

WSARE PaNDAS

*Summary of interviews with
Co-PI Producers of the project
currently hosting trials on their operations*



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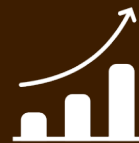
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RESEARCH CONTEXT

A semi-structured interview guide was designed with open-ended questions around: **each operation context, producers' previous experiences with cover crops, expectations on the WSARE research project, cover crops benefits and concerns, and ideas for scaling up cover crop adoption in the inland Pacific Northwest.**

The 8 in-person interviews were performed between December 2022 and January 2023. Each interview lasted approximately 1 hour, totaling 8h40 of content recorded.

All participants were assigned an identification number to ensure anonymity and confidentiality within the data summary.

In this document we present a summary of topics that emerged during the transcribed interviews. Data are presented and illustrated with quotations.

This project was reviewed and approved by the **Institutional Review Board (IRB)** at the University of Idaho, Protocol: 22-136, Reference: 018545.

J.D.Wulfhorst was assigned as the Principal Investigator (PI) and Fernanda Gomes Moojen as the co-PI.

Producer co-PI locations in Inland Pacific Northwest



Profile of interviewees:

- **8 farmers managing 25,700 acres (average 3,200 acres / farm)**
- **7/8 are 100% no-till for ~27 years**
- **All had previous experiences trying cover-crops**
- **Average rainfall varied from 10-22 inches a year**

Representative Crop-rotations



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring barley/canola	Aug- Harvest of spring barley/canola	
Year 4		Pulse crop	Pulse crop	Sep-Seed winter wheat



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring wheat	Aug- Harvest of spring wheat	
Year 4		Chemfallow (May-cover-crop)	Chemfallow (cover-crop)	Sep-Seed winter wheat
Year 5		Canola	Canola	



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring wheat	Aug- Harvest of spring wheat	
Year 4		Chemfallow (May-cover-crop)	Chemfallow (cover-crop)	Sep-Seed winter wheat



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring wheat	Aug- Harvest of spring wheat	
Year 4		Legume/ clover+ alfalfa (grazed)	Legume/ clover+ alfalfa (grazed)	Sep-Seed winter wheat



Winter Spring Summer Fall

Year 1	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		Spring barley	Spring barley	
Year 4		Canola/garbanzo /lentils	Canola/garbanzo /lentils	Sep-Seed winter wheat
Year 5	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 6		Spring wheat	Spring wheat	
Year 7		Legume	Legume	



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring wheat	Aug- Harvest of spring wheat	
Year 4		Chemfallow /canola barley (May-cover-crop)	Chemfallow /canola barley (cover-crop)	Sep-Seed winter wheat



Winter Spring Summer Fall

Year 1				Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	
Year 3		April-Seed spring cereal	Aug- Harvest of spring cereal	
Year 4		Chemfallow (May-cover-crop)	Chemfallow (cover-crop)	Sep-Seed winter wheat



Winter Spring Summer Fall

Year 1		Legume or Brassica	Legume or Brassica	Sep-Seed winter wheat
Year 2	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	Cover crop
Year 3	Cover crop	April-Seed spring wheat	Aug- Harvest of spring wheat	Cover crop
Year 4	Cover crop	Legume or Brassica	Legume or Brassica	Sep-Seed winter wheat
Year 5	Dormancy of winter wheat	Grow of winter wheat	Aug- Harvest of winter wheat	

Year 4 17/April/2023, final summary



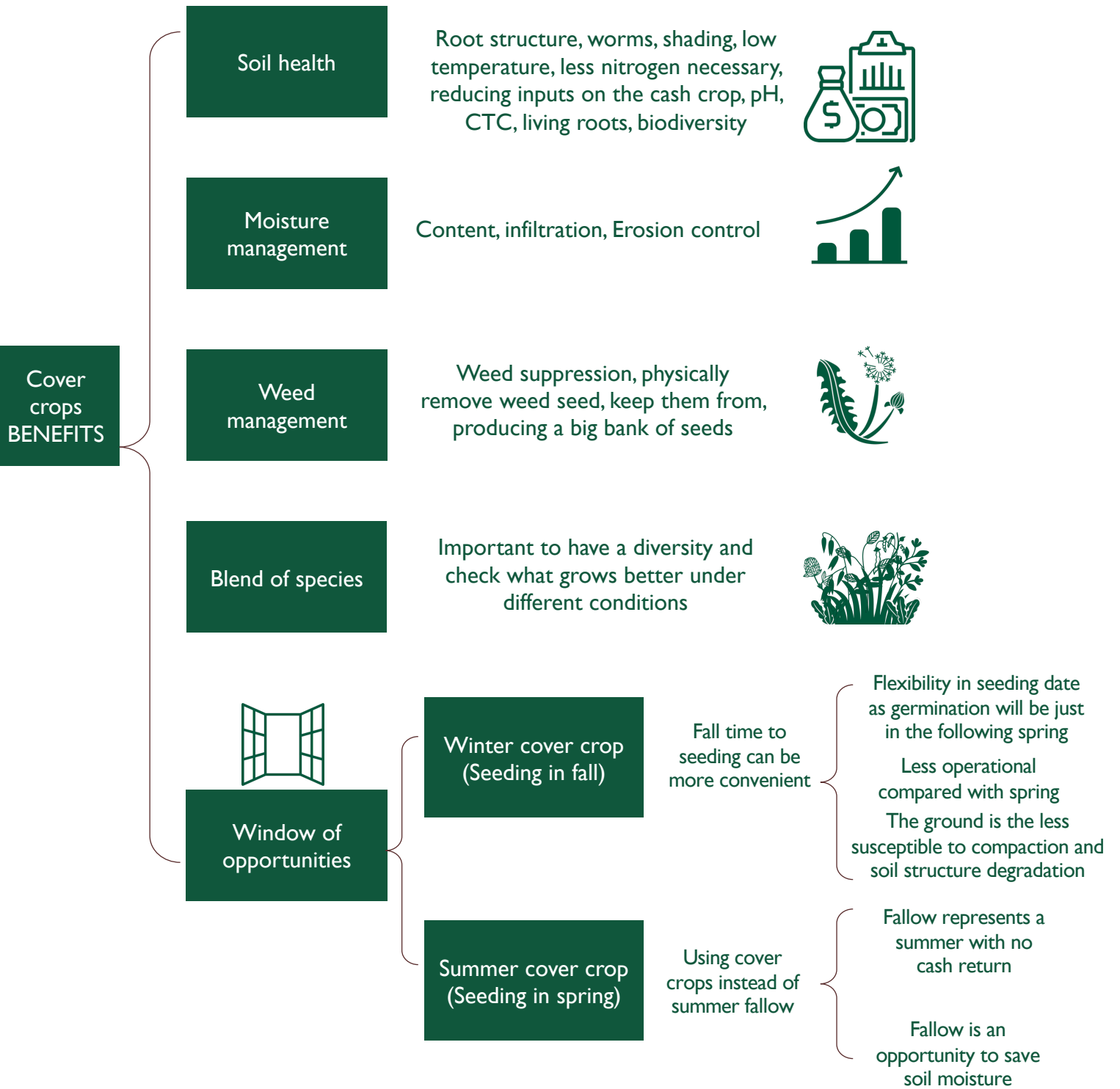
FOR INITIAL REFLECTION...

During the interviews, one producer’s historical references provide an important backdrop and context for the ongoing story that illustrates evolution and inertia of changing practices:

“...We had 70 horses and a tractor at that time (~100 yrs. ago); after a winter sitting in the barn, the horses needed some exercise because before they actually had condition they couldn't pull the cultivator. So that was the reason for harrow....But my Dad was doing this harrowing in the 1970s! He hadn't had horses since the late '30s so it's traditional stuff at work and you look around all of this. That's what I see a lot of – (farmers still harrowing.”

It important to know the “why” of each practice to assess keeping them or not, and instead of letting social inertia “decide”.

PERCEIVED BENEFITS OF COVER CROPS





COVER CROP BENEFITS

“...A main benefit will be use for, you know, soil health, building and weed suppression. Here, perhaps moisture capture in other places. You know the thought being that it's kind of a fallow rotation. You know shading the ground is a good thing. Baking bare dirt to me is kind of the least beneficial way to have your ground....I also kind of plan to have either cover crops or hay as part of the rotation, you know, kind of as a **way to deal with weeds**, just to physically remove weed seed, keep them from, you know, completely producing a big bank of seeds that I can't get rid of.”

COVER CROP TO REPLACE FALLOW WITH GROUND COVER

“My expectations are really: How is it going to affect our operation? I totally believe in the concept that we need to keep our soils covered. The benefit is you know, having **live roots** in the soil, but my experience so far has been like just **keeping the soil covered is a huge benefit**.....everything that was fallow I'd probably shoot for (a cover crop)”

“**The reason for fallow was to get moisture...That's why it's so important to have the ground covered.** Because if you just have, like following this **canola** crop, we'll put winter wheat in here next year just because there won't be **any residue**, I mean all that growth that the canola has. It dries up and disappears quickly.”

