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Teaching Climate Change in a South African context of high climate variability

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Climate Change Education

- The CAPS Curriculum
- The importance of Systems thinking
- Teaching in a context of high climate variability
- An open framework for learning-to-change

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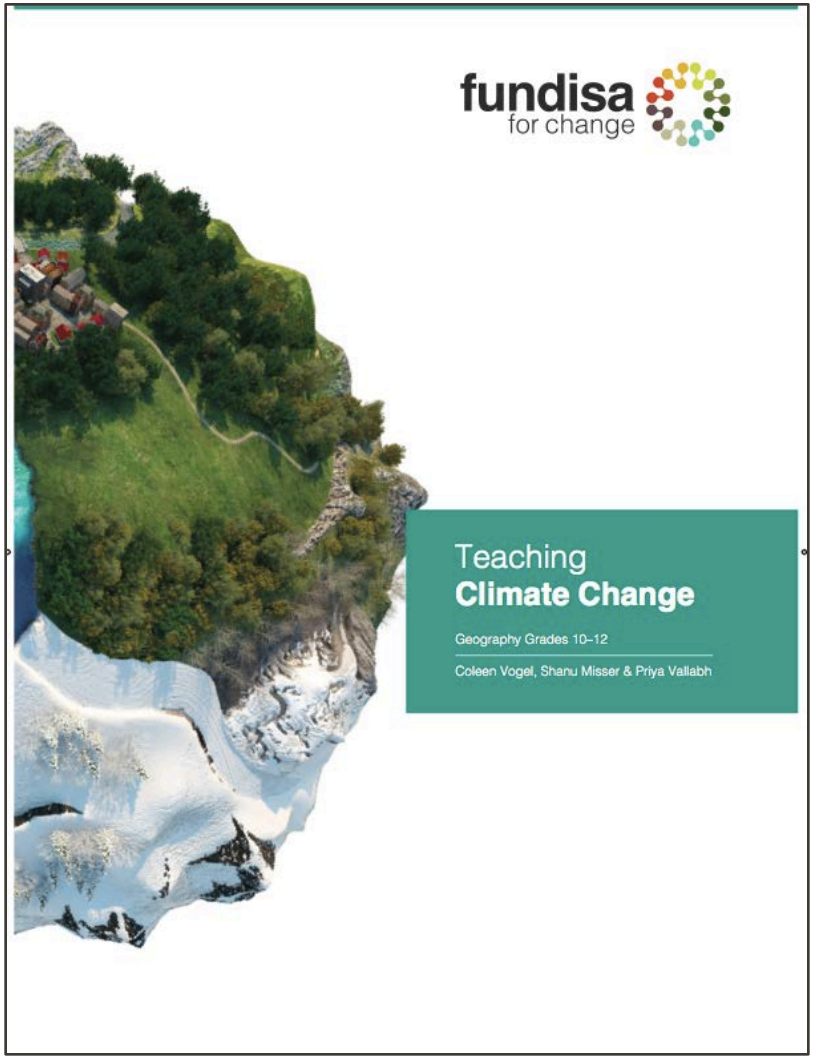
TEACHING CLIMATE CHANGE: A CAPS curriculum topic

FET- Climate Change (G-G10-12)

Senior- Climate Change (NS-G7-9)

