MANITOBA

Technology Adoption and Production of Renewable Energy in Manitoba

Background

Adoption of modern agricultural technologies reduces the use of agricultural inputs, such as labour, fertilizers, and energy, thus allowing farms to increase production efficiency, achieve economy of scale, reduce environmental footprint of farming, and stay competitive in the global market. Similarly, on-farm production and use of renewable energy reduces greenhouse gas emission from the agricultural industry. This report highlights the adoption of agricultural technologies and the on-farm production and use of renewable energy as reported by Census of Agriculture 2021. More than half of Manitoba farms reported the use of technology on their farm operation in 2021.

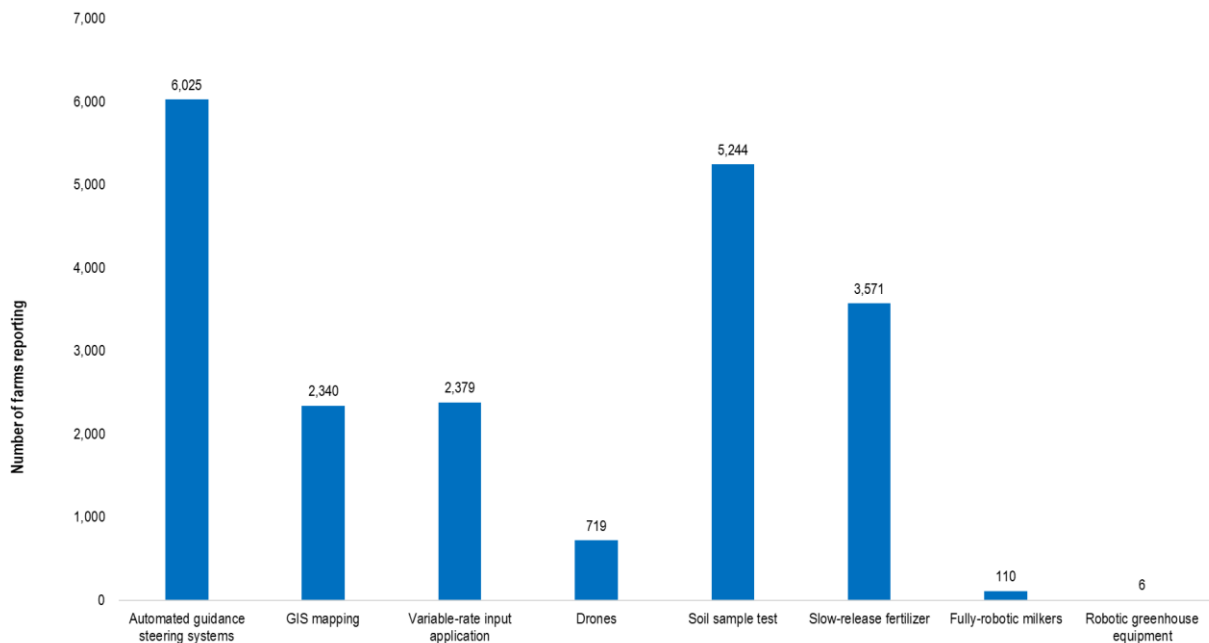**Adoption of Modern Technology is a Growing Trend in the Agriculture Industry in Manitoba**.

In 2021, 55.9 per cent of Manitoba farms reported the use of at least one technology on their farm operations. The top three technologies used by Manitoba farms in 2021 are automated guidance steering systems (auto-steer), soil sample testing, and variable-rate input application. At the national level, the top three technologies used on farms are soil sample testing, auto-steer, and slow-release fertilizers. For both Manitoba and Canada, robotic milking, and Geographic Information Systems (GIS) mapping showed the largest increase in 2021 compared to the previous census.