COVER CROPS CAN HELP IN WEED MANAGEMENT

“...for whatever reason, (to control) ryegrass, **our best tool, has been alfalfa because it gets this tall and you cut it off and bail it up and the cows like it, and the next year it gets this tall.** We took the field out of Alfalfa four years ago for seven or eight years and we have not put a grass herbicide on that field. That's been clean. We have very little fertilizer. It is possible (to control ryegrass).”

LOOKING FOR POTENTIAL BENEFITS:

“...**suppressing your weed pressure** and you're **conserving moisture and your soil microbes are expanding instead of decreasing**...”

“So, **if you could skip two or three sprays, that's helping cover that cost of that seed.** So that is, that would be another benefit. You'd use less herbicides, I guess.”

BENEFITS EXPECTED

“**Definitely weed suppression.** I mean not all of the weeds.”

“We should be **improving our biological and general soil health** above what? No tilling. That was really kind of the purpose of this. **We got crop diversity**, but like we've kind of mentioned, we're **we're moving back, we're narrowing up.**”



PREVIOUS EXPERIENCE: EROSION CONTROL

“In 2017, I did seed with our cover crop that we had that year. I could. I was in the field when we had a flush in the spring, what they call it anyhow. It warms up anyhow and everything was moving on the fields around. I mean erosion was happening. **Stuff was coming off the field except that area had radishes.** We had a good cover; nothing was moving on. It all stayed and said that is **100% no erosion** and that we can do that now. But it's going to take something like radishes that dies, grows big, dies at a hint of frost, deteriorate really fast, leaves a hole in the ground through the frost layer that when snow melts, however fast it will go in, go down instead of flashing off.”

“So, two years cover crops, 25 years of CRP probably had to have something to do with that. And.... we're not ripping up stuff”

PREVIOUS EXPERIENCE: POSITIVE RESULTS IF WHEAT SEEDING IS NOT DELAYED

“...the cover crop I seeded into this fall, actually **looks pretty good**, but I was late seeding the chem-fallow crop, so they pretty much came together in the past. When I've seeded early, you have to wait for rain in the cover and at least around here it's been my experience that you can take **10 bushels off if you don't get the wheat up first half of September.**”

“I will say that where we had cover crop two years in a row or two times, two times this last year it was in winter wheat, and **that was significantly better in that field than where I did not have cover crop in that field, like 30 bushels at the top of a hill.**”

“**I think it was increased organic matter.** It's the only thing I can think of, but I mean they were literally right next to each other. This one and 95, and this one started at a field average of 95 and it climbed as a field average all the way to the top of the hill. Top of the hill was 100 and 120.”

COVER CROP EXPERIENCE

“The point with the cover crop, I think, is with the **root structure, and it opens up the soil more** and you get more worms and beneficial things, and the water goes in better yet. And **we've had some tests** when I've done cover crops before that show that **very dramatically.**”

“In fact, the third-year I hayed it was great, big and lush, and so we just made hay out of it and didn't know. I thought well, we'll see if the steers will eat it and boy, they just licked it up. They thought it was great. **So that's for the guy that has cows. I think that's a viable option** now that takes all your above-ground cover away, obviously, but it made it easy to seed into, didn't have any trash to try to get through, and you still, with the turnips and the radish tubers, they were still huge in the ground and doing their thing. So yeah, it intrigued me.”

“I can't say that it helped, and I can't say that it hurt seemed to be....It'll be a lot more scientific than what I was doing. But like I say, it didn't hurt anything....”



GOOD EXPERIENCE IN WETLANDS

“...it’s landlord ground, you know, and I can’t afford to screw it up, you know, and then tell the landlord well, we would have made a 130 bushels on this, but I couldn’t get the wheat up. So, we didn’t make any. So, I wanted to do my best effort, even though I was doing this cover crop experiment and anyway we mowed it down.”

“...it did phenomenally. The only place the wheat did not do well is where it drowned.”

“...didn’t really tell me anything other than **when you have an unlimited supply of water you can grow wheat.**”

EROSION CONTROL

“Well, the benefits boil down to that **organic matter thing you know, and wind erosion, you just won’t have any of that when you have the ground covered.** Obviously **almost zero water erosion.** That’s the end game, for no till is zero water coming off the field. So those are the benefits and I’m trying to get to a point where I have better computers in my combine so that I can document: you know show the data on these hills...you know, data isn’t one year’s worth of stuff. **It takes a decade showing, you know, change, growth.** So, it just takes so long and by then you’ve changed combines and you didn’t buy same yield monitor, you know. **So really all you can do is see it from the seat you know, and then tell people: I’ve seen it from the seat -- it works.**”

COVER CROP: PROMISING TESTING RESULTS

“...we kind of have budgeted into our farm now to lose a 100 acres year production, to try things.”

“I think the success behind clovers, alfalfas and those which I don’t know necessarily if count as cover crop, but the success behind them has been really well, especially with winter wheat crops and following those, you know, four or five years of alfalfa. **I mean, we’ve seen with clover up to 25 to 30 bushels jump, with 70% of nitrogen, I mean the field was right next to each other, you know, go across the ditch into the old clover field. It was like 25 bushel jump with less fertilizer.**”

LIVING ROOTS FOR “FEEDING” THE SOIL

“You know when you listen to those discussions, like at the Direct Seed <meeting>, it just absolutely makes sense. In fact, one guy up there said: you feed your livestock, don’t you? He said god, yes, every day in the wintertime! Well, feed your livestock ‘*underground*’ too. **They’ve got to have something to eat. That makes sense, you know, if there’s nothing for them to eat, it’s got to be a living root.**”



NO CONCERNS WITH SOIL WATER DEFICIT IN REGENERATIVE APPROACH

“...even in our xx-inch rainfall areas we have enough; our moisture comes at the timing of when crops are growing. So no, we don't have that reduction and our ground is so open, with all of the root structure that we're not disturbing. **We have full, full penetration of the water.**”

“I think it's....I'm going to say this goes into more the regenerative ag component, where we are looking at it, on a holistic component, with the no-till absolutely zero types of tillage or residue management. So, leaving that ground completely alone and then, if we put a cover crop in there, have that help establish to get rid of those compaction layers. As long as we have all that opened up and the worm casts recharges, it just recharges.”

WEED CONTROL

“...we've got such a weed bank. **My hope is with these cover crops, which is exciting to me, is the trigger component of putting it in in the fall...**We're having weeds that typically only germinate in the spring, germinating in the fall. So, we're getting a winter kill on them or, if they do overwinter, to get chemistry one before we actually plant cash crop. But we've got to build that. We've got to take that out of our weed bank. I mean our weed bank is just full. I would love to know how many years of weed bank we have. So no, I can't say we've eliminated or reducing it yet, but I think it's coming.”

SOIL HEALTH

“...hoping that we're going to start seeing sort of benchmarks, and data on our soil testing, maybe not so much of the nutrient cycling, but our organic matter also see it build.”

“Our pH, our lowest one was 5.3. We have been rebounding back up to 5.7 to some 6.2...So, this is part of the component of cover cropping and reducing the synthetic components and cover crop. So, it has been over 4-5 years.”

“The exchange capacity -- that's changing for us and I think that's a component of leaving room, leaving those living roots in there as much as possible to keep that biodiversity...”

“**My biggest encouragement, and I'm hoping that we're going to see the soil health rebound from,** is I think our benchmarks of pH we need to track. We need to get some of this bad -- I'm going to call it the biodome -- out of our systems. So, you got your biology that lives in the ground. A lot of the chemistries that we use have promoted the bad biology to exist and their good biology that always fend it off. It doesn't need to work anymore. I don't know if it's even there anymore or if it is. It's very limited. **So, I'm hoping these cover crops are going to create an environment that we can actually create equilibrium.** We need to get our fungi bacteria ratios back up and that's going to be through living roots and the function of cropping systems -- cover cropping systems within our our cash crop. We just don't have a lot of options from cash crops if its wheat and garbanzo beans and everything else is just kind of rotational. We need to be able to work within that system for the economic viability of our farm on top of it. So, we can, if I could, encourage anybody to say that you're going to make your soils better, more resilient and you're going to see the return from less synthetics. Healthier crops manage just on the management side, not even talking to him about the health food component that you pull off of it, but just the management side of a healthier crop.”



MULTIPLE TESTS

“I've done spring ones too. I've done so many. I mean, I don't know how far you want, how many different cover cropping scenarios you want to look at. So, I've done interseeding in spring wheat and I've done interseeding and garbanzo beans and peas.”