IP - Foundations of weather and climate

FET Climate Change Module

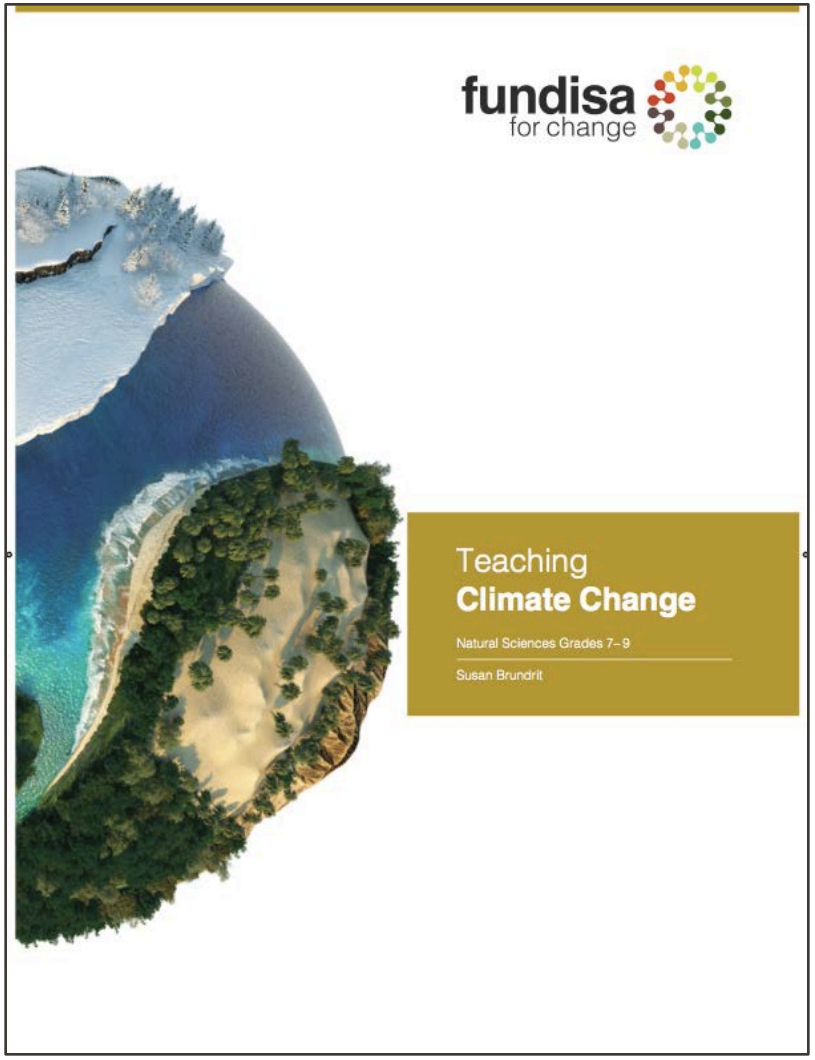


Learn about...
energy exchange, energy resource use, and responses to energy exchange and climate change.

Using the Fundisa for Change teacher education materials, the programme supports Grade 10-12 teachers to understand and translate the key concepts of climate change for their learners. Teachers also learn to use new teaching methods such as scenario planning and learning by doing, and how to assess climate change learning in Geography.

For more information visit
fundisaforchange.co.za

Senior Phase Climate Change Module



Learn about...
the evolving planet, earth systems and climate change, energy and carbon dioxide.

Using the Fundisa for Change teacher education materials, the programme supports Grade 7-9 teachers to understand and translate the key concepts associated with earth systems and climate change for their learners. Teachers also learn to use new teaching methods such as modeling and investigation, and how to assess aspects of Natural Science learning.

For more information visit
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CAPS Knowledge, Teaching and Assessment

Read about topic & Raise questions

Find out

(**Work out**)

Try out

Report-back, talk about the topic & make decisions

Knowledge acquisition	**action / awareness**	**synthesis /Innovation**
(Knowing and remembering)	(understanding and applying)	(analysis, evaluation and innovation)

ASSESSMENT	**assignments**	**case studies**	**&**	**projects**
	activities	**translation tasks,**	**&**	**practical task**
	tests	**&**		**exams**

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TEACH

ASSESS
(For & of learning)

Report-back, talk about the topic & make decisions

Analysis, synthesis, evaluation (15%) & innovation

Find out

(Work out)

Try out

Can report / expand /apply knowledge

Understanding (25%) & Applying (20%)

Read about topic & Raise questions

Can explain things and find answers to questions

Knowing & Remembering (40%)

Can ask and answer questions on the topic

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Systems thinking:
A key for learning to change

Systems thinking is necessary for learning in complex social ecological constellations

Interpersonal engagement, problem solving and **action-taking** develop with:

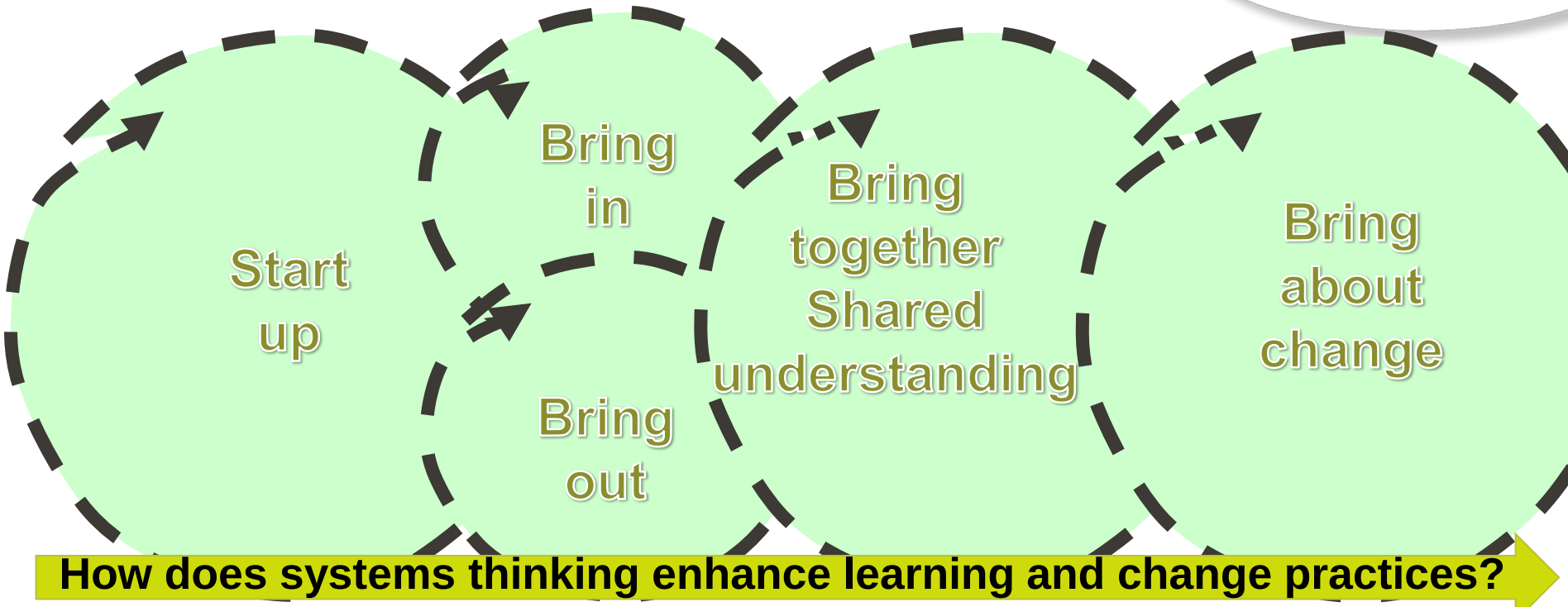
Systems thinking for appreciating complex constellations of risk and for shaping

Anticipatory competence to imagine future conditions that might enable a

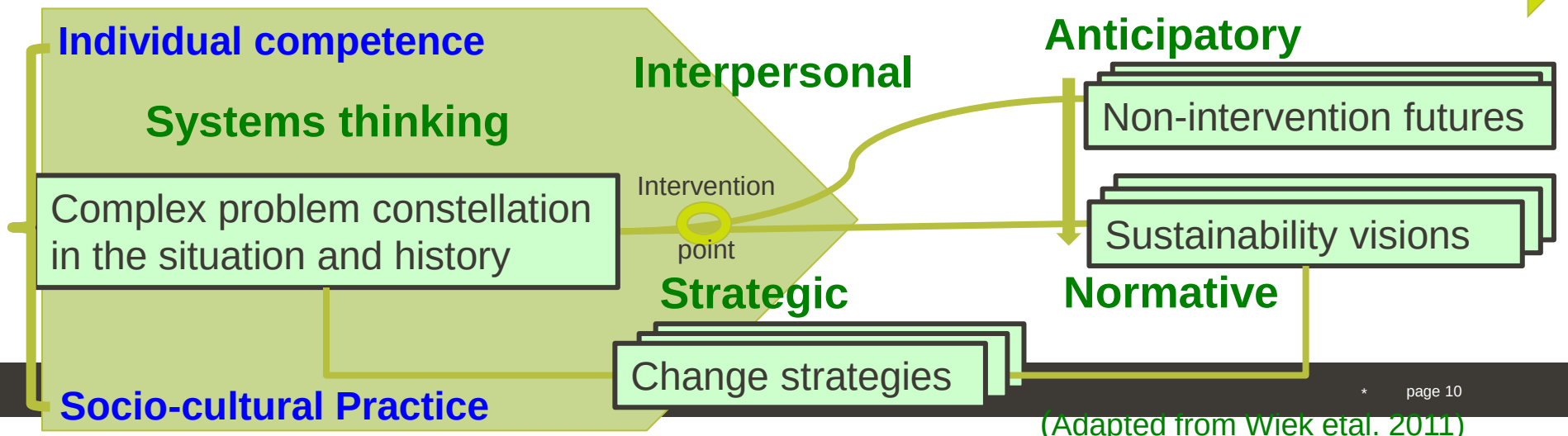
Normative competence of reflexive re-imagining with

