



# MRV OF LIVESTOCK GHG EMISSIONS: CURRENT PRACTICES AND OPPORTUNITIES FOR IMPROVEMENT

Andreas Wilkes  
Lini Wollenberg  
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RESEARCH PROGRAM ON  
Climate Change,  
Agriculture and  
Food Security



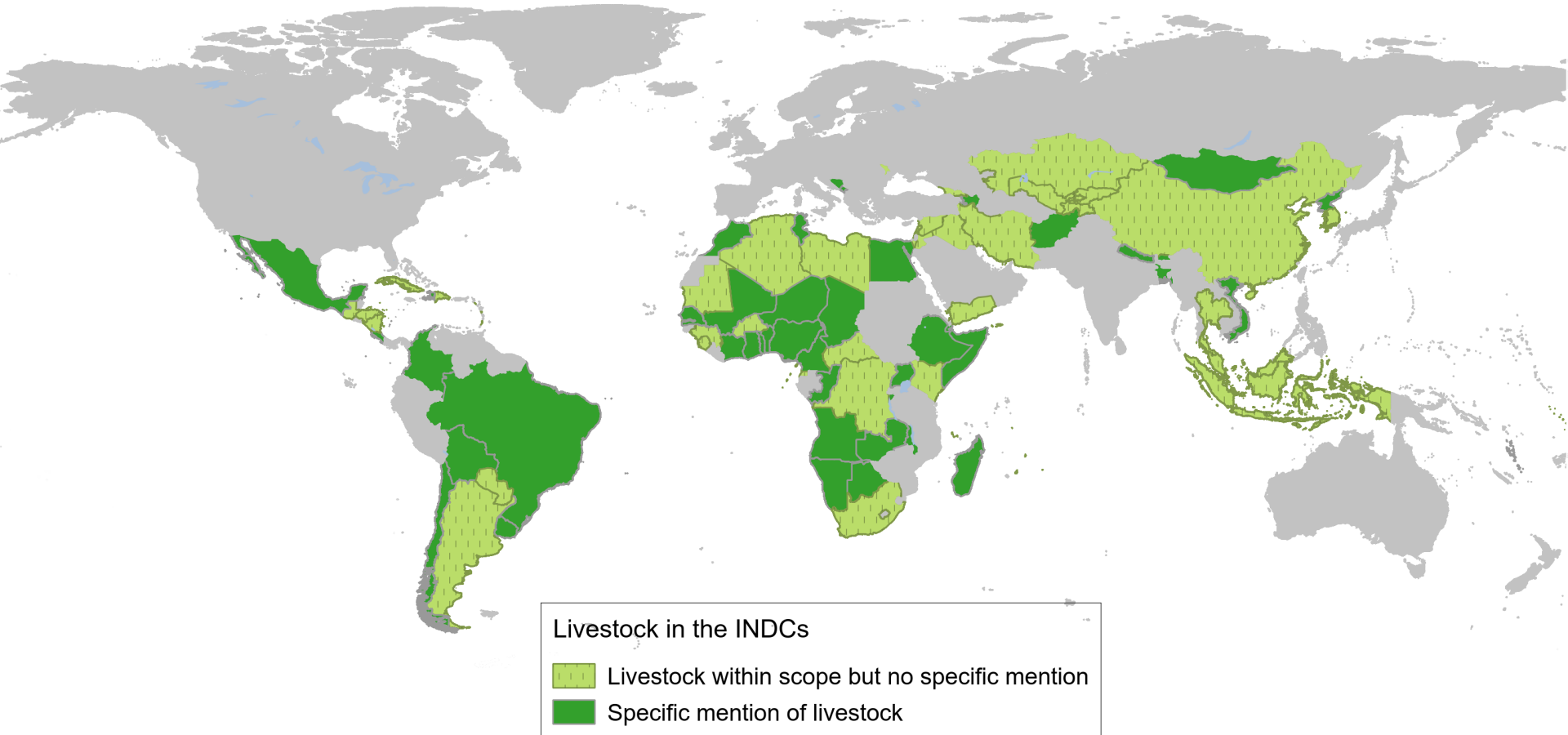
Food and Agriculture Organization  
of the United Nations



GLOBAL  
RESEARCH  
ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

# 92 DEVELOPING COUNTRIES INCLUDED LIVESTOCK EMISSIONS IN THEIR NDCs



# ANALYSIS OF MRV OF LIVESTOCK EMISSIONS

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**Collaboration of CCAFS, GRA, FAO and the World Bank  
with UNIQUE Forestry and Land Use**

- What is the current state of MRV for livestock emissions?
  - What are the barriers and opportunities for improvement to meet countries' needs?
1. Review Paper, analysis of national comms, survey, interviews— finalized by May 2017
  2. “Making MRV work” workshop Feb 2017

# MRV IN THE UNFCCC – PRE PARIS

**M**

*IPCC 1996, 2000 GPG, 2003 LULUCF*

**R**

Developed Country Parties	Developing Country Parties
National Communication every 4 years	National Communication every 4 years, with flexibility
Biennial Report every 2 years	Biennial Update Report every 2 years, with flexibility
National GHG Inventory annually	

