Confronting Climate Change: *Vetiver System Applications*

The Fifth International Conference on Vetiver (ICV-5)

Vetiver and Climate Change

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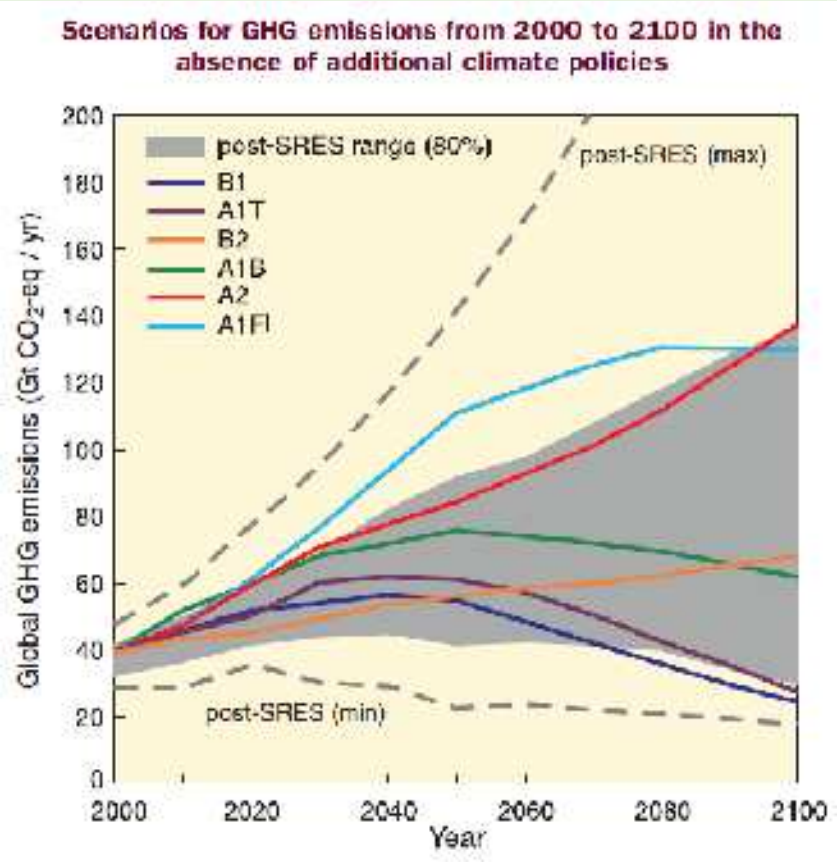
Jim Smyle – President TVNI

