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Catalogue 96-3010SPB

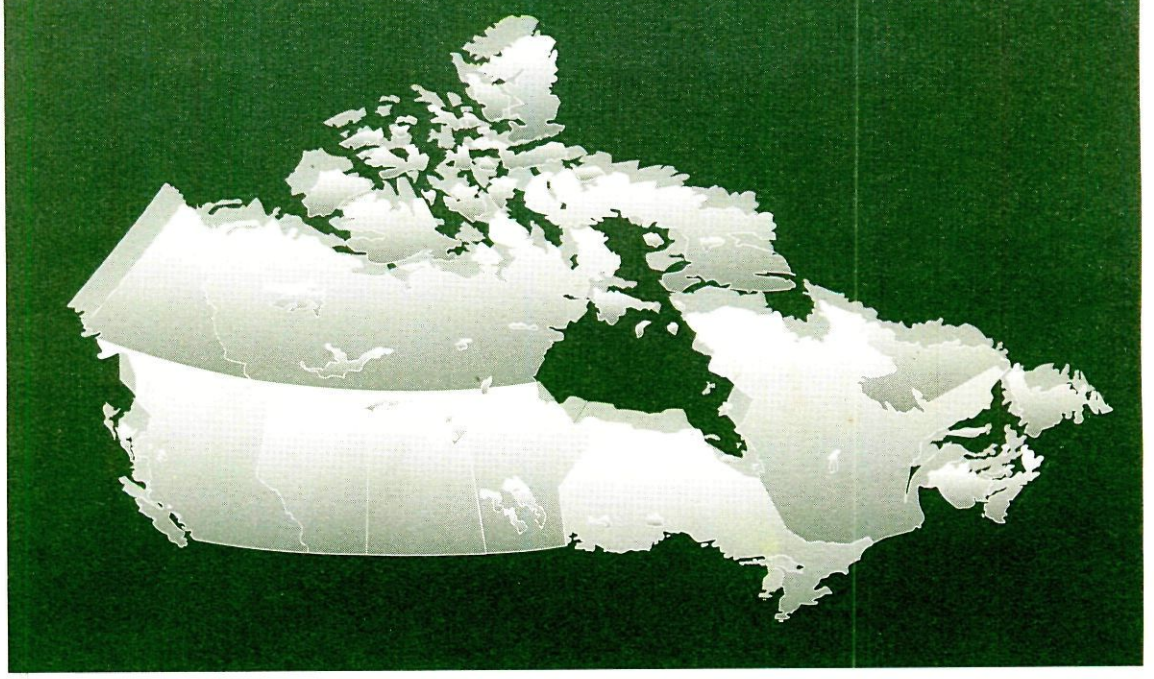
Canadian Agriculture at a Glance

Teacher's Kit

Suggested grades: Secondary

These classroom-ready activities give high school students the opportunity to learn about agriculture in Canada through ***Canadian Agriculture at a Glance***, Catalogue no. 96-3010XPB. This colourful book presents the most comprehensive picture available of Canadian agriculture and its people through feature articles, graphs, charts and colour-coded maps. Drawn from the Censuses of Agriculture and Population and a wealth of Statistics Canada and other data sources, topics range from the apple industry, to the geographic and climatic framework of Canadian agriculture, to the role of women in agriculture.

This kit is of use to teachers of a wide variety of subjects including geography, mathematics, science and family studies. Each activity is multi-disciplinary and recognizes the range of learning styles within the classroom. The kit is available free to educators who purchase ***Canadian Agriculture at a Glance***.



Statistics Canada Statistique Canada

Canada

Eating — It's Not Just a Matter of Taste

Eating habits have changed in Canada in the 10-year period ending in 1991. As a result, some changes have been made on Canadian farms.

Suggestions for classroom development

1. To help your students see how their eating habits compare with those of other Canadians, refer them to the list in Activity 1, Student's Guide.

2. Have the students refer to Table 1, page 6 of *Canadian Agriculture at a Glance* to determine if they are matching, going against or setting food consumption trends. Have them compare their findings with those of their classmates. (Note that the activity does not include breads and cereals.)