“I came up with **26 different cover crop scenarios** of what I thought would work in the Palouse and what were working in other parts of the country. And then they came in and they plotted them, and plot seeded each one so that we could get replication randomized, 3 reps and then we tracked it. We tracked those and were fortunate to work with NRCS as they came down and did bio-readings. They also came, University of Idaho came down and did arthropod and entomology insect counts just to see if it was going to be detrimental to that and then we traced it all the way to termination. Termination was mowing. My hope was that the mowing wasn't going to actually terminate it, it was just going to put it into a vegetative growth. But we tracked all 26 of those different replicated sites and then the following year we reseeded it with our cash crop and PNW came back in with their combine to see if they could see any economic values to each one of the different crops within the cover crops strips and so we extracted quite a bit of information from that too. We are also looking at weed control and that was pretty crazy: what we saw, unbelievably hands down, under the neatest tests I've ever seen on weed control.”

“So those were some really neat trials that we are able to extract that information. The problem with that is that the density of the seeding rate is not economically feasible -- 50 to \$70 an acre.”

TESTING REGENERATIVE APPROACH

“I'm also working on a study on my own that **we are eliminating a cash crop and putting a cover crop in for one full-year and then trying to build soil health and nitrogen and then reduce the input components on the cash crop.**”

“<Name reference>.... He's a no-till organic farmer that developed this system. So, he says over the five-year period one of those years will be a cover crop where you have no cash crop revenue. But with all the input reductions for the next five years you make the same amount of money. So, I want to follow his system through a five-year period; that's on small acres, it's on 16 acres.”

TESTING COVER CROP AT LARGE SCALE

“It's not 100% of our, our farm **but large acreage, and every year** that we're doing that on our premises; we try to keep a living root and try to get some trigger components to some of the weeds.”

“...we're having limited success with it, it kind of depends on the fall for growing conditions.”

“I jumped in with both feet, but also there were programs for it. So, I mean the cost was offset by NRCS programs where there was an EQIP or CSP component. So, our take on our farm is: if we're going to get that money, we need to do large scale. Try. It wasn't going to hurt us economically. So, I guess my question is: **why are people so apprehensive too when there are programs to try it right?** So, we use the money to try it? And yeah, so that's large-scale stuff.”



NO-TILL IS NOT ENOUGH FOR SOIL HEALTH

“I don't think we're regenerating as much as no-till that we have done throughout, you know the last, I've never pulled a plow in my life....but I still don't think our cropping systems is regenerating the soil yet. I just think we're touching it too much and we're putting too much stuff on it.”

FALL SEEDING AND PERENNIAL IMPORTANCE FOR SOIL HEALTH

I'm trying to find more perennial crops to raise so that were on-the-ground less and less all the time, because two-thirds of our cropping system is put in the spring of the year and it's typically too wet. And that's when the ground is the most vulnerable to compaction and soil structure degradation, in my opinion. So, we're trying to do everything we can to stay off the the ground in the spring. **So, we're adding hay and clovers and perennials....**more and more winter peas all the time, because the more we can seed in the fall, we feel better for the ground in the long run.”

WINTER CROVER CROP X SPRING COVER CROP

“We don't rely on summer rains, we really rely on winter moisture, and so these two cover crops I've talked about, that I've done, have both been seeded in the fall and which is why I'm kind of curious as to how this particular experiment, with Uldaho is going to work using just spring cover crops.”

“...if there was a value in doing a winter cover crop that you could then seed into in the spring. Otherwise, I'd kind of see it as a year of summer fallow, and so you know, fallow years. Here is a year that you don't take income off that ground. So, it's not ideal.”

“So that's kind of one of the reasons why I'm also interested in **a fall seed cover crop because in the fall I'm going to basically only be seeding winter wheat, which is kind of time-critical** unless I'm seeding winter pea, which I sometimes do. I did this year, and there it just seems like most falls, you have more time. Spring is really compressed time, you know, and it's more time-sensitive if it's dry in the fall. If you seed it on **September 25th or on October 15th and it's dry, your seeding date is essentially the same because everything's going to germinate when that first rain comes in the spring.**”

COVER CROP DEFINITION

“And finding a mix that actually fits the term cover crop. I don't know what the definition inside of this research project is, but that **fall rape seed we planted is the best cover crop I've ever seen on this farm. The foliage that's out there, the things that are going to go back into the soil, are far and, above all, the different things I have seen grown in those mixes, but I don't know if it counts in the term cover crop.**”

COVER CROP CONCERNS



It is a long-term decision



Short-term economics?

Species in the mix



Not add species that could be potentially weeds

Landlords need to be aware



Wildlife



Impact on soil compaction
Fences would solve as they can jump

Cover crops CONCERNS

Terminate

Not extract soil moisture (leave a bank soil moisture)

Rely + winter moisture (from snow) than summer rainfall

Not have seeds of cover crops on the ground

Terminate without affecting next crop yield

If is a legume, terminate before reproductive stage for letting more N on the soil



how

Herbicide

Roll crimp (organic)

mechanical

Mow
Grazing

challenges

regrown

Cover crop species should be easy to kill





CHALLENGE: ECONOMICS IN THE SHORT-TERM

“I think it's not economically feasible yet. I mean, I think the theory and the idea behind it has merit. I mean the science is there and everything else. But in a xx-inch rainfall, you know....you realize, most of these farmers still have to make money. He's still got to put groceries on the table and make their combined payment and everything else, and they're just not willing to give up any of that potential revenue by doing something that **they may not see a benefit of for four to 10 years, they're kind of farming in the short-term going.** You know well I don't care about that. This year I got a \$50,000 combine payment I've got to make, so I got to grow maximum wheat and with that comes maximum erosion now doesn't it.”

“There's going to be a lot of money available for, you know, projects like this. So, **to what extent do you fund somebody that wants to do more cover crops?** So, you know the question is: if we pay for the seed, will you, do it? It's like no, what if we paid for the seed and another 100 bucks an acre? Would you, do it? Maybe. We paid for the seed 100 bucks an acre plus put some fertilizer down. Would you, do it? Maybe, you know.”

SHORT-TERM ECONOMICS CONCERN

“...(my main concern) is the short-term economics **of leaving enough ground that really fix something...there is short-term sacrifice for long-term gains. Long term means different things to different people.**”

“...you can be the best soil health farmer in the county and if you go broke, you didn't succeed. Yeah, so **it's playing that game between doing the best you can and still handbills.**”

CONCERNS: HOW TO KEEP WHEAT YIELD WITHOUT CHEM-FALLOW

“...but we've been doing chem-fallow; kind of hard to get away from the chem-fallow and maintain any kind of winter wheat yield most years.”

CONCERNS: LESS PRODUCTION IN THE FIRST YEARS AND TIMING OF CASH CROP SEEDING

“There's the cost of the seed, but there's also the cost that you get in less yields the following year, which pretty much doubles the cost of the seed.”

“...almost guaranteed that the following year, behind a cover crop, is not going to yield as well, **but three years down the road will probably do better.**”

“The fly in the ointment is, if you happen to have early rains in September, and then it doesn't, what it really amounts to is your yield loss following a cover crop is whether or not you **get the crop up early.** If you get the crop up early, then there's no loss. If it has to wait till mid October or November before it comes up, then it'll be the same as if you see it in November and you just lose those growing days.”



CONCERN: YEAR OF NO-CASH IN THE PALOUSE CONTEXT

“You know the big dilemma in the Palouse is is, **cover crops are big in the Midwest, but they don't lose a crop to grow**, also they integrated it into their system. So, they still get a cash crop then in their corn. They plan to cover crop and it grows and they take it out the next year and the plant soybeans; we don't have the heat units of the moisture here to do that. So, it always comes back around to losing a year of production. And when you start from scratch, you're paying rent on all these acres and so you pay the rent, and you get no income. And and so our big challenge has been to **figure out how to how to compensate for that**. We're looking for ways to to grow these green manures and not lose that year of production.”

IMPORTANCE OF THE CONTEX

“I mean I've been very fortunate to work with some very big players within the cover crop industry. They've been down to our farm. **They've given us advice, what to do, but again they're out of the Midwest or somebody that's in the northeast and they'll tell me what works on their farm and then we try to bring it back and it doesn't work.**”

IMPORTANCE OF LOCAL DATA AND KNOWLEDGE ON COVER CROP

“...the guys who speak at the conference, they're **coming from the Midwest, and they get inches of rain in July and we just don't get that.**”

COVER CROP CONCEPT: WHY NOT ENCOURAGE ALTERNATIVE CASH CROPS?

