Climate Change in the Context of Whole-Farming Systems: Opportunities for Improved Outreach

Climatic Change

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Description: Demographic characteristics of our study participants compared to state farmer demographics (Table 1), and glossary of concepts included in the aggregated farmer and outreach professional mental models (Table 2).

Table 1 Comparison of demographics between study participants and all farmers in Maine and Vermont (NASS 2017).

Farmer Characteristic	Maine Study Participants (%)	Maine Farmers (%)	Vermont Study Participants (%)	Vermont Farmers (%)
Female	52.4	42.2	30.8	40.8
Male	47.6	54.5	69.2	57.3
Multiracial	4.8	0.7	0	0.8
White	95.2	94.4	100	96.9
Military Service	0	11.0	25	8.1
Age (average yrs)	41	57	51	56

Table 2 Definitions of each concept in the final aggregated mental models, showing the change in concept names from the first round of standardization to the last.

Final standardized concept	Definition
adequate labor	All concepts related to labor including payment for work, wellbeing, and labor in general.
climate	Distinguished from the "good weather" category, "climate" captures long-term patterns and changes in weather
community wellbeing	This is one of the larger categories, and houses everything community related. A majority of interviewees mentioned something community related, including other farmers, broad community wellbeing, specific community relationships, and contributing to the local economy.

diversity	Includes concepts relating to farm system diversity, whether biological or economic. Beneficial insects are included as a sub-category as they were discussed in terms of the benefits of biodiversity on the farm.
economic viability	Houses all concepts relating to profitability, financial health, and economic sustainability of a farm enterprise.
education & resources	This category is specifically about access to education and training resources for the current and next generation of farmers. Farmer knowledge concepts reflect the role that on-farm knowledge bases play in the success of the farm.
environmental stewardship	Includes concepts reflecting environmental values and actions farmers have or are planning to take in order to benefit the environment on either local, regional, or global scales. Also includes riparian buffers to manage nutrient runoff.
expenses	Fertilizer prices, fuel prices, seed prices, tarrifs. Anything relating to costs of operating a farm.
external forces	Includes external factors that impact a farms economic viability, such as the cost of inputs, political influence on markets, and societal economic inequality.
farm inputs	Nutrient inputs, feed, fertilizer, plastic, seed.
farm planning	Concepts related to budgets, business plans, field plans, and dynamic short- and long-term financial and economic farm management
farm success	Reflects the goal and mission of the farm that the farmer is trying to fulfill; e..g, providing for their family, educating other farmers, saving the world, etc.
feeding people	Concepts about increasing access to healthy, high quality food for communities and customers. Similar to “farm success”, but with the more specific goal of providing food for others.
field management	Anything related to crop, grazing, and soil management. Cover crops, rotations, and tillage were common raw concepts within this category.
general management	Houses management concepts that were too general to fit within field or livestock management, or that related to forest management, which was rare enough to include in this broader category. Examples include “good management,” “general management”, or “forest management.”
good weather	As distinguished from the “climate” category, the “good weather” category captures shorter term changes, such as concepts that mention wind, storms, extreme rainfall, extreme temperatures, or weather.
income & capital	This category includes funding, investors, capital, financial systems, and general financing for the farm (direct income or otherwise).

infrastructure & land	This category includes concepts that mention access to pasture or space, proximity of land, or any farm infrastructure (equipment, buildings, etc.)
livestock management	Livestock management primarily captures animal health and genetics, but also includes predation, breeding, and animal quality of life.
marketing	This category captures explicit efforts by farmers to market their products or anything that helps people to understand why they should purchase a certain product over another.
markets	Many people added "markets" by itself as a concept. Other concepts include direct sales (CSA, farmers market), customers (stores, restaurants, tourism), and good prices (fair prices for goods).
nutrient management	This category includes management decisions that affect nutrient use - different from the "inputs" category, which would capture mentions of fertilizers. This includes, nutrient management plans, soil testing, mentions of fertility, and adjusting pH.
pests & managemet	This category includes not only insect pests, but also weeds, disease, and the management of these problems.
postharvest management	Any management decisions that create a higher value product after harvest.
pro-agriculture policy & regulation	Includes concepts that mention policy, insurance, regulations, legislation, laws, environmental protections, fees, or legal issues.
public education	Public education emerged as a consumer awareness concept that we felt should be distinguished from marketing. Marketing captures active attempts by the farmers to raise awareness about their business practices, whereas public education captures more broad community knowledge and education that might only be shifted by a broader campaign.
quality of life	This captures mentions of home, wellbeing, fulfillment, personal relationships, and family.
soils	Many participants mentioned soils explicitly, but this also includes things such as "ability to hold water" and "mulch" and "healthy land." Almost all of these had the word "soil" in the concept.
sustainability	Sustainability is one of the four concepts that were originally labeled as "farm outcomes" because it was often mentioned as a final outcome of the farm. There seemed to be a fairly direct (and roughly linear) connection between resource sustainability, yield, and purpose/providing healthy food for the community. This category includes mentions of sustainability, replenishment, healthy ecosystems, and resilience.
technology	This includes mentions of general and specific technology used on the farm, such as electric fences.
time management	Many participants mentioned specific time constraints on their ability to manage their farm. This includes time on the farm, timely harvests, and efficiency.

water	This category includes anything that mentions access to water, irrigation, or drainage. Rain is captured by the weather category.
yield & quality	This category is primarily made up of explicit or implicit mentions of yield (e.g. the word “yield” or a mention of “poultry” which can be interpreted as yield). Most of this category is a mention of the specific crop or animal they primarily produce. It also includes product quality, because that is often equivalent to yield in the context of the models as the “farm

Reference Cited:

National Agricultural Statistics Service (NASS). (2017). Census of Agriculture. United States Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/index.php