The use of robotic milking by Manitoba farms increased by 71.9 per cent between 2016 and 2021. Robotic milking is gaining a wider acceptance among dairy farmers in Manitoba as it reduces labour demand on dairy farms, increases milk production per cow, and allows more flexibility in the farmer's daily life. The robots also provide digital data related to the cow and the milk, which helps farmers achieve early detection of any potential illness and injury in the cows. During the same period, adoption of robotic milking increased by 106.7 per cent in Canada.

The use of GIS mapping increased by 57.9 per cent, compared to 2016 while the use of auto-steering increased by 16.0 per cent. In 2021, 41.4 per cent and 16.1 per cent farms reported using auto-steer and GIS mapping, respectively. The use of these technologies increase the precision and accuracy of seeding, input application and crop harvesting. Between 2016 and 2021, adoption of GIS mapping and auto-steer increased by 58.6 per cent and 28.2 per cent respectively in Canada.

In the 2021 census, Statistics Canada started asking producers about the use of variable-rate input application, drones, soil testing, and slow-release fertilizers. In Manitoba, about 16.4 per cent of farms reported using variable-rate input application technology (16.1 per cent in Canada), 36.1 per cent farms reported conducting soil sample test (32 per cent in Canada), 24.6 per cent farm reported use of slow-release fertilizer (23.4 per cent in Canada) and 4.9 per cent farms reported drone use in their agricultural operation (3.6 per cent in Canada) (Figure 1).

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Figure 1. Number of Farms Reporting Use of Different Technologies on Their Operations in 2021 in Manitoba

Technology Adoption Varies by Industry Group

Technology use is the highest among oilseed and grain farms where 83.6 per cent reported using at least one technology for their farm operation in 2021, followed by hog and pig farms (52.7 per cent) and vegetable and melon farms (44.6 per cent). Vegetable and melon farms reported the highest use of drones with a 13.6 per cent adoption rate, while oilseed and grain farms (55.9 per cent) and hog and pig farms (47.3 per cent) are the top users of technology conducting soil sample tests. The highest use of slow-release fertilizer was reported by oilseed and grain farms (36.4 per cent) and greenhouse, nursery and floriculture farms (34.3 per cent).
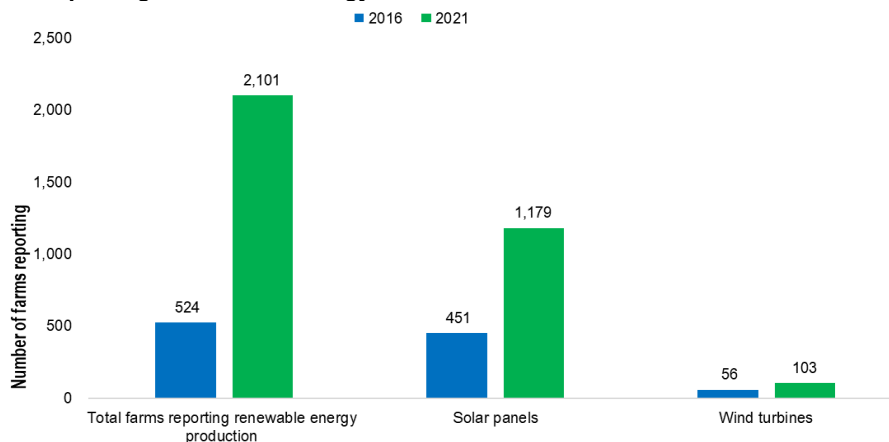
Table 1. Proportion of Farms Reporting Use of Different Technologies by Industry Group