“It's like garbanzo beans or peas, or all of this should qualify as a cover crop. But **because it's not three to four cultivars, you know different seed types and because you've generated income off of it, it doesn't qualify**. There's not very many people that'll do peas, garbanzos, canola, lentils. You know those are the pulse crops -- and canola's not pulse, so I understand that -- that people would normally rotate in on their fallow ground. You know and they'll take the hit. Yield wise, because you will take a yield hit on it. You know if you've peeled all your moisture out of there with canola and then you seed that right back to winter wheat, the chance of getting it up in the fall is slim because all your moisture's gone. But I'll take the 30% yield hit if I get to sell 2000 pounds per acre of canola at 30 cents. **That's 600 bucks I just made in my fallow ground.**”

“I use roundup ready canola. So, I have an opportunity to use round-up in crop....and, then of course canola is such a competitor. You know once it gets bolted, not even a Russian thistle will come through that, and for my area that's a bonus.”



MAIN CONCERN: SAVE MOISTURE

“My main concern is just water, soil, moisture. If if we take all the moisture that we're **trying to save from the wintertime** and we used it all up come September when we plant, it's kind of discouraging.”

CONCERN WITH COVER CROPS: MOISTURE FOR WINTER WHEAT

“...around here, **moisture is key**, and we're trying to find out, and everybody asks me, and I don't know. That's why I decided to participate. The reason you summer fallow -- that's what we call that, summer fallow. **The reason you do that is to store up moisture. So, you have a good soil profile full of water for your winter wheat.** That's the whole purpose. And so, what? What is counterintuitive to everybody, including myself, is: So why in the world would you plant a cover crop in that fallow ground to suck moisture out of it when the goal of having summer fallow is to gain moisture?”

CONCERN: TOP MOISTURE

“**Most of the research out there is pretty consistent and indicated: cover crops don't take really any more moisture to grow than we lose in a fallow year just off the ground, but it's that surface moisture to get your crop started. That is the critical part.**....The only moisture that counts is what's within two inches of the surface.”

CONCERNS: PREVIOUS BAD EXPERIENCE

“What discouraged me from when we did it with the <Name reference> before was the amount of water. I mean **the cover crop took all the water for the next couple of years** and you know a lot of the reading I have done is that a lot of this **cover crop stuff is pretty much water neutral, and so that's what I'm really kind of looking forward to see: just how it impacts the following crop.**”

CONCERN: TRITICALE IN COVER CROP MIX

"I'm like not a real fan of having triticale in it because **it may not be rye, but it looks like** and it will come back...it's triticale. Well, **nothing you can do to kill that within a wheat crop**, it's just going to be there and then you're just going to spread more of it."



"So, I don't think it's going to be that big of a concern. It's just the aesthetics of it. I mean those of us that do this thing, the neighbors drive by and say: what in the hell is that nut wagon doing now, you know."

CONCERN: COVER CROPS TURNING INTO WEEDS

"...it can be kind of a weed." **"These things we're growing. You'll see them for years** and it's like what the hell is that? Oh, I did cover crop four years ago, so that's some of my tillage radish still coming through"

CONCERNS: TRITICALE IN THE MIX COMPOSITION

"...here's a lot of the stuff that we think we should *not* have in there: **no cool season should be put in where we have cool season cash crops.**"

"Not too excited about triticale....Triticale, as far as I can see oats is a bad one."

"I think the researchers are off on this,

and I wasn't involved in putting this together. I tried and tried to ignore the thing for a long time."

"Sweet clover could be an issue, sweet clover, if it has moisture, it will go 12 feet. There will be nothing else growing. The first year the sweet clover won't do you a lot. The second year is what you get."

CONCERN WITH INTRODUCING NEW PLANTS

"My biggest concern is that we are going to create or bring a pest in; when I say a pest, it could be either a plant or an 'evil or something that we can't control because we are creating conditions here that we just don't understand and what are the control functions going to be of that? So those are my two big concerns: weeds that I'm bringing in, something that's just going to be a weed that we can't manage in our cash crop over a potential pest."

COVER CROP EXPERIENCE: THE CHALLENGE OF FINDING A GOOD MIX

"...we've tried the clovers where there's substantially more money in the crop. **If you can lose a year of production but then get double the income on this next crop**, then it helps cover that. But there's where we have a boom pile full of failures stuff."

"I mean I did **Sudan Grass a couple of years ago and it froze out in August**. In August, froze out, died. I mean it just knocked it flat and that's it's just cold out here.....So, we just struggle. **We're trying to find blends of crops or a crop that does the same thing as a cover crop. That's where they're grazing the clovers.....things we can grow.**"



SELLING THE IDEA TO LANDLORDS

“Even our rent, a lot of our rents, were based off production, so we left ground, also lay idle this year and then tried for winter rape, which really looked... It was huge, the fall, big leaves, really beautiful. But we went to the landlord and said: look **we'll pay on a basic year this year, but then next year we'll have to talk if it's double income for the rape field. We don't want to pay up on that too, you know. So, we've got to make sure they understand what we're trying to do that's the most difficult part. As you are not only just trying to do something, but you also have to sell it to landlord.**”

CONCERNS: LANDLORDS

“Well, there's there's a couple of reasons for that, dad. One of them is that. We own nearly everything that we farm. I don't have to deal with landlords and most don't have any interest in improving the ground or anything. All they want is the cash; and, anything that increases the costs, is a negative, I mean anything. In 50% of the county, it is absent landlords, I guess you say most of them, not if its most are in a care center. Probably at least two generations removed from anybody, actually, whilst farming and trying to convince them to do something that might cost them money, but to improve the ground is pretty hard. And there are those that really want to. **I mean the environmental community has affected some of these people and they want their, they want their ground on systemic, sustainable.**”

LANDLORDS

“...we really need to see a return on investment. I mean I've got landlords that get really excited about this...they're very aware and they want to see the reduction in pesticide of which I'm a big advocate <of that reduction>. We need to start reducing these synthetic chemistries that we're putting out there.”

“...it's all about how you drive that conversation and have that conversation with the landlord, because all of mine have been extremely receptive to it as long as they're made whole. That's the biggest detriment that I see: the landlord might be negative if you start talking about how eliminate a cash crop. Their income is tied to that acre so that's probably the biggest hurt. It's not a negative hurdle in my mind. It's just a hurdle of how we're going to get around it economically.”

“...if you could present it in a way that the landlord making money while the producer is still making money, I think it's it's an easy sale, at least for my landlords.”



TERMINATION OPTIONS

“We have a mower, we can mow it. You know we have talked about there’s the option of cattle. I do have a neighbor that would be willing to to pasture if I build the fence and his cattle are used to electric fence probably bow down here. The one you passed probably would do it too. So that is an option. **It just depends on how much work I want to do.**”

TERMINATING COVER CROPS

“That's the other thing that goes into it when it's time to terminate. That's another factor. How?

How hard is it to terminate? We need to find something that will that's **easy to kill.**”

“...when you go to terminate and it's a real expensive operation, well then, you've got to add it up. Yeah, maybe you didn't have to spray it once when you sprayed everything else, but if it cost you twice as much to kill it, well then you may as well have sprayed it, because if you see what I mean dollars, you've got to add that end of the into the equation and **we don't want to be planting anything that if it does go to seed**, that's going to be bad. So that's the one mix that we're going to seed got triticale in it, which I'm okay with, as long as we don't let it get going.”

TERMINATING WITH A ROLLER CRIMPER X MOWING

“I've got a roller crimper coming in...It's just one pass and they do it typically right before they seed, and so you'll see these great big <implements>, and they're doing it with cereal rye, and it is six feet tall and they're just laying these great big grasses down and then they got a drill that comes through and seed into it.....I mowed pretty short, probably around four inches, because I needed to kill, needed to stop the reproductive cycle.”

“...**especially on a legume, if you let it go through a reproductive cycle, it starts robbing all the nitrogen that it just put in the ground.** So, you just lost the benefit of the nitrogen fixation the mowing also mulches it so fine that it it breaks down too quick. So, you lose that layer which is your weed control. If you take four tons of biomass and lay it over and don't destroy its cellular <structure>, then it stays there, it physically stays there and then that controls your weed population.”

TERMINATION WITH DRILL

“We've terminated early, we've terminated when we've let it go to maturity. As far as I'm concerned, you don't mess with them, you just let them go to the maturity and we have the drill -- which most people don't -- that can go through it.”



CONCERN: MORE ADAPTATION WITH MANAGEMENT AND MORE QUESTIONS

TO BE ANSWERED

“**Much more intense management**.....same stuff we've been doing for years, but managing the cover crops so you can do what you want to do with, you know, cover crop. Theoretically we can take care of our weed issues so we can cut down, and that's the other object. **We cut down our input of herbicides, which are all poisons that are not good. But that takes some real management that you know we're only gaining on that.** We know sort of things. We don't know the sort of thing. Can we cut our fertilizer, synthetic fertilizers down? Those are shown to be negative if we can. If we can do that, get the soil to handle more of that. That's got to be helpful....and that's the other thing: can we cut our expenses down enough to make up for the crop yield that we will probably lose? I mean we've been promoting high yields. We've been dumping lots of nitrogen on and lots of other stuff on for many, many years and most of our breeding of our crops or cash crops have been bred to accept that kind of agriculture. Now, If we cut that off, what's that going to do? Go to rebreed stuff!.....we've got to get things more resilient and we know that our fallow that the blackfallow is horrible in everything and anything we can do is better, and we also are far enough in this game -- we know that you know the watchword now is trying to keep a living root in that ground as long as you can, preferably 12 months a year...maybe not practical.”

