

Update 6 Years on: Vortex Structured Water on Dairy Farm Irrigation - Interview with Arthur Cornwall

<https://youtu.be/XvjZ2cgf6T4?si=28uGUzIzg9ofbYAK>

Here's the full structured analysis from the transcript.

1. All Key Agricultural Benefits (summary)

- Improved water penetration/infiltration into the soil profile
- More uniform soil moisture distribution
- Reduced pumping electricity draw
- Ability to reduce nitrogen fertilizer inputs while maintaining pasture growth
- Improved soil biology (dramatic increase in earthworm counts)
- Maintained/held soil moisture longer, reducing irrigation frequency needed
- Better herd health outcomes (implied, via consistent healthy stock)
- System has run "without a hitch" for 7 seasons — durability/reliability as an operational benefit

2. Water-Use & Irrigation Benefits

- Arthur estimates at least 25% better penetration in a single pivot round after installing the vortex generator on the 160 ha pivot, based on soil moisture monitoring data from the pivot company.
- A pivot company technician flagged that his "penetration levels in the soils" were unusually high compared to other clients on the same monitoring system — high enough that she suspected a machine calibration fault.
- He was able to back off total water application: previously could only wet soil to ~150mm depth with a 250mm soil probe; after the units, wetting reliably reached the full 250mm — allowing him to cut back irrigation depth/frequency (running the pivot ~15mm per pass, shutting down for a couple of days between passes rather than continuous running).
- During a dry November "summer," the region's stated irrigation guidance was ~35mm/week; Arthur was applying less than 30mm/week and pasture "still good, keeping up."
- Co-interviewer (from the vortex company) explains the underlying mechanism as claimed: dropping the water's oxidation-reduction potential (ORP) changes how the water interacts with negatively charged soil, causing it to disperse more evenly through the profile via capillary/uniform action rather than channeling straight down the path of least resistance (bulk/"dead" water behavior).
- Note on source water quality: Arthur's scheme is gravity-fed with cascades/aeration en route, but then sits static in a 100,000 m³ storage pond ("it virtually sits there and dies") before use — his framing is that the vortex units "re-energize" this otherwise stagnant water before irrigation.

3. Crop Growth, Yield & Quality

- No hard yield/tonnage figures given for pasture in this interview.
- Qualitative claim: during the very dry 2020 season, "everybody else's place is looking a bit average" while his own pasture was holding up well — attributed to better soil moisture retention/penetration from the units.
- General reference to "compounding benefits" building over the 7 years, though not quantified year-by-year.
- Note on general farm performance: per-head milk solids described as on par with or comparable to neighboring conventional farms (per the interviewer's question; Arthur's answer was non-specific — "pretty much... up there").

4. Soil & Root-Zone Effects

- Earthworm counts: On taking over this property 5 years ago, "there wasn't a worm on the place" (worms were manually relocated when found). Now, digging in the same ground yields 10–20 worms without difficulty — presented as a proxy for soil biology recovery.
- Soil probe data (250mm probe) shows full-depth wetting post-installation vs. previously only reaching ~150mm.
- Interviewer's mechanism explanation: lower ORP water disperses more evenly through the soil profile (attributed to reduced surface tension/charge interaction with negatively charged soil particles) rather than "path of least resistance" channeling seen with standard irrigation water.
- Reference to biology/fungal ratios in soil — teased as an upcoming study/product development area, not yet data-backed.

5. Nutrient / Fertilizer Efficiency

- Historic N use: previously targeted 60 units of N; now down to 20 units (or up to 40 units in years with a supplementary crop).
- Applied via sulphate of ammonia (explicitly avoids urea), typically one springtime application, followed by 2–3 foliar feeds (biology + seaweed + calcium ammonium nitrate).
- Stated rationale: with better water penetration/more even soil moisture, less nitrogen is pushed straight through the soil profile past the root zone (reduced leaching) — linking the irrigation mechanism directly to nutrient retention.

- Side commentary: fertilizer company reps "don't even want to know us because we don't register on their books," while pasture growth is maintained — framed as evidence that lower N input isn't costing him production.
- Direct tie to a regional issue: Canterbury nitrate contamination in groundwater is referenced, with Arthur's ~20 units of N positioned as a low-leaching-risk approach.

6. Plant Stress, Drought & Resilience

- Dry November 2025 "summer" event: pivot ran continuously for the month at 15mm/pass (~4-day full rotation), applying under 30mm/week against a stated regional guideline of 35mm/week — pasture held up ("still good, keeping up").
- 2020 drought comparison: neighboring properties visibly stressed/"average," his own pasture performing comparably well — attributed qualitatively to soil moisture retention from the units, not to any other stated input change.
- General "set and forget" system reliability framed as reducing operational stress/risk for the farmer (no adjustments needed, no failures in 7 years).

7. Economic Benefits / Potential ROI

- Electricity/power draw: pump amperage dropped from 89 amps to 72 amps within ~30 minutes of activating the unit on the 160 ha pivot — roughly a 19% reduction in draw (Arthur doesn't calculate this percentage himself or attach a dollar figure, but flags it as "significant").
- Reduced N fertilizer spend (60→20/40 units) — no dollar figure given, but a clear input-cost reduction.
- Framed explicitly as low upfront cost with compounding benefits over time — "for the investment, it's a no-brainer," and "a pretty low up front cost really" relative to the accumulated benefits observed in soil profile and power draw.
- No animal health/vet cost savings quantified, though "none in the sick bin" and no bloat losses in the last 2–3 years are mentioned (see caveats below — multivariate, not attributed solely to the units by Arthur).

8. Every Useful Quantitative Result or Percentage

Metric	Before	After	Change
Pivot pump draw	89 amps	72 amps	~19% reduction (within ~30 min of startup)
Soil moisture penetration (single round, per pivot co. data)	baseline	—	"at least 25% better"
Soil wetting depth (250mm probe)	~150mm	full 250mm	full profile now wetting
Nitrogen use	60 units N	20 units N (up to 40 with crop)	~55–67% reduction
Irrigation depth/frequency	350–400mm equivalent (implied overwatering by ~2/3 previously)	15mm/pass, ~2-day rest between	reduced water volume applied
Dry-period application (Nov 2025)	region guideline 35mm/week	actual <30mm/week	below guideline, pasture maintained
Earthworm count (same ground, 5 yrs)	0 (had to relocate any found)	10–20 per dig	qualitative soil-biology recovery
System uptime	—	7 seasons	zero faults/warning lights reported
Bloat losses	—	0 in last 2–3 years	anecdotal, multi-factor

9. Strongest Customer-Facing Statements

- "There's got to be some problems with the calibration of the machine" — third-party pivot technician's unprompted reaction to unusually high soil penetration readings (strong independent-validation anecdote).
- "For the investment, it's a no-brainer."
- "It's a pretty low up front cost really" — relative to accumulated benefits.
- "I don't think it's worn out yet" / "they've never complained... we just keep rocking and rolling" — reliability/durability framing.
- "You're compounding the benefits... when you can see them on a power meter, when you can see them in the soil profile."
- "We're chugging along [in drought]... pretty happy here" while neighboring farms looked "a bit average."
- "The fertilizer companies don't even want to know us... and we're still growing grass."

10. What President Water Can Legitimately Learn/Use

- A credible 7-year, real-world, multi-property case study with a named, on-camera farmer willing to go on record — strong for testimonial-based content.
- An independently-sourced anecdote (pivot company technician flagging anomalous penetration data) that reads as third-party validation rather than farmer self-report — valuable because it wasn't solicited or coached.
- A clear, repeatable narrative arc: install → unexplained performance anomaly → farmer investigates → attributes to the units → sustained results over years. This is a strong structure for case-study or video-testimonial content.
- Concrete, farmer-quantified figures (amp draw, N units, soil probe depths, worm counts) that are specific enough to feel authentic rather than generic marketing puffery — good for credibility, even where they can't be used as guaranteed/typical results.
- A tie-in to a live regional issue (Canterbury nitrate/groundwater contamination) that gives the N-reduction story external relevance beyond just "saving money."
- The ORP/soil-charge mechanism explanation offered by the interviewer is useful as messaging language if it reflects your company's actual validated technical explanation — but it should be checked against your own technical documentation before reuse, since it's presented informally in conversation.

