TVNI Vetiver Grass Technology Case Study Awards

Bioengineering — Submission Template

ICV-8, Chennai, India

One award of US$1,000 for bioengineering. There are separate awards, and separate forms, for agriculture and for phytoremediation.

How to enter

- **Deadline:** 1 April 2027. Email the completed form to **information@vetiver.org** with **TVNI Award Submission** in the subject line.
- **Three-year rule:** the vetiver must have been planted at least three years ago.
- **Send with the form:** eight to ten photographs (the original files) and the site coordinates (question 1.6). If the files are too large to email, send a shared-folder link.
- **Numbers:** put a letter after every number — **M** measured, **R** records, **E** estimate. A form full of honest **E** codes is a good entry.
- **Help:** the annexes mentioned in this form are in the separate Instructions document. Questions to information@vetiver.org with **TVNI Awards question** in the subject line.

PART 1 — WHO AND WHERE

1.1 This entry is for the BIOENGINEERING award. [No action needed — you have the right form.]

If that is wrong, please use the agriculture or phytoremediation form instead.

1.2 Title of your case study [Required]

One line. Say what and where. Example: "Vetiver hedges on a road embankment, Nilgiris district, Tamil Nadu."

1.3 Your name and contact [Required]

- Name:
- Organisation (if any):
- Role — what were you in this work? (engineer, contractor, project officer, road or railway staff, researcher, farmer, volunteer, other):
- Email / phone / postal address:
- Country:

1.4 Who else did this work? [Required]

List the people and organisations who made it happen. If a community did the labour, say so. If an engineer designed it and a contractor built it, say both. We want to know who deserves credit.

1.5 If someone helped you write this form, who? [Helpful]

1.6 Where is the site? [Required]

Because we cannot visit, this is the most important factual question in the form. Annex 5 shows how to get coordinates in about a minute.

- Village / town:
- District / province:

- Country:
- **GPS coordinates of the centre of the site:** Latitude _____ Longitude _____
- Roughly how big is the site? (metres of embankment or bank, hectares of slope, or "about half a kilometre of the canal" — any honest description works):

1.7 Help us find it in a satellite image [Helpful]

Answer whichever you can.

- **If the site is long** (a road, railway, canal, riverbank, gully, dike): coordinates at each end — Start: Lat _____ Long _____ End: Lat _____ Long _____
- **If the site is an area bigger than about half a hectare:** coordinates of two or three corners, or a KML file traced in Google Earth (Annex 5 explains this) —
- **A landmark next to the site that would be visible from above** (a bridge or culvert, a road junction, a bend in the river, a building with a distinctive roof, a tank or reservoir):
- **Which side of that landmark is your site on, and how far?** (e.g. "the cut slope on the east side of the road, about 300 m north of the bridge"):
- **Which part of the site should we look at?** (e.g. "the scar in the middle of the slope is the 2019 slip that the hedgerows have now stabilised"):

1.8 May we put this site on TVNI's public world map of vetiver evidence? [Required]

☐ Yes ☐ Yes, but show the district only, not the exact point ☐ No

PART 2 — THE SETTING (WHAT IT WAS LIKE BEFORE)

2.1 What was the problem? [Required]

3 to 6 sentences, plain words. What was going wrong before the vetiver went in? Who was it hurting? Example: "The cut slope above the road failed every monsoon. In 2019 the debris closed the road for eleven days and the district had to hire a machine twice in one season. A concrete drain had been built along the toe in 2016 and it cracked and filled with soil within two years."

2.2 Describe the place. [Required]

Answer whichever of these you know. "Not known" is fine.

- Climate (rainfall per year, wet and dry seasons, temperature range):
- Slope (flat / gentle / steep / very steep — or degrees or per cent if you know):
- Soil or material (clay, sand, loam, rocky, laterite, black cotton, fill, mine spoil, weathered rock):
- Soil pH, salinity, or contamination if known:
- Water (rainfed, seasonal stream, perennial river, canal, tidal, waterlogged, seepage):
- What was there before, and what the land or structure is used for:

2.3 What else had been tried before the vetiver? [Helpful]

Concrete, riprap, gabions, retaining walls, geotextile, other grasses or trees, repeated repair, nothing at all. Did it work? Why not?

2.4 Whose decision was it to use vetiver, and why? [Required]

Who first suggested it? Had they seen it work somewhere else? Was there resistance, and from whom? Engineers and approving authorities are often sceptical of a grass — if that happened, say how it was overcome.

