KPU Institute for Sustainable Food Systems

Mid Island Farmers Institute

PICS Pacific Institute for Climate Solutions

Comox Valley Farmers Institute - Since 1873 -

SUMMARY REPORT

March 2024

BUILDING DROUGHT RESILIENCE

Comox Valley Regional Farmer Dialogue

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The Institute for Sustainable Food Systems

The Institute for Sustainable Food Systems (ISFS) is an applied research and extension unit at Kwantlen Polytechnic University that investigates and supports regional food systems as key elements of sustainable communities. Our work is primarily focused in British Columbia but also extends to other regions. Our applied research focuses on the potential of regional food systems in terms of agriculture and food, economics, community health, policy, and environmental integrity. Our extension programming provides information and support for farmers, communities, business, policy makers, and others. Community collaboration is central to our approach. www.kpu.ca/isfs

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Context

The Comox Valley in British Columbia (BC) is experiencing increasingly severe and frequent droughts. Most recently, in 2023, very low precipitation levels and an unusually rapid and early snowmelt caused an unprecedentedly early onset to summer drought conditions which persisted for the duration of the summer. As early as June, farmers started reporting wells running dry.[1] Streamflows levels in the Tsolum River fell below the environmental flow threshold early in the season, threatening the survival of local fish populations.[2] The onset of low flow conditions in the Tsolum River was among the earliest ever recorded.[3] In August 2023,[4] the Ministry of Forests issued a fish population protection order[5] requiring approximately 45 license holders in the Tsolum River watershed to stop using surface and groundwater to irrigate forage crops.[6]

These events highlight an urgent need to build capacity for drought resilient farming and watershed-wide resilience in the Comox Valley to enable the stewardship of freshwater ecosystems and to support farm viability and local food production.

In December 2023, the Institute for Sustainable Food Systems (ISFS), Kwantlen Polytechnic University, hosted a regional farmer dialogue to document the scope and scale of drought impacts experienced by farmers in the Comox Valley and to identify their priorities for research, extension and coordinated action to build drought resilience. This discussion is summarized in this report.

A dry dugout, Merville. 28 August, 2023. Thom O'Dell

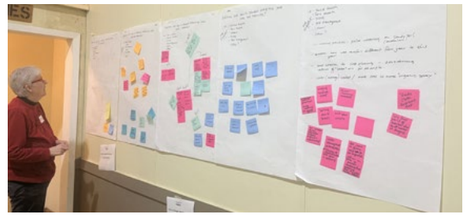
Building Drought Resilience: Comox Valley Regional Farmer Dialogue

Date: Dec 6th, 2023
Location: Merville, BC
Farmers in Attendance: 26

Participants gathered at the Merville Community Hall for a land acknowledgement and welcome from the Mid Island Farmers Institute and the Comox Valley Farmers Institute. Participants were divided into small groups to discuss the following questions. Questions were selected to help understand on-farm drought impacts and next steps for building drought resilience.

How is drought affecting your land and farming?
What are your on-farm needs to improve drought resilience?
What are the priorities to build watershed-wide drought resilience?

Facilitators at each table supported dialogue and helped record notes. After an initial 45 minute discussion, facilitators organized and compiled responses from all groups and posted them on the wall of the venue.



Participants then voted ("dot-mocracy") on the responses that they felt were most important by placing a dot sticker on their priority responses. Each participant had 5 dot stickers to distribute for each of the 3 questions. Depending on their prioritization, participants could distribute dots across multiple responses or choose to put all dots on a single response. The authors compiled dialogue notes and priorities into the key themes discussed in this report.

From page 4

[1] Local farmer, personal communication June 2023

[2] Presentation, July 27 2023, Comox Valley Drought Information Session for Agricultural Producers

[3] *ibid*

[4] Order of the Ministry of Forests, August 18th, 2023 OIC Cover (gov.bc.ca) https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/drought-info/tsolum_river_tpo.pdf

[5] Water Sustainability Act Section 88 Water Sustainability Act (gov.bc.ca) https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/14015

[6] https://news.gov.bc.ca/releases/2023FOR0053-001320#:~:text=The%20fish%2Dpopulation%20protection%20order,hay%2C%20alfalfa%20and%20forage%20corn.

The Impacts of Drought on Land and Farmers

1. Water Shortages and Crop and Livestock Health

Drought conditions caused water shortages, yield decreases, crop loss and livestock reductions.

Farmers conveyed experiencing noticeable decreases in yields and crop loss due to lack of irrigation water and low precipitation. Farmers cited bolting (premature flowering), sun scald, and poor fruit set resulting from environmental stress. Increased pest pressure, particularly stink bug, flea beetle and walnut fly were also indicated as a contributing factor to crop loss.

