Skills for Climate Resilient Development and Adaptation: Surfacing Environmental Practice and Care Work and Learning Pathways to Advance Inclusion in the Just Transition

PCC Skills Indaba

30 October 2025

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Overview

Why focus on climate adaptive work and inclusivity in JT?
Why now? When else?
Where to start?

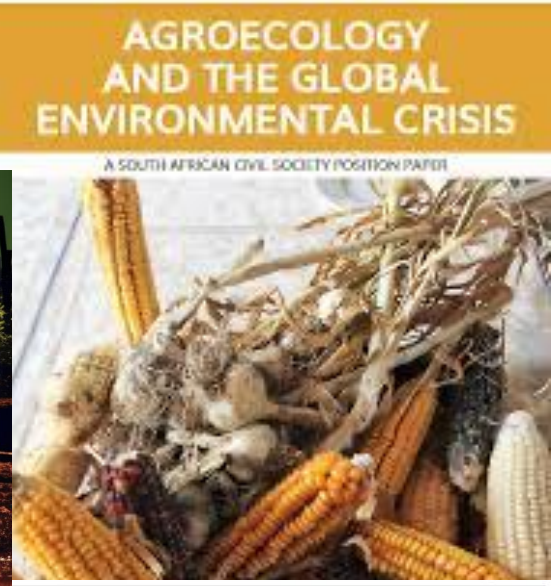
Who should be involved?
How soon?

What should we do next, together?

South Africa has many intersecting environmental challenges … it is being recognised for its work on ‘Just Transitioning’

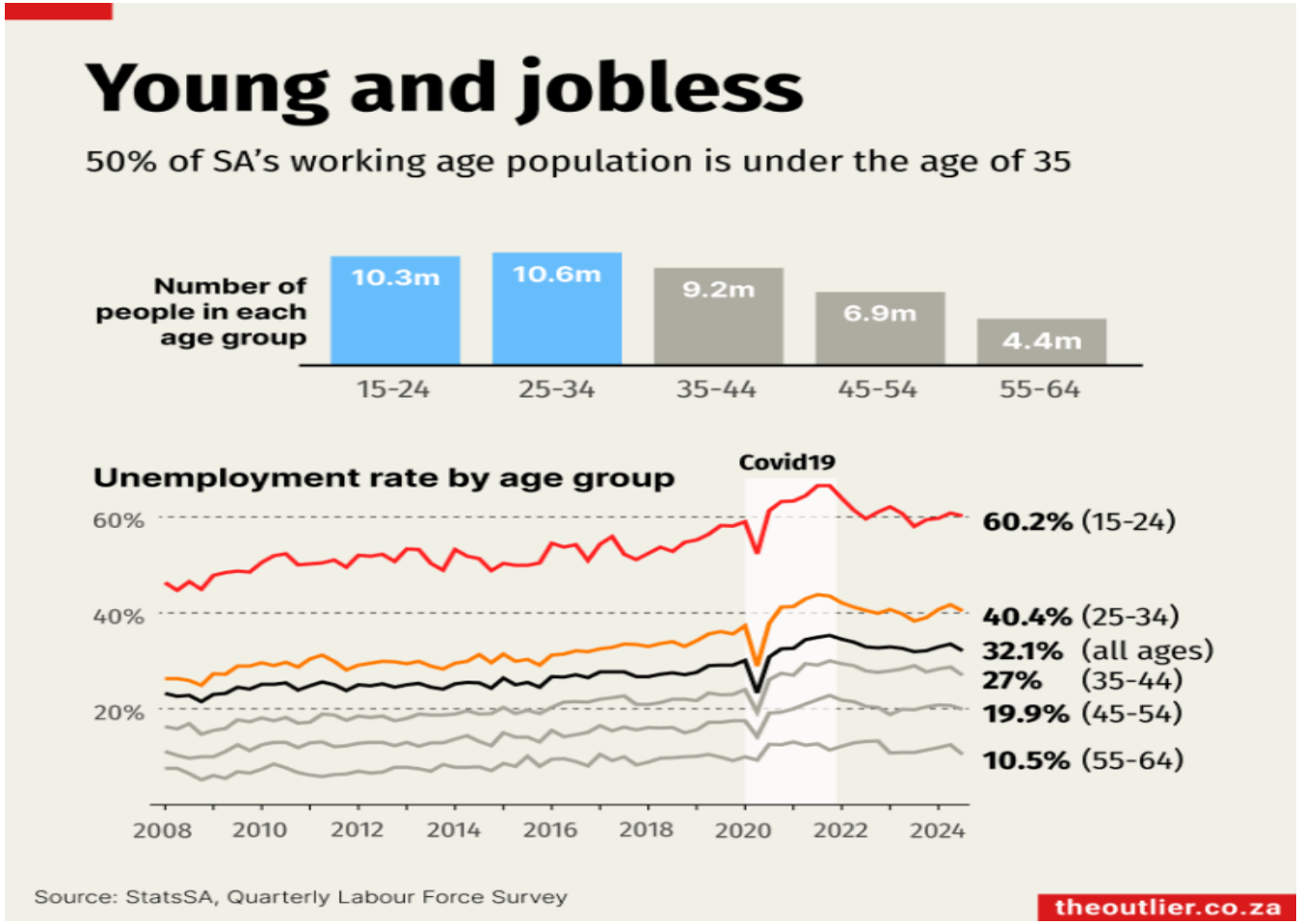
Just Transitioning aims to ‘leave no-one behind’ in transitions to sustainability