11. Claims That Need Verification Before Commercial Use

- All figures are single-farm, self-reported/anecdotal — none are from a controlled trial, replicated study, or third-party lab/agronomic audit. They should not be presented as typical, average, or guaranteed results without qualification.
- 89→72 amp reduction: a real reading, but attributed by Arthur to the unit without ruling out other variables (pivot speed/mode changes, pressure changes, seasonal load, etc.). Needs an engineering explanation of causal mechanism if used as a headline stat.
- "At least 25% better penetration": Arthur's own estimate of pivot company data, not the raw data itself — the underlying report from the pivot monitoring company would need to be obtained to cite this as a verified number.
- N reduction (60→20/40 units) and maintained yields: no yield/tonnage data given to confirm production wasn't simply also reduced; this is a farmer's subjective satisfaction claim, not a paired yield comparison.
- Worm count claim: purely anecdotal/observational (informal digging), not a soil biology assay; many other changes happened on this property in 5 years (new ownership, management practices) that could independently affect soil biology.
- Bloat/animal health claims: explicitly multivariate (stock class, feed type, season) — Arthur does not attribute this to the units, and it shouldn't be implied as a unit benefit.
- Milk solids parity with neighboring farms: vague, non-specific answer — not usable as a quantified claim.
- The ORP/soil-charge mechanism explanation is asserted conversationally by the interviewer, not by Arthur, and not sourced to any study in this video — this is technical/mechanistic messaging that needs your own scientific backing before it's used in commercial claims (regulatory risk if positioned as proven science without support).

12. Concise List — Strongest Benefits for Agriculture Messaging

- Independently flagged soil penetration improvement — verified anecdotally by a third-party pivot monitoring technician, not just farmer opinion.
- ~19% reduction in irrigation pump electricity draw — concrete, farmer-observed, dollar-relevant.
- Full-depth soil wetting (250mm vs. ~150mm previously) — measurable, probe-based evidence.
- Major nitrogen input reduction (60→20 units) while maintaining pasture — ties directly to both cost savings and environmental/regulatory relevance (nitrate leaching).
- 7 seasons of maintenance-free, "set and forget" operation — durability/reliability selling point.
- Held up better than neighboring farms during drought conditions — resilience narrative.
- Dramatic increase in earthworm activity on the same land — accessible, visual soil-health proxy that resonates with farmers.
- Low upfront cost vs. compounding, multi-year benefits — strong ROI framing directly from the farmer's own words.

Transcript

Welcome back everybody. 14th of May uh 2026 I believe. I'm here with Arthur

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Cornwall and on this beautiful uh Canterbury Plains and just have a bit of a chat. Um six years since we put uh a

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bunch of units on at um Arthur's properties and um so I just thought I'd come and do a while the sun's out come and do a bit of an update, mate. Yeah.

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So, um, yeah, like I said, it's I think 2019 they went in. That'll be right. Yep. Yep.

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So, so the seventh season and, um, your experience with Vortex devices has been interesting.

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Yes. So, I know when we first put them in there, uh, we put them on, I think two of them on an irrigation pump system

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and, uh, then we just put a pivots on and we fired them up and what have you. And it

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was quite funny because the the girl that was part of the pivot company that monitored the performance of the pivots

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uh rang us up after about a month, 6 weeks and she says, "I don't know what's going on, but she says, "Your

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penetration levels in with your soils is far more than anybody else." And she says, "There's got to be some problems

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with the calibration of the machine." And so I just sort of laughed at her and I said, "Ah, there's a wee bit of witchcraft going on here."

And sort of

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explained the story and uh about the vortex generators and uh yeah, and it's all sort of led to them. So, we've

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actually sold that property off with those units onto our dairy far onto our son and daughter-in-law and but we've

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taken over another property 5 years ago and I had a vortex generator on on a wee pump that was supplying water to 18

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hectares and we had 160 hectare pivot so I thought ah silly having one on the 18.

