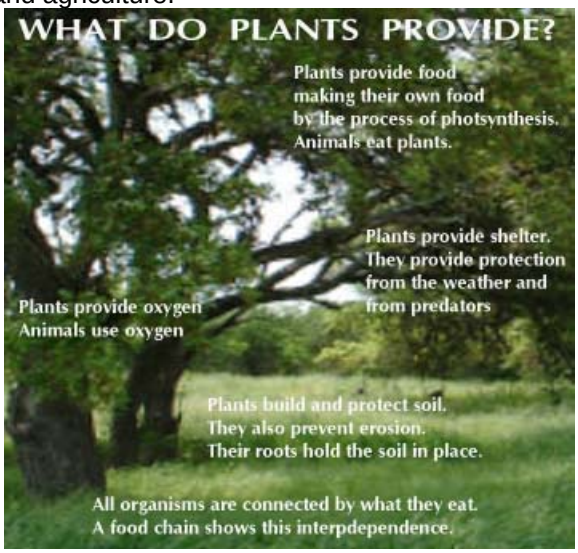
## 2.0 Plants play an essential role in the environment and in meeting human needs

### 2.1 The Role of Plants in the Environment

Plants are necessary for all life on Earth. Plants provide many things for the sustainability of life on our planet. Vegetation in Canada is classified into 4 main categories: forest, tundra, barren and agriculture.




As a critical part of the ecosystem, plants provide **oxygen** for organisms to survive. They are able to **reduce the problem of pollution**, by using carbon dioxide. Plants are also the basis of most food webs as **producers of food** for herbivores and ultimately carnivores. Plants also provide **shelter** for animals, **clean and filter water** and help **prevent soil erosion**.

### 2.2 We Use Plants in Many Ways

#### *Plants For Food*

Nearly 75% of the the world's food supply is based on seven major crops: wheat, rice, maize (corn), potatoes, barley, cassava and sorghum.

| Cocoa | Canola | Seaweed | Sugar |
|---|---|---|---|
| Chocolate is made from the fruit of the cocoa tree | 78% of vegetable oil production is from canola | contains iodine and is used in soup broths and sushi | half of the world's sugar comes from sugar beets, located in the sugar beets' roots |
|  |  |  |  |
| Cocoa beans are roasted, shelled and then crushed. Cocoa butter and cocoa powder are separated. Cocoa powder is then mixed with milk to make chocolate. | Canola is pressed from the canola seeds and used as salad oil and frying oil | other products from seaweed include: ice cream, chocolate milk, yogurt, whipped cream, pies, jellies and candies | roots are shredded, heated in running water and the concentrated clear liquid crystallizes to produce sugar similar to sugar cane |
| | It is used to make margarine, shortening, baked goods, potato chips and french fries | seaweed products are often used to thicken food (alginate, agar, carrageenan) | |
|   |  |  |  |

People use plants for things other than food.

### *Plants for Fibre*

Plants also provide fibre, which is the tissue of plants from the stem, leaves, seeds or roots. Plants provide fibres for clothing, paper and shelter. The aboriginal people from the west coast wove cloth from the bark of the western red cedar tree. Much of our clothing today comes from synthetic (manufactured) material, such as polyester and nylon. Natural fibres also provide resources for cloth:

- Cotton - is a natural fibre that absorbs moisture and then allows it to evaporate easily, making it the world's most important non-edible plant. The cotton fibres come from the plant's seeds. The silky fibres are strong, flexible and have a gradual spiral that causes the strans to intelock when twisted, making them ideal for spinning into thread. The second layer of fibers are shorter and are 'fuzzy' - they are used to make cotton batting, rayon and various types of plastic and paper.
- Hemp - Early makers of jeans used hemp, which is the oldest cultivated fibre plant in the world. Other products included the Bible, sails and ropes. Hemp has a less negative effect on the environment, because it uses less land area than trees, can be harvested in a year, lasts longer than paper, can be recycled up to seven times, chokes out weeds naturally and is not prone to insect pests.
- Flax - is a food and fibre crop. The flax fibres, which are smooth and straight, are taken from the stem of the plant are are two to three times stronger than cotton fibres. Flax fibre is used for making linen paper, linseed oil - which is used as a drying oil in paints and varnish - and in products such as klinoleum and printing inks.

### *Plants for Medicine*

An apple a day keeps the doctor away! Many medicines (over 7000) contain ingredients made from plants. Herbal remedies are a common example of how plants are used to prevent illness. Plant medicines include:

- tea (made from ginger root) - is used to soothe an upset stomach
- tea (made from white spruce and hemlock) to prevent scurvy
- white willow bark - is used to ease pain
- kinnikinick (buffalo berry) was used to treat  kidney problems
- opium poppy's seed pod - thick milky fluid provides a powerful pain medication - morphine
- codeine is also found in the poppy - it is used in cough medicines
- quinine - which comes from the cinchona tree - is used to prevent malaria.

### *Plants for Transportation and Construction*

Rubber is one of the most important plant products that people use. Natural rubber comes from the Brazilian rubber tree. Synthetic rubber is made from coal and oil by-products - but natural rubber is also an important ingredient.
Canoes were carved from trees by Aboriginal people. Lubricants are provided from coconut and castor bean oils. The construction industry in North America uses wood (softwood lumber from British Columbia) as a building material.

### *Plants for Fuel*

Wood or coal (which is a fossil fuel) are used to heat homes. Sugar can be turned into ethanol and wood can provide methanol (wood alcohol). Fuel from plants is economical, but not energy efficient, because a large amount of energy is needed to grow the plants and a lot of the energy is lost when it is converted to fuel.

We must make sure that our living resources survive and thrive,
in order to have them in the future.

## 2.3 Managing Living Resources

**Living resources** are living things that can be used for human needs. Managing living resources involves maintaining healthy populations of all living things that make up those resources.

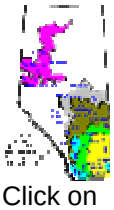
Because we grow more than we consume, Canada exports the excess to other countries around the world. Canada is also a leader in forestry and agricultural research science. Changing practices in using the living resources the land provides has resulted in certain stresses on these resources. This has led to the need to become better mangers of the resources we have and need. Scientists, farmers and foresters are working together, developing practices that will reduce the negative effects that sometimes occur when we harvest plants for food and fibre.

**Sustainability** (an ecological balance) is essential, if we are to keep our living resources healthy in the long term.

### *Agriculture in Alberta*

Alberta crops are worth almost $3 Billion.
The food industry is second only to oil and gas in terms of earnings.

Agriculture is important, but relatively new as an industry in Alberta. The vast natural resources in Alberta attracted many settlers who cultivated the grasslands to grow crops and harvested trees for construction, manufacturing and fuel. Nearly all of the grassland in the prairie provinces was converted to cropland, thus destroying the natural vegetation and native plant species that had been around for a thousand years.



Click on Map to see full view

This map shows the **ecoregions of Alberta** where parkland, grassland and forests in Alberta have been cultivated to grow crops
( *of the 60 million hectares of land in Alberta, over 20 million is now farmland* )
Math Note: *A hectare of land is equal to 10,000 square meters of land.*

### *Forestry in Alberta*

Canada has about 10% of the world's forests. Alberta tree species most valued for lumber and paper include: **Lodgepole Pine, White Spruce, Black Spruce, Aspen, Tamarack (Larch) and White Birch**. From these forests come lumber and pulp and paper products. Natural forests have many different kinds of trees, shrubs, and smaller plants. There are many animals that make their homes in, around and under these plants. A natural ecosystem has a higher diversity, or variety, of plants and animals than a field of wheat or a stand of trees. The species within this ecosystem are all interdependent. Forestry practices can increase the diversity of forest species by careful cutting to let in more light and air.

Agencies that mange forests resources establish methods and regulations that foresters must follow when a forest is to be harvested. These regulations provide the rules for harvesting. Foresters explore a potential tree cutting area thoroughly before any work begins. They map the area indicating which species of trees are to be cut and what special features should be noted. They also decide how to cut the trees, either clear cut (removing all the trees) or, selective harvesting (removing only selected trees). Foresters attempt to improve the conditions (light, temperature, water and nutrients) within the forest. Leftover branches (from the logging operations) must be disposed of. They are chopped (shredded) spread out over the forest floor and some smaller piles are burned. Replanting is always done by hand. When the trees begin to grow again, if too many of a particular kind compete, they must be removed by thinning or pruning. Fertilizer is dropped from a helicopter to improve the level of nutrients for the young trees. Forest fires are a natural development of forests, but foresters try to ensure that they burn in a controlled fashion (as much as possible).