Strategic competence to initiative and sustain change

(Adapted Wiek, 2012)



How does systems thinking enhance learning and change practices?



(Adapted from Wiek etal. 2011)

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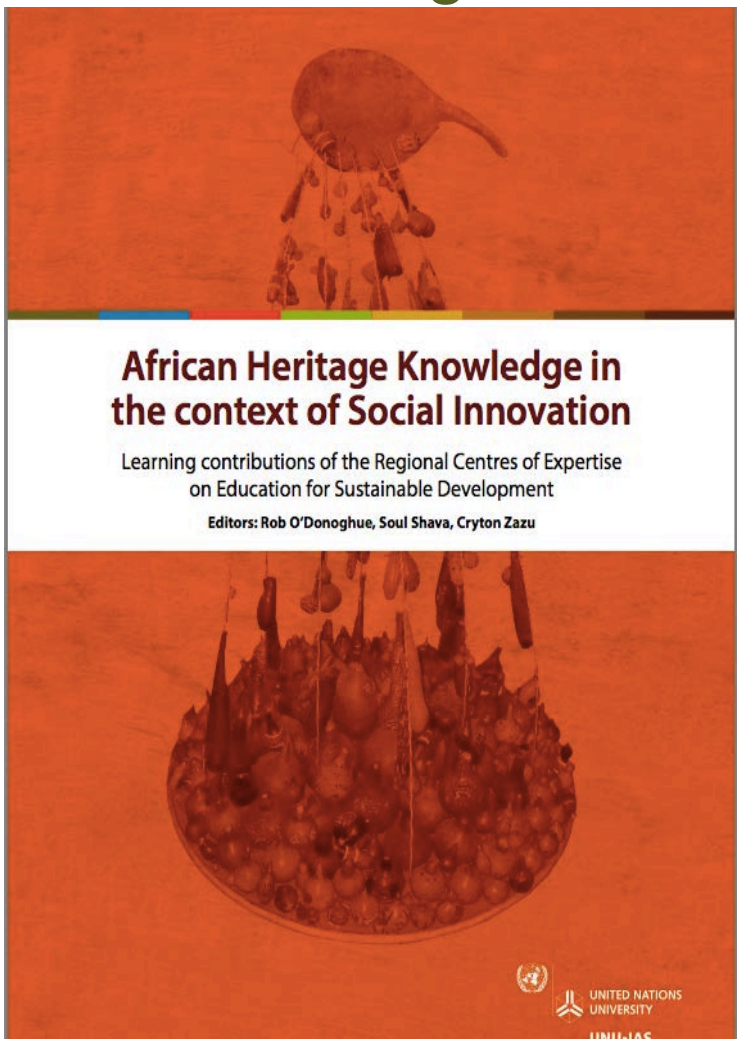
Learning in a social context

What makes South Africa a special place for teaching and learning related to climate change?