**V**

Reporting	Verification
National Communication	Consultative Group of Experts
Biennial Update Report	International consultation and analysis & facilitative sharing of views

# MRV IN THE UNFCCC – POST PARIS (2015)

**M**

- all Parties shall account for their NDCs
- take into account existing methods and guidance

**R**

- all Parties shall regularly submit national inventory reports and information on implementation and achievement of NDCs
- developing country parties should regularly communicate progress made on implementing capacity building plans, policies, actions or measures

**V**

- “facilitative, multilateral consideration”
- Global stocktake every 5 years, starting 2023

*Ad Hoc Working Group on the Paris Agreement (APA) to report modalities and procedures for the enhanced transparency framework in 2018*

# MRV IN THE UNFCCC - PRINCIPLES

## How to MRV?

Principle	Interpretation
Transparency	Assumptions and methodologies clearly explained
Consistency	Same methodologies used for all years
Comparability	Use agreed methodologies and reporting formats
Completeness	All GHG sinks and sources are covered
Accuracy	No systematic over- or under-estimation, uncertainties are reduced as far as practicable

## Additional considerations?

Cost-effective	Make cost effective use of resources
Precision of the trend	Ability to describe the trend in emissions over time



# MRV IN THE UNFCCC - FLEXIBILITY

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## Characteristics of requirements

1. UNFCCC: “Flexibility for those countries that need it”

“should”, “are encouraged to”...

2. IPCC: Tier 1, Tier 2, Tier 3

“should”, “may”, “are encouraged to”...

- ➔ Flexibility allows improvements over time, but does not answer **what is acceptable MRV practice or how to improve over time**
- ➔ Given this flexibility, how can MRV of livestock GHG emissions best serve national policy objectives?

## Status of inventory practices

- 119 out of 140 developing countries using Tier I (85%) approaches that generally do not capture mitigation
- Most countries are still designing their MRV systems for mitigation of livestock emissions
- Each country has made progress on different aspects of MRV design
- No 'one size fits all' solution



### Diverse structures for Tier 2

#### Argentina



- 8 agro-ecological and climatic regions
- Breeding and fattening systems identified/region
- Production systems modeled (activity, diet, reproduction and production)
- Aggregate results cross-checked against regional, census and agricultural production data.

#### Bolivia



- 3 climatic regions (altiplano, valles and tropics)
- Cattle and sheep sub-classes (e.g. dairy cattle, non-dairy cattle, young cattle and oxen) using expert opinion in region.
- Data on feed rations, apparent digestibility of forage and feed and other production data (e.g. milk yields, live weights)/region obtained from publications or government agencies.

## OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES:

### Parameters & data sources for updating Tier 2 Efs by some countries

Country	Type	Parameters						
		Live weight	Weight gain	Milk yield	Fat content in milk	Diet composition	Pregnancy rate	Feeding situation
Denmark	Dairy cattle	S	S	S	S	S		S
Poland	Dairy cattle			S	S	E	S	
Portugal	Dairy cattle			S	S		S & X	L & S
Portugal	Cattle	S						
Czech	Cattle	E	E	S	S			E
Slovakia	Cattle	L & S		S		E	E	

S= statistics; E = expert judgment; L=literature data; X: extrapolated

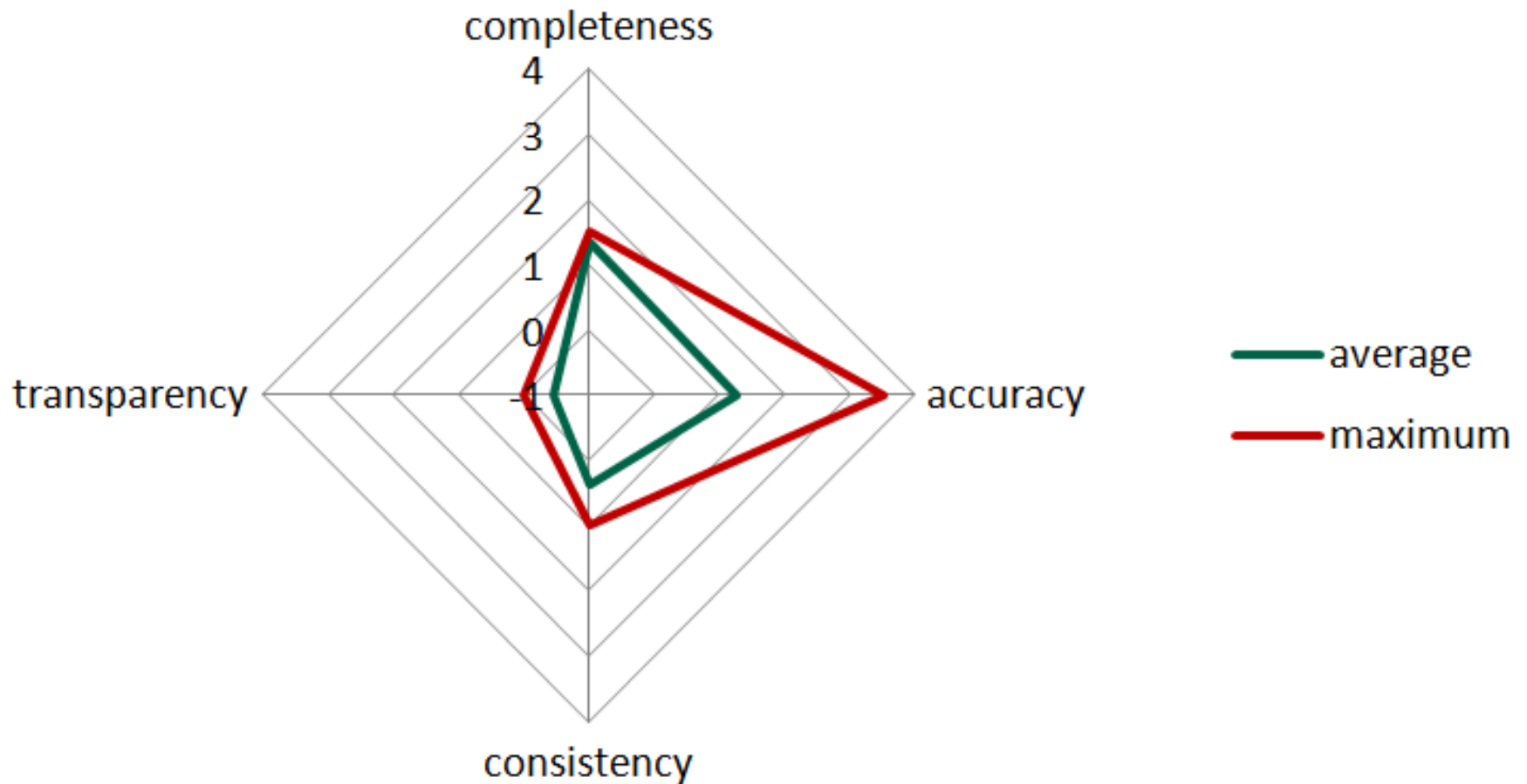
## OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES

### Practical constraints to inventory improvement

	Chile	Colombia	Ethiopia	Indonesia	Philippines	Vietnam
Human resource allocation to inventory work	✓	✓				
Institutional structures for inventory related research	✓		✓			
Weak links with national data providers (e.g. statistics agencies)	✓		✓	✓		✓
Lack of data on diverse farm conditions			✓			✓
Limited capacities for Tier 2 research			✓			✓
Sustainability of finance for inventory agencies		✓				
Finance for activity data collection or emission research			✓	✓	✓	✓

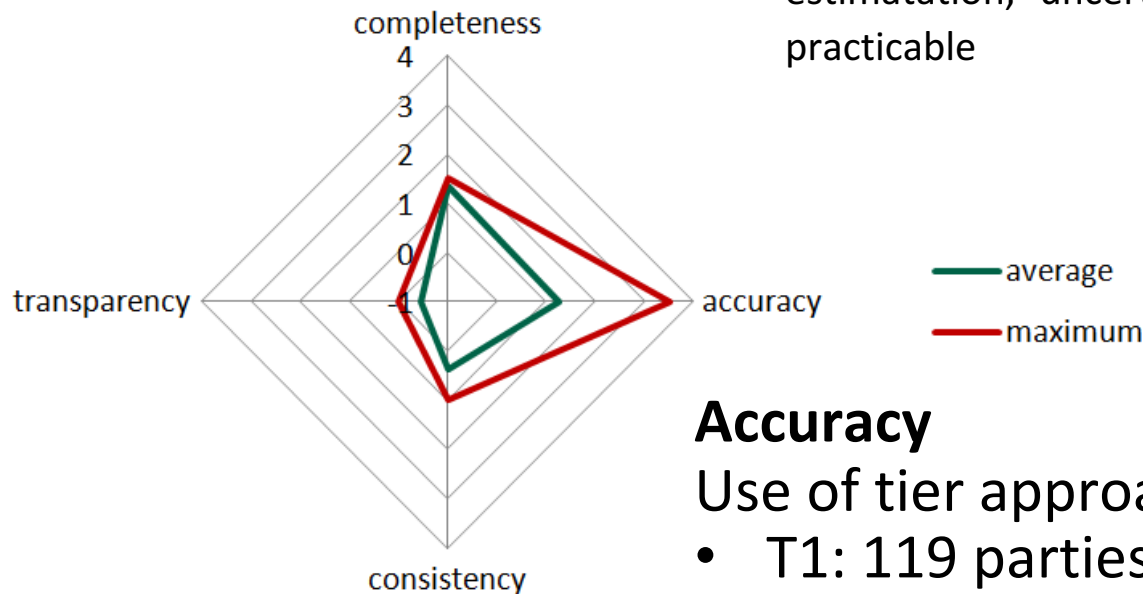
# OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES

## MRV criteria



# OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES

Accuracy: No systematic over- or under-estimation, uncertainties are reduced as far as practicable



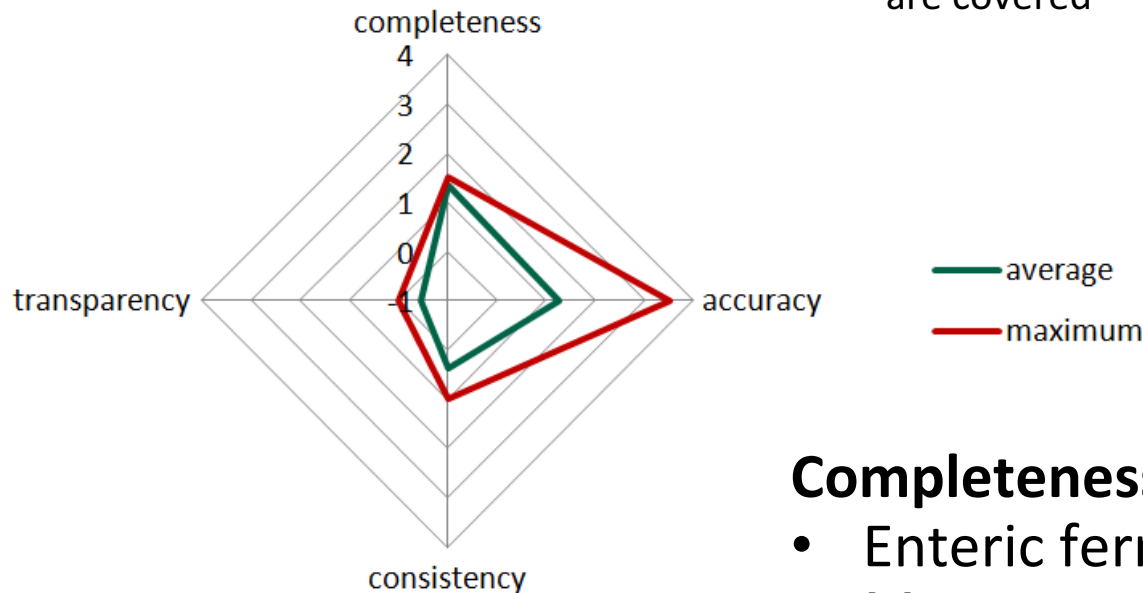
## Accuracy

Use of tier approaches:

- T1: 119 parties
- T2, no updating of emission factor: 16 parties
- T2 with updated EF: ~5 parties
- 89 parties made no analysis of the uncertainty

# OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES

Completeness: All GHG sinks and sources are covered

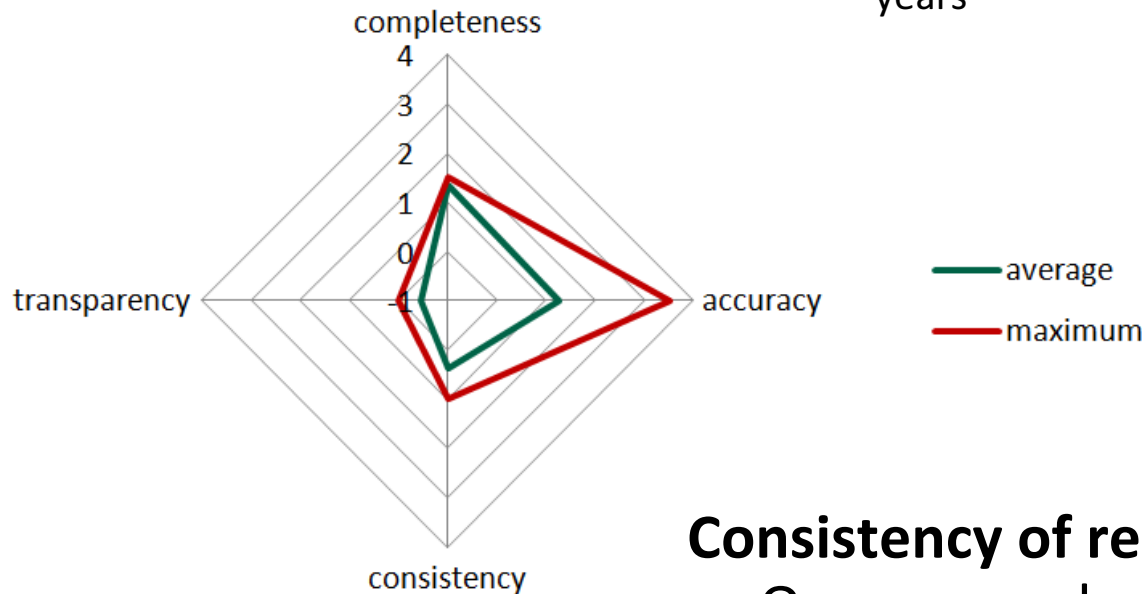


## Completeness

- Enteric fermentation: 139 parties
- Manure management CH<sub>4</sub>: 134 parties
- Manure management N<sub>2</sub>O: 115 parties
- Ag soil N<sub>2</sub>O: 116 (PD?)

# OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES

Consistency: Same methodologies used for all years

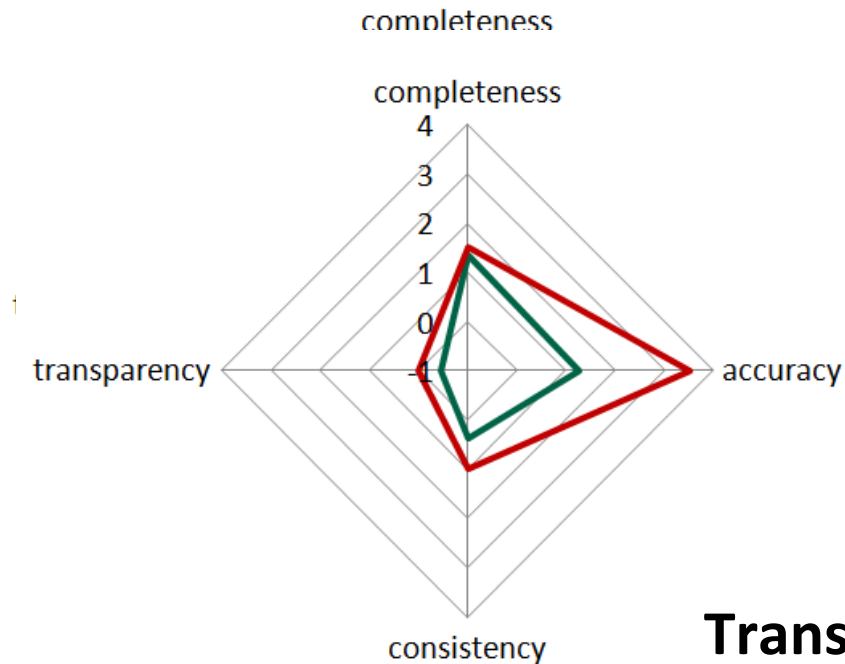


## Consistency of reporting:

- One year only: 21 parties
- Consistent time series: 82 parties
- Inconsistent time series: 37 parties



# OVERVIEW OF CURRENT GHG INVENTORY PRACTICES BY 140 PARTIES



Transparency: Assumptions and methodologies clearly explained

## Transparency:

- Activity data reported: 99 parties
- Emission factors reported: 117 parties
- Reason for source omission: 12/32 parties

# IS IMPROVING ACCURACY THE TOP PRIORITY?

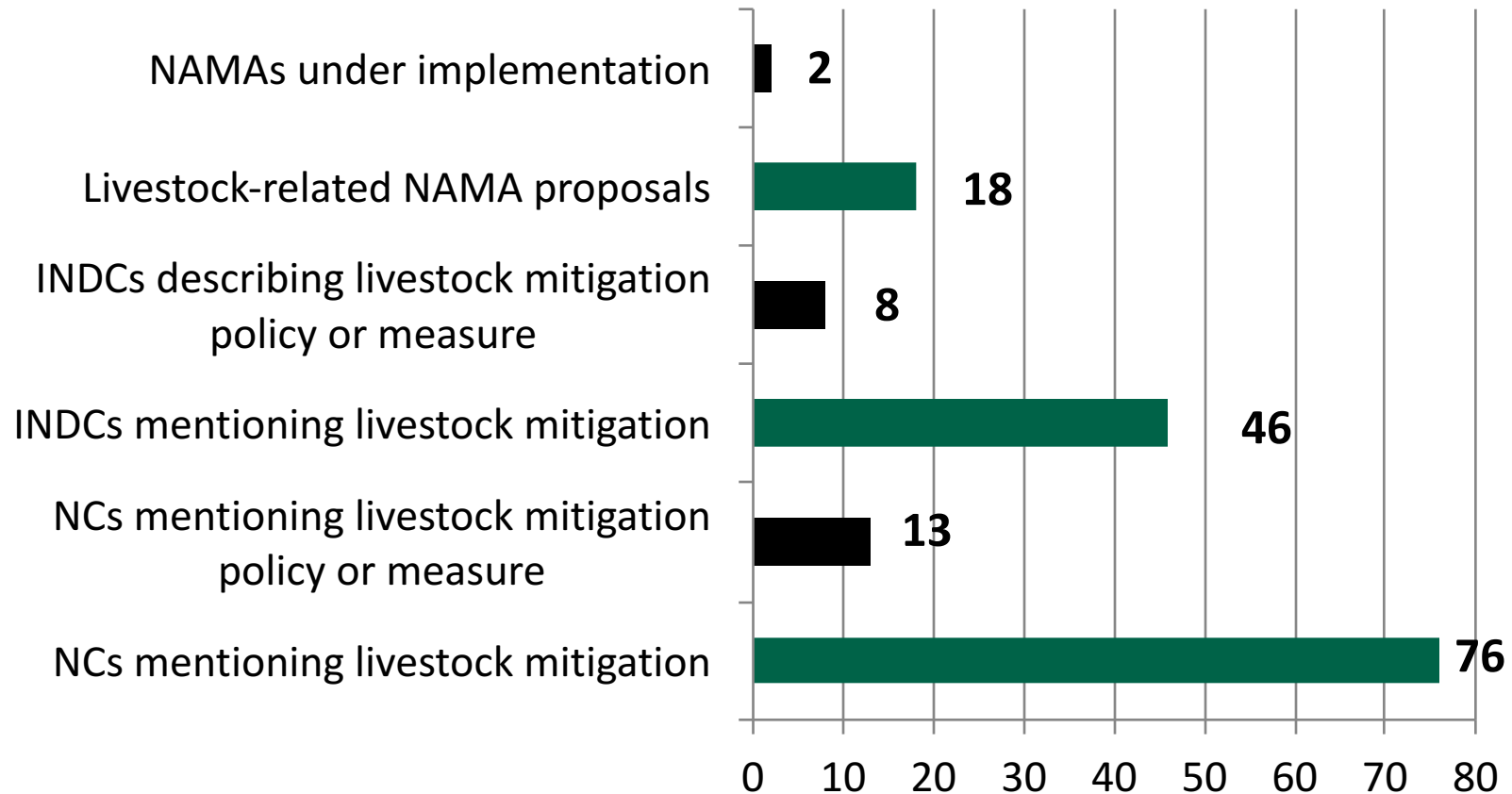
	Uncertainty of activity data (%)	Uncertainty of emission factor (%)	Combined uncertainty (%)
Selected Developing Country Parties (n=12)	12 (0 – 40)	26 (10 - 50)	28 (14.14 – 58.30)
Selected Developed Country Parties (n=35)	5 (0 – 20)	24 (0 – 89)	24 (5.00 – 89.02)

Q1: What policy objectives are served by increasing accuracy?

Q2: If a country has limited resources for inventory improvement, should accuracy be a priority or should the focus be on trends?

# MRV OF MITIGATION ACTIONS

## Status of intentions and actions



➔ *How are countries thinking about MRV of mitigation actions?*

# MRV OF MITIGATION ACTIONS

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## Fundamental technical issues

- Determining GHG sinks and sources affected by livestock mitigation actions
- Baseline setting
- Sources of EF and activity data
- Levels of accuracy and uncertainty

# MRV OF MITIGATION ACTIONS

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## Linking MRV of NDCs to national inventories and other benefits

### 1. Ideally national inventory and MRV on NDCs are compatible

But:

- (1) most countries' national inventory do not update T1 or T2 emission factors, so cannot reflect effects of mitigation actions on enteric fermentation;
- (2) most countries' NDCs are compared to a BAU scenario, not inventory base year;
- (3) MRV of action may use higher resolution AD & EFs than inventory;
- (4) actions may affect many sinks and sources in different parts of the inventory.

### 2. MRV of non-GHG benefits

# MRV OF MITIGATION ACTIONS

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## Institutional coordination

How to integrate data management systems among

1. different government agencies
2. government and the private sector (including finance sector)
3. project-level and national-level MRV, and
4. international and national institutions.

# MRV OF MITIGATION ACTIONS

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## What is driving decisions at the moment?

UNFCCC guidance very general

Most climate finance sources have not developed specific requirements

- ➔ Country stakeholder processes determining priorities
- ➔ Capacities and resources are determining progress




# RECOMMENDATIONS

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1. Expand support for analysis, identification and implementation of economically viable, farmer-focused livestock mitigation options
2. Consider updated Tier 2 approaches using activity and livestock production data that reflect changing livestock systems and their productivity
3. Improve synergies among statistical systems, other livestock data systems and MRV
4. Share country experiences on priorities for livestock MRV system development
5. Promote MRV innovation at different level of mitigation action and MRV (project, jurisdictional, sectoral, national)