PART 3 — WHAT YOU DID

3.1 When was it planted? [Required]

- Month and year of first planting:
- Was it planted in stages? If so, list the dates:

3.2 Design and spacing [Required]

Answer what applies:

- Layout (rows across the face of a slope, single line along a bank, block planting, batter rows, toe and crest rows, gully lines, dune lines, etc.):
- Distance between plants (slips) within a row: _____ cm
- Distance between rows / hedges: _____ m
- Number of rows or total length of hedge:
- Total number of slips planted (estimate is fine — mark **E**):
- Was the spacing based on a design or a guess? Who decided it?

3.2a Are the hedges on the contour? [Required]

☐ Yes, surveyed with an instrument ☐ Yes, set by eye ☐ No, they follow the line of the road, bank or structure ☐ Not applicable

- If surveyed, what did you use? (A-frame, line level, hand level, dumpy level, phone app, GPS or Google Earth, or a survey by the design office):

Why this is asked: Annex 1.

3.2b The slope, bank or embankment itself [Required]

- Slope angle, and height of the face:
- Vertical interval between hedge rows: _____ m
- Is there a row along the top edge? ☐ Yes ☐ No — Along the toe? ☐ Yes ☐ No
- Any benching or terracing? Width and spacing:
- Was the slope stable in itself before planting, or was it still moving?
- Was any drainage put in — cut-off drains, toe drains, weep holes, chutes?
- Was vetiver used with anything hard — riprap, gabions, geotextile, concrete, retaining wall? If so, explain what each component was specifically to accomplish.
- Who designed it? An engineer, a contractor, the community, or nobody in particular?

Why this is asked: Annex 1.

3.3 Draw it. [Helpful]

A hand sketch on paper, photographed with your phone, is genuinely useful and counts for as much as a professional drawing. A cross-section through the slope showing the rows, the toe and any drainage is worth more than a plan view. Attach it.

3.4 Where did the planting material come from? [Required]

- Variety or cultivar if known:
- Do you know which type it is — the Asian (sterile) type (*Chrysopogon zizanioides*), the Southeast Asian (seeding) type (*C. nemoralis*), the African (seeding) type (*C. nigritanus*), or "Not known"
- Source (own nursery, neighbour, government nursery, commercial supplier, organised community group's nurseries, project supply, contractor):

- Was supply a problem? Did you have to wait, or travel far, or pay more than expected? On a contract job, did plant supply hold up the programme?

3.5 How was it planted, and by whom? [Required]

- Who did the labour (family, community group, hired workers, contractor, machine)?
- Roughly how many person-days?
- What time of year, and why then?
- Anything done to the ground first (trimming or regrading the face, benching, trenching, topsoil, manure, fertiliser, matting or netting)?

3.6 What maintenance has it had since? [Required]

This is one of the most useful questions in the form. Say honestly what has been done and how often. Cutting, gap-filling, weeding, fencing against livestock, watering in the first season, clearing debris after a storm. If nobody has touched it in four years, say that — it is a valuable finding, and on road and canal sites it is a common one. Also, what maintenance is planned from now on — the same as before, or changed because of what you have seen?

3.7 Herbicide, mowing and shade [Required]

These are the things that most often kill an established hedge on an engineered site. See Annex 1.

- Is any herbicide sprayed on or near this site? Which one, and how close does it come to the hedge? Roadside and canal-bank vegetation control is the usual source.
- If glyphosate is used nearby, how have you handled that?
- Is the site mown, slashed or burned by a maintenance gang? How often, and how low?
- How much sun does the hedge get through the day?
- Has tree or scrub canopy grown over the hedge since it was planted? What happened to the hedge?

PART 4 — CONDITION TODAY

4.1 How old is the vetiver now? [Required] _____ years

4.2 What condition is it in? [Required]

☐ Excellent — dense, continuous, doing its job fully

☐ Good — mostly intact, small gaps

☐ Fair — noticeable gaps or thinning, still working partly

☐ Poor — largely failed

4.3 Describe the condition in your own words. [Required]

2 to 5 sentences. How tall? How dense at the base? Any gaps, and what caused them? Is the line continuous across the face, or broken where water crosses it? Has it spread where you did not want it? Has it survived drought, flood, fire, grazing, machinery? Have you seen any flowers?

4.4 What has it survived? [Helpful]

Name specific events with dates if you can. "The 2023 cyclone", "the flood of August 2022 that took the bridge approach", "a road-widening in 2024 that cut 60 m of hedge." Extreme events are the strongest test and judges weight them heavily. If you know how fast or how deep the water ran, say so — almost nobody reports it and it is one of the most useful numbers in this whole form.

PART 5 — RESULTS

This is the heart of the entry. Take your time here.

5.1 What changed? Fill in the table. [Required]

Give only the results you actually have. Three well-supported results beat ten guesses. Remember the letter code after every number.

What you are reporting	Before	After / now	Code (M/R/E)*	How you know — tool, record, or whose estimate	Over what period
e.g. Days the road was closed by slips	*11 days in 2019*	*0 since 2021*	*R*	*District highway division call-out log*	*2019–2026*

** M = measured (by you, or a sample you took yourself and had tested); R = records (a written record, including someone else's routine testing or monitoring); E = estimate (a best judgement — say whose).*

Ideas for what you might report are in Annex 2. Use any that fit and ignore the rest. Very few entries will have something in every group.

5.2 How did you measure? [Required]

For each measured result above, explain in plain words how you did it. "We drove five steel pins into the top of the bank in 2020 and measure back from each one to the edge every year after the rains." That level of detail is exactly right. If a survey office or a laboratory did it, name them and attach the report.

5.3 What is your comparison? [Required]

How do you know the change came from the vetiver and not from something else? Pick whichever is true:

☐ We have an untreated stretch next to it we can compare against

☐ We have measurements or survey from before planting

☐ A comparable site without vetiver behaved differently over the same period

☐ Judgement only — we did not have a comparison, but here is why we believe it was the vetiver:

☐ Other:

Explain in 2 to 4 sentences. Saying "judgement only" honestly is not a weakness. Claiming a comparison you do not have is.

5.4 What did NOT work, or did not change? [Required]

Every real project has some of this. A case study that reports only successes is less believable, not more. Judges have been told to look for this answer.

5.5 Who else can confirm this? [Helpful]

We cannot visit your site, so an independent voice carries weight. Name one or two people not in your own household or organisation who know the work and would answer a question about it if we wrote to them — a highway or irrigation engineer, a village leader, a district officer, a contractor, a neighbouring landowner. A short, signed letter from any of them is even better, but a name and a contact is enough.

- Name, role, and how to reach them:
- ☐ A letter is attached

PART 6 — COSTS AND BENEFITS

Use your local currency. Say which currency and roughly which year the prices are from. Estimates are expected here — mark them **E**.

6.1 What did it cost? [Required]

Item	Cost	Code (M/R/E)	Notes
Planting material			
Site preparation (regrading, benching, trenching)			
Labour to plant			
Maintenance so far (total since planting)			
Tools, fencing, matting, transport			
Design, survey, technical advice			
Total			

- Currency: _____ Prices are from around the year: _____
- If you can, give the cost per metre or per square metre of face treated: _____
- Who paid? (own money, community contribution, government scheme, road or water authority budget, donor project, company budget, loan):
- How much of the labour was unpaid or contributed?

6.2 What was it worth? [Required]

Benefit	Value per year (or one-off)	Code (M/R/E)	Notes
Repair or reinstatement cost avoided			
Cost avoided elsewhere (dredging, desilting, machine hire)			
Value of access kept open (traffic, trade, school, market)			
Products sold (slips, fodder, thatch)			
Other			

6.3 Benefits you cannot put a price on [Required]

Safety, water security, no more flooded houses, children can walk to school in the rains, a village no longer cut off, land dispute settled, dust reduced, pride. Write 2 to 5 sentences. These count.

6.4 How long until it paid for itself? [Helpful]

Your honest sense is enough: "about two seasons", "not yet, but the road repairs have stopped", "never in cash but it saved the approach road."

6.5 What was the alternative? [Helpful]

If you had not used vetiver, what would the engineered option have cost? A rough quote, a tender price, or a comparable local job is fine. Any of these, or something else:

- *Concrete or rock riprap revetment, per metre or per kilometre*
- *Gabions, mattresses or sheet piling*
- *A retaining wall, shotcrete, or soil nailing*
- *Regrading or benching the slope*
- *Repeated repair of the same failure, at the rate it was costing before*
- *Relocating the road, canal or building instead*
- *Doing nothing — in which case, what would that have cost by now?*

If vetiver was used alongside a hard structure, the useful figure is often what the hard structure would have cost on its own to do the whole job.

PART 7 — HAS ANYONE ELSE COPIED IT?

Report only what you actually know. A small number you have checked yourself scores better than a large number you have only heard about.