3. Encourage them to explain the decisions they would make if they were farmers or food processors.

4. Discuss what other factors should be considered when deciding what to grow or raise, for example, physical capabilities of equipment, buildings and land, market location, price received for the product, cost to grow or raise the product, and how hard or easy it is to change the type of crop grown or livestock raised.

5. Discuss what factors will influence future consumption trends. Examples are new health findings, immigration, trade policies and globalization.

Extension

How do these changes in eating habits fit into Canada's Food Guide?

Eating — It's Not Just a Matter of Taste

1. Think of the foods you have eaten over the past three days, and check them off on the list below:

Broccoli	_____	Radishes	_____	Processed cheese	_____
Cabbage	_____	Rutabagas	_____	Variety cheese	_____
Carrots	_____	Tomatoes	_____	Yogurt	_____
Cauliflower	_____	Apples	_____	Beef	_____
Celery	_____	Grapes	_____	Pork	_____
Cucumbers	_____	Grapefruit	_____	Poultry	_____
Lettuce	_____	Oranges	_____	Eggs	_____
Onions	_____	Butter	_____	Margarine	_____
Peppers	_____	Cheddar cheese	_____		

2. Based on Table 1, page 6 of *Canadian Agriculture at a Glance*:

a) I am "matching the trend" for _____

_____

(foods I have eaten which have gained in popularity)

b) I am "going against the trend" for _____

_____

(foods I have eaten which have declined in popularity)

c) I am "setting a trend" for _____

_____

(foods I have eaten which are not on the list)

3. Based on the consumption trends in Table 1, what would you do if:

a) you were a vegetable grower? What six vegetables would you grow, in order of importance?

_____

b) you were a director of a dairy processing company? Explain why your clients' consumption patterns seem to be changing. Also refer to Figure 2, page 227.

_____

_____

c) you were starting to raise livestock? Defend your choice of animal, taking into consideration Canadian consumption trends. Also refer to Figure 2, page 231 and Figure 1, page 237.

_____

_____

4. What things, other than consumption trends, should you consider when deciding what to grow or produce?

_____

_____

5. What factors will influence future consumption trends?

_____

_____

_____

_____

The Geographic and Climatic Framework of Canadian Agriculture

This exercise encourages students to summarize the natural capabilities of a region in Canada and compare them with another region. They are also asked to make hypotheses (educated guesses) about why the geography and/or climate is as it is.

Suggestions for classroom development

1. Distribute copies of Activity 2, Student's Guide and pages 163 to 168 of *Canadian Agriculture at a Glance*.

2. Introduce the terms **Canada Land Inventory**, **growing season**, **growing degree days** and **precipitation**. Have the students write these terms on the appropriate lines.

3. In determining the answers to each question consider discussing:
   a) The effects of glaciers and pre-historic seas.
   b) The intensity of sunlight at the equator vs. the poles, using a globe and light source. Ask those students who have travelled south where the sunlight seemed to be strongest (refer to the "Notes to readers" sidebars on pages 164 and 165).
   c) Factors which affect temperature, like the amount of sunlight and the proximity to large bodies of water.
   d) The usual wind patterns and the proximity to mountains and large bodies of water.
   e) The fact that corn needs a longer growing season and more growing degree days than crops like wheat, oats and barley.
   f) The influence the greenhouse effect could have on the growing season. It may raise the average temperature in Canada by 1°C, which will dramatically affect the length of the growing season in the northerly regions. Be sure to discuss that agricultural productivity is determined, not only by length of growing season, but also by soil considerations (depth, chemistry, distribution, fertility, etc.), topography and other factors, such as changing local precipitation patterns. Refer to maps on pages 106, 186 and 187.

The Geographic and Climatic Framework of Canadian Agriculture

1. Human hands and machinery plant and harvest the food we eat, but nature has the ultimate say in what is grown where. To come to an understanding of what nature has provided the farmers in your region, read pages 163 to 168 of *Canadian Agriculture at a Glance*.

2. Place the following terms on the appropriate lines — **Canada Land Inventory, growing season, growing degree days** and **precipitation**.