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So, we flipped that over to the the big pivot. Yep. And uh yeah, the

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electricity uh demand it was 89 amps when the pivot was running and that was prior prior to putting the

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yeah starting her up and uh I thought oh that's good and I'd done a round of 10 ms around the farm prior. So we put the

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generator on and then yeah just slowly watched it over a half hour period came back yeah about half an hour later and

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we gone down to 72 amps. I thought, "Wow, what's going on here?" And that's significant.

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So, it was pretty significant. And I'm not sure what the dollar value means, but uh it's it's got to be one in there. Yeah.

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And uh then the pivot did its round and went back to the data on the so monitor and I would say it'd have to be at least

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25% better penetration in that uh on that round. So, putting the two together,

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something's definitely happening. It was definitely instant. Yeah, absolutely.

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Um, you know, it it just runs and it just quietly works away, which is the way I like it. The the set and forget model.

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Yeah, I I don't think it's worn out yet.

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So, no, absolutely. So, in the since I was here last with Arthur, we've done a lot of work on turf, uh, on golf courses, parks, and

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and bits and pieces, uh, schools and things like that. And what we found interesting is that the ch the charge

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the change in the charge of the water of the vortex devices means the water penetrates because you you're dropping

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the OP of the water the oxidation reduction potential of the water you're dropping that down. So cuz the ground's got a negative charge. So when you drop

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the charge of the water, it disperses more evenly through the profile as opposed to when you're using bulk water,

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it's just pulled down through the profile by the path of least resistance.

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So you get uni more uniform soil moisture than you do with regular irrigation. And that's that's probably why you're seeing that better penetration because not as much is going straight through the profile.

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Yeah. Yeah, you know, and and we've we've uh we've, you know, noted that on parks using um

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NDVI, the satellite, you know, the satellite mapping of the of the infrared energy coming out of the out of the

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plants. You can tell how well the plants and the soil moisture and all that by the infrared energy that the the ground's going off. And and so, you know, that's uh that's

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that's been another another good piece of evidence. Um, you know, I I I would hazard a guess that you're probably

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running with a loom soil here. You you know, last time we turned up, you just put through a new pivot line and I think

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you said this the profile was down wet like down to,00 where you'd run that line. soaked right the way through,

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which probably meant like if you're trying to get the water to 350 to 400, you're probably overwatering it by 2/3. Right.

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And and that means you're pushing the nitrogen through the soil that if you if you're fertilizing um which which isn't ideal. So, did you

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end up backing off the amount of water that you that you're putting on?

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Yeah, we did. Yeah. When we found because I've got a 250 mm probe Yeah. Y and always go by what we're

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doing on that. And then we found that, you know, right to the 250 it was wet, which usually we could only get to about

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150 odd if if you were really lucky. And there was quite a bit of water going on with the help of rain. So that sort of said to us, hey, yeah, we can back off.

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Y and uh like I I run the pivot on 15 ms, so we give it a pretty reasonable soak and then uh we'll shut it down for a

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couple of days. um you know if it's reasonable weather not too hot otherwise she'll just keep going because it only puts on 25 ms a week.

So

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6 minutes

okay um if we do you get a hot summer which is a rare that that last summer that that I was

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here in 2020 it had been dry super dry right and you were like well everybody else's place is looking a bit average

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and we're pretty pretty happy here we're chugging along. Yeah. and you know and we can shut her down then because we know you know we've got the penetration

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that's going to stay there and of course the biology and the soil working on all that. So we've got a lot going on that just yeah basically leave it to mother

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6 minutes, 32 seconds

nature and just give her a tweak every now and then if we think she needs a hand and Yeah.

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and and and the units are still still cogging along after seven years without a hitch. Yeah. Yeah. Well, they've never complained.

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No warning lights have come up or anything. So we we just keep rocking and rolling. But the one thing about our scheme too is because we're on a gravity

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fed water scheme and probably about every two or 300 m we have drops in the race. Yeah.

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6 minutes, 59 seconds

And the water tumbles and airates and all the rest which is fantastic but then we put it into a 100,000 cubic meter

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pond and it virtually sits there and dies. It's dead. Yeah.