The Vetiver Network International

Proven & green environmental solutions

Climate Change Effects: 2100



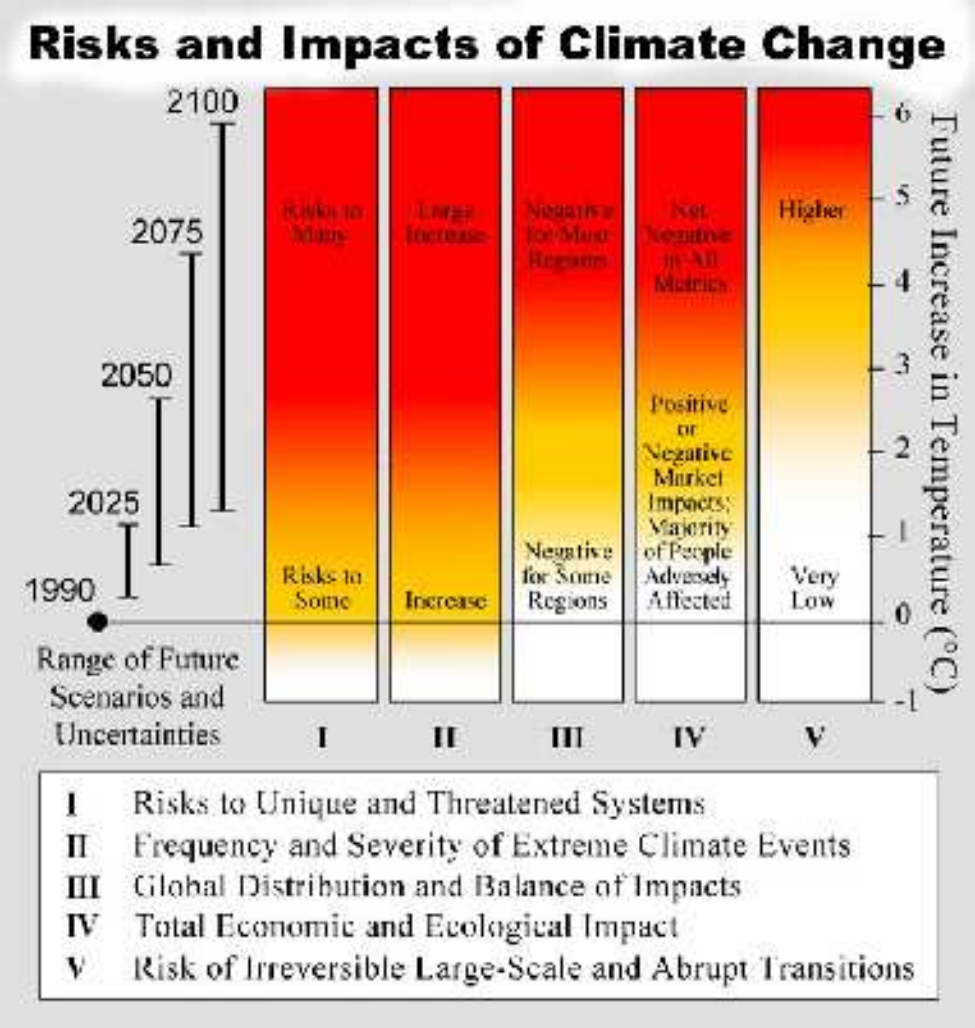
Change seems certain; most scenarios negative, some worse than others.

Temperature?: 1.1 – 6.4^{O}C (locally highly variable)

Sea Level Rise?: 0.18 – 0.59m (locally highly variable)

Precipitation?: increase >20% (high latitudes) − decrease >20% (subtropical)

Why Be Concerned?



Who Are The Most Vulnerable?

Source: Maplecroft, 2011

Climate Change: India

Indian Network for Climate Change Assessment (INCCA), 2010

- Objective: ascertain CC impacts in 2030s.
- Four major regions: Himalayan, North Eastern, Western Ghats, & Coastal Region

Impacts by 2030 (India)

Temperature: + 1.7°C to 2ºC seasonal variability

Extreme temperatures: daily maximum & minimum intensity

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Precipitation: small increase in annual; fewer rainy days
Extreme Precipitation: increased frequency
Cyclones: fewer, more intense
Storm surge (coastal): 5% to 20% increase
Sea level Rise: on average, slight increase (50-80 cm)

Impacts by 2030 (India)

Water availability: variable, generally wetter = increase & drier = decrease

Sediment yields: up to 25% increase, most areas

Floods: 10% to 30%, compared to 1970s, most regions

Drought: earlier onset, moderate – extreme in southern portion NE; West Coast; most severe in Himalayas

Crop Water Demand: increases 5% - 20% in Himalayas & NE; variable Coastal Zone; decrease nominal to 5% other areas

Impact Pathways

- Reduced dry season flows & droughts
- Higher peak flows & flash flooding
- Increased landsliding
- Salinization coastal areas
- Urban water supply & drainage
- Infrastructure stability (dams, bridges, roads, etc.)

Source: INCCA, 2010

Impact Pathways

- Land degradation & loss: erosion/flood/ sediment
- Agriculture: overall declines in total yield for all regions & most crops (rice, sorghum, maize, mustard, wheat, apple)
- Increased temperature/humidity stress on livestock
- Food security (high risk) *source: Maplecroft, 2010*

Source: INCCA, 2010

VS Applications: Climate Change Adaptation & Enhancing Resilience

Impact Pathways	Soil & Moisture Cons.	↓ Runoff Velocity & Trap Sediment	Divert Flows	Enhance Infiltration	Infra. Protection & Stabilization	Slope & River Bank Stabilization	Others (Fodder/ Thatching/ Mulch)
↓ Dry season flows & droughts	X			X			X
↑ Peak flows & flash flooding	X	X	X	X	X	X	X
↑ Landsliding		X	X			X	
↑ Salinization					X		
Urban water supply/drainage				X		X	
Infrastructure stability (dams, bridges, roads)		X	X		X	X	
Land loss & degradation	X	X	X	X	X	X	
Ag: ↓ total yield	X	X		X			X
↑ Temp/humidity & stress livestock	X			X			X
↓ Food security	X	X	X	X			