_____

Fertile soil

↓

Adequate rainfall and snow cover ⟶ CROP ⟵ Warmth and sunshine

_____ _____

_____

3. In which region do you live? **Eastern Canada** ___ or **Western Canada** ___

a) Where is the best agricultural land in your region located? _____

Why?[1] _____

_____

b) How does the growing season vary within your region? _____

Why?[1] _____

_____

c) How do the growing degree days in your region compare to the other region of Canada?

_____

Why?[1] _____

_____

d) How does the precipitation in your region compare to the other region? _____

_____

Why?[1] _____

_____

e) What prevents farmers from growing corn in the Yukon? _____

_____

Why?[1] _____

_____

f) Should Canada experience the greenhouse effect, and the growing degree days and growing season are lengthened, where might crops which have only been grown in southern Ontario and Quebec be grown? _____

_____

Why?[1] _____

_____

1. *The answers to "Why?" are not in the article. Think about other factors, such as latitude, the presence of water and mountains, and the topography. Also consider the effects of glacial movements thousands of years ago.*

The Number of Farms in Canada

This activity requires that the students graph the data given to them and then interpolate and extrapolate from the graph they have created. They are also asked to apply what they have learned from the graph to other situations in rural Canada.

Suggestions for classroom development

(See the inset graph on Map 1, page 7 of *Canadian Agriculture at a Glance*.)

1. Review the process of rounding to the nearest thousand.
2. Review the necessary components of a line graph and explain that this graph should be located at the bottom right of the graph paper and should cover about two-thirds of the page.
3. The following explains what happened in rural Canada:
   a) The total amount of land used for farming has stayed relatively constant; however, there has been a loss of some of the best farmland near cities and an increase in land marginally suitable for agriculture.
   b) The average size of farms has increased (see page 3).
   c) The number of people living on farms has decreased (see page 4).
4. Farmers have come to rely more heavily on machinery — everything from computers (see page 156) to four-wheel drive tractors (see page 159). On average, farms became 67% larger between 1961 and 1991. Farms have had to take on more debt. Their productivity has gone up, for example, more milk per cow, more wheat per hectare.
5. Review the terms "interpolation" and "extrapolation". After the students have produced their graphs, show them the inset graph on page 7 for a comparison.
6. Regardless of their parents' ages, the students will all find that there were fewer farms when they were born than when their parents were born.
7. The following statistics should help you in your discussion of extrapolation. Note that the number of census farms peaked in 1941.

1901 - 511,073	1931 - 728,623
1911 - 682,329	1941 - 732,832
1921 - 711,090	1951 - 623,091

Source: Census of Agriculture.

8. The role agriculture has played in the settlement of your area is a fascinating study. Your students are encouraged to pursue this further.

The Number of Farms in Canada

Year	Number of census farms in Canada	Number of census farms in Canada (to the nearest thousand)
1961	480,903	
1966	430,522	
1971	366,110	
1976	338,552	
1981	318,361	
1986	293,089	
1991	280,043	

Source: Census of Agriculture.

1. Round off the number of farms to the nearest thousand, and record this on the above table.

2. Draw a line graph at the bottom right of your graph paper. This graph should cover about two-thirds of the page.

3. Considering the decrease in the number of farms in Canada from 1961 to 1991, what do you think happened to:

   a) The amount of land being farmed? _____

   b) The average size of a farm? _____

   c) The number of people living on farms? _____

4. What changes have Canadian farmers made in order to feed a growing population in an increasingly competitive marketplace? _____

   _____

   _____

5. Use interpolation to determine the number of farms in the year you were born.

6. Use extrapolation (or interpolation) to determine the approximate number of farms in Canada when one of your parents or guardians was born.

7. We know that extrapolating the graph further back into the past could not produce a continuous increase in the number of farms in Canada. Your teacher can tell you the year in which farm numbers peaked and the number recorded. What do you think happened to the number of farms between the hundreds of years when native people were the only farmers in Canada and the mid-1900s? Mark this on your graph and explain.

8. Investigate further the role that farming played in the early settlement of your area.

Who is a Farmer in the 90s?

We all have our own stereotypes of a farmer in our minds. Some of these stereotypes are accurate, while others are based on our impressions of the farmers in our parents' generation.