WILDLIFE CAN BE ATTRACTED BY COVER CROPS AND IMPACT ON SOIL COMPACTION

“You know, in the past the **elk will typically come in and graze everything.** I mean we have up to 400 head of elk here....They're not going to devastate the field but when you get you know 400 hooves times four.”

“They've come through a winter canola field and **looks like you just took a rototiller out** there and it's just so many hooves and then they bring in sea strip also. That's a story. It's a soilborne disease that's in the mountains and they can bring it in on their hooves. On most of the wheat that we plant, make sure it's all resistant to it, but it makes the wheat won't stool and the heads are just spindly and little. I mean it could easily cut your yield by two-thirds it's pretty devastating and it's typically only when it's in the mountains and so cattle coming off the hills or wildlife, they could bring it in.”

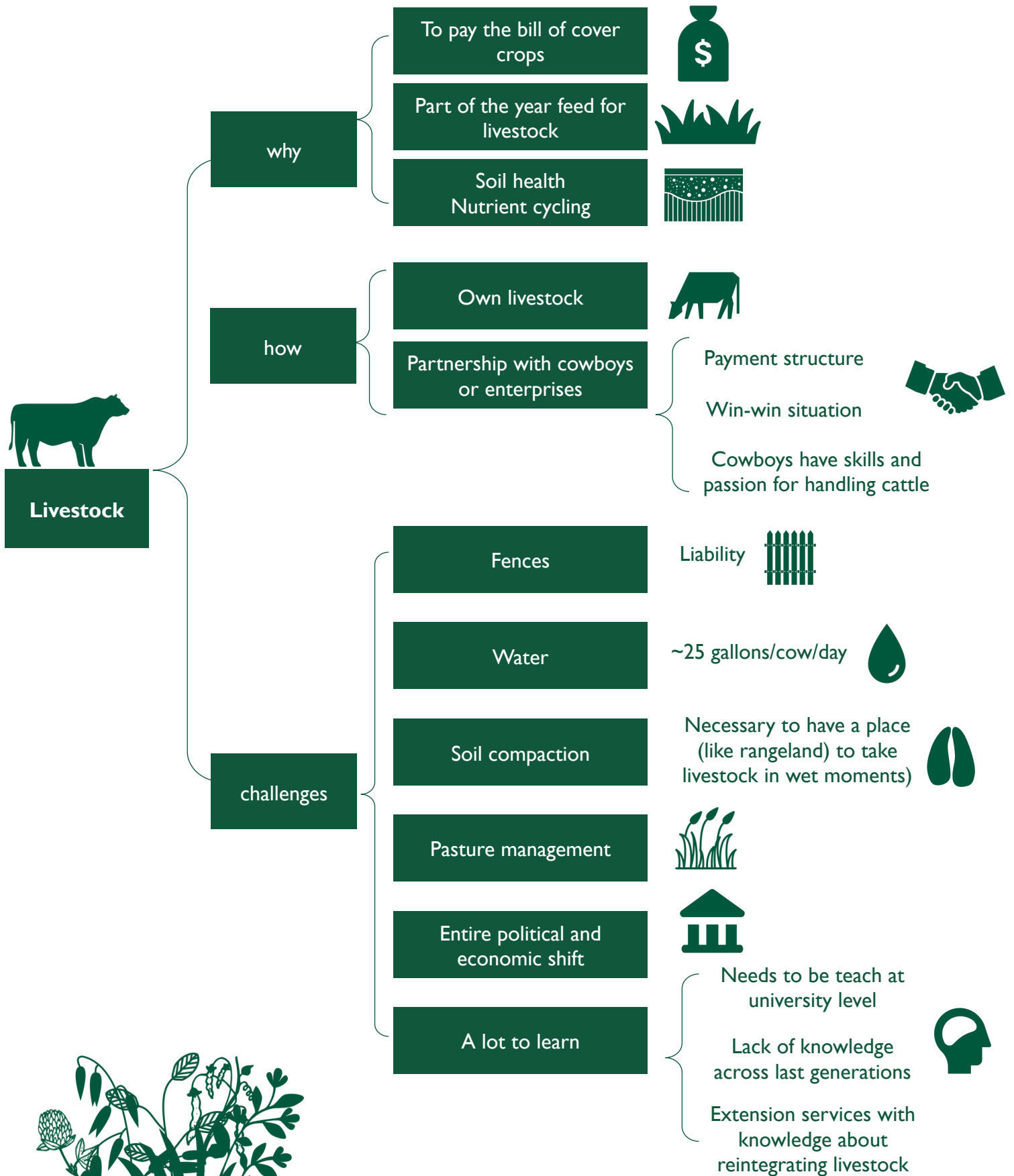
WILDLIFE X COVER CROP

“Our, our biggest enemy is the wildlife. We've got elk herds here.....that's why I quit growing Canola, because they come in and, oh boy they just...it's bad deal.....you want to talk about **soil compaction!!!**”

“It is going to happen to this and I'm sure they'll find it and **it's not as bad in the spring.** So, where it's a spring seeded crop it'll be less apt to get a big herd of elk. Probably you know 20 or 30 will find it.”

“...springtime snow melts, they usually go up into the mountains or down the canyons or somewhere, but we'll have some find it. I'm sure of that. But that's if you're going to do this on a large scale or you wouldn't be able to fence the whole field. And the kind of fence that keep out elk is about as tall as the ceiling. **They can jump a normal fence just like nothing.**”

Livestock on cover crops





INTEGRATING LIVESTOCK + COVER CROPS INTO THE CROPPING SYSTEM

“...it would have to be an entire shift in agriculture and foreign **policy to incentivize that, to teach about that at the university level, you know, have extension services, be knowledgeable about reintegrating livestock back onto the farm, you know.**”

“**I think there's a place for <cattle>**, and I think that losing animals from the farm for entirely, you know, cropping systems based on inputs that I have no control over the pricing of, have little control over the efficacy of, as it relates to resistant weeds.”

“I don't know those numbers well enough. I don't know what you know the gains target for cattle would be and what **the payment structure** for that would be, and how that would offset the cost of seed. And then the cost of, you know, not harvesting a crop in particular.”

“I think self-sustainability, self-reliance, you know, all those things could factor into having cover crops and **animal agriculture come back into fashion**. But that's all just. I guess I don't know. It may not be. It may not happen. I mean, looking in that direction **for the long term on this farm and cover crops could definitely be part of that.**”

LACK OF INFRASTRUCTURE FOR GRAZING AND LIVESTOCK MARKET

“When I was a kid up here, all these farmers all had a 100 head of cows or 50 head cows, and you know **all the fences have been torn out when the cattle market went in the early eighties**.

Yeah, so I'm not opposed to grazing: **I think there is benefit**. You know, I think what kind of happened around here was just the economics and the upkeep of fences and. I think that's why most of the neighbors got rid of all their cows, and you know now, since the infrastructure's all gone, it's more difficult.”

LIVESTOCK CHALLENGE

“I am not a cow person. Our dirt up here gets really muddy. I mean like sticky, bad muddy.”

“And oh man you talk about a mess, **so no cows, rule number one.**”

LIVESTOCK PARTNERSHIP

“...if you're born with cows and and have the passion for cows, you could do this. But for us who have the passion to grow crops, to try and run cows would be a failure a lot too. So, **we teamed up with a cattleman who's passionate about cows and we're passionate about growing stuff his cows can eat and it's working good.**”

“We don't get as much gain off of those acres as we would if we owned those cows, **but we don't know enough about cows to probably get the gain**. He knows how to manage his cows and we get the soil benefits.”

“...bringing the cows in and the water was a big issue with the cows. It's amazing how much we told the cattleman and we said: look, we've had a truck that holds 3000 gallons. So, if the water gets short, I'll just bring a truck. You said well, that'll last a day.....he said they'll drink 25 gallons a day per head.”



LIVESTOCK TO PAY THE BILLS

“I started with you know, essentially from zero my wife and I and we had to pay the bills. So, I'm like: Why would I raise cover crop spend all this money to get nothing in return other than the hope of a soil health benefit. So, I'm like I've got to put cows on it. I mean or hay it? We've done, from the beginning, **We've hayed covers and we've grazed covers because I have to have a return on investment.**”

“I do it just because of the logistical nightmare of grazing the cows, the haying portion. There again, the thing I don't like about haying a cover is we're removing all that biomass. Every year my balance sheet gets a little more positive, so I'm able to graze it because I don't need as much return on investment per acre and I can kind of spread that cost out over other acres. And so yes now **I think grazing the cover crops is the only thing that will help regenerate soil.** Haying, I think, has a negative impact.”