Industry Group (NAICS)	Total number of farms	Farms reporting technologies used on the operation	Use of automated steering (auto-steer)	Use of GIS mapping (e.g., soil mapping)	Variable rate input application	Drones	Soil sample test	Slow-release fertilizer	Use of robotic milking	Robotic greenhouse equipment
All farms	14,543	55.9	41.4	16.1	16.4	4.9	36.1	24.6	0.8	0.0
Oilseed and grain farming	6,749	83.6	71.9	27.9	25.7	8.0	55.9	36.4	0.1	0.0
Vegetable and melon farming	184	44.6	36.4	26.1	25.5	13.6	37.5	32.1	0.0	0.0
Fruit and tree nut farming	66	31.8	3.0	1.5	6.1	0.0	24.2	22.7	0.0	0.0
Greenhouse, nursery and floriculture production	137	40.9	8.0	5.8	6.6	2.9	12.4	34.3	0.0	4.4
Other crop farming	1,898	28.6	12.9	4.2	6.9	1.7	16.0	12.0	0.1	0.0
Cattle ranching and farming	3,812	36.0	16.9	5.6	9.0	2.4	20.8	15.2	2.3	0.0
Hog and pig farming	245	52.7	28.2	15.1	13.9	1.6	47.3	20.0	0.4	0.0
Poultry and egg production	263	25.1	18.6	8.4	8.0	2.7	17.9	11.0	0.0	0.0
Sheep and goat farming	174	12.6	4.6	1.7	2.3	0.6	5.2	5.7	0.0	0.0
Other animal production	1,015	19.5	7.9	4.2	4.8	1.8	10.2	9.6	0.8	0.0

Shift Towards On-Farm Production and Use of Renewable Energy Accelerating

Over the last few years, adoption of renewable energy sources has accelerated in Manitoba. The number of farms reporting renewable energy production quadrupled, from 524 farms in 2016 to 2,101 farms in 2021. One in seven (14.3 per cent) farms in Manitoba reported some forms of renewable energy production in 2021, compared to one in 29 (3.5 per cent) farms in the previous census. As shown in Figure 2, between 2016 and 2021, the number of farms reporting solar panels and wind turbines increased by 161.4 per cent and 83.9 per cent in Manitoba, respectively. At the national level, adoption of renewable energy sources increased by 121.7 per cent in 2021, compared to 2016.

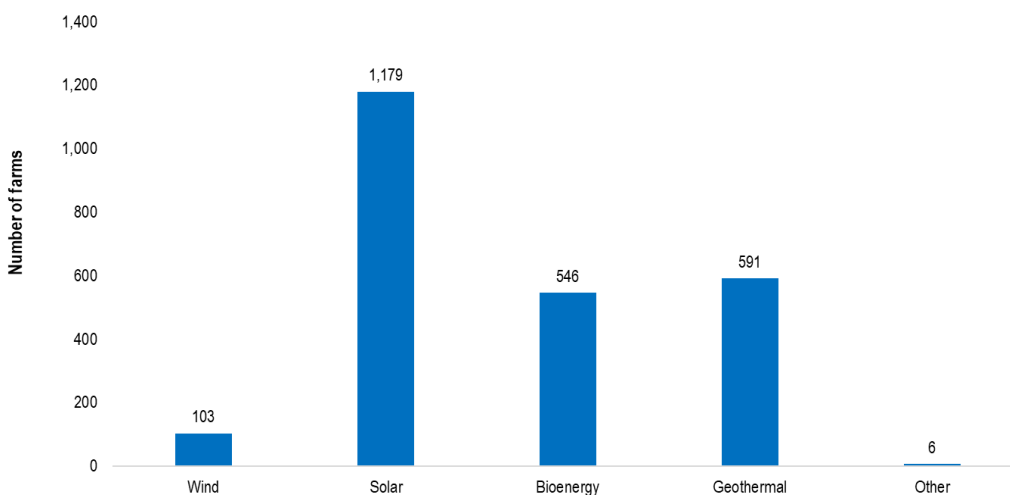**Figure 2. Number of Farms Reporting Renewable Energy Production in Manitoba in 2016 and 2021**

Source: Statistics Canada, 32-10-0380-01   Manitoba Agriculture, Roresight and Analysis, 2022-06-17

Solar Energy the Most Common Forms of Renewable Energy Produced by Manitoba Farms

With 1,179 farms reporting, solar panels are the most popular renewable energy source in Manitoba in 2021, followed by geothermal and bioenergy (Figure 3).[1]