Suggestions for classroom development

Have the students individually complete the "My impression" column before referring to *Canadian Agriculture at a Glance* for the answers to the "Reality" column. Then, have them explain, in the last column, why the reality is as it is. Many possible explanations can be given. Here are a few ...

1. **Age:** In 1991, the average age of farm operators was 49. The greatest number of operators was in the 35-to-59 age group. High start-up costs and the low returns from many products are two reasons why some young people would not consider farming. Many of the farmers in this age group started farming when it was less costly to do so and when they received higher prices for their products.

2. **Sex:** Twenty-six percent of Canadian farm operators were women in 1991. In many other countries, women make up the greatest proportion of farmers. These differences are dependent on a number of factors including the degree of mechanization on the farm, start-up costs, child care options and cultural norms.

3. **Education:** The average primary farmer[1] attended school for 10.8 years, which was a shorter period than for the average Canadian citizen, at 12.9 years. Re-examine the average age of farmers and think about the availability of jobs to young people and the lack of emphasis placed on higher education 20 to 50 years ago. Many young people starting farming today have completed college or university. This was far less common in the 1940s and 1950s.

4. **Family size:** In 1991, the average farm family had 3.4 persons compared with 3.1 in the general population. Based on stereotypes, one might have expected the average size of a farm family to have been larger. It is important to consider the average age of farmers when discussing family size. A farmer in the 45-to-64 age group is less likely to have a large number of family members living at home. Mechanization on the farm and general societal changes, such as dual incomes and acceptance of contraceptives, have also contributed to the reduction in size of the farm family.

5. **Hours worked:** Farmers worked an average of 53 hours per week in 1991 — more hours than other self-employed Canadians, who averaged 41 hours. Why do farmers work more hours than store owners or construction workers? One reason is that most farmers do not work specified hours. The length of their day is often determined by natural factors like the weather or the condition of their animals.

1. *Primary farmers are farm operators whose main occupation is agricultural, such as a wheat farmer in Saskatchewan.*

Who is a Farmer in the 90s?

Like students or teachers, farmers come in all shapes and sizes. But what are the characteristics of the "average" farmer? Record your impression and then check the specified pages in *Canadian Agriculture at a Glance* for the answers. Try to explain, in the last column, why the "reality" is the way it is.

Characteristics of the "average" farmer	My impression	Reality	Factors influencing these characteristics
1. Age		(pages 45 and 46, and 21 to 23)	
2. Sex (proportion of males to females)		(page 40)	
3. Education		(pages 23 and 24)	
4. Family size		(pages 62 to 65)	
5. Hours worked per week		(pages 29 and 30)	

This problem-solving activity encourages students to think about the economy and quality of life in the year 2015 — a time when they will be middle aged.

To ensure that each student has a chance to formulate independent ideas, have them record a few of them before meeting to form a group strategy with three or four students. Presentations from each group should be made to the class.

How Old Are Canada's Farmers?

Notes:

How Old Are Canada's Farmers?

"Too old" some would say. In fact, 49 was the average age of farm operators in 1991.

As an advisor to the government of Canada, it is your responsibility to create a plan to encourage more young people to become farmers. The year is 2015, and a new attitude has swept the country. Because of world-wide high energy costs and environmental problems, as well as economic instability at home, consumers have begun to demand that their food be grown in Canada. In this way, consumers know that their food will be grown with less energy being used on transportation, and with respect for their health and the health of the environment. They also know that the money they spend on food will stay in Canada. Some of this money can be put towards their own communities.

To effectively revive the farming/rural community, you know that there must be an increase in the number of young people who will produce our food. You know this won't be easy since only 3% of Canada's population lived on farms in 1991. That was 867,000 out of 27.3 million.

1. To plan your strategy, first read pages 45 to 48 of *Canadian Agriculture at a Glance* to determine how old Canadian farmers were in 1991. Consider what attracted young people to farming in the past.

2. Next, come up with some answers to the following questions:
   a) What would attract young people to any occupation? Does farming have any of these "attracting" characteristics?
   b) Should you train new farmers? If so, what skills would you need to develop in new farmers? How would you develop these skills?
   c) Should you help them get started financially? If so, how?
   d) Should you encourage them to farm until the next generation can take over the farms? If so, how?
   e) Should you encourage them to use environmentally-friendly farming practices? If so, how?
   f) Should you develop the non-farm sectors of the rural community including services like medical care, education, culture and communications? If so, how?
   g) What kinds of support businesses will farmers require?
   h) What problems might you encounter?