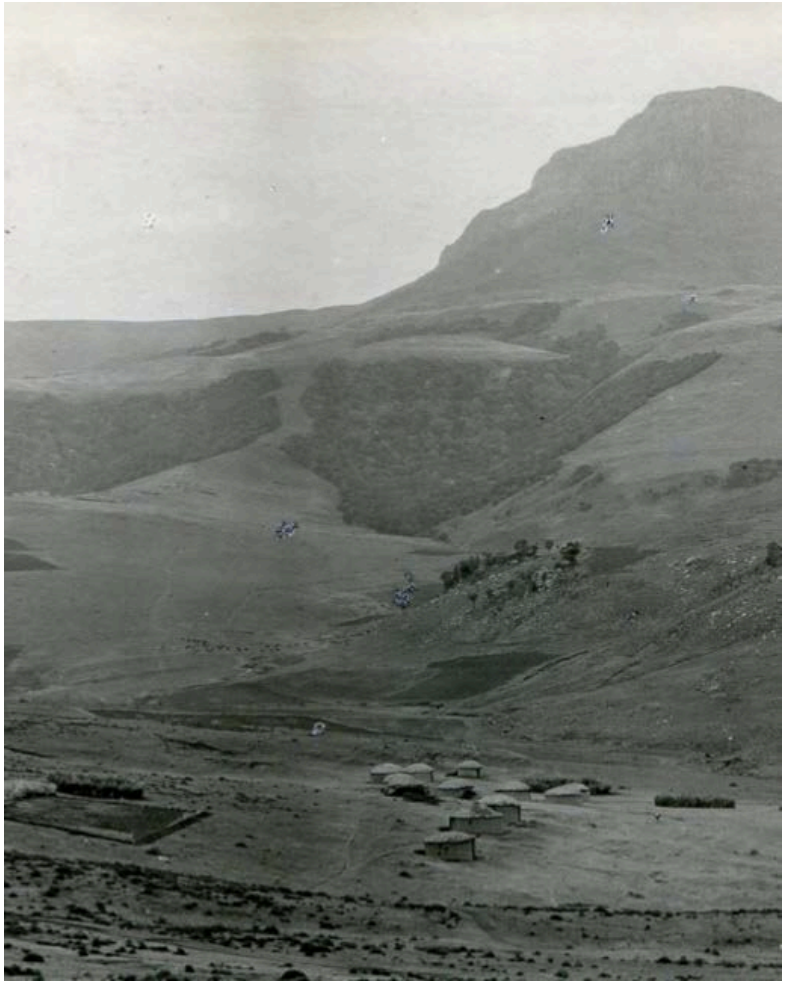
Climate migration and innovation in a context of high climate variability



- Social ecological landscapes and sustainability
- Zuurveld migrations and the colonial intrusion
- Gelesha
- Heritage-based social innovations

http://www.ias.unu.edu/resource_centre/UNU_Booklet_MB2013_FINAL_Links_v12.pdf.

Eastern Cape Landscape change 1928 and Present



Wiersum & Cocks

Zuurveld Climate Migration

- *The **Zuurveld** is the country contained between the ocean and the Bushman's and Fish rivers.*
- *The Xhosa would move their herds to winter grazing on so-called sweet veld of the Amathole Mountains.*
- *Sweet veld pasture remained nutritious throughout the year but could not support continuous heavy grazing in dry years so cattle were returned to the Zuurveld in summer.*
- *Transhumance patterns were cut and dislocated when colonial boundaries included the Zuurveld and excluded its Xhosa occupants.*
- *Today stock is still migrated by truck but now much of the land is under conservation management as game parks.*

(Mostert, 1993:236)

Gelesha:

The rise of the Orion constellation (Isilimela) signified the time for the practice of gelesha. (Image wileyonlinelibrary.com/journal/ird)

Gelesha . . .

- involved mid-winter ripping of the sod of the previous crop,
- followed by seed bed preparation after the first good spring rains.
- Ripping the soil was done during mid-winter (July),
- because during that time of the year the cattle (oxen) were still in fairly good condition...
- Ripping also left the soil surface in a rough, receptive state, improving the infiltration rate of soils.