GRAZING PERENNIALS

“I'm even kicking around the idea of trying a like forage mix that would be **perennial grasses and perennial forbs, that the cows can graze and raise beef on this productive wheat ground in the Palouse and raise pounds of beef for five to seven years on a chunk of ground and try to heal it and regenerate it.**”

GRAZING IS WATER DEPENDENT

“What the covers is: you plant it, mother nature does whatever she's going to do. You're going to get a ton of forage. You're going to get very little forage” “If the ground is so saturated, **you don't want to put cows on because you make it concrete and compact the crap out of it.** It's really a tough deal because every single season is different, and every crop performs different in different environmental conditions. One year you might have millet, and the millet doesn't do anything, and the oats do awesome and a lot of the choices for coming up with the cover crop mix I make every time I try to **step out-of-the-box and do something exotic.** I'm like we live in the Pacific Northwest. We need cool season crops because that's what grows here. **Look around at the native land and be like that's native should be raising that not millet and we're not in Texas.** We're not in Kansas, we can't raise millet.”

FERTILIZING COVER CROPS

“Early on, I was against fertilizing covers, and we always had mediocre covers. Start fertilizing the covers a little bit, raising them like a crop, treating them like a crop. **You can get some impressive covers, but you've got to farm it like a crop.**”

PARTNERSHIPS

“...the more people we can expose to this and the more ranchers that we can hook up with farmers, one of my best friends is anti livestock (...) he will not have an animal that he owns. This year he's registered his own brand. He had over 300 pair on his place (...) **him and another guy are partnering up and they're going to buy their own livestock and this guy hated livestock and he's going to have livestock back on the farm.**”



GRAZING SEASON AND WEED CONTROL

“...usually from June, July, August, usually by about the end of August. It's pretty dry and things are kind of petered out or going in a reproductive mode. And if the cows can't keep up with it because you have so much and you got to mow it to keep everything from going to seed, to create a bigger problem. But one of the reasons I'm able to get away with some of the things I raise in covers is a lot of people try to raise a cover before a wheat crop. **I'm raising the cover in the spring wheat leg of the rotation so that I can plant brassica or a pea or blend of legume on it because it's different chemistry to take out the grasses that I don't want to be in my winter wheat....**then I seed garbanzos and then I get another chance for that selective grassy weed, herbicide and either roundup ready canola or a garb or a pea, and then I can take out whatever grasses I don't want.....before, I'd plant a cover and then I'd raise wheat on it that fall, and it was always my poorest wheat in the region.”

ECONOMIC

“I started replacing the spring grain going with pulse or brassica, and then winter wheat; it was a benefit to do it that way. The problem is it's a financial problem again because taking more wheat out of the rotation to raise a cover it's you know it's a, it's a cost and it's you know when you factor out **how many acres of wheat you need annually from spring or fall wheat to pay the bills. You know wheat -- it's our cash crop.....**it is the only way we are going to regenerate our soil. But that's why we're beating that drum all the time.”

LIVESTOCK AND CROPS

“It's like a Brazil or Argentina soccer fan. They're going to play, they're going to cheer for one team or the other, and if you have cows in this region, you typically don't farm. **There's very few of us that farm and run cows:** me, my dad, my brothers. I bet the percentage of that is less than five percent in this. In in a 100-mile radius here very few people farm and have cows.”

PARTNERSHIPS

“Every conference we go to every soil health convention, everything is farmers looking for a responsible cowboy that will bring cows to make a partnership...all of them....There's a company (...) that comes around to a lot of these conferences and is trying to find farmers that want cattle. They'll pay you to plant covers and give them x amount of acres a year to graze cattle on and they're trying. You know this guy's got a great business model going (...) pretty out-of-the-box thinking cattle producer, he's not a cowboy, he's a cattleman with a very extensive knowledge in business. Very smart.”

GRAZING TESTING

“I also tried to integrate some grazing into this...not on *those* hilltops, because it's just not feasible. But I've been trying to find some ground that's close to my cattle that I can not string off and graze it. So, I put in a millet, cows really like. Millet is good, but that's about the only grass.”

CHALLENGE WITH WEEDS

“We tried it this year and it was kind of an epic fail. I mean I had a place where I knew I was going to have cattle on it in mid-July because the rest of the field we cut the grass off and I said this little grass pocket down here is horrible. Let's just take my little drill down there and seeded it to cover crop and when the cows come in on the rest of the stuff, let's see how they like it. Well, you can't spray anything on cover crop. You know, so **it was mostly just the same weeds I had in this field (...)** They don't eat that. You know a lot of mustard. They don't eat that.”



GRAZING ECONOMICS

“...we've done grazing studies too....this was on 10-acre trials. We did a rate to gain study on cover cropping. That was one thing that we looked at is if we completely eliminated the cash crop and put cattle in there. We've even gotten so far to talk to cattle people, but **they don't want to pay for the rate of the rate-to-gain to offset.**”

“If we eliminated the cash crop, say 300 acres, I'd have to put cattle out there and **if I got paid 40 cents a pound for every pound that that cow gained, that would be my cash crop for the year.** The cattle guys right now don't want to pay that in our area....they don't want to pay anything because the cattle guys in this area.....they've got rangeland that they can put on. **So why would I pay you and I can just put them out on range and it doesn't cost me anything now they don't have the same rate of gain and there's not a healthy beef, but they're just looking at the economic component.**”

GRAZING SEASON

“We seeded in June because we're waiting because we put a lot of warm season stuff in. I think it was the middle of July that they finally put some cattle in there and we should have been in earlier what they are afraid of, the cattle would graze it down too quickly and then we're going to build a recover, seeing what we saw those plants were growing so vigorously () and they pulled in September and the reason we pulled them in September is prussic acid in sorghum we're going. It's poisonous to cattle and if you have a frost, we didn't we just didn't know enough about it. So, we were told that if you have a frost event the sorghum won't create this prussic acid and then it's toxic to animals. So, we stopped. We could have started grazing, probably the first of July, probably even earlier, if we would have seeded it in a little bit different mix and we could have grazed until the first of September easily and we **were getting two and a half to three pounds to gain a day.**”

