RWSN 2014 Webinars
(Sept – Dec)

UPGro
Unlocking the Potential of Groundwater for the poor
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- **UPGro – Africa Groundwater Research**
- **Rainwater Harvesting**
- **Water Point Mapping**

A series of webinars in English and in English/French

23rd September – 9th December 2014

Register on:
http://tinyurl.com/RWSN2014

Webinar 11 – Groundwater Research

9th December 2014

Sustaining Groundwater Supplies

- **Water for Wajir. Assessing Risks of Developing Groundwater Resources of the Merti Aquifer Kenya -** Jan de Leeuw
- **A Hidden Crisis: unpicking the causes of failure of handpump boreholes -** John Chilton
- ***Discussant*** – John Gowing

Unlocking the Potential of Groundwater for the poor

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Water for Wajir

Assessing risks of developing groundwater of the Merti aquifer, Kenya

JAN DE LEEUWAND EIKE LUEDELING

WORLD AGROFORESTRY CENTRE

Wajir's water needs – and a possible solution

Pipeline

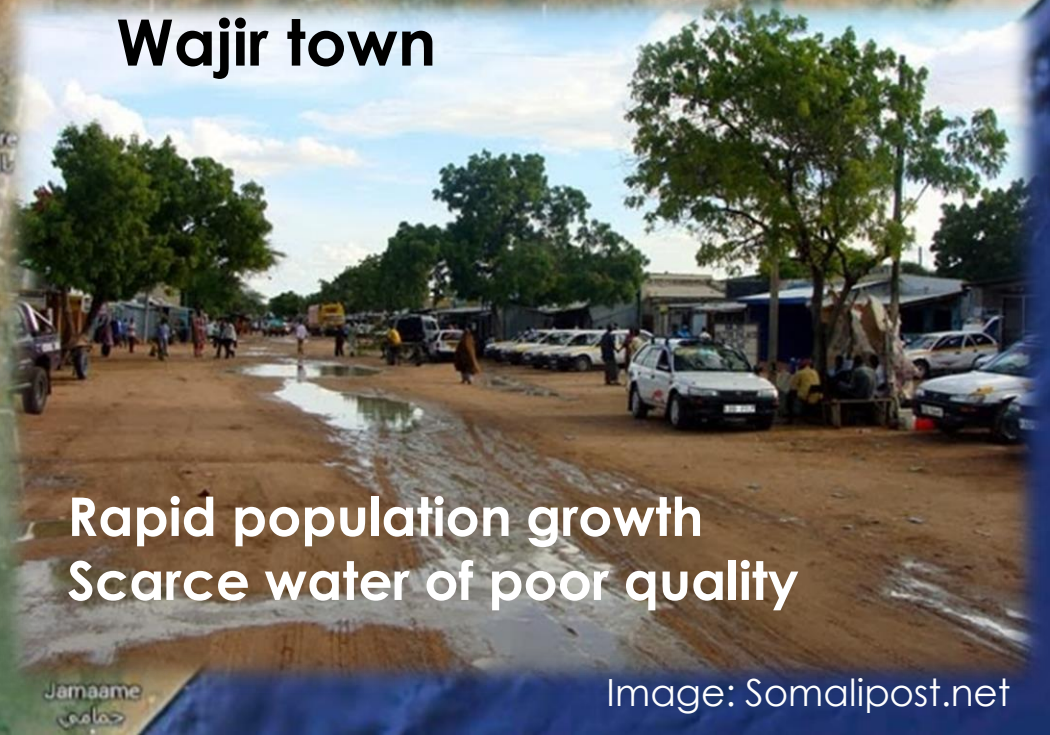
Tap the Merti aquifer to the south

Image: startelegraph.blogspot.com

Habaswein

Concerned about water abstraction plans

Image: panoramio.com



Wajir town

Rapid population growth
Scarce water of poor quality

Image: Somalipost.net

Kenya

Meru

Dadaab

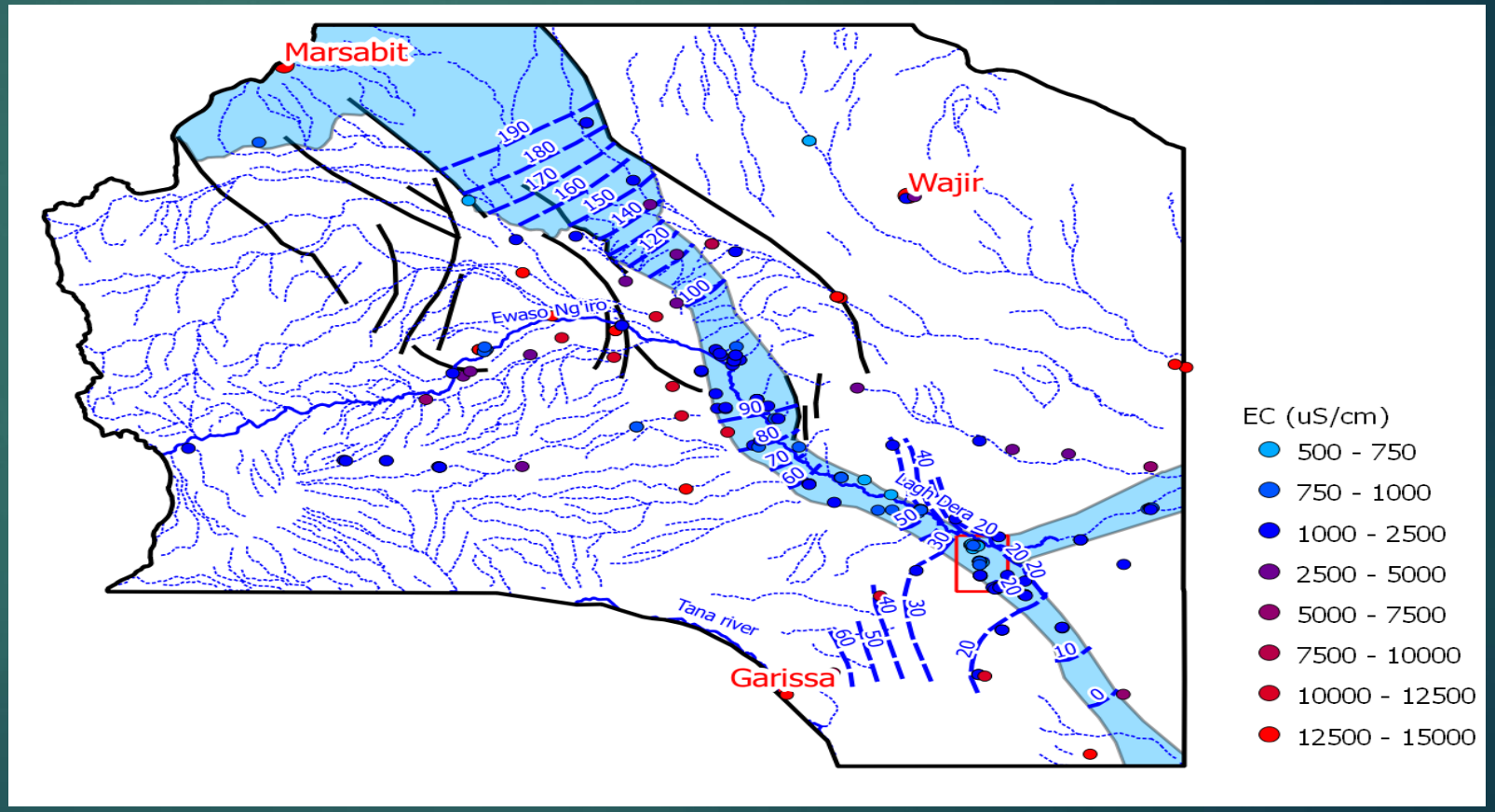
Baidoa

The Habaswein-Wajir pipeline project

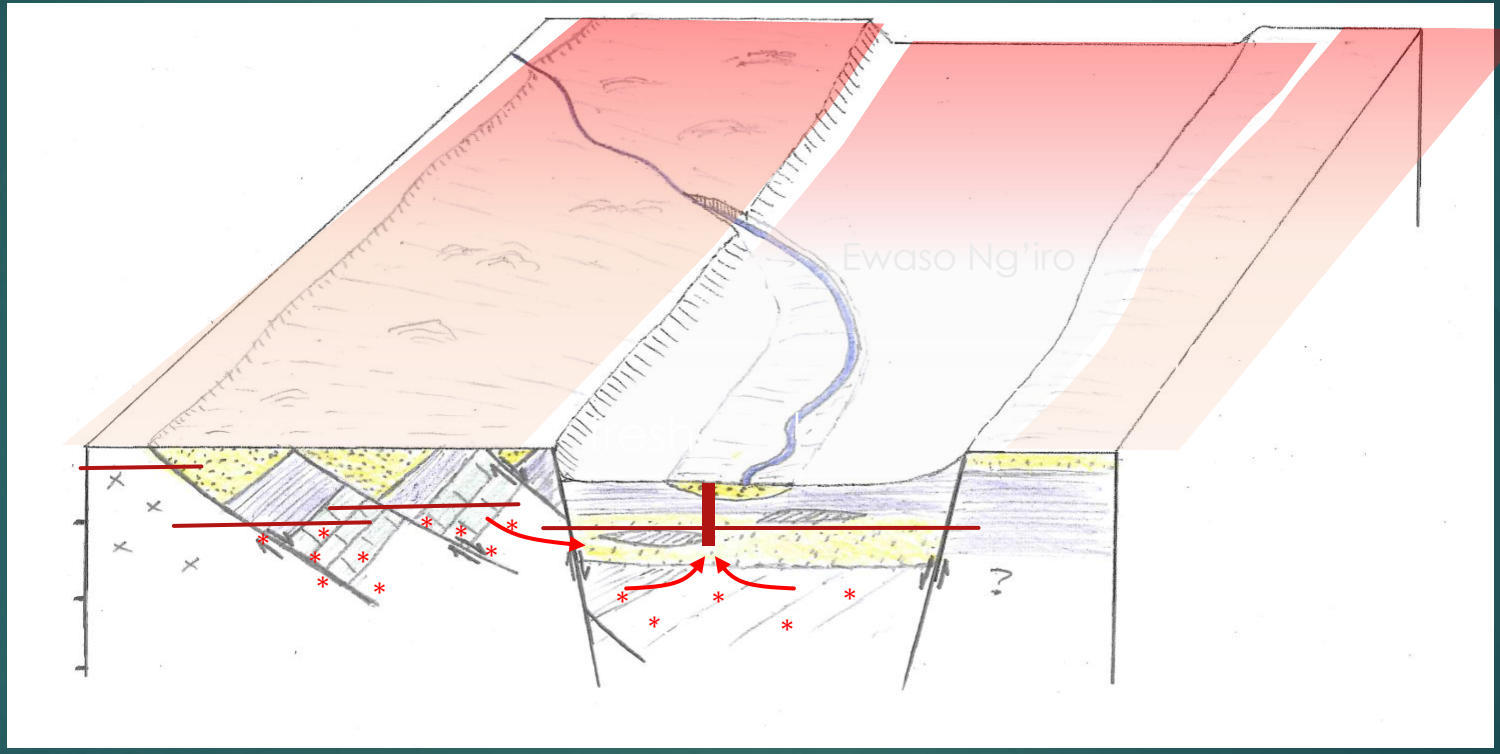
- Government of Kenya initiated planning process
- Recent devolution of power shifted initiative to county level
- Stakeholder involvement has been poor
- Opposition to plans among stakeholders, especially in Habaswein

- Dutch development donor ORIO is ready to invest up to €38 million, but requires feasibility studies
- Only hydrological feasibility has been assessed
- Many more risks should be considered, but adequate planning methods are missing

Geology of the Merti aquifer



Geology of the Merti Aquifer

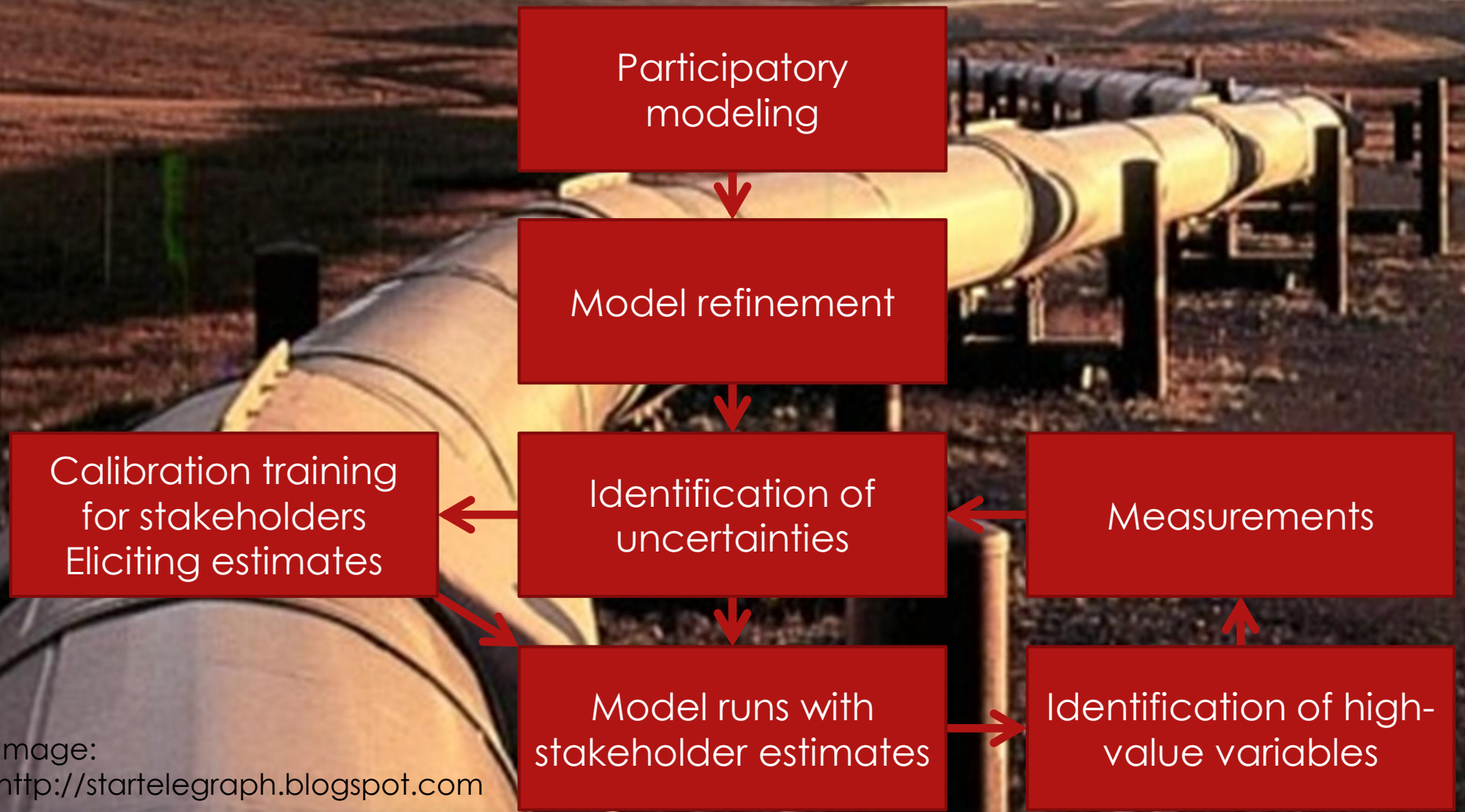


Decisions on investment under uncertainty

- Development decisions normally affect many stakeholders
- Data is often scarce
- There are many possible outcomes, not all of them satisfactory

- Most traditional scientific approaches are ill-equipped for such situations
- Business analysis methods much better suited
- Applied Information Economics offers guidelines for analysis

Decision modeling process



Further analyses

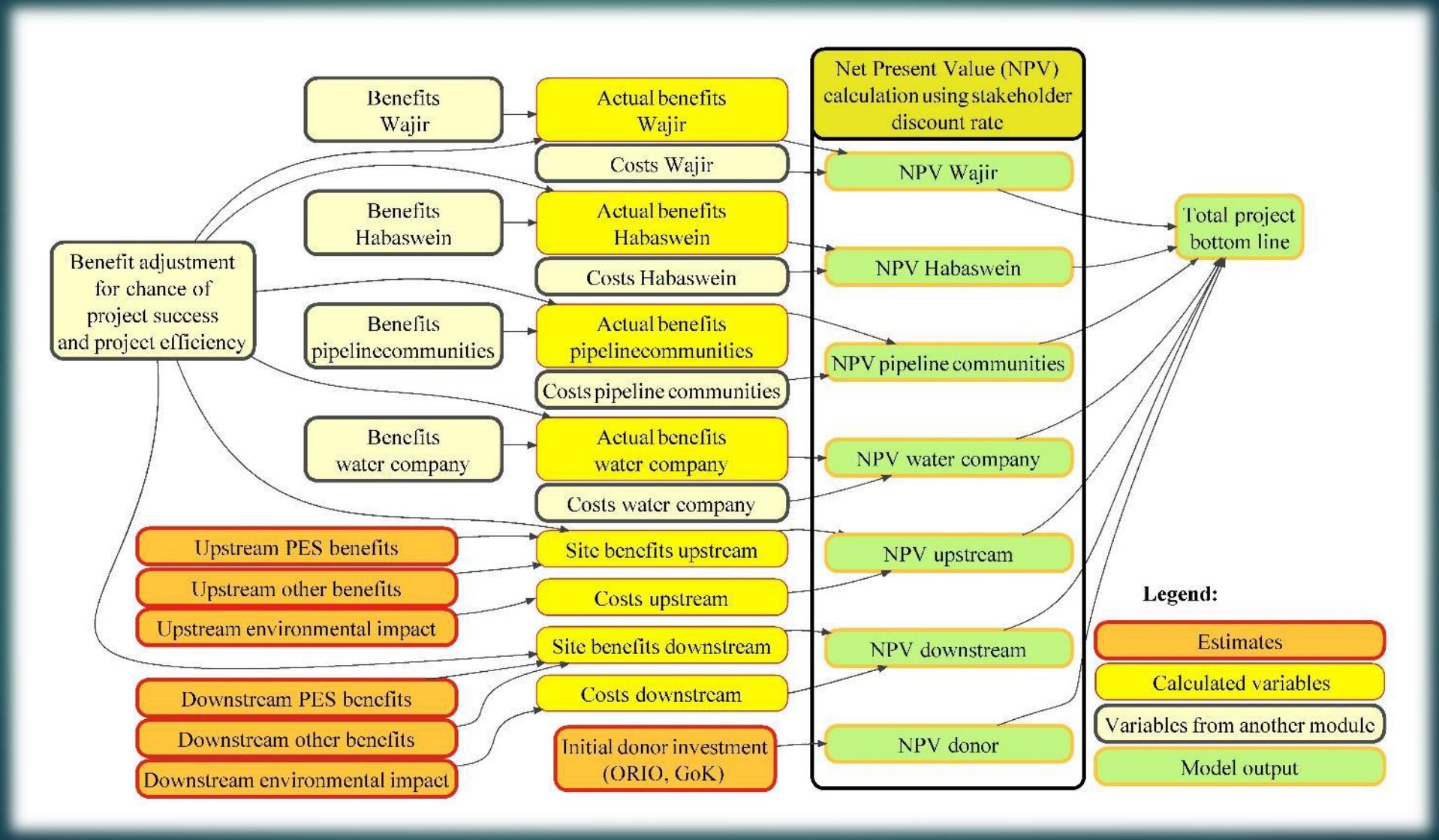
- Stochastic hydrological modeling
- Extensive socioeconomic surveys

