World Soil Day Celebration
Food Security, Soils, Climate-Smart Agriculture
Sochi, Russia
5-6 December 2019

Linking soil carbon protection and sequestration from climate-smart soil practices to NDCs

Liesl Wiese-Rozanova

International Consultant

South Africa

Soil organic carbon (SOC) sequestration

Technical annual SOC sequestration potential (agriculture)

- 2-5 Gt CO_2 $year^{-1}$

~38-86 %

Annual agricultural GHG emissions

- 5.2-5.8 Gt CO2eq $year^{-1}$

(Smith P. et al., 2014)

(Fuss et al., 2018; Smith et al., 2019)

Rank	Country	SOC sequestration potential (Mt C yr^{-1}) (Zomer et al., 2017a)
1	USA	124.66
2	India	103.8
3	China	65.42
4	**Russia**	**62.59**
5	Australia	36.23
6	Brazil	35.88
7	Canada	26.78
8	Mexico	21.1
9	Nigeria	19.77
10	**Ukraine**	**17.29**
16	**Kazakhstan**	**13.24**

Soil organic carbon (SOC) protection

Risk of SOC loss from peatlands

- 2 202 Gt CO2eq

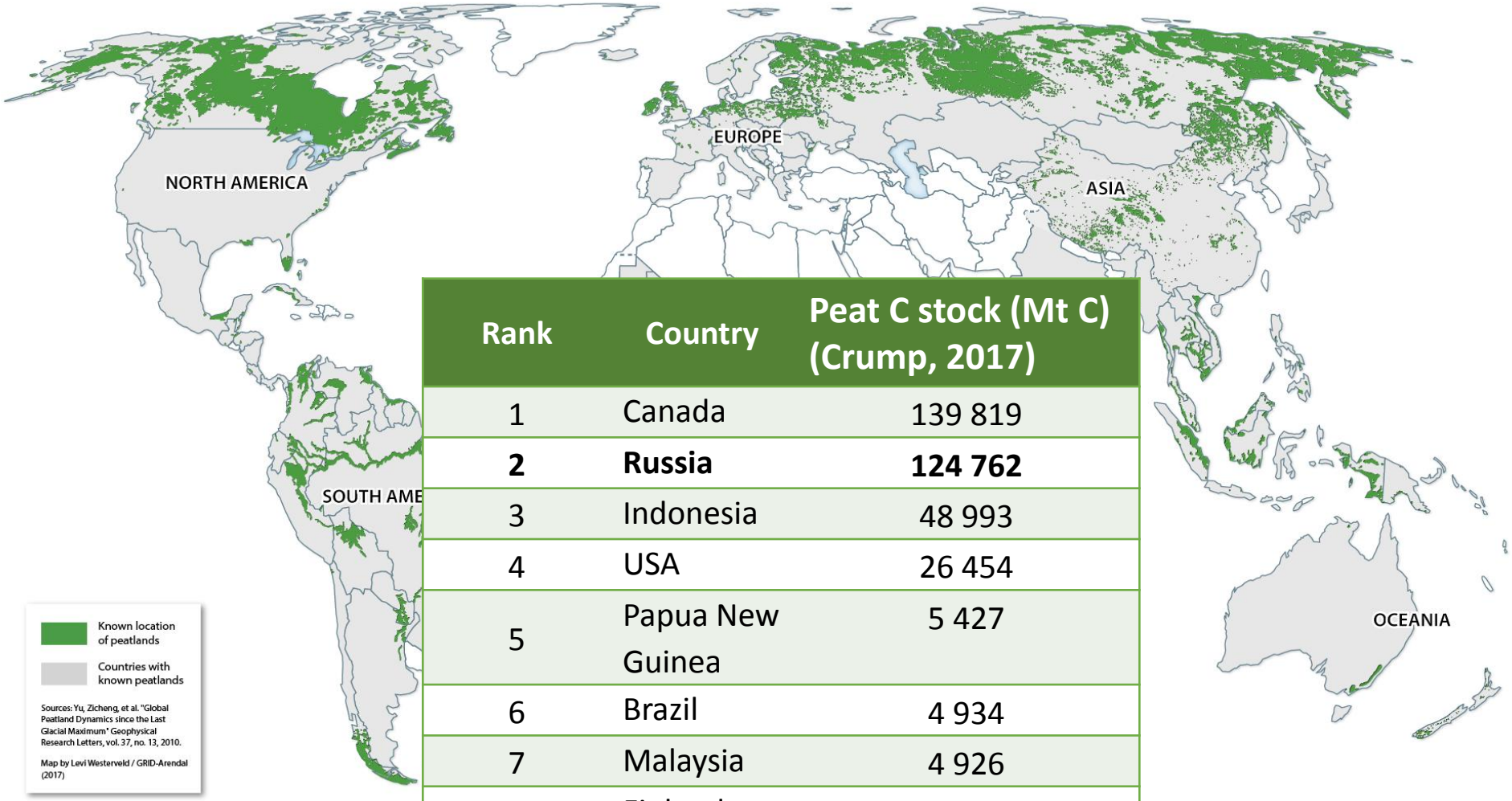
  (Leifeld and Menichetti, 2018; Rumpel et al., 2019)