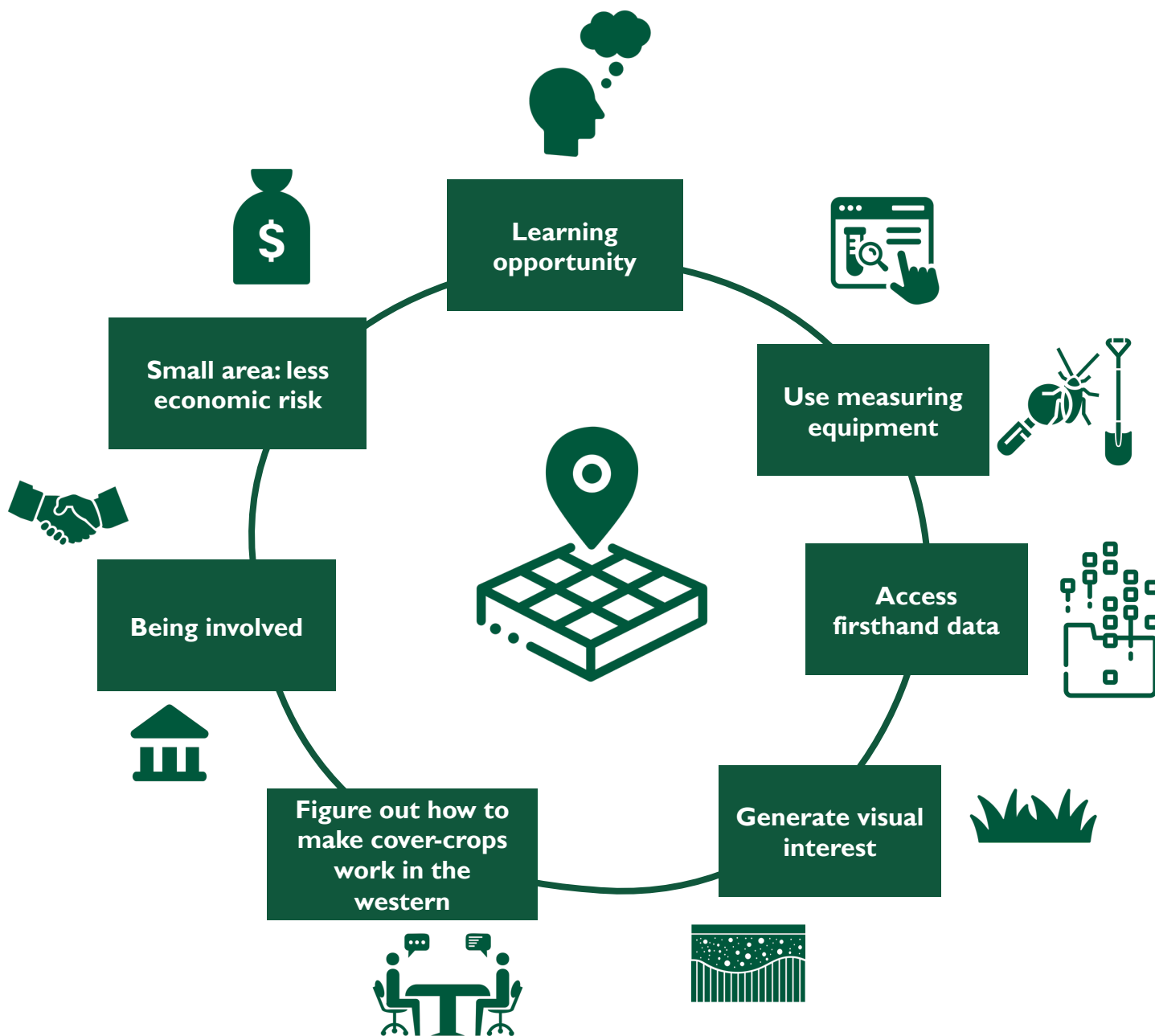
CHALLENGES FOR FARMERS RE-INTRODUCING GRAZING IN THE PALOUSE

“I'm a big advocate of **not getting back** into cattle because one **I don't know anything about cows.** My dad had some cows when he first got into farming. **We are not cattle guys, just the capital expenditure of re-fencing.....The liability component of that scares** the heck out of me....there's a lot of reasons why we don't want to get into cattle, **plus the time.**”

PARTNERSHIPS

“...there are some potential partners that are out there (...)There's a lot of questions that need to be answered yet and they're doing some work with some farmers I know up north by Spokane this year. So, we'll have a lot of information that we're going to gain on that and **how it works** for them because **it's got to be working for the cattle guy too. So, like you said, it's got to be a true partnership where it is a win win for both.**”

Producer Expectations related to WSARE project





WSARE PARTICIPATION

“I mean, you learn most by collaborating with stuff on the farm, and that's what I've always been pretty open to: working with universities, research, because **you learn so much more and when you're looking at it every day...typically I'll take a lot of pictures too.**”

LEARNING OPPORTUNITY

“I'm just a cooperator, you know, and I'm happy too because I'm curious to see, you know because back in the Midwest, cover crops are all the rage, and they're really not here and maybe for good reasons, I don't know one way or the other. You know we can find out good or bad, and I'm game to find out, and **three-acre plot or four-acre plot isn't going to make me break** and I would rather be involved personally in a deal where I can learn more personally in this...selfish, I'm sure, but **I will learn more being involved in it than just looking at the data afterwards and honestly, the process interests me. (...) I think I'll enjoy and learn something in the process and positive or negative, that still a result.**”

RESULTS EXPECTED

“...if we can **get a feel for when to terminate** without affecting yield...So if we can figure out and maybe we'll figure out that it'll take a bit of a hit on the first year, but the second-year gain some, I don't know. Maybe it averages out. So, if we can figure out, you know, a) determine how much moisture we are really using and they'll you know they've got the equipment to do that and then figure out the right way to do it. And if it actually helps, I mean if there's **enough yield gain to offset the extra cost of the seed per acre, then and there's enough benefits as far as more more water infiltration**, and I think there will be, because I've already seen that.”

EXPECTATIONS ON THE PROJECT

“That's the biggest flaw is why I'd like being connected to the university in this is: **we just can't measure success....**You know what I'm most interested in again is always the measuring. We can do things, but it would be really nice to know that what we did this year could be positive three years from now. But is there a way we can know today? Otherwise, you don't have...you got to wait and if, three years down the road, you find out what you're doing isn't working.... and so they're they're coming in with **all kinds of instrumentation to measure**. You know the physiology of the soil and the way it breathes, and **I'm hoping they will figure out a way to say this is better within one year and it would be a system that we could use and, on a larger-scale.** “Well, we get to try a rotation that we're interested in, and they will be measuring it with tools and we, we don't have any measurement and the big, **hopefully expertise in young minds are excited and they will say: look what we see here....The measure, what these crops are doing, will help us learn how to measure**”



WSARE PROJECT

“...well, it seems like every year, I've always been involved helping the university with research projects. So was <named reference>, the guy that farmed this place before me. So, it's just kind of a legacy. I want to continue because if we're not doing on farm research, how the hell are we going to learn? So, **we've got to have a university out here and we have to go around these <inconvenient> plots and do all that. But that's our duty.**”

“What's my role? **Just to be a co-operator** and whatever...I don't know; I've done <cooperative research> since I've started farming, so it's just part of what we do. It's just my responsibility.”

EXPECTATIONS

“**I just want to figure out how we can make soil better and stop degrading.** That's my my motivation. Farming is the place I took over. I want it to be better for my kids and create, you know, healthy food. I think we have healthy soil. We're going to have good, healthy food.....My motivation is **100% trying to improve soil health.** To just make healthier food I mean at the end of the day, if we're not trying to farm better and make our dirt better, long term food production is spooky. There'll be a lot of people starve if we don't pull our heads out and try to make our ground better. I think they're something that we have to do to try to give the ground a break, **throw some diversity** at it, different plants growing, and you know, for all the different insects and disease pathogens and all, that all these different species of crops have to bust that monoculture. **Even if we're in a three-year rotation, I still think it is a monoculture.**”

ROLE IN THE PROJECT AND EXPECTATIONS

“In this I'll be one of the co-operating producers. I'll have a test plot in my field that's still kind of up in the air.

How many acres? This is what you realize: three acres, **pretty big and big where you're talking test plots.**”

“I expect to prove some of the theories that are already proven and to disprove some of the others, because in this thing we do get our own chance to do: okay. What's your cover crop plan? You know what's your seed mix, what's your...? How do you do it? So, in one of these replicates, I get to do it my way and so I'm going to introduce my rate of fertilizer into it and my rate of seed and my seed package, if you will. You know not a seven different thing, but maybe three. You know and try to prove. You know just sheer volume, distance with fertilizer, things like that, and it **will be kind of exciting for me to have people out that'll look up on the hills and go well. What? What? What are you doing up there? Why do you have a cover crop up there?**”



WSARE INVOLVEMENT

“We've got a good, actually got a good location to put this, and it's **very visible just down the road.**”

WSARE PROJECT HAS THE DIVERSITY OF CONDITIONS

“I think it's helpful, especially because the scope that you guys that are working on it in different areas....**to be able to point to people in that area and say it's worked in these types of growing conditions that is going to be powerful for that initiative to move forward.**”

ROLE IN THE PROJECT

“My role is going to be **just a contributor, putting cover crop in and just the management site on the farm and the cover crop.**”

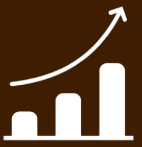
LEARNING COMPONENT

“I'd like to see how the cover crop is going to work. Now I feel like we've thrown everything at the wall and how make cover crops work, and maybe we did something wrong. So, I think that **there's always a learning component** to it and I want to see if there's something that we're missing. The mixes that that have been picked is similar to some that I've used. It's going to be treated a little bit differently, I am hoping to learn something and hoping that we can figure out how to make it work. So yeah, I'm very positive about it.”

TESTING AND HAVING FIRST-HAND DATA

“We don't understand our soils and so I think growing...growing and understanding how that cover crop interacts with all of that is important and we need to start learning how we can reduce that exposure environmentally for people that eat the food, to people that have to handle the products. And then we need to be able to understand the return on the investment into the cover cropping systems, gathering all these economics. **That's what I'm excited about it. It's not just me trying all this trials down there, and I just don't have the expertise and ability to track a 100% of it.** As good as I should, as it could be, so partnering with universities like that, where they've got on with you all in place, **it just make sense and it is firsthand data.**”

NEEDS FOR SCALING UP COVER CROP IN THE INLAND PACIFIC NORTHWEST



SHOWING HOW TO PAY THE BILL

“...soil quality, weed suppression, better water infiltration and that I think, goes to yield, **because at the end of the game, the winter wheat and the spring wheat, is what is paying the bill**....so, if we can boost that and, it'll be beneficial everywhere else. Well, that's great, you know, and and you're not going to convince anybody, there'll be people that will do cover crops just because they want to. But you won't convince anybody. Very few producers, especially in this county, because we're dry if it's a break-even deal, or maybe even less, it doesn't matter what the soil, the long-term soil benefits are going to be. There, it is going to be a hard sell.”