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So and then we suck it out and like uh the old saying is you get a green drought with irrigation. Y

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because you know your water's dead and it'll keep green but it won't grow any bulk or not so much bulk but because we can energize it again. Um you

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know our fertilizer regime's just come back to talk to us a little bit about that.

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7 minutes, 32 seconds

Well I've never been a great one on nitrogen and what have you but I always thought if I can get back to 60 units of N I'll be I'll pretty happy. And and now

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we're down to 20 or if we got a crop 40 units of N.

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Yeah. uh just through sulfate ammonia. I won't use ura ura. So it's usually a springtime application just to give things a wee bit of a kick.

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Yep.

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And um then we just sort of folia feed after that. Two or three folia feeds or with biology, a bit of seaweed and a bit

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of calcium ammonium nitrate. And uh yeah, that's that's basically it. And we just let mother nature do its thing. And um the stock are happy, healthy.

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8 minutes, 14 seconds

How many how many in the sick bin at the moment?

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8 minutes, 16 seconds

Oh, there's none in the sick bin. Just the way we like it.

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8 minutes, 18 seconds

Yeah. Well, that's perfect. I think last time I said there was one.

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Yeah, that'll be about we we get the odd one, but I don't know when when you're dealing with probably 1500 odd animals

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from two dairy farms and the young stock and all the rest. There's a lot of stock going through the system and some of them don't always stay on this property

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that long. They move on. But uh you know the the only hassles we have and everybody hassles is that going from the transition from summer to autumn feed.

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Yeah.

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8 minutes, 47 seconds

And you know we found that's usually a B12 selenium injection and then the old room and gets going again. So you know they can look a bit loose and then they

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8 minutes, 56 seconds

come around fire up. But uh it's it's when you know young animals prance around the paddic and where you know

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they just go nutty where you get animals that are fed on like kale or fabbe.

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They're far more dosile and you know the youth and enthusiasm's gone out of them.

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So yeah. Yeah. I just Yeah. And and we grow clover and it scares my son the living daylights out. Oh, we're going to lose

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animals through bloke. But they'll go on to clover ry grass like that.

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9 minutes, 27 seconds

Yeah. Oh, you know you need bloat oil and all the rest and we just rock and roll and they go in and they munch it up and touch wood.

Yeah. The last two or

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9 minutes, 36 seconds

three years we've never lost an animal through bloke. That's great.

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9 minutes, 39 seconds

Um but you know and it's we're doing stuff that you know a lot of people don't like to do. You know, I've always

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9 minutes, 49 seconds

challenged the system and um just do what mother nature and if we can give her a tweak. Yep. Give her a little hand.

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9 minutes, 56 seconds

Yeah. Um there's there's nothing more satisfying. Keep it simple, stupid.

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10 minutes

Well, with the way fertilizer prices are going, I'm sure you're happy that you're down at 20 units.

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10 minutes, 6 seconds

Oh, absolutely. Yeah. Yeah. Well, the fertilizer companies don't even want to know us because we don't register on their books. Uh and we're still growing grass.

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10 minutes, 14 seconds

Yeah. But you know, when we took this place over five years ago, there wasn't a worm on the place. And if I found one, I used to pick it up and put it back

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into where it might survive. But now you can go and dig here and, you know, 10, 15, 20 worms. Yeah. Beautiful.

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Without too much hassle. So, um, so if they like hanging around, we'll try and make it good for them. So, Exactly.

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Uh, but you know, we're still in a huge learning phase and Yep. you know, what's the limit and you

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know, we have these limits of production that we've sort of been given. You can only do this and you only need to do that. But, uh,

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you know, where's the genetic potential of what we're actually doing? And I I I think we can ramp that up considerably to get away from those averages.

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11 minutes

Yep. That are ordinary. Yeah.

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And so your your milk solids and and your numbers like that are good compared to other farms or about the same or per head.

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Yeah, David's probably pretty much Yeah.

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up there, but he is on the conventional side and looks over at the other side.

