

# “Irrigation is made complex [by engineers]”

Recounting the travails of social sciences knowledge  
in water expert thinking in Mozambique

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# Details of research project

- Applied Research Fund (ARF), funded by the Netherlands.
- Title: *Exploring the potential of farmer-led irrigation development in the Beira Agricultural Growth Corridor (BAGC), Mozambique*
- Wageningen University, Resiliência and ISPM



# Small and medium commercial farmers/smallholders

Tiny



Huge

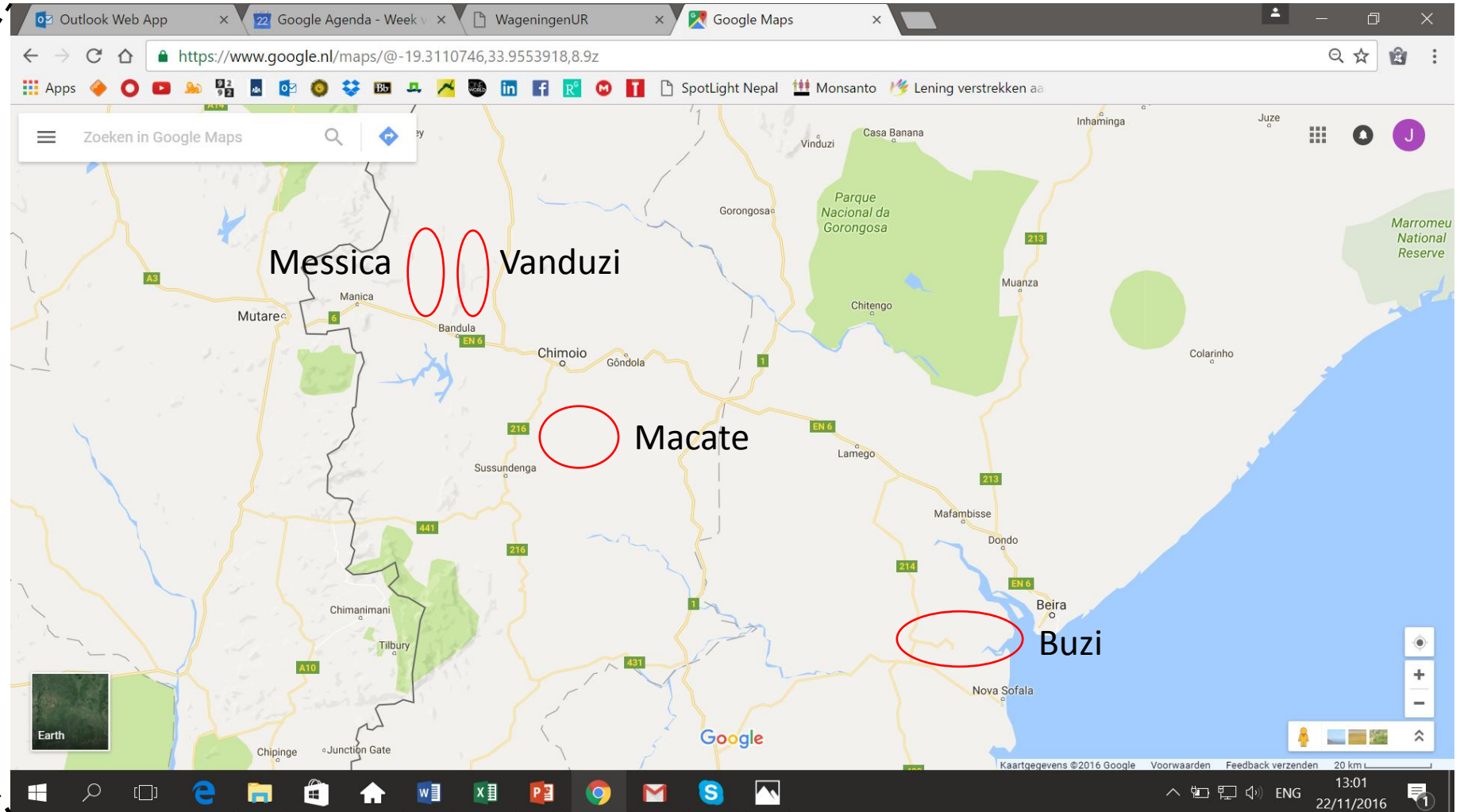
Estimated 68.000 farmers  
3-20 ha or more  
Using water for irrigation  
More than USD 600/year