Exploited for agricultural production due to high fertility

~ 1.91 Gt CO2eq $year^{-1}$

(Leifeld and Menichetti, 2018)

Soil organic carbon (SOC) protection

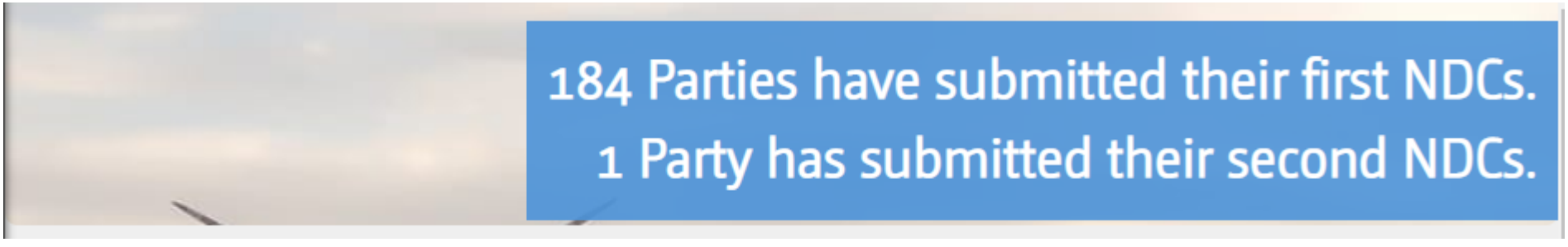


Rank	Country	Peat C stock (Mt C) (Crump, 2017)
1	Canada	139 819
2	**Russia**	**124 762**
3	Indonesia	48 993
4	USA	26 454
5	Papua New Guinea	5 427
6	Brazil	4 934
7	Malaysia	4 926
8	Finland	4 802
9	Sweden	4 535
10	China	2 924
19	Belarus	1 184