Farmers stressed the scarcity of irrigation water this past season (2023), and expressed an urgent need for on- farm water storage, such as water retention ponds and cisterns. However most remarked that the cost of this infrastructure was prohibitive.

Livestock farmers remarked on a 50%-100% decrease in hay production due to the drought, requiring them to purchase off-farm hay to feed livestock. The economic implications of purchasing off-farm feed were significant for all farmers present, and many were forced to raise prices and/or reduce herd/flock size by selling or culling.

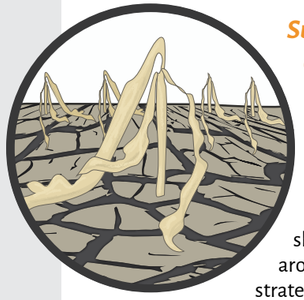
2. Compromised Farmer Livelihoods

Reduced revenue and increased production costs put additional strain on farm businesses and farmer livelihoods.

Drought conditions increased production costs and reduced farm revenues. Decreased yields resulted in reduced sales revenues for some farmers. Those marketing directly to consumers noted a considerable decrease in market customers during periods of high heat, particularly farmers running U-Pick operations. Farmers noted that reduced revenues were particularly impactful as "the cost of everything has gone up" rapidly in the economic conditions since the COVID-19 pandemic.

Drought conditions had notable impacts on farm production costs. This was particularly true for livestock operations, as many needed to purchase off-farm feed. Farmers reported that the price of hay increased substantially. Farmers also reduced the number of livestock on their farms. Many farmers who did not have sufficient access to water had to purchase water, often requiring additional storage infrastructure.

3. Deteriorated Soil Health



Sustained hot and dry conditions deteriorated soil health, compounding challenges for crop growth and soil moisture retention.

Farmers frequently reported "hard, baked soil" conditions. One local farmer has commented that "the soil literally bakes, almost like a clay."[7] Soil deterioration causes adverse growing conditions and, importantly, reduces the capacity of the soil to absorb water when it does rain. Farmers reported that soil deteriorated by drought repelled water which ran over the surface rather than infiltrating. Farmers shared concerns over dried out soil, and discussed opportunities for extension services around drought specific soil management, including research and resources on the strategies employed in drought prone areas such as Oregon, California and Australia.

4. Mental Health Impacts

Drought conditions increased the stress and anxiety farmers felt regarding the vulnerability of their livelihoods.

Farmers reported increased stress and mental health burdens from managing extreme heat and drought conditions. They shared heightened stress and uncertainty around the availability of water for livestock and irrigation, the related economic implications of crop and livestock losses, and a growing anxiety around increasing climate instability. These concerns are compounded by an overall increased frequency of extreme weather events, beyond drought, that pose additional challenges to farmers such as atmospheric rivers, flooding, and wildfires.

[7] https://www.theglobeandmail.com/canada/article-climate-change-young-farmers-canada/

Priorities for Building Drought Resilience on Farms and across the Watershed

The priorities for building drought resilience comprised three overarching themes:

1) POLICY AND GOVERNANCE

2) RESEARCH AND EXTENSION

3) PUBLIC ACTION AND SUPPORT

1. POLICY AND GOVERNANCE

a. Support for farmers adopting drought adaptation strategies

Farmers discussed the on-farm adaptation strategies they adopted during the 2023 drought to manage the challenging dry conditions. Crop management strategies included keeping seedlings moist by using shade cloth or row covers (e.g. Reemay) for the first time, implementing new watering practices (e.g. drip irrigation, pulse watering), cover cropping, reducing fertilizer usage or changing the timing of fertilizer applications. Livestock management strategies included changes to strip grazing or changing livestock type. Farmers are doing their best to adapt to changing conditions, but more support is required for both long-term adaptation and short-term emergency responses. Here, many farmers noted the economic challenges of farming and drought, and how the financial impacts of testing and implementing adaptation strategies are beyond their capacity to pay for out of pocket. They commented that "farms need to be supported to become climate smart".

Farmers are doing their best to adapt to changing conditions, but more support is required for both long-term adaptation and short-term emergency responses.

Farmers prioritized three areas of financial support that would advance drought resilience. First, farmers articulated a need for financial assistance to increase on-farm water storage capacity through water retention ponds. Second, farmers emphasized the need for financial support to implement regenerative and agro-ecological practices to retain soil moisture such as high quality compost, mulching, cover cropping, and planting areas of native plants and trees to retain soil moisture with the co-benefit of improving on-farm biodiversity. Here farmers highlighted the potential of bulk purchasing, subsidies or other forms of discounting to make these practices more accessible. "Farmers know what we need, but we can't afford it".