Workers, but also **communities (women and youth)**



”Unashamedly focus on youth and women” in JT skills development landscape “Dr Mathe, this morning”

'Waithood’ and ‘Inclusion Failures’ need all of our attention and imagination – **new forms of thinking and practice** to address complex problems



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Where to start??

- ✔ Undertake **grounded demand analysis research**, to map emerging CCA work and learning pathways that are already going on and emerging – *where are youth, women and disabled people who are doing CCA work, what are they doing, how are they being supported?* **framed within a more inclusive concept of value: economic value, social value & ecological value**

- ✔ Aligned with CRDPs in South Africa

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Where to start?? With Energy of course … but also beyond energy only

Dr Mathe, this morning

Transition to lower-carbon technologies

- Decarbonisation of the electricity system, manufacturing/mining, transport, etc
- Develop new skills to support economic opportunities such as:
  - Green hydrogen
  - Electric vehicles
  - Solar PV / Wind
  - Gas to Power
  - Nuclear (incl SMRs)
  - Storage (BESS, Pumped-Hydro, Gr… Compressed Air, Thermal, Capacitors, Hydrogen)
  - Clean coal (incl CFB, CCUS, SOx, …dates, CCPs utilization, etc)
  - Transmission (ultra high voltage 1…
  - Smart Meters; Smart Geysers; Sr…

ENERGY INNOVATION FOR L…

Transitioning Skills for JET

1 Solar PV and Wind

Emerging Skills
- Renewable systems engineers & site resource analysts
- PV installers & turbine technicians
- SCADA & O&M specialists
- Environmental, social, and quality officers
- Solar/wind technicians, renewable project managers, yield analysts

Transition Focus: From coal-plant operations → renewable generation design, installation, and digital maintenance

2 Transmission

Emerging Skills
- Grid expansion planners & power-systems engineers
- Substation & HV/MV line technicians
- SCADA, cyber security & grid data specialists
- Energy market & policy analysts
- Smart-grid engineers, system operators, grid-data analyst

Transition Focus: From manual grid operations → smart, digital, and integrated transmission management

3 Storage & EEDSM

Emerging Skills
- Battery and BESS engineers & integrators
- Energy auditors & efficiency project managers
- Smart metering & data analysts
- Green finance & carbon-credit specialists
- BESS technicians, energy modellers, ESCO project developers

Transition Focus: From traditional generation balancing → storage, efficiency, and demand-side management

4 Green H_2 & NEVs

Emerging Skills
- Electrolysis engineers & hydrogen safety specialists
- Fuel cell & catalyst researchers
- EV assembly & charging infrastructure planners
- V2G software & hydrogen logistics developers
- Hydrogen process engineers, EV battery technicians, fuel-cell technologists

Transition Focus: From fossil-fuel refining → hydrogen production, e-mobility, and fuel-cell manufacturing

…ERGY INNOVATION FOR LIFE

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Emerging Occupations for CCA in the Just Transition

Work and Learning Pathways for Environmental Practice and Care: cuts across SETAs

WORK & LEARNING Path 1

Climate Change and CARE: Community Environmental Health

LGSETA

WORK & LEARNING Path 2

Sustainable Urban Food Systems and Agribusiness

AGRISETA

WORK & LEARNING Path 3

Water Supply Management

EWSETA

WORK & LEARNING Path 4

Rehabilitation / restoration

CATHSETA / MQA

QCTO: Environmental Practice and Care
Occupational Skills Programme/s: Levels 2-6

& Others e.g. in **Energy / Waste / Water Quality monitoring** that are being investigated in related projects

Multiple employers and SMME potential in all Streams

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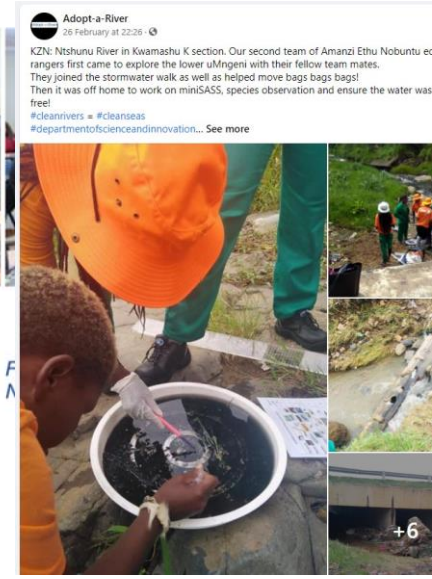
Work and learning stream 1: Water quality and quantity monitoring and management

South Africa's economically viable water is fully allocated. Approximately 37% of South Africa's drinkable water is lost to leaks and wastage

Over 4,000 sewage spills occur annually. Furthermore, 56% of wastewater treatment plants are reported as being in a poor state with 40% of citizens not having access to clean drinking water.

It is estimated that this could cost the economy R 270 billion if left unchecked(Randwater 2018).



Work and Learning Stream 2: Sustainable Food Systems

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PROJECTED SITUATION

11.8M
20% of the population analysed
People facing high levels of acute food insecurity (IPC Phase 3 or above)
IN NEED OF URGENT ACTION

systems-based development of agrifood value chains that are economically, socially and environmentally sustainable, as well as resilient to shocks and stressors

Employers:
Agri-sector
Retail sector
SMME sector

Work and Learning Stream 4: Community Environmental Health Care and Support: post-disaster risk reduction, early warning officers, heat stress management

The cost of climate change-related flooding in South Africa is in the billions, with the April 2022 KwaZulu-Natal floods alone causing over R50 billion in damage and impacting over 40,000 people.

Employers:

- Municipalities & State services
- NGO / CBO
- International Organisations
- Companies / Private Sector

Work and learning stream 4: Rehabilitation and Restoration practitioners / technicians

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Work and learning stream 5: Waste into Circular Economy Reuse and Value Creation Enterprises

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Work and learning pathways: grounded research process

WORK & LEARNING Path 3
Water Supply Manage

- **Development of junior plumbers and plumbing assist** water infrastructure.
into

Katlehong School of Specialisation

John Orr School of Specialisation, Gauteng

There is much more to each of these, and other, related climate adaptive and green learn to earn pathways

WORK & LEARN
Rehabilitation / restor

removing alien plants

- **Restoration of wetlands**

uMzimvubu Catchment Area

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Transversal research – across the workstreams

SKILLS ECOCSYSTEM – OCCUPATIONAL QUALIFICATION

- Understand how work is being done, and how the work being done is constituted as **Environmental Practice and Care work and learning pathways** with associated **occupationally directed skills programmes and qualifications -** that are or can be accredited by the QCTO.
- Investigate the needs for **a potential occupational qualification\s** (Level 5 with articulation possibilities) focused on 'Environmental Practice and Care', with core modules focused on CCA and environmental practices and elective modules that allow multiple foci and learning pathways.

- ✔ Review of existing environmental qualifications on NQF levels 5 and 6
- ✔ Hosting of CoP to initiate the development of the skills programmes / qualifications that are needed
- ✔ Engagement with QCTO, relevant SETAs
- ✔ Prepare provider development plan
- ✔ Propose draft qualifications response

Transversal research – across the workstreams – heterodox economic thinking and research is needed!

VIABILITY ANALYSIS

- Assess the work in relation to the concept of **decent work** (ILO)
- Assess the **viability of the work and occupations** identified in the sites.
- Determine what **enablers** are required to sustain and grow them, and what **constraints** need to be actively addressed.
- Development of **a viable economic framework for funders and employers** to focus on the occupations and their related skilling programmes.

Work and learning pathway focus:

- **Climate & care** - the **costs of flood impacts on communities and infrastructure** can be offset by care work associated with early warning systems
- **Water infrastructure management** - the **costs of ongoing water scarcity and inefficiency to the economy** and institutions concerned (e.g. school water bills) can be offset by work done to avoid such costs
- **Small-scale urban** - the viability of **agripreneurship for livelihoods construction** can be established in addition to the social value of reducing food insecurity, hunger and malnutrition
- **Rehabilitation** - in uMzimvubu catchment the **economic impact of the livestock economy that has been created through rangeland rehabilitation and management**, and potential replicability can be assessed, including transitioning process economics

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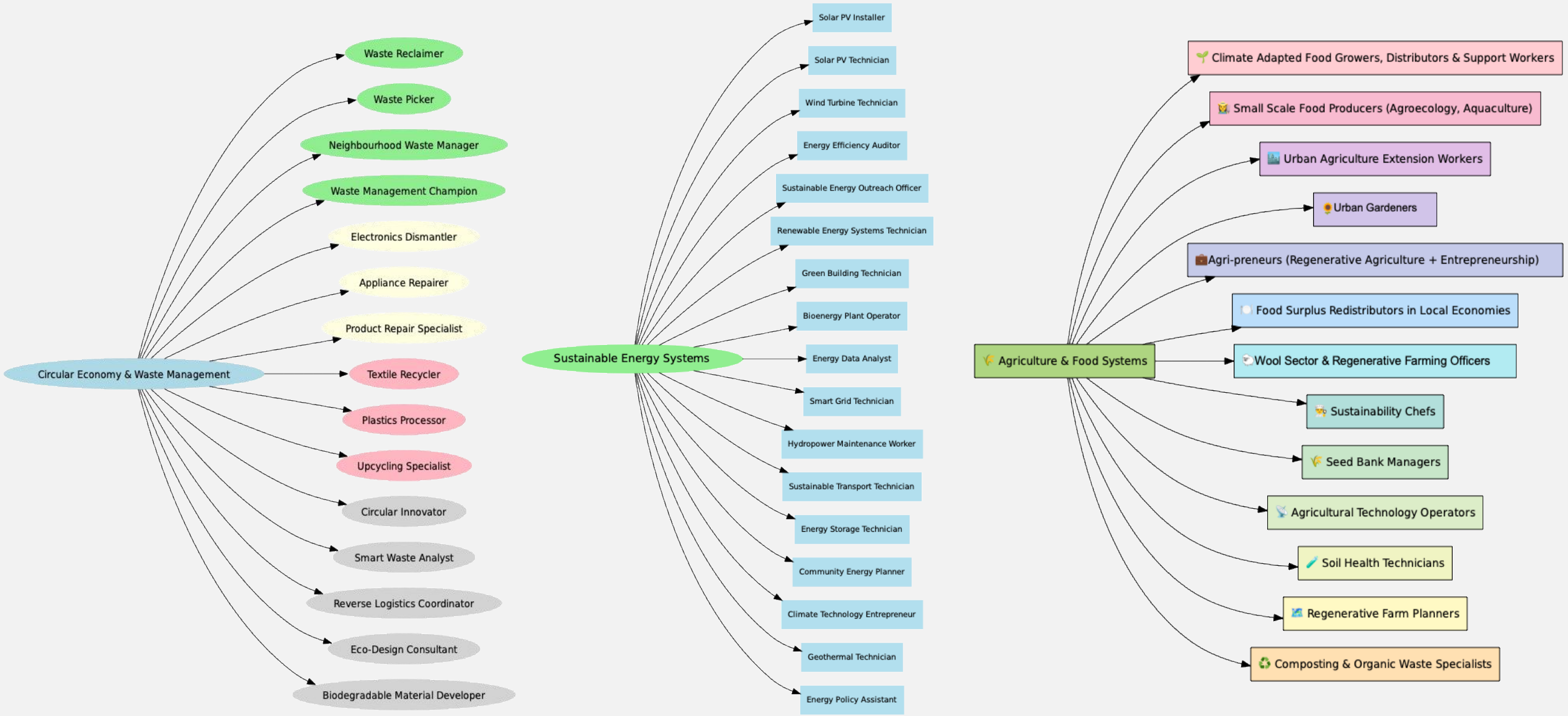
Climate Change Adaptation Focus Areas: insights from roundtable deliberations

- Agriculture & Food Systems
- Circular Economy & Waste Management
- Community Support
- Education & Engagement
- Environmental Monitoring & Health
- Land Rehabilitation
- Legal and Compliance
- Sustainable Energy
- Water Managment

Climate Change Adaptation Jobs

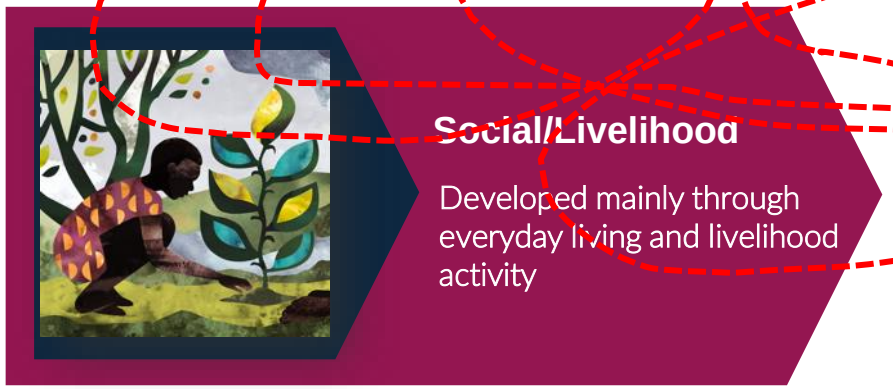


Occupational

Developed mainly in the formal workplace and labour market

Educational

Developed mainly in an educational institution



Social/Livelihood

Developed mainly through everyday living and livelihood activity

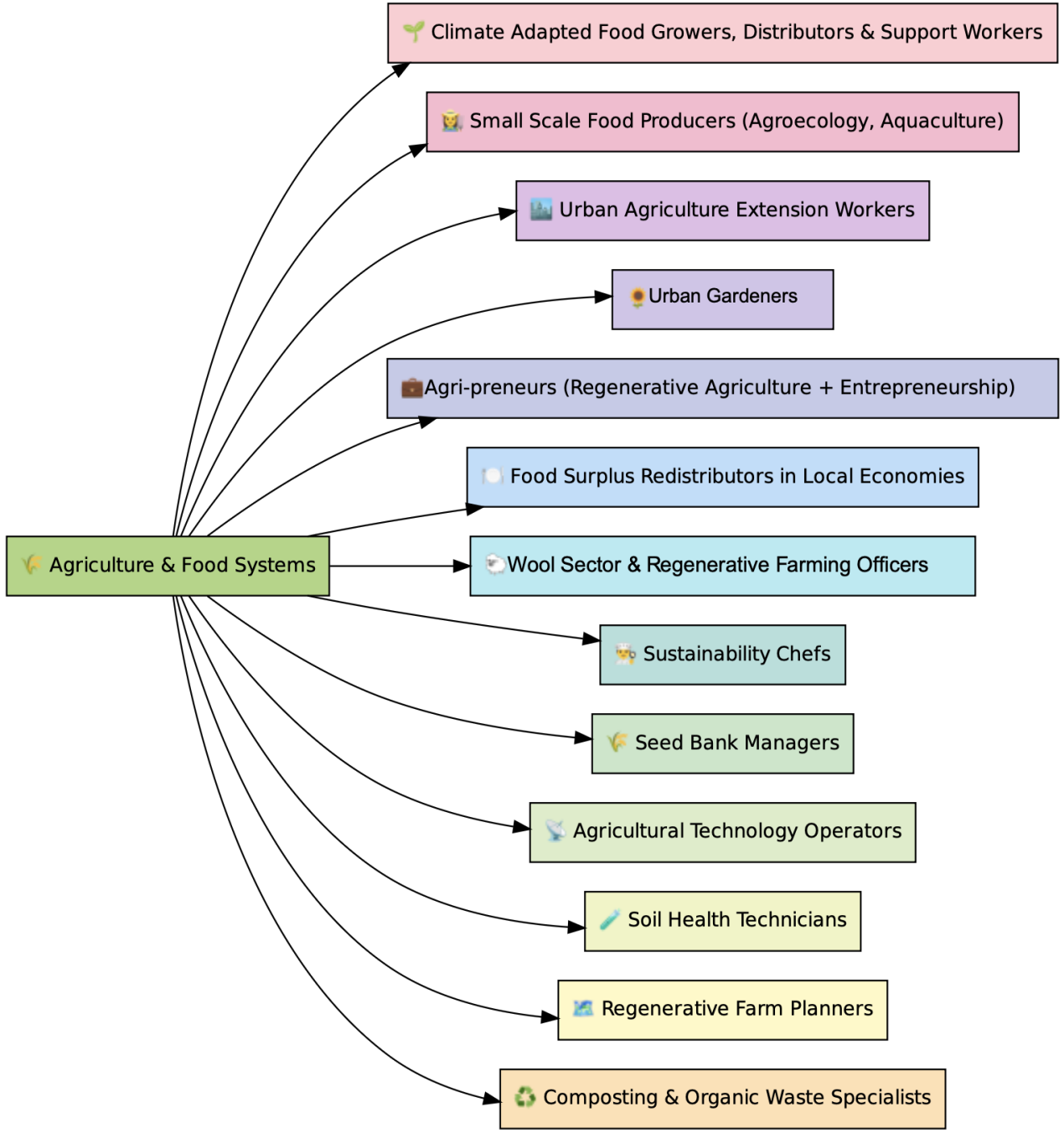
Sustainability Learning Pathways: Skills for the economy AND society

are diverse in their construction

BUT NECESSARILY CONNECTED!!

"Not only WORK for the economy, but also related WORK FOR THE COMMON GOOD"

An Example from our Research Work



Agripreneur

- Agripreneurship and Regenerative agriculture are increasingly recognised as avenues for income generation, particularly for communities in peri-urban areas.
- Regenerative urban agriculture forms part of the broader agricultural landscape and value chain, with agripreneurs contributing to local job creation.
- The agripreneurs included in this study (Eastern Cape and the City of Cape Town) specialise in poultry, organic vegetables, and crop production, and their outputs are primarily market-oriented rather than subsistence-based.

Occupations and occupational tasks

Agripreneurs / Community gardene farmers

Crop cultivation , Harvesting, Mulching, Land Preparation, Compo seedlings, Pest control

Rearing small livestock, Poultry production, Plant diversificatio

Marketing , Farm supervision, Farm management, Farm maintenance

Climate knowledge, climate change adaptation knowledge and skills changes the nature of the tasks and how they are / can be done (e.g. water wise approaches)

Knowledge required

Agripreneur

Technical

Soil health management, Water manageme
aquaponics, hydroponics, Horticulture
organic pest control

Sustainable farming methods
regenerative agriculture, post

Poultry (animal) husbandry,
Mechanical and electrical s
farming techniques, Regen

Management

Marketing and branding of produ
Cooperative organisation
Supply chain management
Sustainable production
Financial planning
Economic viability of small-scale / urban farming enterprises

Climate knowledge, climate change adaptation knowledge and skills changes the ‘foundational knowledge’ needed

While important, investigation is not enough …

We need to AT THE SAME TIME **pro-actively and reflexively** support the emergence of these work and learning pathways through innovative skills development programmes – operational / action research and implementation to expand capabilities of youth and women in the JT where work already exists (reskill / upskill)

This is also an important ***transitioning into work strategy*** that builds identity, workplace skills, life skills, and contributes to workplaces, communities, climate adaptation outcomes, *develops integrative skills and capacity to be flexibly engaged in the labour market*

unicef for every child

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EARN SKILLS.
BUILD YOUR FUTURE.

AGROECOLOGY

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Join the **Green Learn2Earn Agroecology Pathway**! This is an interactive online course made up of **10 short units** and a reflective **impact task.**

