Monitoring and Reporting of Soil Organic Carbon – in practice –

Considering mitigation and adaptation benefits at multiple levels

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On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
Federal Ministry for Economic Cooperation and Development
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UNIQUE forestry and land use

SOC Monitoring & Reporting methods for mitigation

SOC monitoring methods (selected examples)	Activity monitoring & process-based models	Scale	Reflection
IPCC 2006 IPCC Guidelines for National GHG Inventories	Yes	National	Basis for all methods but countries often lack activity data for SOC
VCS VM0017: Adoption of Sustainable Agricultural Land Management (SALM)	Yes	Project	High demonstration value
VCS VM0026 Methodology for Sustainable Grassland Management (SGM)	Yes	Project	High demonstration value
GS Value chain (SCOPE 3) guidance for SOC	Yes or direct measurement	Value chain	Evolving cooperate approach
Ex-Act tool	Yes	Project-national	Widely used for decision support by public sector
Cool-farm tool	Yes	Farm level	Widely used for decision support by private sector

SOC Monitoring & Reporting case study: Vi Agroforestry Western Kenya projects

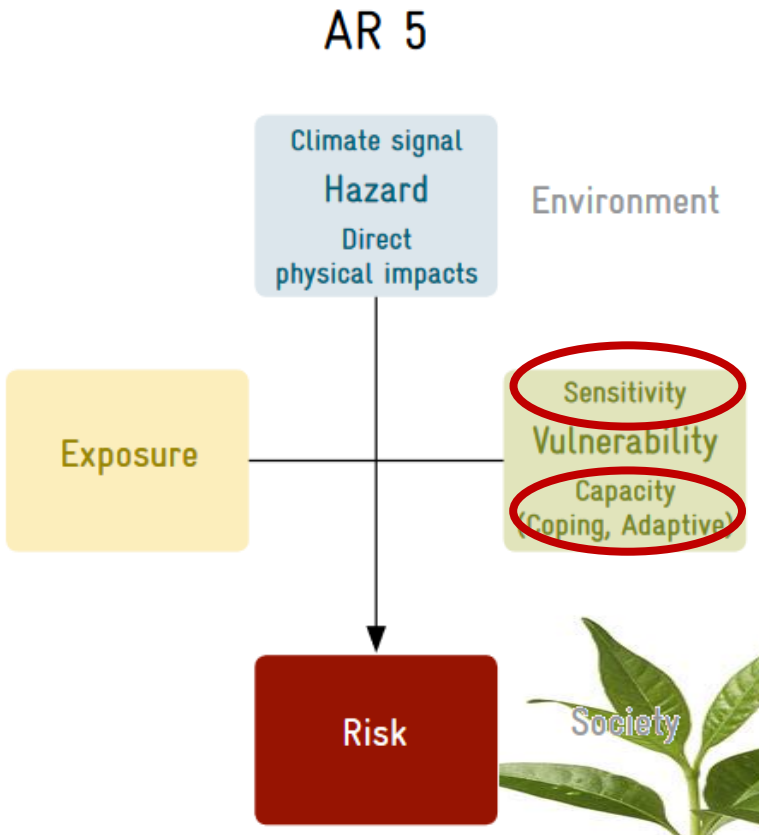
- Projects implementer Vi Agroforestry; Livelihoods Funds & World Bank BioCF invested
- System operating since 2009 with > 50,000 family farms included
- Monitoring & extension support provided by Vi Agroforestry; dairy market access provided
- 3rd party verified farmer groups self-reporting & extension staff monitoring revealed no significant differences (farmer self reporting slightly underestimate the area, but no difference in yield monitoring)
- Monitoring costs: US$1.4/ha/yr; extension costs vary: US$3-30 /ha/yr depending on approach and intensity

SOC Monitoring & Reporting case study: Vi Agroforestry Western Kenya project

Farmer increased yield by more than 3-times & 36,000 tCO2 mitigated in 2016 on 22,140 ha