SOIL AND WATER CONSERVATION

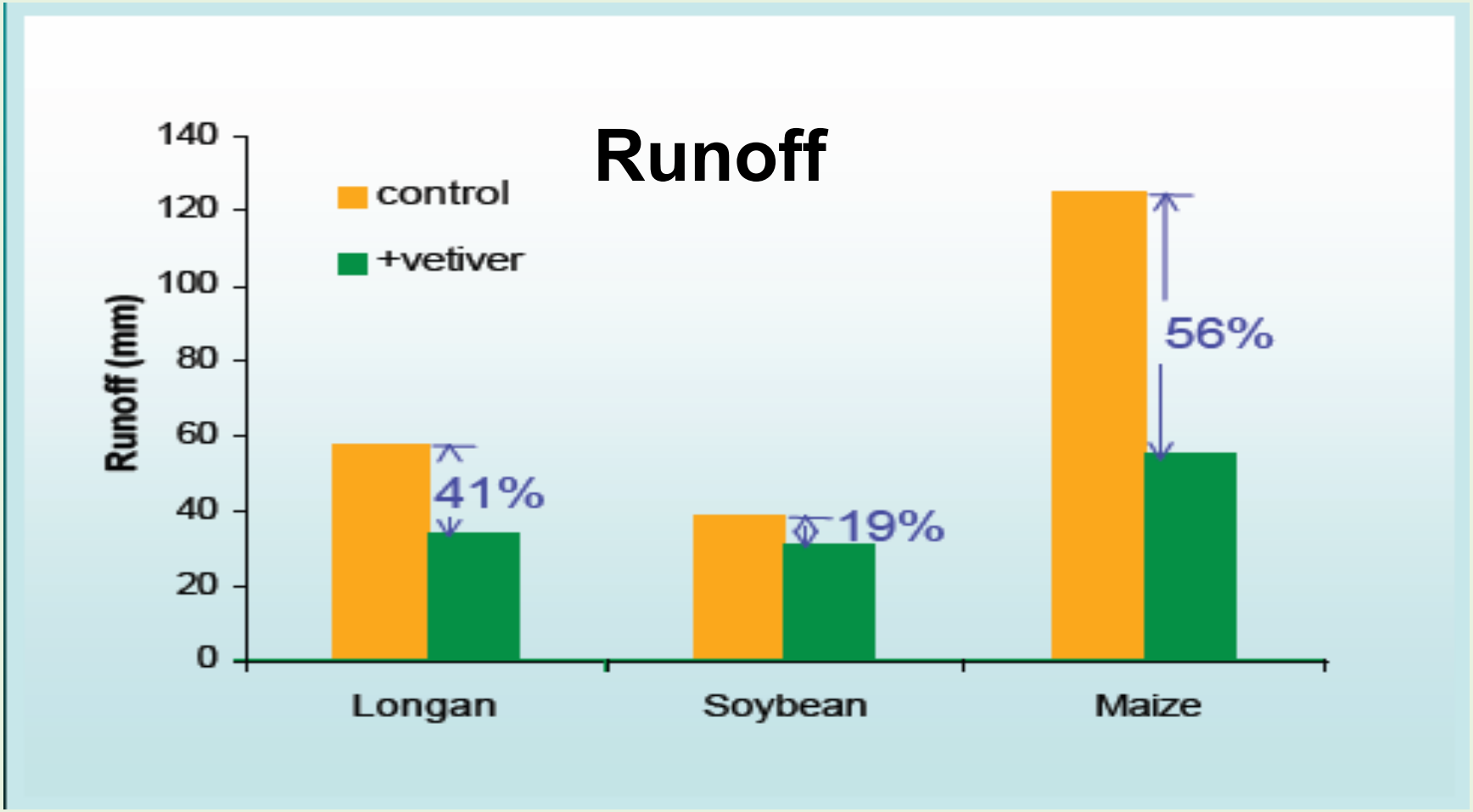
Sehore - Madhya Pradesh. India
1% slope - black cotton soil