7.1 Have others taken it up? [Required]

- Roughly how many other people, sites, or lengths of road or bank? _____ (Code: M / R / E)
- How do you know? (you counted, you walked or drove the area, a survey, a project record, word of mouth):
- How far has it spread — same road or canal, neighbouring division, whole district?

7.2 How did it spread to other sites? [Required if others have taken it up]

Did people see it and copy it themselves? Did you train them? Did an official visit and take it up? Did a contractor carry it to the next job? Spread that happens without a project paying for it is of particular interest to TVNI — describe it if that is what happened.

7.3 Did any institution get involved? [Helpful if others have taken it up]

Government ministry or department, highway or railway authority, irrigation or water board, local government (municipal, panchayat or local council), other local institution or organisation (religious, social, service organisation or club), university, company, NGO, project or programme, other. Has it been written into any policy, scheme, budget line, tender, or standard specification? Has anyone come to see it officially?

7.4 Is anyone earning a living from it? [Helpful]

Nurseries selling slips, contractors doing planting, people making and selling products. Even one person with a small nursery is worth reporting. If a contractor now bids vetiver work as a line item, say so.

PART 8 — LESSONS LEARNED

8.1 What went wrong? [Required]

Be specific. Failed plantings, wrong spacing, livestock damage, a season lost, money that ran out, machinery that cut through the line. Say what you did about it.

To jog your memory — these are the things that most commonly go wrong with vetiver anywhere in the world. Did any happen to you? Tick or describe:

☐ Plants died in the first weeks — too dry, too wet, or poor material

☐ Slips went straight from dry ground into waterlogged or flooded ground

☐ Spacing too wide, so the hedge never closed

☐ Rows too far apart vertically, so water gathered speed between them

☐ Hedge too far off the contour, so water was channelled along it and broke out at one point

☐ Water was concentrated onto the hedge from a drain, culvert or road edge

☐ The toe was undercut or scoured before the hedge had established

☐ Planted on a slope that was still moving or a fill slope that was not adequately compacted or other condition (specify), so that vetiver could not hold it

☐ Livestock or grazing got in before the hedge was established

☐ Herbicide drift, e.g., glyphosate, from roadside or canal-bank spraying

☐ Repeatedly mowed, slashed or burned too low by a maintenance gang

☐ Shade — trees or scrub grew over the hedge

☐ Machinery, road-widening or desilting cut through the line

☐ Nobody maintained it once the project, contract or funding ended

☐ Something else:

Why we want this: Annex 1.

8.2 What would you do differently? [Required]

8.3 What surprised you? [Required]

Something you did not expect — good or bad.

8.4 What advice would you give someone starting this tomorrow in a similar place? [Required]

3 to 6 short points. Write it as if you are talking to a colleague on site.

8.5 What would you need to do this at ten times the size? [Helpful]

Money, plant supply, permission, skilled people, machinery, a standard specification, a policy change — say what the real bottleneck is.

PART 9 — THE STORY

TVNI needs stories as much as it needs data. This part is short and it matters. Write it as you would tell it out loud.

9.1 Tell us about one person. [Required]

Pick one person this work affected — it can be you. What was their situation before, and what is it now? 5 to 10 sentences. Use their name if they agree. Concrete detail beats general praise: "his truck now gets through in August, which it never did before" says more than "connectivity improved."

9.2 What did someone say? [Helpful]

One or two direct quotes from a person involved — an engineer, a driver, a village leader, a sceptic who changed their mind. Write down their actual words. Give their name and role.

9.3 The moment it became obvious it was working. [Helpful]

Was there a day, a storm, an inspection, a visit, when people could see it? Describe it.

PART 10 — PERMISSIONS AND DECLARATION

10.1 Permission to publish [Required]

☐ TVNI may publish this case study, in full or in part, in newsletters, on the website, at ICV-8, and in TVNI's evidence base, with credit to the people named in 1.3 and 1.4.

10.2 Photographs [Required]

☐ I have permission from the people shown in my photographs for TVNI to publish them.

☐ Some photographs may not be published — I have marked which.

10.3 Named individuals [Required]

☐ Anyone I have named or quoted has agreed to be named.

☐ Please use initials or "an engineer in [district]" instead of names — I have marked which.

10.4 Declaration [Required]

☐ Everything in this form is true to the best of my knowledge. Where I was not sure, I said so. Where a number is an estimate, I marked it **E**.

Signed: _____ Date: _____

NOTE: The instructions document does not have to be read or followed in order to enter. However, we do encourage you to use it as a guide so that you know why a question is asked, how to measure something, or what type of information we would like to receive.

Bioengineering form — v1, closing 1 April 2027