Yu et al, 2010; GRID-Arendal

Nationally Determined Contributions

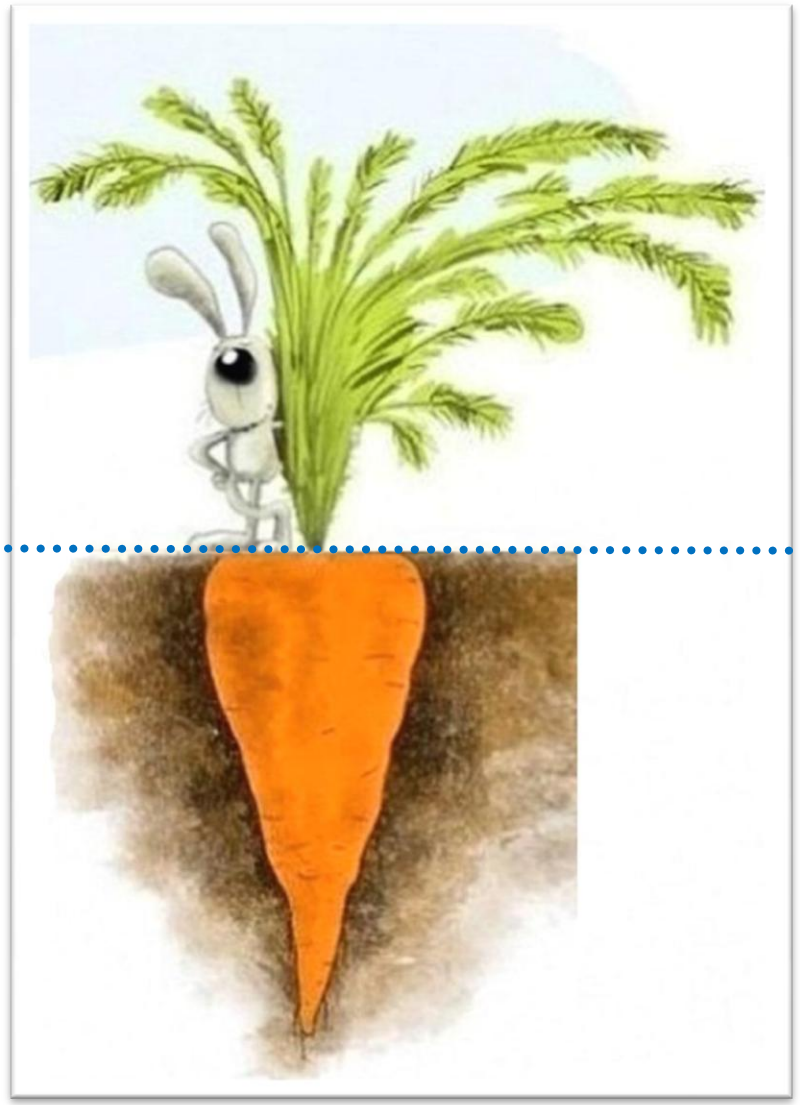
- Voluntary pledges for mitigation and adaptation to meet the 2015 Paris Agreement goals
- Support should be provided to developing countries to allow higher ambition
  - ✓ Enhance capacity to prepare, communicate and account for NDCs
- Since October 2019 – all 12 Eurasian countries ratified Paris Agreement