Figure 3. Number of Farms Producing Renewable Energy from Different Sources in Manitoba in 2021
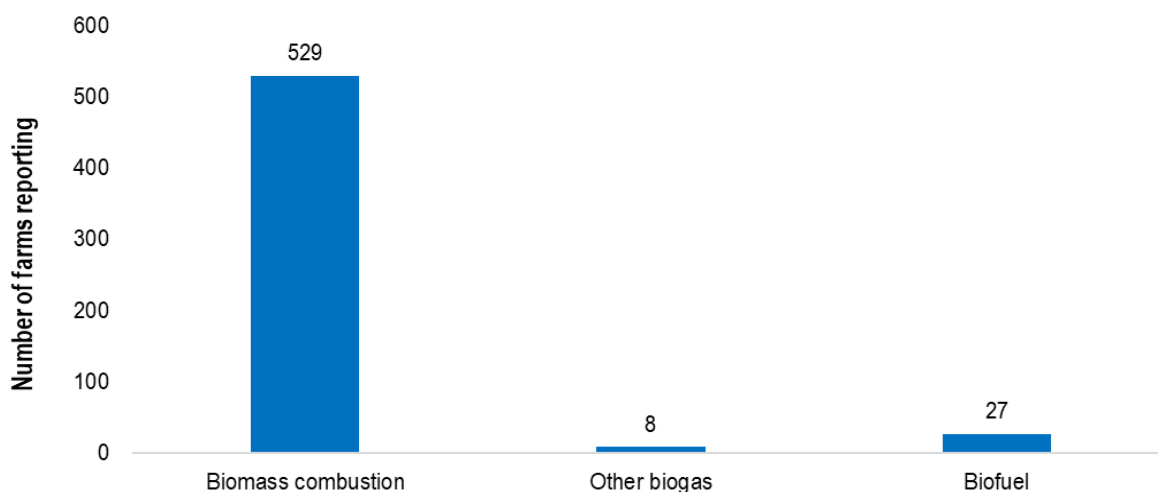

Source: Statistics Canada, Table 32-10-0380-01   Manitoba Agriculture, Foresight and Analysis, 2022-06-14

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[1] As the categories are not mutually exclusive, the number of farms reporting the different forms of renewable energy are higher than the total number of farms reporting renewable energy production in 2021. A farm can report using multiple types of renewable energy sources, which results in the sum being greater than the total number of farms reporting renewable energy production. This also applies to the number of farms reporting different forms of bioenergy production.

Biomass combustion is the main source of renewable energy for Manitoba farms producing bioenergy (Figure 4). In 2021, 529 farms reported using biomass combustion for renewable energy production in Manitoba.

Figure 4. Number of Farms Reporting Different Types of Bioenergy Production in Manitoba in 2021

Source: Statistics Canada, Table 32-10-0380-01   Manitoba Agriculture, Foresight and Analysis, 2022-06-17