Third, many farmers noted that they were aware of the funding streams through the Investment Agriculture Foundation (IAF) and the Environmental Farm Plan, but found them to be too restrictive or challenging to navigate, noting grant applications and the bureaucracy as barriers to access.

"Farms know what we need, but we can't afford it".

Also mentioned, but with less frequency, were financial supports to increase access to other types of infrastructure and services including more efficient irrigation, and water delivery. Additionally farmers requested support to mitigate fire risk.

b. Improve equity and communications surrounding water licensing, regulations and restrictions

Farmers were concerned about equity and communications in regard to water licensing, policy, and regulation. There was discussion around the frustrations experienced by some farmers trying to negotiate water access through government channels. Farmers shared experiences of outstanding groundwater license requests, perceived limited transparency concerning water approvals, and complicated processes. Additionally, farmers expressed frustrations over equity in the decision making process for approving licenses; including mechanisms for "grandfathered" wells, and confusion as to why developments were approved in the watershed but not water licenses for farmers.

Furthermore, farmers struggled with the impacts, equity, and effectiveness of water restrictions. A Provincial Fish Protection Order (Section 88) was issued on the Tsolum watershed in August 2023, restricting water access for forage crop irrigation. Water restrictions introduced additional uncertainty and complexity in an already very difficult year for farming. Farmers expressed a need for clarity around how restriction levels are determined and whether water restrictions were effective. There were discussions about how to prioritize food production relative to less essential water uses during times of water stress. There was agreement that improving communications was an important part of strengthening government-farmer cooperation and relationships.

Farmers also discussed a need for more effective communication between provincial ministries to appropriately address the interconnected nature of climate change impacts. Further, the compounded nature of climate emergencies and the need for interconnected policy and planning was stressed by some farmers. It's "not just droughts, [we need to be] resilient to floods, extreme weather events, wind, snow, heat and so on".

c. Watershed Wide Policy and Environmental Protection

Throughout the discussion, farmers echoed the need to coordinate drought mitigation and adaptation efforts at the watershed scale. Here, they expressed an urgent need to recognize the broader impacts of environmental and land use policy on drought resilience. In this context, there was significant conversation regarding forestry practices and the need to adapt these to maximize watershed health and drought resilience. Reducing clearcutting in the headwaters was repeatedly discussed as a key area of policy work to improve drought resilience.

There was interest in the potential to utilize additional water sources such as grey water and runoff capture from roads, and suggestions were made that municipalities begin to investigate the potential for this. There was also the suggestion that municipalities implement a green waste/organics program providing farmers with free access to compost and organic material to improve soil health and water holding capacity.

Finally, farmers discussed the relationship between the Agricultural Land Reserve (ALR) housing restrictions, climate adaptation strategies and long term economic viability. Farmers noted that without housing for succession, they were limited in their ability to add additional workload. One farmer remarked that "more farming could be possible and more stewardship, but more hands are needed to do the increased work of managing drought, fire, flooding and climate [change] mitigation".

Additional watershed level actions included riparian restoration efforts, increased tree canopy, and improved watershed governance through the establishment of a watershed table to advance watershed health through policy, practice and coordinated action. Membership should include diverse actors including farmers, K'ómoks First Nation, local/provincial governments, stream keeping groups etc.

2. RESEARCH AND EXTENSION

Farmers noted a need for improved on-farm research and extension services as well as improved knowledge sharing and farmer networks to support the development and adoption of adaptation strategies. Farmers articulated an opportunity to learn from regions with more experience with drought conditions such as Oregon and California. Farmers identified the following topics of interest:

a. **Research on drought-resistant crops and variety trials**
   - Research on perennials and food crop trials for drought resistance and heat tolerance

b. **Whole-farm management strategies that integrate practices such**
   - slow release fertilizers
   - perennial food crops
   - water reclamation and water storage e.g. retention ponds, cisterns
   - efficient irrigation strategies e.g. pulse watering
   - cooling options e.g. shade cloth
   - native planting for soil moistures retention
   - sourcing compost ingredients

c. **Accessing resources such as;**
   - Information and workshops on grant applications, farm status applications, funding, water storage regulations
   - building farmer-to-farmer training networks
   - mentorship and peer-to-peer learning
   - consulting services to support the design of climate-friendly farms

3. PUBLIC ACTION AND SUPPORT

The role of the public in building resilience was mentioned at each table, addressing the need for public support of local farms and the local food economy. At each table, farmers stressed the economic challenges of farming and how these played a significant role in a farm's long-term viability, in the context of drought and beyond. Farmers felt a lack of public support for the local food economy, marginal awareness of farming challenges (drought and other), and a low appreciation for the importance of local food and food production capacity. Farmers remarked that it was necessary to "build respect for small/medium farmers and our value in the food chain". Here, farmers suggested strengthening the local food economy through institution procurement as an area of support and action. Suggested avenues included education for, and support of, restaurants and institutions on seasonal buying and the co-benefits of supporting local growers.

Conclusion

The 2023 drought conditions highlighted the urgent need to build capacity for drought resilience in the Comox Valley with the goal of protecting ecosystem function, supporting local food production, and strengthening farmer livelihoods. Balancing these goals will require support for on-farm adaptation strategies as well as coordinated, watershed scale responses and equitable, preventative water management policy.

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APPENDIX: DOTMOCRACY RESULTS

The Impacts of Drought on Land and Farmers

More Votes — Fewer Votes

WATER SHORTAGES AND CROP AND LIVESTOCK HEALTH

Less food yield from low precipitation and lack of irrigation water
- *Low fertility e.g. 50% decrease*
- *Undersized vegetables*
- *More reseeding, need to keep seedlings moist*
- *Poor fruit set in some crops e.g. zucchinis*
- *Lost crops e.g. bolting due to stress, tomato blossom end rot, sunburn on apple and raspberries*

Reduction in yields of forage crops
- *Lack of feed*
- *No hay produced on farm this year, all brought in for livestock*
- *Hay yield decreased - ¼ of normal yield*
- *Selling off livestock*
- *Having to bring in feed from Washington*
- *Strip grazing, moving fence every day, moving from sheep to cattle because easier to strip graze*

Increased pest incidence
- *Heavy flea beetle, stink bug, walnut fly pressures*

Increased heat causes algae and bacteria to accumulate in water storage ponds and clogs filters

Animal stress during heat and travel

Needed to change fertilization dates

COMPROMISED FARMER LIVELIHOODS

Increased cost of production
- *"Cost of everything has gone up"*

Doubling of hay prices

Have had to reduce number of animals

Fewer customers in the heat
- *U-pick, markets*

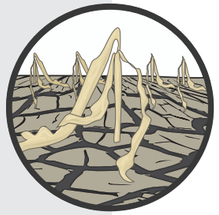
Loss of production

Lack of seed

Low grass growth

Markets flooded with animals needing to be slaughtered to reduce herds

Competing pricing, some are undercutting others



DETERIORATED SOIL HEALTH

Hard, baked soil
- *Soil repelling water*
- *Water sheafing off the soil*

Reduction of land elevations due to lack of water in the ground

Salt accumulation in greenhouse

Extreme rain in winter season affecting soil

Changing carbon sequestration capacity on farm
- *"Peat bog on land is drying up, now emitting carbon dioxide rather than sinking it"*

MENTAL HEALTH IMPACTS

Stress from increasingly severe drought conditions and extreme heat
- *Increased stress and uncertainty about our water supply*
- *Increased fire risk, fields are close to forests*
- *Stress from water inspections*
- *Stress from reductions in viable forage and for livestock*
- *"Anything out of the normal costs time and money"*

Snow loads on farms
- *Stress from snow load on old farm buildings*

"Cranky staff"

APPENDIX: DOTMOCRACY RESULTS

Priorities for Building Drought Resilience on Farms & Across the Watershed

More Votes — Fewer Votes

POLICY & GOVERNANCE

Support for farmers adopting drought adaptation strategies

Financial support for on farm water storage

- *More funding and support needed for on farm water storage and personal water retention ponds.*
- *Financial complications for leaseholders investing in water storage and expansion*

Financial support for regenerative/ agroecological practices to retain soil moisture

- *Access to high quality local compost and mulch*
- *Funding to support planting native species to develop areas for increased water storage, water retention, and biodiversity*
- *Support regenerative farming, money for fencing and rotating crops*
- *Increase cover cropping, reduce tarping e.g. Oats and clover on wetlands; rye and fava in fields*
- *Farmers know what we need but can't afford it*
- *Small farms need to be supported by MOA to be climate resilient*
- *Free access to landfill organics from Comox Valley Regional District*
- *Ability to share resources e.g. local manure*

Support for accessing existing funding

- *Benefits consultants more than farmers*
- *Access to funding restricted by bureaucracy*
- *Support for farmers with applications and grant writing to access funds*
- *More access to the Environmental Farm Plan*