Image: http://startelegraph.blogspot.com

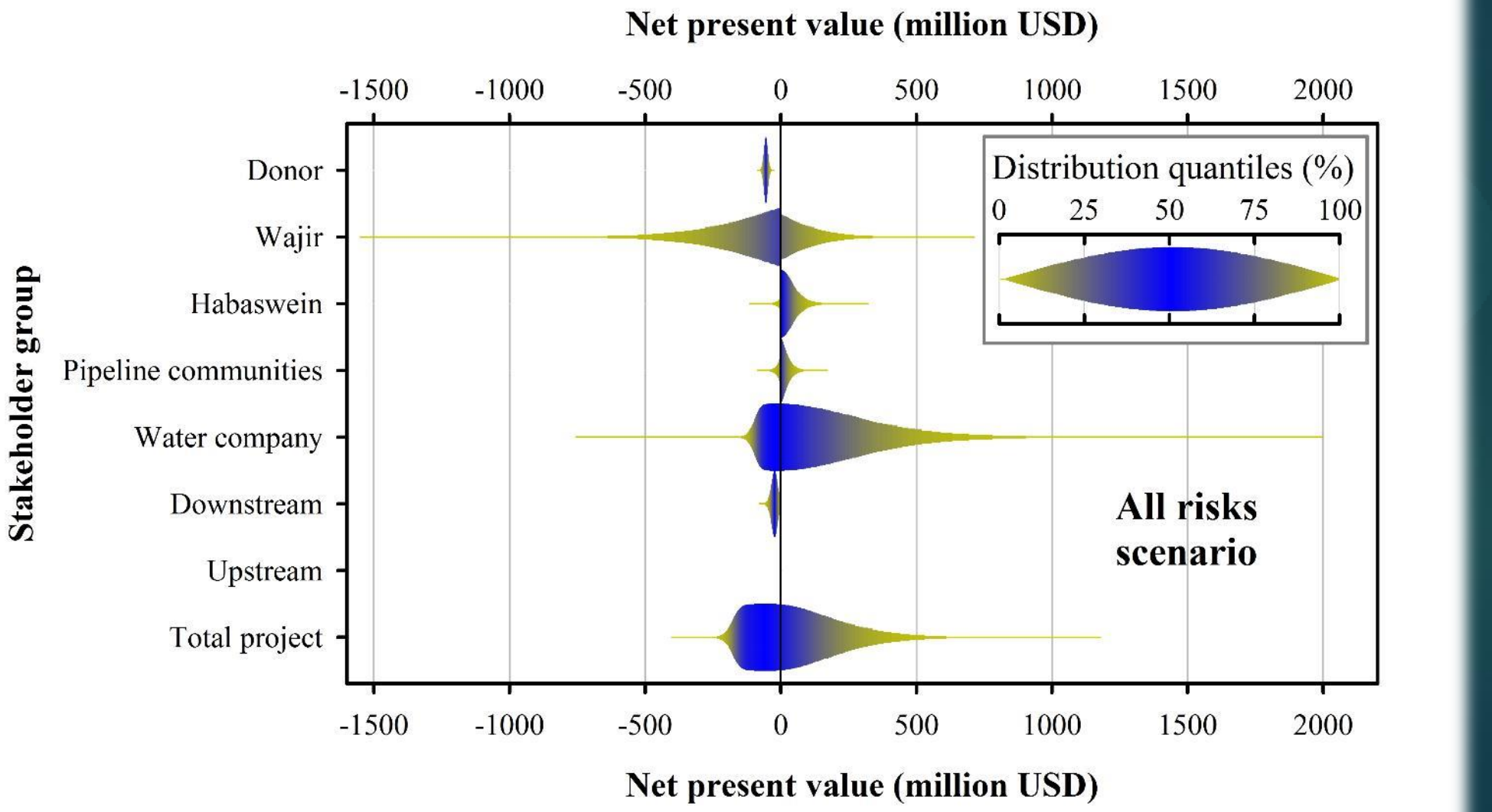
Decision modeling process

- 1-day inception and discussion workshop with ~30 stakeholders from science, practice and policy
- 2-day model building workshop with 8 experts
- Development of model code
- Elicitation of feedback on model structure and estimates of uncertain variables
- Model runs
- 1-day workshop to present results to stakeholders
- 1-day event in the field to present and discuss results