3. Once you have recorded your own ideas, formulate a strategy with the group assigned to you by your teacher on how to attract more young people to farming.

4. Report your strategy to the rest of the class.

Apples, Farmland and Why I Need to Know $A = 4\pi r^2$

Eight percent of Canada's land mass is capable of agricultural production. To illustrate what a precious resource farmland is, this activity uses an apple to represent the total amount of land in Canada.

Suggestions for classroom development

Provide the students with the following materials:

- apples (preferably one per student);
- butter knives (preferably one per student);
- rulers (dependent upon the number of students doing the extension);
- an overhead transparency of the inset graph on page 168 of *Canadian Agriculture at a Glance*, and;
- an overhead transparency of Table 1 on page 169.

1. a) The percentage of land in Canada which is not capable of agricultural production 92%
b) The percentage of land in Canada which is capable of agricultural production 8%

2. a) The percentage of agricultural land which is capable of growing crops 25%
b) The percentage of agricultural land which is suitable only for ruminants and is marginal for arable culture 42%
c) The percentage of agricultural land which is unusable for arable culture or permanent pasture 33%

(Also refer to pages 163 and 164.)

Discussion points

a) Farmland can be taken out of production and used for other purposes including housing developments, landfill sites, industry and recreation.

b) Red meat (e.g., beef and lamb) will have to be exported, or used domestically, in greater quantities in order for Class 4-6 land to remain productive. This land cannot be used to grow the cultivated crops needed for human and non-ruminant consumption.

c) See "Tilling Rich Soils in the Urban Fringe", pages 76 and 77 and "Changes in Canada's Total Farm Area", pages 169 and 170 of *Canadian Agriculture at a Glance*.

Apples, Farmland and Why I Need to Know $A = 4\pi r^2$

Eight percent of Canada's land mass is capable of agricultural production. That's 73 million hectares (ha) out of the nation's total land area of 922 million ha. To illustrate what a precious resource this land is, you will use the surface area of an apple to represent the total amount of land in Canada.

Using a butter knife, mark an apple to represent approximations of the following:

1. a) The percentage of land in Canada which is not capable of agricultural production ..... ____
b) The percentage of land in Canada which is capable of agricultural production ..... ____

2. a) The percentage of agricultural land which is capable of growing crops (see Classes 1-3 of the inset graph on page 168 of *Canadian Agriculture at a Glance*) ..... ____
b) The percentage of agricultural land which is suitable only for ruminants[1] and is marginal for arable culture (see Classes 4-6 on page 168) ..... ____
c) The percentage of agricultural land which is unusable for arable culture or permanent pasture (see Class 7 on page 168) ..... ____

3. The greatest amount of Canadian Class 1 and 2 land is located in southern Ontario and Quebec. By referring to the "Change since 1986" column of Table 1, page 169, alter the smallest segment of your apple to indicate what is happening to the most productive land in Canada.

Discussion points

a) What would cause farmland to go out of production?

b) Most "red meat" (e.g., beef and lamb) is produced from ruminants which can feed on low-quality feeds grown on low-quality land. As less red meat is eaten in Canada, what will need to occur in order for low-quality land to stay in production?

c) Discuss the pressures exerted on agricultural land use. Should measures be taken to protect agricultural land? If so, what strategies and policies could be followed to achieve this?

Extension

Assuming that your apple is a perfect sphere, find its surface area using a ruler and the formula $A = 4\pi r^2$.

What is Canada's number one fruit crop? . . . Apples!

1. Ruminants are animals, such as sheep, cattle and goats, which have four-chambered stomachs. The largest chamber is called the "rumen" and contains a large population of carbon-digesting bacteria. Ruminants, because of these digestive characteristics, can digest relatively low-quality feed like hay and rough pasture on low-quality land compared to non-ruminant animals, such as pigs and poultry, which require higher-quality feed and land.

Teacher's Guide[1]

It Grows in Canada

This activity invites students to examine the various crops grown and livestock raised in Canada.

Suggestions for classroom development

1. Divide the class into groups. Each group will choose to read about one of the following topics as presented in *Canadian Agriculture at a Glance*:

Wheat	– pages 188 to 192	Beef	– pages 228 to 232
Canola	– pages 195, 196 and 200	Pork	– pages 233 to 236
Tomatoes	– pages 206 to 208 and 210	Chicken	– pages 237 to 240
Apples	– pages 208, 209, 211 and 220 to 222	Lamb	– pages 241 to 243
Milk	– pages 225 to 227		

2. Have the students answer the following questions:
   a) Where is your crop grown or livestock raised?
   b) What is your crop or livestock used for? (Consider by-products as well as main products.)
   c) Where is it used? Inside or outside Canada?
   d) What are the capital (land, buildings, machinery), labour and operational cost requirements to produce your crop or livestock?
   e) What are your choices for marketing this crop or livestock? (Some choices are marketing directly to the consumer, through a food processor, through a marketing board, to a wholesaler or retailer, or to other farmers.)

3. Ask each group to report their answers to the rest of the class.

4. Determine, as a class, which product travels the furthest outside Canada.

Farmers Get Better Mileage on Productivity Highway

This activity encourages students to examine the changing productivity of Canadian and American farms and to design an accurate and creative graph.

Suggestions for classroom development

1. Review the meaning of "productivity" (see "Notes to readers", page 150 of *Canadian Agriculture at a Glance*).

2. Have the students read "Canada and the United States" (pages 151 and 152) and draw a line graph or bar chart to represent their findings.

3. Encourage the students to include all the factors needed to make an accurate graph, but assign extra marks for the most creative ones (using maple leaves and stars and stripes, for instance).

1. Student's Guide is not provided.

Probability and the Salesperson

This exercise illustrates the use of probability while introducing the students to the idea that today's farmers require much more than pickups and tractors.

Suggestions for classroom development

Tell your students that they are computer salespersons. They live in Calgary, Alberta and have to decide between attending a farm management conference in British Columbia and one held the same weekend in Manitoba. The British Columbia conference is likely to attract 110 farmers, the Manitoba conference 100. Each farmer is from a different farm. A travel agent is on the phone impatiently waiting for them to book a flight. Your students have a copy of Figure 1, page 157 from *Canadian Agriculture at a Glance* so they can calculate the potential number of customers at each conference.

Answer

In 1991, 8.6% of Manitoba farms had personal computers and 91.4% did not. Therefore — 91.4% x 100 = 91.4 potential customers.

In British Columbia, 14.3% of farms had personal computers and 85.7% did not. Therefore — 85.7% x 110 = 94.3 potential customers.

Based on this calculation, the students will be flying west. Ask them what other factors might influence their decision, such as the number of farmers in each province, their average income, the type and size of farms, and the age and education of farm operators.

Which Farms Diversify Their Incomes?

Many farmers today earn their incomes from a variety of sources. This activity encourages students to examine, in detail, a graph which shows the share of total income earned from non-farming activities.

Suggestions for classroom development

1. Present the students with Figure 2, page 109 of *Canadian Agriculture at a Glance*.
2. Have them write six concise sentences to explain what they can see in the graph.
3. Have them read pages 107 to 109 to verify their findings.

1. Student's Guide is not provided.

Agriculture's Role in Canada's Economy

Agriculture is one of Canada's primary industries. As a contributor to the gross domestic product, it comes third, after mining and oil, and outpaces forestry, fishing and trapping.

Suggestions for classroom development

1. Have the students brainstorm for ways in which the agri-food industry (production, processing and distribution of food) contributes to the economy of Canada. Also ask them to discuss how non-agricultural industries benefit from agriculture, for example, accounting firms, trucking companies, veterinarians and cosmetic manufacturers.

2. Have them read "Agriculture's role in Canada's economy", pages 4 and 5 of *Canadian Agriculture at a Glance,* to complement their answers.

3. Ask the students to illustrate, on a map, the flow of agricultural products into and out of Canada.

1. Student's Guide is not provided.