Nationally Determined Contributions

Platform and opportunity to specify SOC protection and sequestration targets

Soil carbon in NDCs



Opportunity

Opportunity

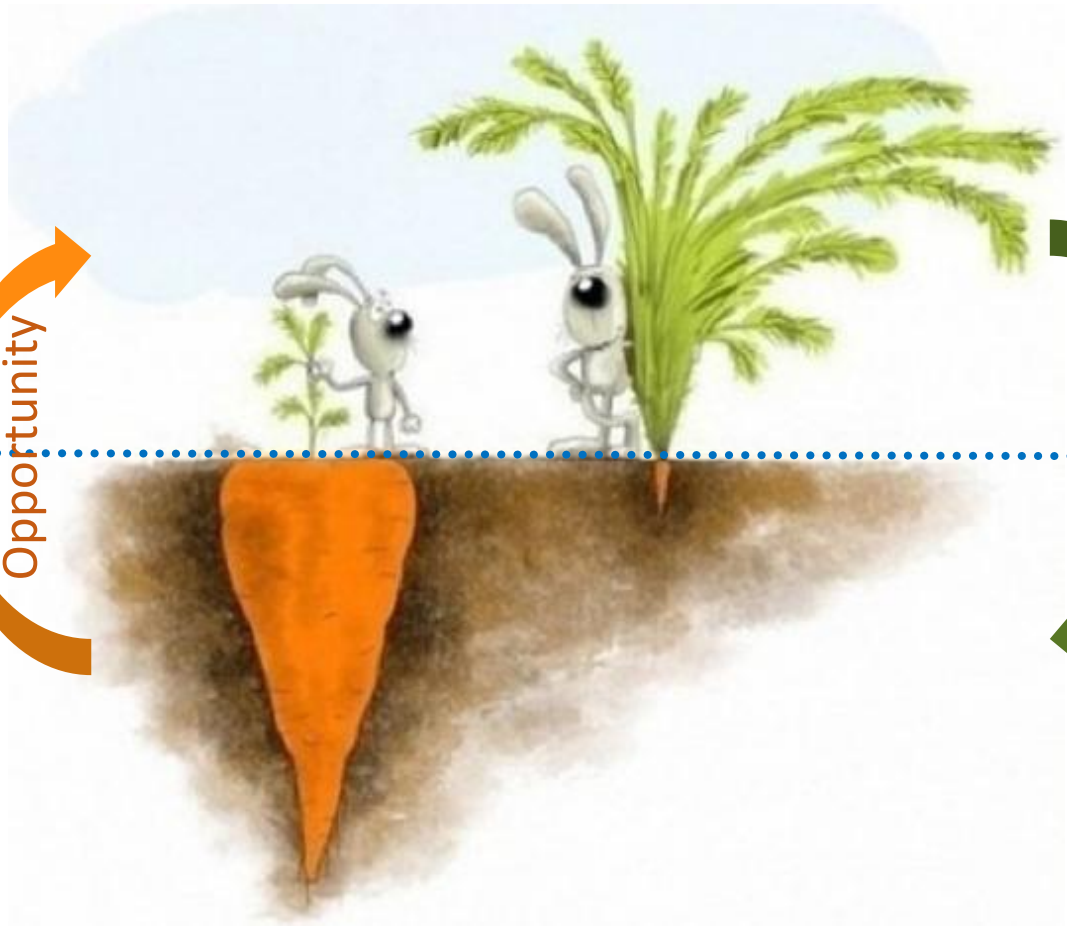
National

- **Policy**
- **Technical capacity**
- **Climate finance**

Nationally Determined Contributions

Platform and opportunity to specify SOC protection and sequestration targets

Soil carbon in NDCs



National

- **Policy**
- **Technical capacity**
- **Climate finance**

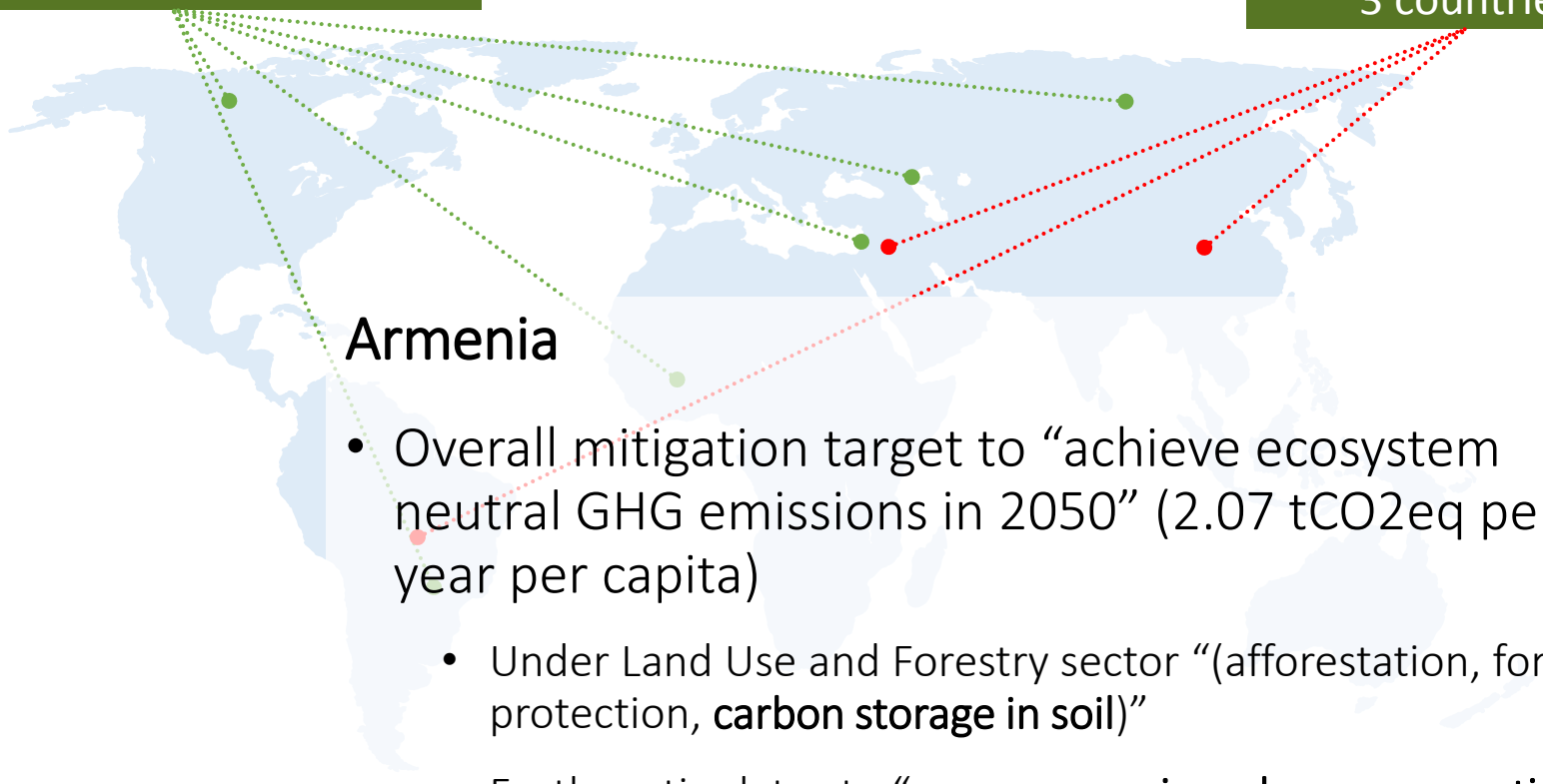
Soil organic carbon in the NDCs

SOC specified in NDC agriculture / AFOLU targets

10 countries

SOC specified in general NDC text

3 countries



Armenia

- Overall mitigation target to “achieve ecosystem neutral GHG emissions in 2050” (2.07 tCO2eq per year per capita)
  - Under Land Use and Forestry sector “(afforestation, forest protection, **carbon storage in soil**)”
  - Further stipulates to “ensure **organic carbon conservation, accumulation and storage** in all categories of lands through comprehensive measures”.

Sources:
Richards, 2019
Richards et al. 2016
Hönle et al. 2018
Revised NDCs

Measures for SOC sequestration/protection in

Number of countries specifying measures that would support soil carbon sequestration or protection

Measure/s	Mitigation	Adaptation
Grassland/ Pasture land management	13 (Azerbaijan)	15 (Moldova)
Erosion control	9	41 (Georgia, Moldova)