North-west Ethiopia - 1,500 asl
20% slope - volcanic soil

Reduce Runoff Velocity & Trap Sediment

Gully stabilization in the Congo (DRC)

Enhance Infiltration



Source: B. Deesaeng, J. Pheunda, C. Onarsa and A. Boonsaner. 2006. Vetiver potential for increasing groundwater recharge. Watershed Research Division, Wildlife and Plant Conservation Department. Bangkok, Thailand

Divert Flows

Vetiver protecting a spillway

Infrastructure Protection

Brazil – Residential Slope Stabilization

Infrastructure Stabilization

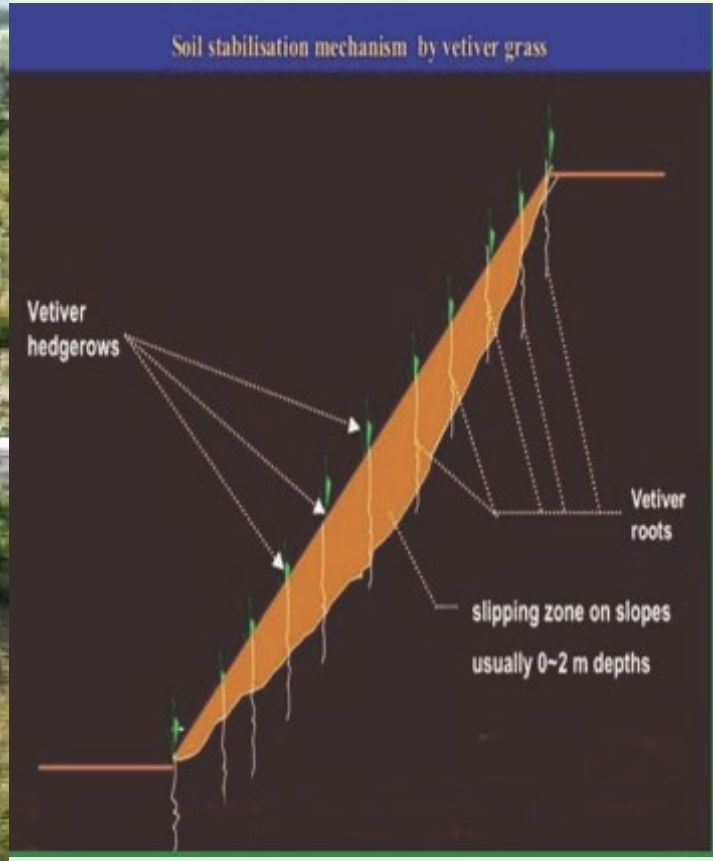
Malaysia – Highway Stabilization

Sea Dike Protection

Viet Nam: Wave Overtopping Simulator Tests - Vetiver grass could suffer a maximum wave overtopping discharge of up to 120 l/s per m.