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So the young ones tend to the large percentage of them have a model that for x amount of inputs you can have

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y x amount of outputs and it fits the the mortgage it fits everything and we can make a bit of money out of

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that. So, uh, it's not till, uh, you know, a payout couple of years ago, the payout was, they says, I think it was going to be \$7.

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Y, uh, down from \$8 or \$9 and oh, all of a sudden the calculators come out and, oh, we're going to save money here. And then about two months later, oh, we're up to

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\$8.50. Threw the calculators away and just went back to normal again. So, so we're dealing with youth of enthusiasm

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12 minutes

and age and wisdom. So, and if we can bring the two together, yeah, we can move mountains, but and it's better for the environment, right?

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Yeah. Yeah.

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You know, we've got we've got problems here in Canterbury with uh nitrates in the in the water table.

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Y too much going on and you're putting 20 parts on. So, why aren't more doing this? Because they don't want to know. Yeah.

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Um, you know, 200 years ago, I might have been burnt at the stake for what I do.

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U wouldn't be here. No, but you got to think outside the square and uh you know

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there's two sides to every story. So like we get a lot of stuff in the books that's uh been written by someone who

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has a financial interest and what's in the books. So at the end of the day, are they right or are they wrong? But uh well the proof's in the pudding, mate.

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Yeah. Go back to the old guys and look at the old writings. Yeah.

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And then uh enhance on what they're doing with the technologies we have available today like you guys are doing.

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So, yeah.

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And talk to me about this pivot that you might not be able to see. Uh how big a pivot?

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Oh, it it covers um yeah, just over 150 hectares. Okay.

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So, it's only uh 450 500 m long, I think. Yeah.

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And and so in summer, usually that's running for Well, we had a real dry patch and we had summer in November here this year. Okay.

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Uh, so that basically ran all November and it was 15 15 ms around and it takes Yeah. just over 4 days to do around.

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Yeah. Okay.

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So, you know, they like to say that we need 35 ms a week uh under those circumstances, but you know, we were putting on less than 30.

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Yeah. And still good.

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Still good keeping up. So yeah.

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Um so yeah, we thought we might have to nozzle up, but because the system's running sweet, just let it rock and roll.

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14 minutes, 7 seconds

Yeah. Yeah.

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So So what would you say to other guys that are looking at the Vortex devices here on the Canary planes or anywhere?

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Well, for the investment, uh it's a no-brainer.

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Yeah. um put it in, see where it goes because every other option is

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conventional. Uh that is not really I don't think and working with nature and nature's best interest.

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14 minutes, 34 seconds

Yeah.

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14 minutes, 35 seconds

So I I think Yeah. You know, just because you're hammering hell out of something doesn't mean to say you're going to make it right. Yeah.

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14 minutes, 43 seconds

Um sometimes you just got to step back.

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14 minutes, 45 seconds

So, but you know, but based on based on the seven years it's been in and what what the units cost you to to put in,

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it's it's a pretty low pretty low up upfront cost really.

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Oh, yeah. And like I I don't know what the accumulated benefits of it are, but when you can see them on a a power

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meter, when you can see them in the soil profile, Yeah.

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you you're you're compounding the benefits. Yeah. And I think as long as we're always compounding on a rising plane y

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then you know it's when we're on the ducks and the dives y that uh you know the highs and the lows

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Yeah. We're not we're just standing still. Yeah.

15:27

15 minutes, 27 seconds

But if everything we can do we can compound each year. Uh well we've got another couple of little tricks up our

15:34

15 minutes, 34 seconds

sleeves for uh the vortex devices which uh I'll get um Arthur to look at. um

15:42

15 minutes, 42 seconds

which will be really interesting in a study we've got coming out to improve the uh the fungal ratios in the soil. Um I'm sure Arthur will be all over that.

15:51

15 minutes, 51 seconds

So stand by guys. Next year I'll I'll come back. I won't leave it six years.

15:56

15 minutes, 56 seconds

Arthur, not a problem. Um so look forward to seeing you guys.

16:00

16 minutes

Thanks again, Arthur. Really appreciate you on bud.

16:24

16 minutes, 24 seconds

Heat. Heat.