Integrated soil fertility management	6	13 (Uzbekistan)
Protecting/Rewetting peat soils	11 (Belarus)	3
Agroforestry/Silvo-pastoralism	31	36
Organic amendments (manure, compost, biochar)	12	10
Reduced/stopped (crop residue) burning	11	6
Residue retention (mulching)	3	3
Reduced or no-tillage	5	6 (Moldova)
Conservation agriculture	21	13

Concluding remarks

- NDCs provide an opportunity for countries to quantify SOC-related targets to leverage support for national **policies**, technical **capacity** development, access to **climate finance**, increase **transparency** for global SOC accounting
- Identify appropriate climate-smart agriculture practices to protect or sequester soil carbon in Eurasia
- Include soil carbon measurement and monitoring as part of climate-smart agriculture management planning and implementation
- Include soil carbon as parameter in climate-smart agriculture-related research linked to climate change

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

Thank you for your attention.

*This work was funded by **Vanguard Charitable**,*

with assistance from

Betsy Taylor, Breakthrough Strategies and Solutions;

the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS); and

supported by the 4 per 1000 Soil Initiative.

4 PER 1000 SOILS FOR FOOD SECURITY AND CLIMATE

Vanguard Charitable

BREAKTHROUGH & STRATEGIES & SOLUTIONS

THE UNIVERSITY OF VERMONT RUBENSTEIN SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES