Data management pain points in building MRV systems and ways to address them with software

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MRV system in seven “easy” steps

- **Involve all people** who have the necessary data
- **Collect data** from them
- **Calculate controlled indicators** based on the data collected
- **Assure quality** of resulting data and calculations
- Put data into a **reporting format** compliant to the applicable reporting regime
- **Keep data** safe and ready for re-use
- Make sure you **know what to do** (better!) next time.
Challenges involving people

- **MRV Expertise/Capacity**: the majority of custodians of data necessary for MRV do not need MRV expertise to participate meaningfully.

- **Language**: ditto.

- **Data integrity and access controls**: access to everything the user needs but not more.

- **Connectivity**: constant broadband Internet access is not yet a reality in all target groups.

- **Usability**: unless you are paid to be expert, your participation should be easy, familiar or intuitive.
Involving people done right - Intuitive workflow

- Take time to define your data collection process
- Reduce manual data entry
- Make write access to data conditional on workflow step
- Think what you will do when things don't go as expected
Involving people done right – Language & Jargons

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- Make simplified entry forms for data providers
- Translate forms into national language
Involving people done right – Connectivity & Usability

- Work on the user’s machine, whatever it is
- Look like Excel but don’t be Excel
- Be able to work offline
- Make data exchange between users invisible to the user
Challenges collecting data

- **Data is not available**: physically? legally? economically? If there is activity - there is data, find the provider and make it possible for them to participate!

- **Inappropriately aggregated data**: involve lower level data providers

- **Incomplete and low quality data**: reduce manual entry, enforce automated checks

- **Data is not coming timely**: your workflow system should tell you who is getting late
Challenges calculating

NO CHALLENGES. JUST DO IT RIGHT*

* Easier said than done
Challenges assuring quality

- **What to check?**

- **Where is the problem?** Lots of data, complex hierarchies mean that the problem may be hard to find

- **What is the problem?** For a more complex check, even once you’ve found erroneous value, it may not be apparent what the problem is

- **Who you gonna call?** Many people are involved in data collection, who dealt with this data point and knows how to fix the issue?
Assuring quality done right – what to check

- Chapter 6 is your friend!
- Basic checks: completeness, data ranges, correct use of notation keys...
- Domain-specific checks: time series and methodological consistency, reasons for recalculation, ...
- Compare your data to your neighbours’ or countries with similar circumstances
- A check not automated is a check not performed
Assuring quality done right - where & what’s wrong

- Navigate the user to the error
- Explain the reason your system believes the value(s) are wrong
Assuring quality done right – who you gonna call?

- Have an audit trail of all entries in your system
- Identify the source of each data point to the user.
Challenges reporting

- **Complexity of reporting formats.** 90+ CRF tables, where are my entries?

- **Data manipulation.** Uncertainty analysis and KCA in inventories require non-trivial computations.

- **Lack of APIs** The current UNFCCC process is not data-centric and does not avail itself to interoperability, leading to the need of manual operations.
Reporting done right - cracking complexity

- Link data entry and reporting intuitively
- Identify aggregates and indirectly affected values in reports
Challenges keeping data

- **Adequate backup and business continuity** may be hard to organize and prohibitively expensive if not done right.

- **Outsourcing of data-keeping** typically means trusting the provider with your data.

- **Security and access management** become tricky for systems that are not used often.

- **Knowledge retention** needs to be top notch to withstand staff turnover.
Keeping data done right – backup and access

- Do offline, off-site, encrypted backups
- End-to-end encrypted data exchange between users
- Keep your access system simple, show it graphically, block unused credentials
Keeping data done right – knowledge retention

- Do self-documenting configuration
- Test disaster recovery!
- Make system recovery secrets easy to keep (recovery envelope)
Challenges improving the MRV system

- **Analysis:** after collecting 20,000 data points, how do you know what went right and what went wrong? Use process reporting.

- **Monitoring:** use automated monitoring of points in the workflow where you experienced difficulties last time.

- **Optimization:** adjust your workflow based on experience and evolution of legal and institutional arrangements. Involve higher quality, more agile data providers.

- **Incentives:** reward your data providers.
Final points

• The majority of data management problems are not unique to one country, so the solutions are highly reusable.

• With good IT tools, the organizational burden does not grow much when you involve more people, so involve everyone who can be useful.

• Better data management and IT tooling means higher quality submissions, with less effort.
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