# Research sites



Beira Agricultural Growth Corridor

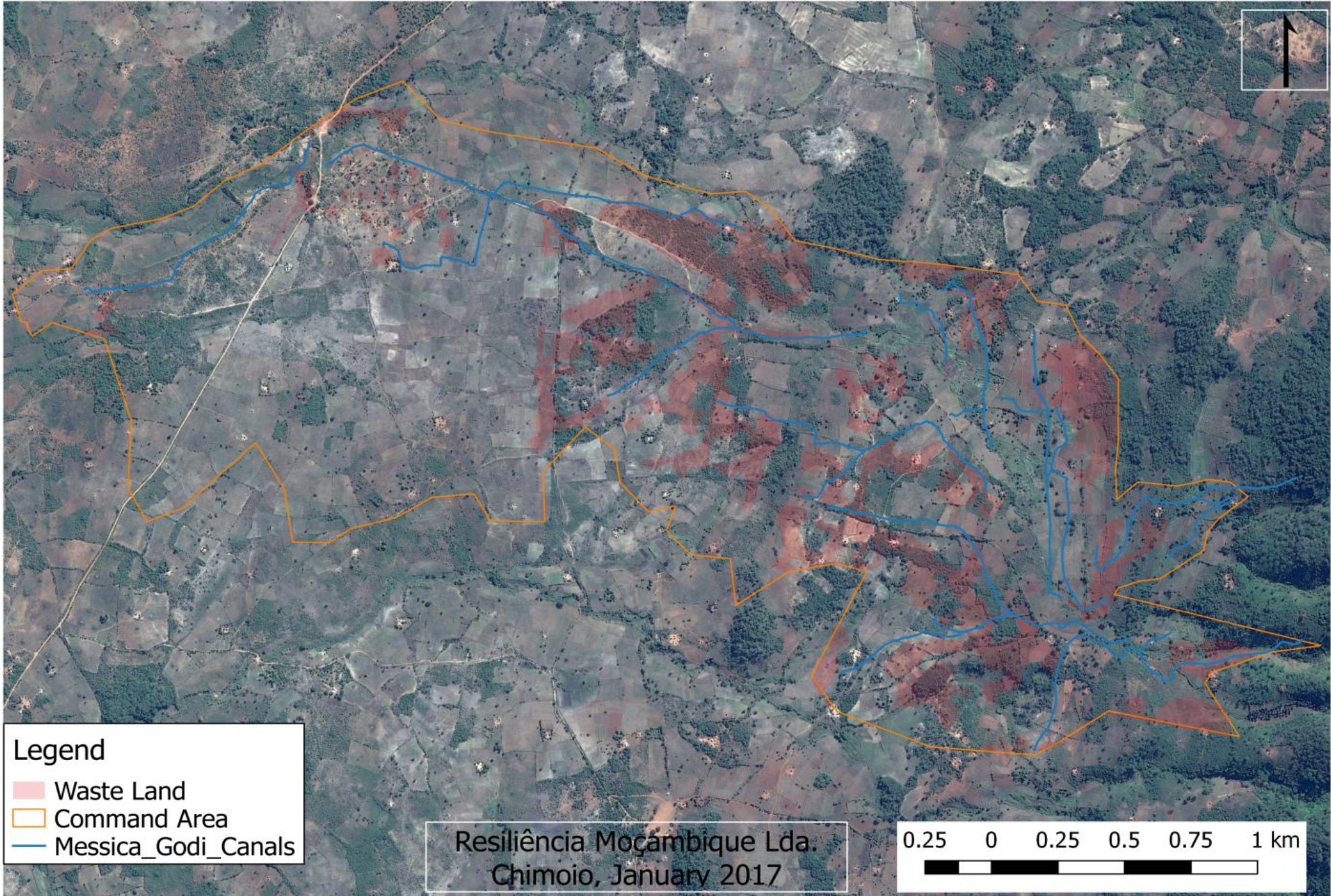


No	Name	Characteristics	Type of water control & irrigation	Interventions & external links	
				State interventions	NGOs, private sector
1	Messica (Godi)	Hill slopes, rivers running down, perennial flows, artesian conditions, peat lands	Furrow irrigation, hand-dug earthen canals; some pumps	No. Yes, tractor park.	NGOs have formed associations for DUAT registration. Traders are active.
2	Vanduzi	Hill slopes, rivers running down, perennial flows	Furrow irrigation, rehabilitated canals originally made by farmers; some pumps	Yes, PROIRRI; rehabilitation of existing systems. Yes, tractor park.	Vanduzi Company introduced contract farming, including rural extension. Traders are active.
3	Macate	River valleys, isolated plots, some perennial flows of water	Hand watering, pump irrigation; some furrow irrigation.	No	NGOs have formed associations for DUAT registration. Traders are active.
4	Buzi	Plains, annual flooding; low and high tide flooding	Controlled flooding and drainage; some pumps	Yes, PROIRRI; building new irrigation systems; No, areas excluded. Yes, tractor park.	NGOs have been involved in the formation of associations. Traders are active.