“I mean it's when I go to like a wheat grower meeting, and we talk about cover crops, and I mean it's the eyes get rolled, and I get it...And the conversation always always always comes back to what's it do to your yield next year?...I mean having happy microorganisms in the soil and and happy earthworms. That's great, but it doesn't pay any, doesn't buy any diesel, and it doesn't pay for anything.”

SHOW THE NUMBERS

“I think you lead by example, and you've got to show people what works and what doesn't, and **you've got to have your numbers to present**. And what I mean **by numbers: I mean dollars**...dollars spent versus dollars gained. You've got to make that dead clear. There's no, you don't leave anything out, **account for everything**, so that people can see on their own, and that's easy to do. That part's easy. What's hard is showing them the soil benefits. The long game and I like this program we're doing, really isn't long enough. I don't think to really stretch out and see what's in five years, what's going on and that I I don't know how to quantify that, to show growers other than by doing it.”

RESISTANCE TO CHANGE

“It'll be interesting to see you know with the data that we're going to gather from this. **If it's positive, you know, probably some people will adopt**. Maybe, and I might do a little more because I've just been playing with it, but you're always going to have people that stick their noses up, which it's just human nature.”

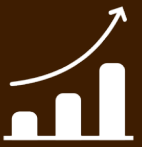
TO ENCOURAGE MORE ADOPTION

“I would have **a lot more economics in the research** because I think if growers start seeing an economic value or a scientific value of soil health benefit, I think that would be a lot faster adoption rate.”

THE CHALLENGE OF ADOPTION: SHORT-TERM BILLS X LONG TERM ACHIEVEMENTS

“I guess you know you just have to have more data. I mean I think for me I'm numbers guy, data works for me and then just trying to convince people that farming has never been a year-to-year deal. I mean you think it is because **every year you got to have a paycheck, but you need to think more long term**.”

NEEDS FOR SCALING UP COVER CROP IN THE INLAND PACIFIC NORTHWEST



FOR SCALING UP ADOPTION

“...you have to be successful. You do and you have to be able to prove it. If we grow a cover crop and then there's a crop out there and the neighbors drive by and look at it and go ‘ooooo, that's a heck of a mess’. And then you stop by and say how much input you have into that... but then if it is working, it will grow...t is like the Idaho football team: are they going to have the best players next year there ‘cause they're winning? **And so, if we want cover crops to grow, we have to prove it works.**”

SHOW BIOLOGICAL RESULTS

“...showing where you've got that mulch, with the cover crop mulch laying there, the bug, the entomology side of it to me is interesting because I know that when after you terminate and those radishes, they shrink up and they just turn into like just a black, yucky looking thing. Well, you pull that thing out there and the worms are just, I mean they're just having a party in there and so that's what they're doing. They're doing your tillage for you; you're just not seeing it under the ground. I think that would be a good visual to have.”

HOW TO SCALE UP COVER CROP ADOPTION

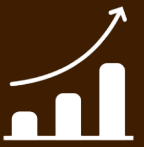
“...like part of this program, we agreed to have field days and stuff. That's just what we've done with the canola. Every year we plant variety trials. You know, we get the word out and have a **field day**, having people walk-through a crop and see what's happening. **That type of education is huge.....**Actually, it's pretty much like **hands-on stuff**, and then the **presenters, if they're giving you practical advice that can pertain to your region....**I like active participation. It's like when we've done the canola workshops, when it takes a lot of time, but when they have canola, and they spray it with different herbicides, and you **see the effects.**”

“...he took soil from where there was a cover crop and soil that was just bare and did that **water filtration** thing. I mean that when I saw that 10 years ago, it's like well, this is why I direct seed...it would be awesome if we could plant a cover crop the first of August and have it sprout and do some good, but typically it's just, I mean it's too dry,” “Well, a lot of the stuff in the Midwest. You know they're interseeding in their cover crop right in between the corn rows and stuff like that. I mean, I think that would be awesome.”

INFILTRATION TESTS

“...here are some **really interesting tests** -- that you can do on a cover crop on anybody's ground, summer fallow traditional, fallow -- they take. It's called water infiltration tests.”

NEEDS FOR SCALING UP COVER CROP IN THE INLAND PACIFIC NORTHWEST



TESTING AREAS FOR HELPING COVER CROP ADOPTION

“I guess proving the benefit is probably the most important thing for this project. A proof of concept is always useful. Right. **Proof of benefit is kind of the next step**, and then that could lead to broader adoption, more adoption on the farm, but you know also broader adoption in the area on other farms.”

“...having things visible along roadways, you know to incentivize people to ask questions. Who are the farmers? You might call it the same, but like farming the roads or you know, you know, drive by farming kind of. You know you like to look around and see what the neighbors are doing, and so that might be a way **to generate just visual interest..kind of like plot location being visible**. I'm interested to see what the following wheat crop looks like on the cover crop versus what would be, let's say, a chickpea crop, which it normally would be. **I'm interested to see how they grow, what parts of the blend do well, what you know if there's a three seed blend or nine seed blend.**”

TIMING OF TRYING

“...long term planning is sort of luxury. To me, **being able to have experiments is a luxury**. If times are really tough, people are going to revert back to the things that they know: work that are the least risk, and I will do the same thing most of the time. But you know farmers will complain because it's in our nature. But you know things are pretty good right now, despite high prices, despite high input costs. You know our crops are worth something. They generally grow pretty well. You know the Palouse is fairly consistent in providing for the farmer.”

“...you get a little bit more latitude to experiment when things aren't just really tight, and so you know, we're kind of in that position right now. I feel like, you know, I feel like things are going fairly well, now it's a good time to improve techniques and learn about new ones, and we're finding the farming to be maybe more efficient, but more sustainable as well. You know, I think of **no-till as a step on that process.**”

COVER CROP ADOPTION BARRIERS

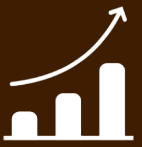
“**It's new. It's another layer of management that they don't understand**. I think there's just that same barrier you're talking about. You're working on sociology side of stuff. It's just the same thing that when we got into no-till 25 years ago it was the same barrier. Those wires, everybody still ploughing...It's still not really accepted on the Palouse and the level that we're at. It's just a shift in all the dynamics of the past histories of what happened on the farm might take. So, I think it's just it's something, it's progressive component that farmers are slow to change.”

PARTNERSHIP WITH NEIGHBORS

“I had these three other growers who were neighbors, like the old neighbors. We were helping each other, we would sit-down and open our books up and talk about labor and what we pay, and and so we helped each other. You know, and **rather than patrol at your borders to keep your neighbors from taking your farm, they were neighbors whom we shared with and shared business decisions, and they're still sharing**. One of the ways we can run lower acres of alfalfa is because the group owns the hay equipment, and we pass it around, **so we don't have to own 200 thousands of hay equipment.**”

27/April/2023, final summary

NEEDS FOR SCALING UP COVER CROP IN THE INLAND PACIFIC NORTHWEST



INTERACTIVE EVENTS FOR SHARE WITH PEERS

“Yeah, those are the ones that I think there's more value to me, because there's **you have to get the right group of people in there if they're willing to share**. But yes, that's those (interactive) I think are **better learning seminars for myself than just listening to somebody up talking.**”

“So, I've been part of some groups where everybody that comes has to present, and if you're not a presenter, it's kind of hard. Yeah, but I think **there's a better value in shared information that way, and I know it's all anecdotal again, information that we share, but it's experiences that you can actually ask, like 'how did you manage your way through that?'** And maybe they don't have the answers, but at least it creates a conversation.”

“You'd have to do workshops and field tours because **I'm part of a workshop group, that's it's more of a think-tank group, the people that we bring in and exposures to make you really think**, and so if you didn't have that exposure, you're going to be pretty set up to denial that it is working. So, workshops, education... got to bust the ignorance somehow.”

“Between October and January everybody kind of does their planning for the next year, and that's probably the best bang for your buck in giving information out. So yeah, and the meetings that people put on in June and July. That's tough because sometimes there's some value in those meetings, but you get ‘I've got to get this job done and this job done, and I can't go to the meeting.’”

ADOPTION AT LARGER SCALE

“Because if they're a success right, I mean **anybody can go to 20 acres of cover crops. But is that going to fix the Palouse?** No!....we've got to come up with a system where growers adapted and go. You know we got to have 20% of our farm a year at least, so that every four or five years we're building and everyone is. If it's just yeah, **we can grow 20 acres of turnips and it really made the ground better. I mean that didn't fix anything....**Let's say you have to **be able to prove the economic benefit and the extra**. You know there is a substantial amount **of extra workload that comes with diversifying**. You know and that you have to commit more time. You know, so I would say that would be a big part of it. And you have to have a measurement. I mean if you want people to grow cover crops, there has to be something on the back side, a 20% you know, lower your inputs by 20% get the same yield. You know that's a financial benefit to a farm.”

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Fernanda and J.D. Spring 2023

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