Averbeke,2003 in Denison et.al, 2012

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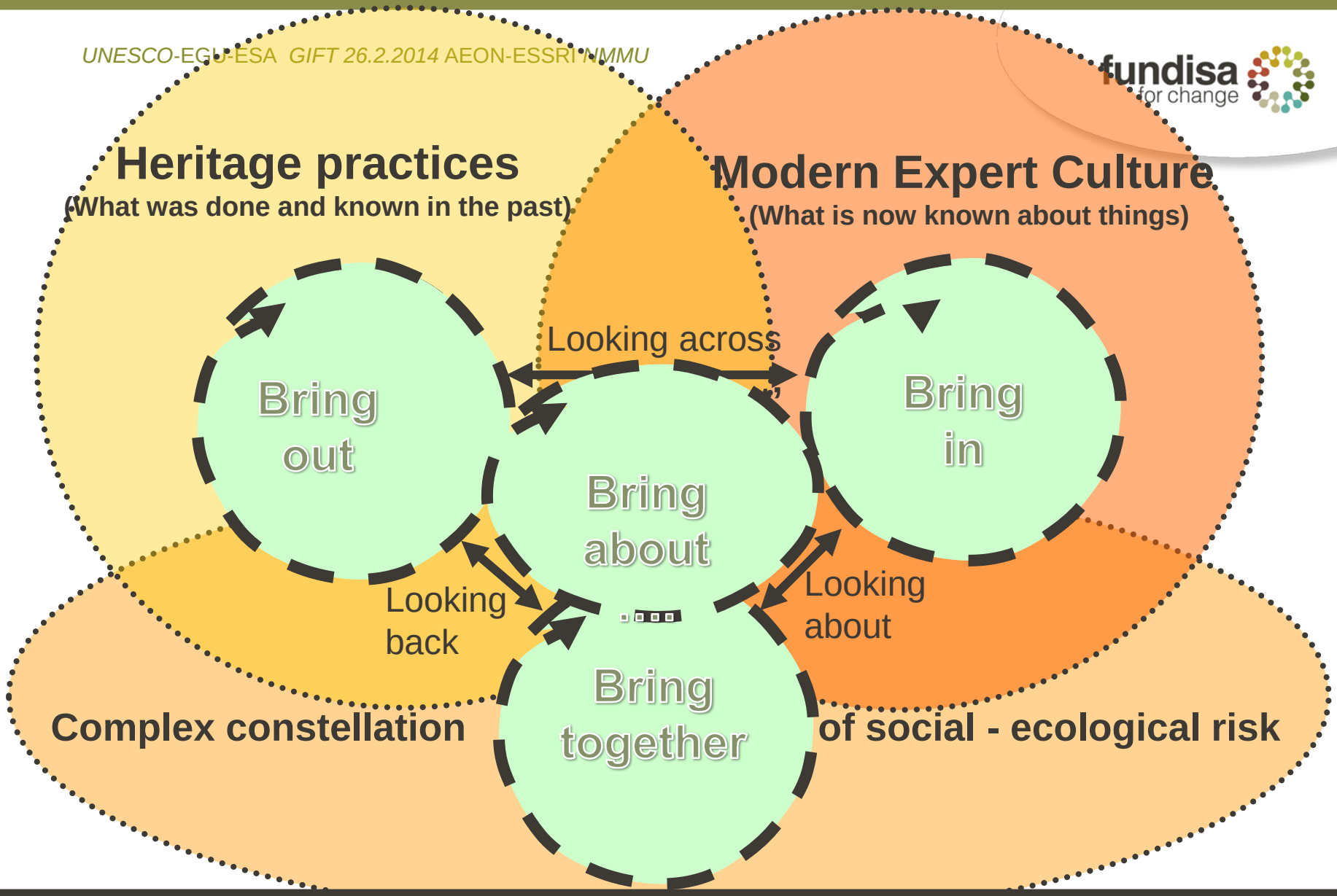
A Framework for Learning-to-Change



A capabilities approach to **social innovation**

(Personal, social and environmental conversion factors)

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Reduce resource use

Restore habitats & ecosystem services

Waste

Water

Biodiversity

Modern livelihood practices

Energy

Agriculture

Enhance quality of life

Health

Adapting to and mitigating climate change

Re-imagining more **sustainable livelihoods**

(Access, Equity, Consumption and Better Patterns of Practice)

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Change practices for low carbon resilience development with enhanced quality of life

WATER (HKP: Water pot)
Rainwater tank
First flush
Ceramic filters
Filtering grey water

ENERGY (HKP: flame / coal)
Clay stove
Cobb charcoal oven
Volcano kettle
Sun stove
Hot box
Induction cooker
Solar water heater
Solar cell
Wind generator

HEALTH (HKP: Slow food)
Tippy hand washer
Soured milk
AmaRewu
Sourdough bread
Hand mill

AGRICULTURE (HKP Izala)
Flip composter
Worm farm
Wire-tie shade house
Chicken tractor
Biochar drum
Sun drier

BIODIVERSITY (HKP: Take forest)
Acacia fire woodlot
Micro nursery
Micorrhyzal
3 step potting soil

