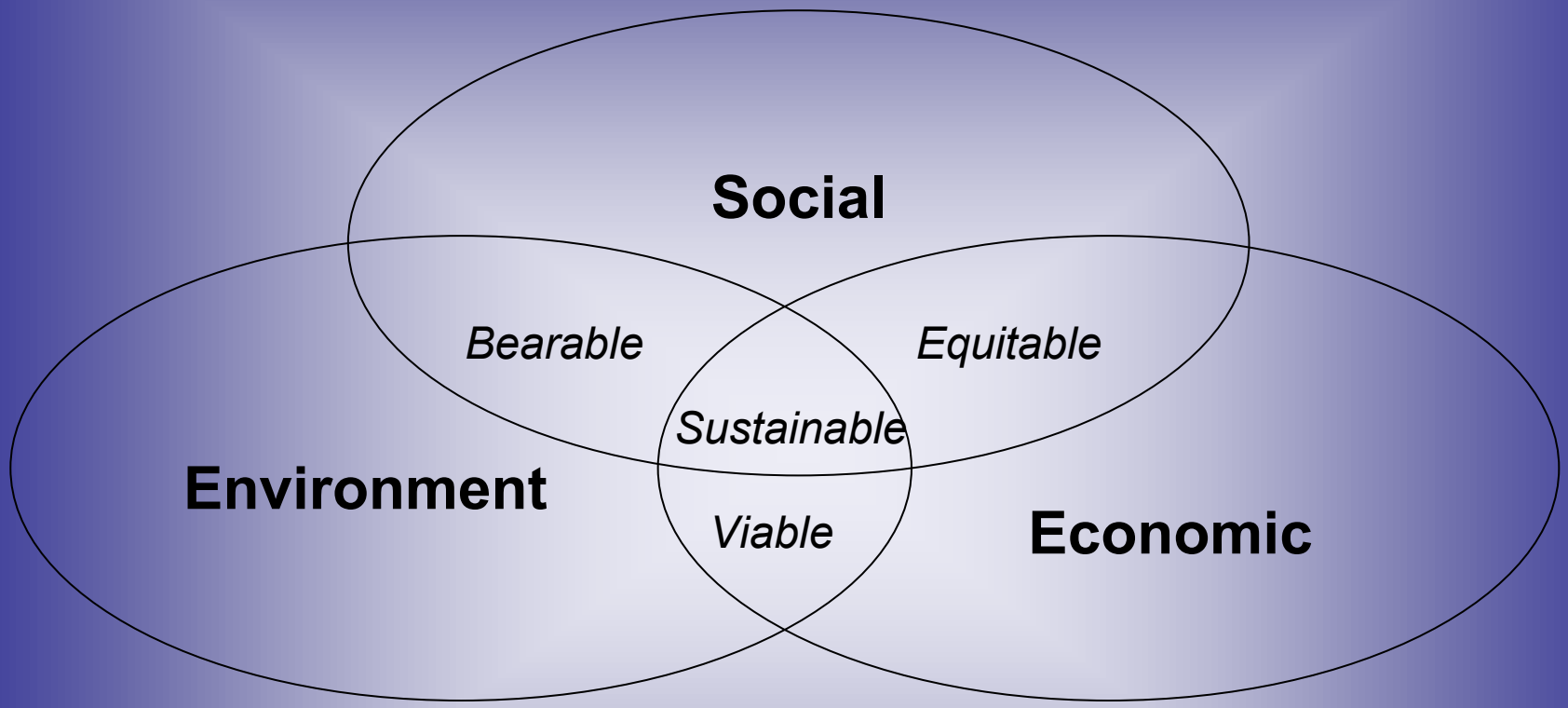
Information in Spanish

- Flax Council of Canada
  - La Linaza Canadiense

http://www.flaxcouncil.ca/spanish/index.jsp

- UN International Year of Natural Fibres
  - Año Internacional de las Fibras Naturales

http://www.naturalfibres2009.org/es/fibras/lino.html



Intra- and Intergenerational Equity – for Present and Future Generations