The Cattle Industry is the Leader in Renewable Energy Production in Manitoba

The cattle industry has the largest proportion of farms producing renewable energy. In 2021, overall, 17.4 per cent of the farms in the cattle ranching and farming group reported producing some forms of renewable energy. About 12.7 per cent and 1.1 per cent farms in the cattle ranching and farming industry reported renewable energy production from solar panels and wind turbines, respectively. Renewable energy production from bioenergy (all forms) is the highest among the "other crop farming" group, which includes hay farms, open field cannabis farms, and farms engaged in growing a combination of fruit and vegetables. Greenhouse, nursery and floriculture farms reported the highest adoption rate of geothermal electric power generation with 6.6 per cent farms in this industry group reporting production of renewable energy from geothermal in 2021.
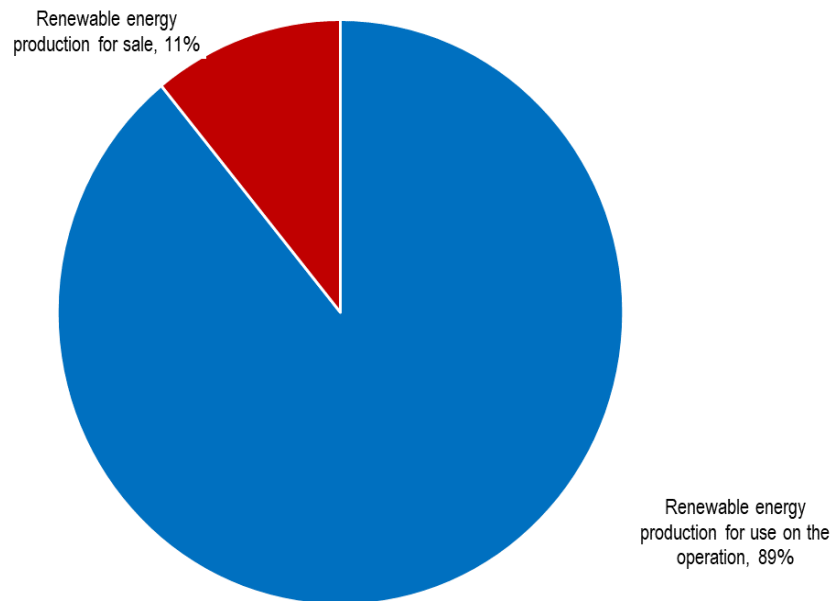
Table 2. Proportion of Farms Reporting Renewable Energy Production by Industry Group in 2021 in Manitoba

Industry Group	Total number of farms	Renewable energy production (%)	Wind turbines (%)	Solar panels (%)	Bioenergy (all forms) (%)	Biomass combustion (%)	Biomethane (%)	Other biogas (%)	Biofuel (%)	Geothermal electric power generator (%)	Other renewable energy producing systems (%)
All farms	14,543	14.23	0.71	8.11	3.75	3.64	0.03	0.06	0.19	4.06	0.04
Oilseed and grain farming	6,749	12.27	0.59	6.16	2.49	2.33	0.03	0.07	0.28	4.79	0.03
Vegetable and melon farming	184	11.41	0.00	3.26	3.80	2.72	0.00	0.00	1.09	5.43	0.00
Fruit and tree nut farming	66	7.58	0.00	3.03	3.03	3.03	0.00	0.00	0.00	1.52	0.00
Greenhouse, nursery and floriculture production	137	15.33	0.73	3.65	5.11	5.11	0.00	0.00	0.00	6.57	0.00
Other crop farming	1,898	15.02	0.74	7.06	6.74	6.74	0.00	0.00	0.00	3.53	0.11
Cattle ranching and farming	3,812	17.37	1.13	12.70	4.14	4.07	0.03	0.08	0.13	2.70	0.00
Hog and pig farming	245	13.88	0.00	9.39	2.86	2.45	0.41	0.00	0.41	4.08	0.00
Poultry and egg production	263	12.55	0.76	5.70	4.18	4.18	0.00	0.00	0.00	3.80	0.00
Sheep and goat farming	174	9.77	0.00	5.17	2.30	2.30	0.00	0.00	0.00	5.17	0.00
Other animal production	1,015	16.16	0.30	8.37	5.32	5.32	0.00	0.00	0.00	4.83	0.20

Majority of Farms Produce Renewable Energy for Own Use

Although the number of farms that reported producing renewable energy for use on their operations was significantly higher, some farms also reported producing energy for sale. In 2021, 1,871 farms (89 per cent) reported producing renewable energy for use on their operations, while the remaining 11 per cent reported producing renewable energy for sale.

Figure 5. Percentage of Farms Reporting Renewable Energy Production by Use Type in Manitoba in 2021

Renewable energy production for sale, 11%

Renewable energy production for use on the operation, 89%

Source Statistics Canada, Table, 32-10-0380-01

Manitoba Agriculture, Foresight and Analysis, 2022-06-17

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