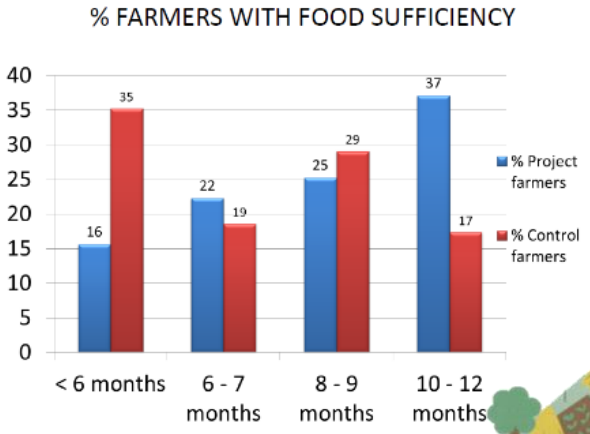
Adaptation monitoring

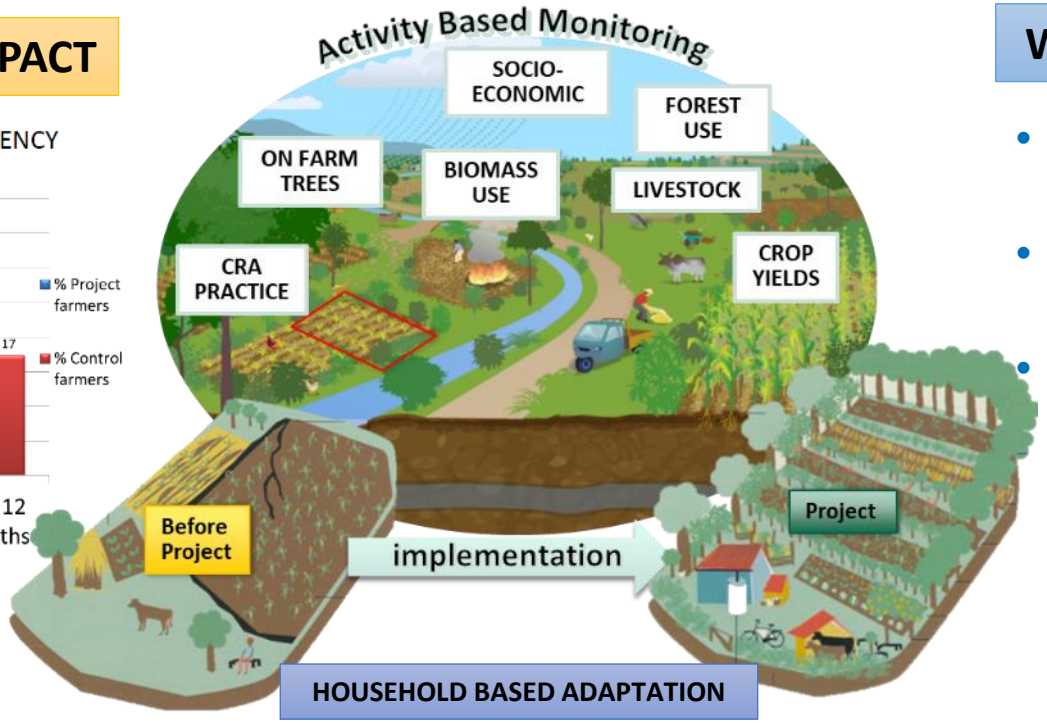
- As opposed to mitigation, adaptation is very site and context specific.
- Adaptation reduces climate risk by reducing exposure or vulnerability.
- Measures that enhance SOC can
  a) reduce physical sensitivity directly (e.g. increasing water holding capacity and reducing erosion)
  b) increase capacities indirectly (e.g. through higher yield and income)



SOC Monitoring & Reporting case study - **adaptation**: Vi Agroforestry Western Kenya projects

SOCIO ECONOMIC IMPACT

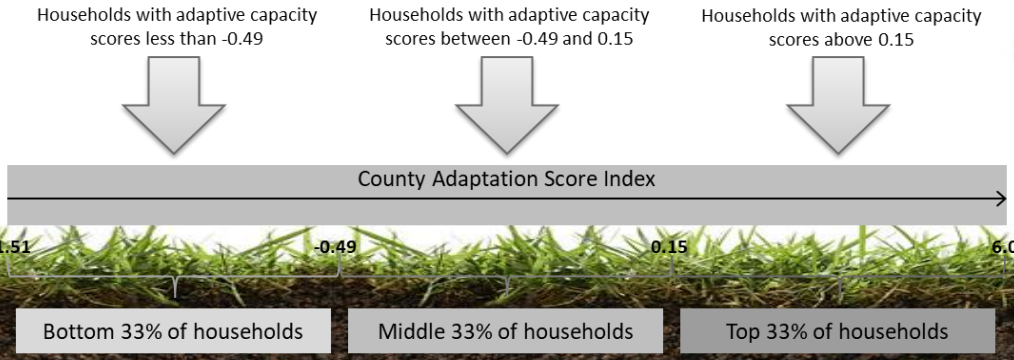




WATER

- 11 $t \cdot ha^{-1} \cdot y^{-1}$ soil loss reduction
- 2 % reduction in runoff
- 6 % increase in available water in the soil ≈ 70 mm of rainfall

HOUSEHOLD BASED ADAPTATION



Conclusions

- The technical SOC mitigation potential highlighted by the 4per1000 initiative can be only realized, when there is **growing confidence in robust SOC monitoring & reporting** among public and private actors and investor
- Existing SOC monitoring & reporting methods vary depending on its purpose and scale:
  - **Activity monitoring and process-based models** are most **widely used for mitigation** monitoring, but further research is needed
  - **Adaptation monitoring** is context specific, impacts are often directly monitored (household income), but activity monitoring is also used (monitoring food intake to understand nutrition)
  - **Direct measurements** are applied when there is direct information value (e.g. for precision farming) and/or when new cost effective technology is available (e.g. infrared spectroscopy in hand held devices)
- **Digital agriculture**: Mobile Apps and Management Information Systems to monitor outputs, activities and input use and its effects (e.g. yield and water use efficiency) will play a key role in the future. MIS will **reduce the costs** of data collection and **facilitate artificial intelligence in extensions and data sharing** among farmer and value chain partner.
- Finally, climate monitoring & evaluation has to integrate **multi-level and multi-purpose information**. The preparation of the NDC implementation plans e.g. provide a window of opportunities.