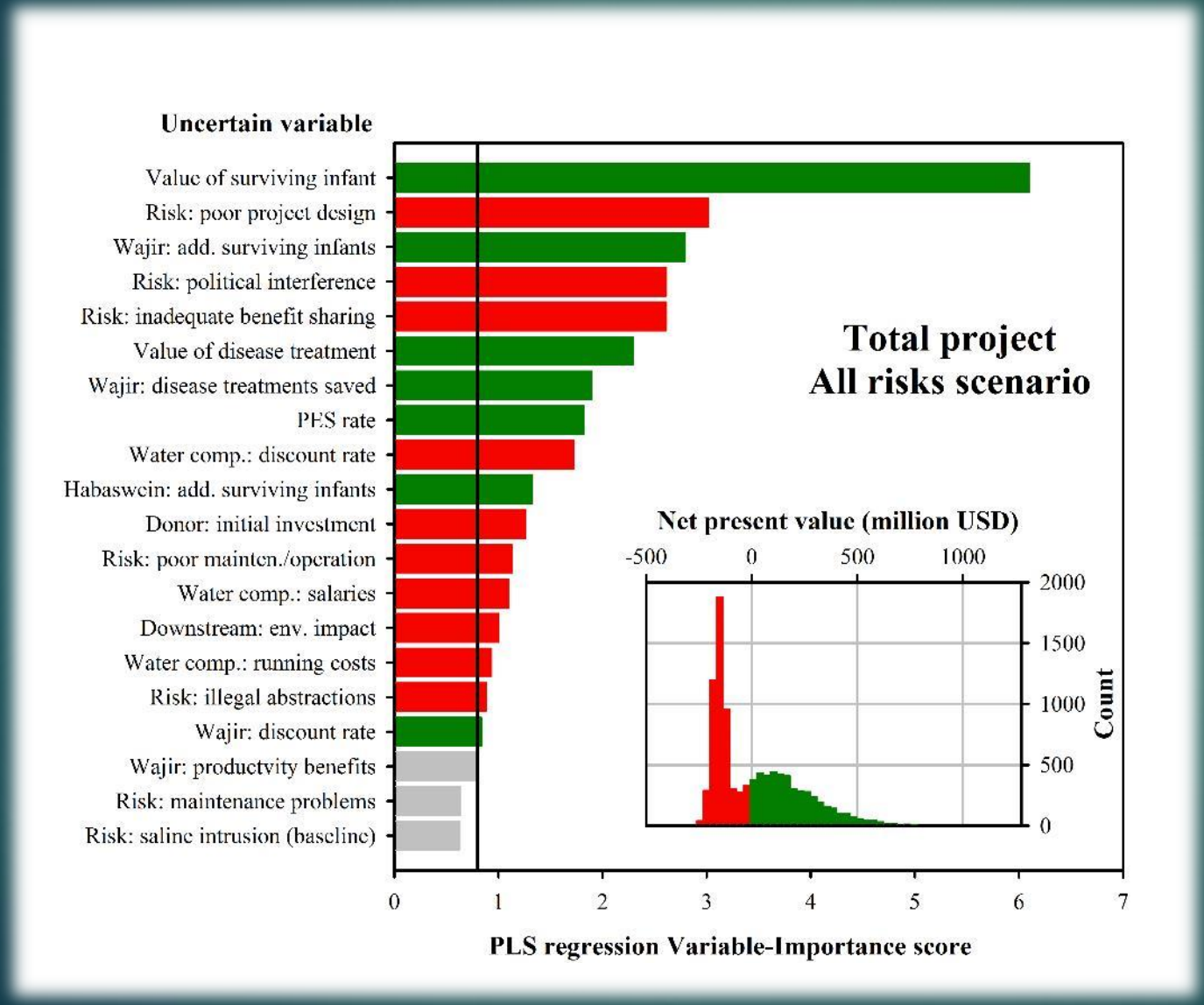
The model


Net Present Value (NPV) calculation using stakeholder discount rate
Benefits Wajir
Actual benefits Wajir
Costs Wajir
NPV Wajir
Benefits Habaswein
Actual benefits Habaswein
Costs Habaswein
NPV Habaswein
Benefit adjustment for chance of project success and project efficiency
Benefits pipelinecommunities
Actual benefits pipelinecommunities
Costs pipeline communities
NPV pipeline communities
Benefits water company
Actual benefits water company
Costs water company
NPV water company
Upstream PES benefits
Upstream other benefits
Upstream environmental impact
Site benefits upstream
Costs upstream
NPV upstream
Site benefits downstream
Costs downstream
NPV downstream
Downstream PES benefits
Downstream other benefits
Downstream environmental impact
Initial donor investment (ORIO, GoK)
NPV donor
Total project bottom line
Legend:
Estimates
Calculated variables
Variables from another module
Model output

Net present benefits



Critical uncertainties



Measurement needs

- Value of reducing infant mortality
- Economic feasibility of water business
- Risk of political interference

Design needs

- Reduce chance of poor design
- Guard against salinity intrusion
- Ensure adequate benefit sharing

Outcomes and conclusions

- Stakeholder involvement and research focus on a concrete decision ensured interest in study results
- Structured analysis of decision's impact pathway enhanced stakeholder understanding of the decision
- Several stakeholders changed their opinions on the intervention
- Analysis exposed critical risks that would likely have remained unnoticed, if only the predefined feasibility studies had been done

- Decision analysis methods have great potential for aiding decisions on groundwater use and other complex issues in the face of risks and imperfect information

Thank you for your attention!

World Agroforestry Centre

Acacia Water

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CETRAD
Centre for Training and Integrated Research in ASAL Development

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RWSN's Groundwater Community:
https://dgroups.org/RWSN/groundwater

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