**With many thanks!**

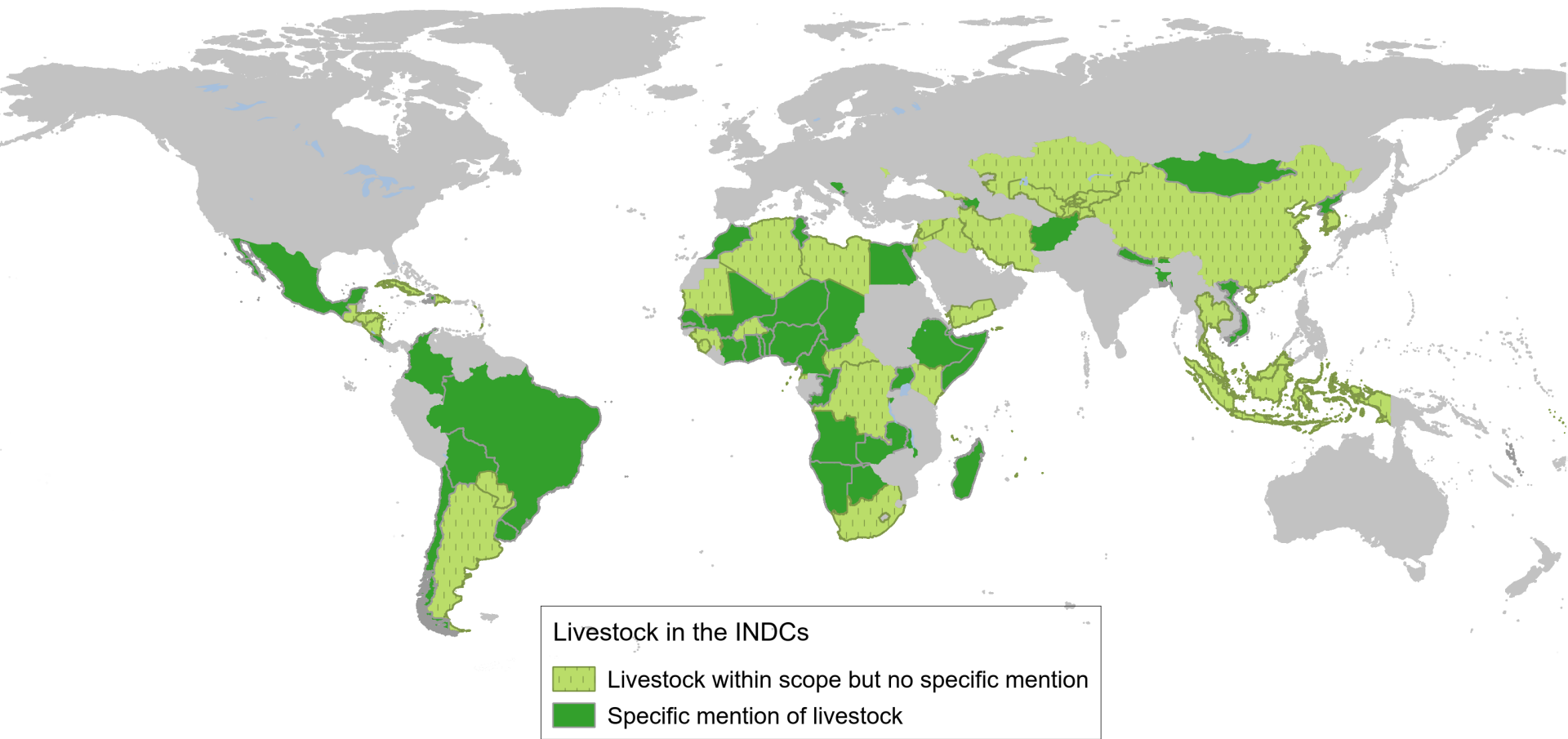
**andreas.wilkes@unique-landuse.de**



Schnewlinstr. 10  
79098 Freiburg, Germany  
Tel: +49 761 208534 – 0

unique@unique-landuse.de  
www.unique-landuse.de

# LIVESTOCK AND THE NDCS



- 92 developing countries include mitigation of livestock emissions in their NDCs
- 38 on enteric fermentation, 30 on manure emissions or biogas mitigation measures, and 31 on grasslands, pastures or silvopastoral practices

# GHG INVENTORY IMPROVEMENT

What strategy if accuracy is the priority?

Key  
source  
analysis

Improving  
data on  
livestock  
populations

Improving  
characterization  
of livestock  
populations &  
production  
systems

Improving data  
on feed intake  
and digestibility

Tracking change  
in livestock  
performance

# GHG INVENTORY IMPROVEMENT

What strategy if a precise trend is the priority?

Analysis of  
sector  
trends,  
policies and  
plans

Identify  
livestock  
sub-  
populations  
relevant to  
policy  
objectives

Establish  
inventory  
structure  
reflecting  
policy  
priorities

Use  
available  
data to  
produce  
emission  
estimates

Assess data  
quality and  
improve  
accuracy  
over time

# MRV IN THE UNFCCC (2)

## MRV of what?

### **GHG emissions (enteric f., manure mgt., urine & dung deposit)**

- National Inventory Report
- in National Communications
- summary/update in BUR

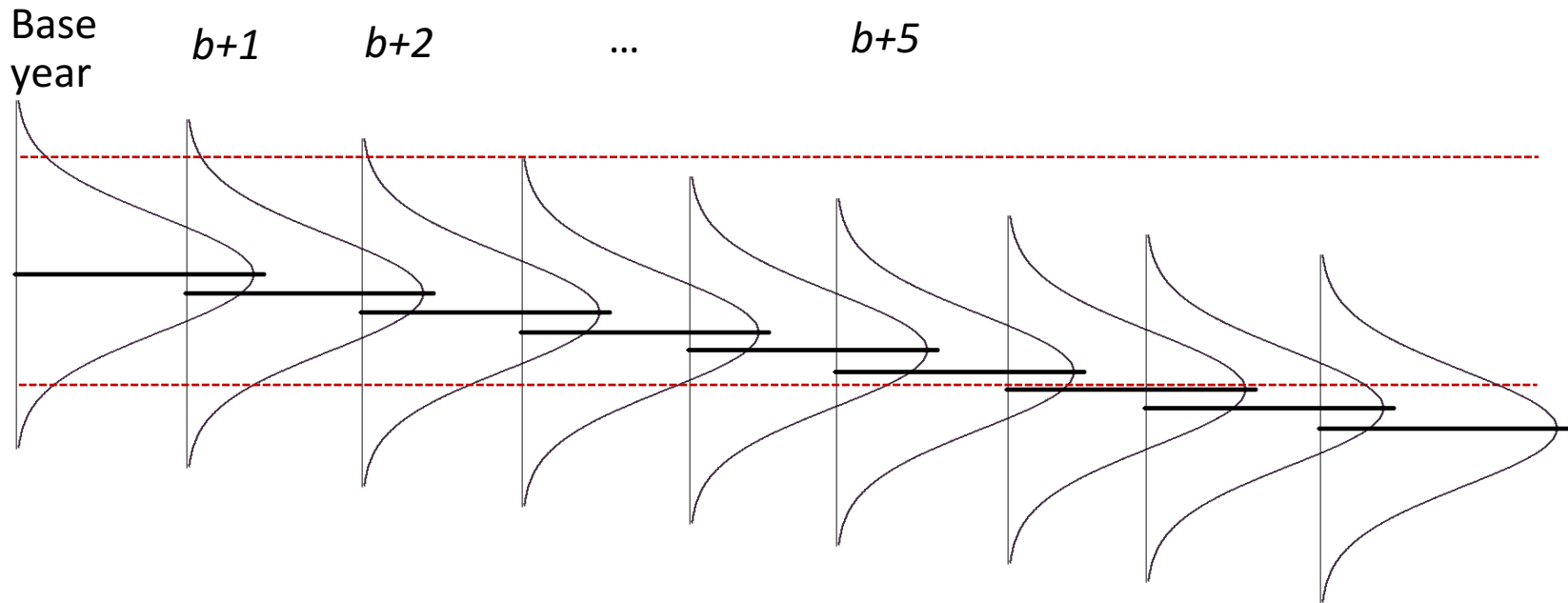
### **Mitigation actions**

- NC: Information on measures, methods, results, scenarios, institutions
- BUR: objectives, methods, steps, progress, results, emission reductions “to the extent possible”

### **MRV arrangements**

- institutions & systems for MRV
- approach used for measurement (incl. methods)
- approach used for verification (incl. experts & mechanisms)

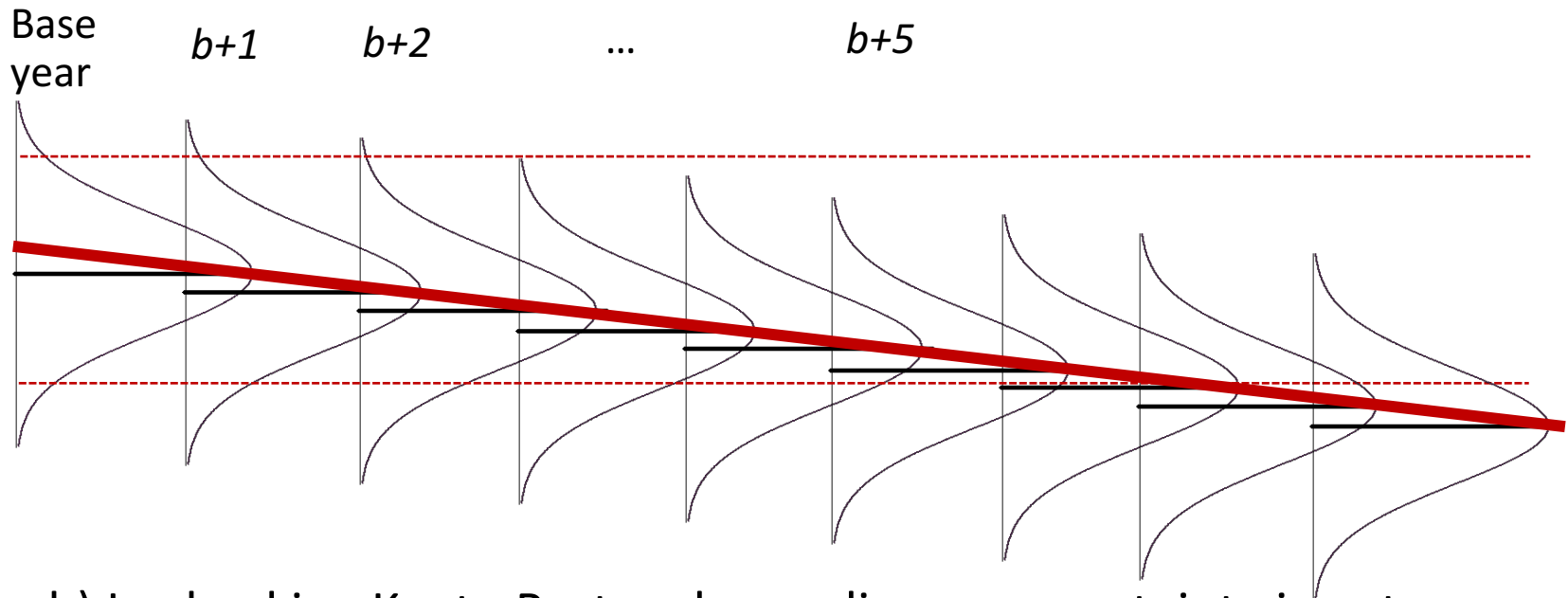
# IMAGINE IF...



a) With combined AD & EF uncertainty ca. 28%, for the average developing country, there would have to be a large decrease in the mean estimate before there was any statistically significant difference →



# IMAGINE IF...



- b) In checking Kyoto Protocol compliance, uncertainty is not considered, only the trend
- c) with livestock in NDCs, describing a precise trend is important
- d) If the inventory uses constant T1 or T2 emission factors, the trend is only determined by livestock numbers & herd structure, but productivity gains over time are one of the big opportunities for livestock mitigation