TRANSPORT
Solar e-bike
Trailer

SEWAGE (HKP: Dry toilet)
Urine separation toilet

WASTE (HKP: Izalene)
Reuse padding
Hand made paper
Making fire-bricks

Assessing low carbon resilience development

 Quality of life enhanced	 Resource use reduced	 Ecosystems Restored	 Carbon footprint mitigated


Water tank
Filter bucket
Copper pot
Test kit
Filter candle
WATER
Tanks
Testing and
Filters
imbiza

ENERGY

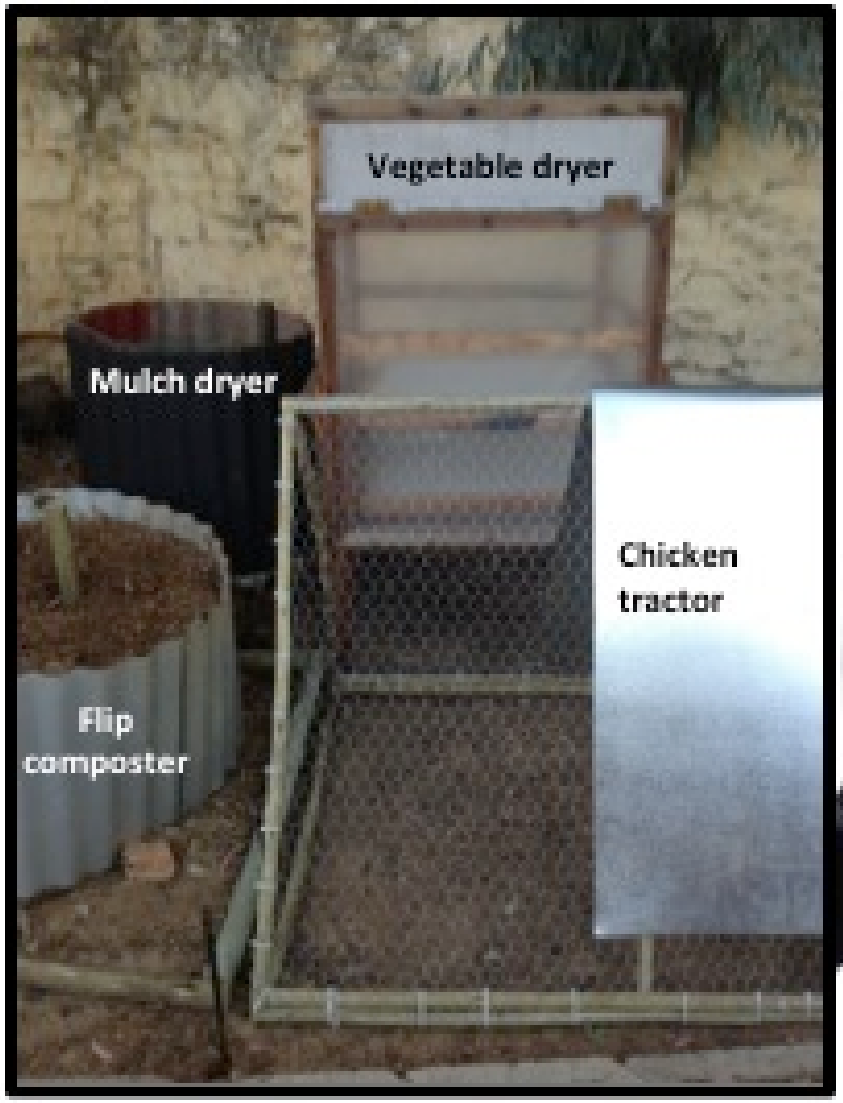
Fire gardens
Stoves
And
Cooking bags

Igoqo

HEALTH

Hand washing
Honey
and
Fermented foods

Iselwa



AGRICULTURE

Small-scale
Organic
Food
Gardens

imifino

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BIODIVERSITY

Micro-nursery
Potting soil
and
Mycorrhiza

ihlathi

WASTE

Grey water
Fire bricks
worm farms &
Dry toilets

ethuthwini

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A partnership programme for environmental learning and teacher education

environmental affairs
basic education
water affairs
RHODES UNIVERSITY
environmental
SANBI
delta environmental centre
UNISA
giz
GreenMatter

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Teaching
Indigenous Knowledge and Technology

Natural Sciences and Technology
Grades 4–6

Soul Shava & Rob O'Donoghue

www.fundisaforchange.org environment • society • science • sustainability

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A partnership programme

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