Protection of Interfaces Between Dissimilar Materials

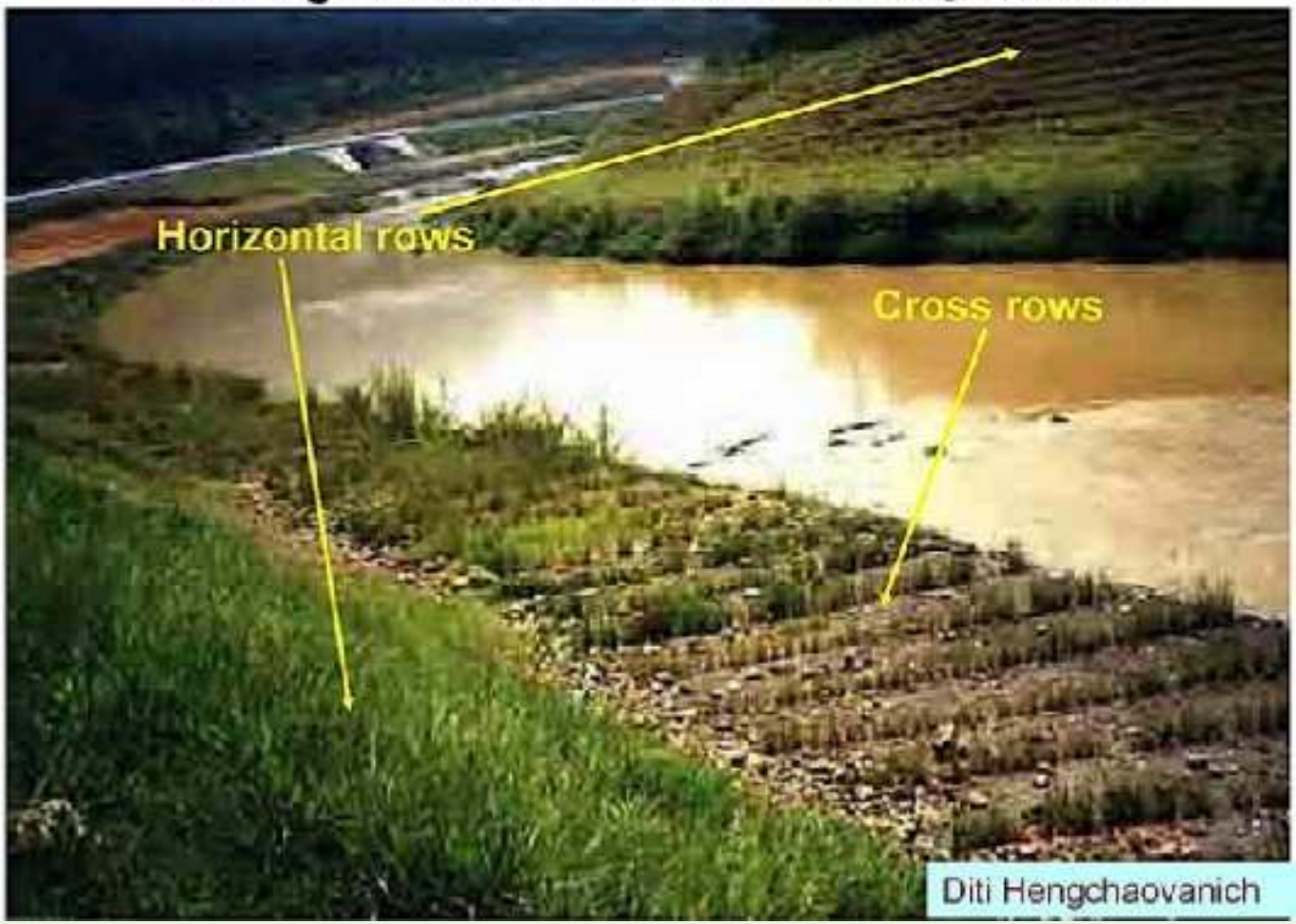
Slope Stabilization



USA California: a farmer showed he could stop his slope slipping. Results after 4 years.

River Bank Stabilization

Malaysia: **An outstanding success, several floods did not damage this river.** Photo Credit Diti Hangchaovanich



Others: Fodder & Thatching

Karnataka, Mysore District: farmers have been using Vetiver for generations for fodder

Venezuela: Vetiver roof thatching

Others: Mulch

Congo (DRC): Vetiver hedgerow & mulch w/pineapple.

VS Applications: Climate Change Adaptation & Enhancing Resilience

- Two "types" of adaptation:
  - Autonomous: adaptation that farmers, groups, communities can make privately.
  - Planned: thru govt. actions & spending with the goal of enhancing the capacity of populations to adapt.
- VS greatest strength for CC adaptation = tool people apply themselves…gives them capacity to respond to risks posed by CC.

VS Applications: Enhancing Adaptation Capacity & Resilience

- Enhancing people's capacity to adapt is a considered one of the top priorities for responding to climate change…VS can do that.
- By using the VS, individuals and communities increase their resilience in the face of CC…another top priority for climate change response.

VS Applications: No Regrets

- Systems that can effectively cope with existing weather variability will be more successful in adapting to future climate change than those that cannot.
- Even in the absence of climate change, anything you do with Vetiver is going to help your given current climate.

VS For Mitigation

- High importance of better understanding VS potential for mitigation
- Prioritize climate change adaptation:
  - Mitigation financing uncertain
  - Where adaptation presents the opportunity to leverage additional benefits from mitigation, it would make sense to do so.
  - Many VS applications can have mitigation benefits