Financial support for accessing other infrastructure

- *Tile drainage to promote deeper rooting*
- *Greenhouse water catchment*
- *Soil moisture sensors*
- *Water cisterns*
- *Shade cloth, cover, Remay*

Support to mitigate increased fire risk

- *Fire mitigation infrastructure requires water*
- *Rooftop sprinklers are well fed*

General funding and financial support for farmers

- *Funding for farmers to stay on farms for food security*
- *Support farming as a long term career*

Financial support for improved/efficient irrigation infrastructure

- *Support for implementing efficient irrigation e.g. drip irrigation*
- *Funding for irrigation that won't clog*

Financial support for water payments

- *Reduce water delivery charges*

POLICY & GOVERNANCE

Improve equity and communications surrounding water licensing, regulations and restrictions

Improve communications surrounding water licensing, regulations and restrictions

- *Communications surrounding water restrictions and management was poor and confusing*
- *Influence and impact of well water on Tsolum River unclear*
- *"Ground water licensing process is lengthy and lacks transparency."*
- *More information needed on water storage regulation*
- *Provide bulletins in plain language*
- *Need to repair relationships with government and farmers*
- *Don't want to talk to government, fear what you say may be used against you e.g. taxation*

Develop effective communication between the various government ministries

Improve equity around water licensing, regulations and restrictions

- *Need to prioritize food production in water rights*
- *Need to differentiate between rain fed and spring fed water storage*
- *Concerns over amount of regulations farmers have to navigate*
- *Establish baseline of water practices and expectations for all folks who claim farm status*
- *Farm uses require licenses, but not domestic uses*

More Votes — Fewer Votes

WATERSHED WIDE POLICY AND ENVIRONMENTAL PROTECTION

Address forestry practices that alter hydrologic cycle and exacerbate drought conditions e.g. clear-cutting
- *"Government intervention in forestry, no clear cutting near water courses and control levels"*
- *"Vastly reduce clear cutting in headwaters"*
- *"Reduce clear cutting of the majority of the watershed in private industrial forest ownership"*

Find additional sources of irrigation water
- *Retention ponds for in highway runoff*
- *Develop large scale water storage in the headwaters that can be provided to farmers downstream*
- *Use grey water for irrigation*
- *Collaborative effort to increase pond development in region*

Address economic incentives for extractive behaviour and ensure basic income for all

ALR, land use and housing
- *Address housing for farm succession*
- *Regulations need to be more case specific*
- *More farming and stewardship is possible, but more hands required to do the increased work of drought, flooding and climate mitigation*
- *Change policies to allow for more farm sales*

Other watershed stewardship practices
- *Increase tree canopy*
- *Riparian restoration*

Improve watershed governance and watershed-wide regulations
- *Watershed table with farmers, MOA, KFN, streamkeepers*
- *Progressive water pricing with increasing water restriction stages*
- *Revise Water Sustainability Act*
- *Stop extractive industry with limited socio-economic benefit e.g. water bottling facilities*
- *CVRD planning with water demand in mind*
- *Manage all water use, not just farmers e.g. residential*
- *Not just droughts: must be resilient to floods, extreme weather events, wind, snow, heat etc.*

Improve data for informed decision making

RESEARCH AND EXTENSION

Drought-resistant crop and variety trials
- *Find perennials and food crops that are more drought resistant and heat tolerant*

Learning from regions with more drought experience
- *Learn from practices in California, Oregon, Australia, where drought is more common*

Water reclamation and storage workshops
- *Easy options (e.g. wash station)*
- *Cisterns for wash station, show us how*

Workshops on regulations
- *E.g. interpretations of regulations, Farm Status*

Workshops on shade options
- *Techniques, strategies, non-plastic options preferred*

Farmer-to-farmer training networks
- *Necessary to adapt to changing climate*
- *Support farmer-to-farmer idea sharing and learning*

Workshops on sourcing compost ingredients

Access to consulting services to design climate friendly farms using whole-farm approaches
- *Advise on crop selection, carrying capacity, restoration, use of perennials*

PUBLIC ACTION AND SUPPORT

Build respect and support for small/ medium farmers and our value in the food chain
- *Support for institutional procurement of local food*
- *Educate restaurants/institutions on seasonal buying and 'real local'*
- *Prioritize local food and recognize the co-benefits of purchasing locally*

Education
- *Increase knowledge and skills for seasonal cooking habits to facilitate more local diets*
- *Change consumer perceptions of produce standards e.g. imperfect produce, dirt on freshly harvested vegetables etc.*
- *Food literacy in schools*