Messica:

Godi catchment





# Messica – Godi catchment

Hill slope



Irrigating beans and maize



Associations



Furrow irrigation



Intake





# Making money





# Studying processes of 'formalization'

- Formalization = .... processes of visibility, legitimacy, eligibility ... in relation to government, markets, NGOs ... or other forms of officialdom and external support.
- Formalization means different things for different (external) actors
- Formalization has potential advantages, e.g. state support, technical expertise, a contract, loans with banks.
- Formalization has also clear disadvantages, e.g. control and regulation, paying of water fees and taxes, loss of land and water rights with construction of new systems.



# Formalization and visibility



## Research question:

How do farmers choose, strategize to become visible and formal?

## Research question:

What forms of formalization does the state and external agents promote; what forms of formalization can they cope with; and which do they reject?



# How irrigation is seen in Mozambique (I)

- ‘the development objective of the PROIRRI project is to increase *agricultural production* (...) and raise *farm productivity* in new or improved *irrigation schemes* in the Provinces of Sofala, Manica and Zambezia’ (WB, 2011).
- ‘smallholder farmers (...) will benefit from the adoption of: (i) improved production *technologies* and know-how related to irrigation; [and] (ii) complementary *technical skills* required to harness the full potential of water for agriculture’ (WB, 2011).
- Irrigation = ‘agricultural production’, ‘farm productivity’, ‘schemes’, ‘technologies’ and ‘technical skills’.
- Irrigation is seen a technical domain in the field of agriculture



# How irrigation is seen in Mozambique (II)

- Instituto Nacional de Irrigação (INIR), Ministério da Agricultura.
  - > Agricultural Engineers, with specialist training in irrigation.
- Direcção Nacional de Águas (DNA), Departamento de Obras Hidráulicas (DOH), Ministério das Obras Públicas e Habitação
  - > Civil engineers.
- Consultancy companies (Salomon Lda etc.), headed by engineers and hydrologists, also acting as teachers at the Departamento de Engenharia Civil of UEM, for instance.
  - > Civil engineers.

# Mozambique is no exception...

- Irrigation is historically a discipline of applied engineering.
- Professional organizations in irrigation are controlled by engineers or specialist in agriculture and water – donor agencies, government departments, consultancy firms, NGOs and universities.
- Epistemic tradition in irrigation/water that sees the world as uniform, makeable and manageable.
- A tradition that tends to emphasize and attach greater value to knowledge that presents the world as rational, universal and 'social-less'.
- Historically, it is a domain that belongs to 'men' and 'masculinity'.

... a reason for concern...



# ...because...

This is NOT how irrigation is practiced by farmers in the field

Irrigation is a matter of:

Crop choices and management

Using and getting access to water

Securing land and water rights

Taking, conveying and distributing water

Gendered division of labour and household resources

Market opportunities and transport

Livelihood

...



# To recount the travails of social sciences knowledge

- To “study up” (Nader, 1972; Harding, 2004)
- Using case studies (4) and interviews with professionals (27 so far).
- Representations of the ‘ground’ are the result of a web of relations across social layers.
- A wider world is reaching into communities.
- Professionals play a key role here: they produce these representations.
  
- Comparison between Mozambique and Nepal.
- Comparison between irrigation and forestry.




# Comparison between Mozambique & Nepal

No.	Characteristics for Mozambique & Nepal	Details
1	Under colonial control	Mozambique < 1975; Nepal < 1947/1951
2	Chronic poverty	Classified as Least Developed Countries by World Bank
3	Donor hegemony	Donor-driven development agendas, excessive reliance on 'technical assistance'
4	Democratic deficit	Lack of accountability among the country's political and bureaucratic decision makers
5	Modernization introduced through foreign aid	A general belief that what comes from the 'outside' is better than what exists 'inside' the country
6	Ongoing state integration and violence	State control is weak and (often) contested; armed violence exists.

# What social sciences knowledge?

- Classical economic knowledge
- Neo-evolutionary ideas of sociology
- Institutional thinking and management literature
- Agronomy and plant sciences

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- Qualitative sociology
  - Anthropology
  - Gender studies



# 'Hypothesis' for limited impact of social sciences knowledge

1. ***Business-as-usual***: The interests of different actors in irrigation do not match beyond technology/infrastructure development
2. ***Science is good; social science is bad***: Engineers' epistemic tradition prescribes 'rigorous' research and disqualifies (qualitative) social sciences categorically as 'anecdotal'.
3. ***Modernization***: Irrigation planning is based on modernist convictions, (qualitative) social sciences implicitly rejects modernist world views, making its insights incompatible with engineering.
4. ***Professional culture and masculinity***: 'Soft' knowledge such as (qualitative) social sciences is a treat for 'hard' engineering knowledge; engineering is linked with reputations, status and authority.

# First observations on 'irrigation sector' in Mozambique

No.	Mozambique	Nepal
1	Not a clearly delineated 'irrigation sector'	'Irrigation sector' is big
2	Where to put 'irrigation'?	'Irrigation' is an established sector
3	Portuguese engineering tradition?	British-Indian (civil) engineering tradition
4	Dependent on agricultural bureaucrats	Independent of agricultural bureaucrats
5	Instituto Nacional de Irrigação (INIR) (est. 2012) It employs about 20 technicians.	Department of Irrigation (DOI) (est. 1952) It employs over 450 civil engineers.
6	Irrigation experts training is both 'technically' and 'non-technically' weak	Irrigation experts training is technically strong, and non-technically weak
7	Water policy elite is small and heavily donor influenced	Water policy elite is big, diverse and heavily donor influenced
8	Rhetoric of decentralization, powerful elite	Rhetoric of decentralization, powerful elite
9	Irrigation is defined as a domain of technology, supplementing crop water requirements	Irrigation is defined as a domain of technology, building infrastructure
10	Irrigation professionals are technical specialists (agricultural engineers)	Irrigation professionals are technical specialists (civil engineering).



# Comparison with irrigation and forestry education (I)

Years	Irrigation expertise	Forestry expertise
< 1980s	<p>Irrigation engineer</p> <p>Building infrastructure, controlling water flows.</p> <p>Education rooted in natural sciences: Physics, mathematics, hydrology, surveying</p> <p>Irrigation departments</p>	<p>Forest engineers</p> <p>Timber production, water conservation</p> <p>Education rooted in natural sciences: Chemistry, physics, mathematics, biology, surveying</p> <p>Forestry departments</p>
1980s	<p>Critique on “building things”</p> <p>Neglect of social and institutional aspects. Neglect of crop, water and land rights. Neglect of gender relations</p> <p style="text-align: right;"><i>&gt;&gt; Surge of social sciences research</i></p>	<p>Critique on “biological bias”</p> <p>Address the needs of forestry actors Neglect of non-timber products, biodiversity, eco-tourism.</p> <p style="text-align: right;"><i>&gt;&gt; Surge of social sciences research</i></p>
<i>Neo-liberal discourse (budget cuts) – environmental turn – anthropological turn</i>		
1990s	....	....

# Comparison with irrigation and forestry education (II)

Years	Irrigation expertise	Forestry expertise
1980s	...	...
1990s	Uptake in policy and education Participatory irrigation design and management Engineers discuss sociology	Uptake in policy and education Participatory forestry management Foresters discuss sociology <i>&gt;&gt; Decline in jobs in forestry sectors</i>
2000s	New design of irrigation curriculum <u>at the margin</u>  Adoption of social sciences knowledge but also a reformulation of irrigation/water as technical  <i>&gt;&gt; Irrigation/water sector is gaining recognition</i>	New design of forestry curriculum <u>at the core</u>  Increase of social sciences knowledge: geography, anthropology and psychology  <i>&gt;&gt; Forestry sector is in "crisis"</i>
2010s	Irrigation education has remained technical Irrigation is still a engineering domain High enrollment of students <b>"Irrigation is made complex [by engineers]"</b> (respondent IPSM, 2 November 2016)	Forest education has become interdisciplinary Low enrollment of students  <b>A new academic field of "social forestry"</b> <b>A new "breed" of forestry professionals</b> <i>&gt;&gt; Forestry education is in "crisis"</i> <i>&gt;&gt; Some blame social sciences</i>

# Obrigado

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