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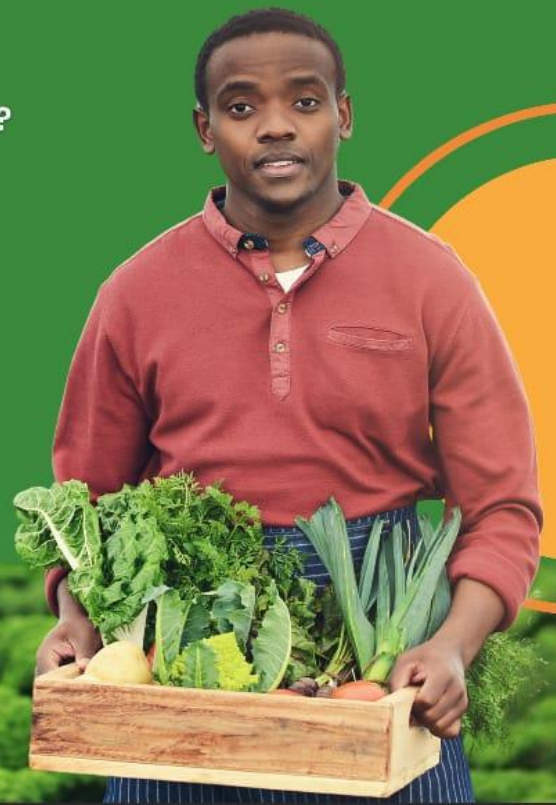

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GROW FOOD.
EARN SKILLS.
BUILD YOUR FUTURE.

Are you a South African youth passionate about farming, sustainability, or community impact?

Join the **Green Learn2Earn Agroecology Pathway** — a free online program that teaches you how to grow food and turn your skills into income.

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RIVER MONITORING

South African youth, this one's for you. Do you care about clean rivers and the future of your community?

Join the **Green Learn2Earn River Monitoring Pathway!**

This is an interactive online course made up of **7 short units** and a **change project.**

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Forecasting Green Jobs

Youth employment in green jobs in South Africa, aligned to key stakeholder groups

This table outlines the roles of key stakeholder groups, including government, academia, private sector, and civil society—in driving youth employment within green sectors. It highlights the entities involved, youth employment impact, flagship programmes, and strategic actions supporting the green transition.

Stakeholder Group	Entities Examples	Youth Employment Contribution	Key Programmes	Key Actions
Government & Policy Makers	environmental affairs; mineral resources & energy; higher education & training	>84,000 youth	Through the Revitalised National Youth Service (NYS) and Presidential Youth Employment Initiative (PYEI)	• Develop national green job strategies. • Support renewable energy targets (e.g., IRP). • Promote climate-smart agriculture and circular economy policies.
Learning & Training Institutions	WITS UNIVERSITY; Stellenbosch University	Not quantified	Supported by the JET Skilling for Employment Programme and TVET capacity building	• Align curricula with green job profiles. • Offer certifications in solar installation, waste management, etc. • Partner with industry for apprenticeships.
Private Sector & Employers	Eskom; LIVE STOCK WEALTH; mpact	5,436 youth placed	Via Jobs Boost Outcomes Fund (12 implementation partners) .	• Hire and train green workers. • Scale operations in solar, agriculture, and waste sectors. • Collaborate with government and academia.
Industry Associations & Chambers	GREEN BUILDING COUNCIL SOUTH AFRICA; SAREC; AgriSA™	Indirect support	NBI mobilized 30+ CEOs and leaders to support youth skilling in green sectors .	• Align curricula with green job profiles. • Offer certifications in solar installation, waste management, etc. • Partner with industry for apprenticeships.
Funders & Investors	IDC; DBSA; USAID FROM THE AMERICAN PEOPLE	R115 million disbursed	Through outcomes-based financing for youth employment in green sectors .	• Promote environmental awareness. • Support grassroots training and employment. • Monitor policy implementation and social impact.
Civil Society & NGOs	WWF; SEA SUSTAINABLE ENERGY AFRICA; greenfund	Active in NYS & Jobs Boost	NGOs are implementation partners in service and skilling programmes .	• Fund pilot projects and research. • Support policy development and capacity building. • Facilitate regional cooperation.

Emerging insights

Climate Adaptive Learning Pathways need to be:

- Conceptualised for **a stream of work** – not just a job
- **Coherent provisioning alongside – coherent, visible streams of work that 'leads somewhere' meaningful**
- Multi entry and multi exit **(formal ↔ informal recognition**) - pathways and parallel pathways
- Flexible, incorporate diverse modes of learning BUT they need to articulate and be coherent. Allowing for credit transfer
- Signposts and safety nets – these are often facilitated by local intermediaries

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Who should be involved? How soon?

Include women, youth and the disabled in our country – let them help us all plan and implement the skills development work for the Just Transition …

NEEDS A DIFFERENT MODEL – co-constructed!!

Back to the overview questions …

Why focus on climate adaptive work and youth skills?
Why now? When else?
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How soon?

What should we do next, together?

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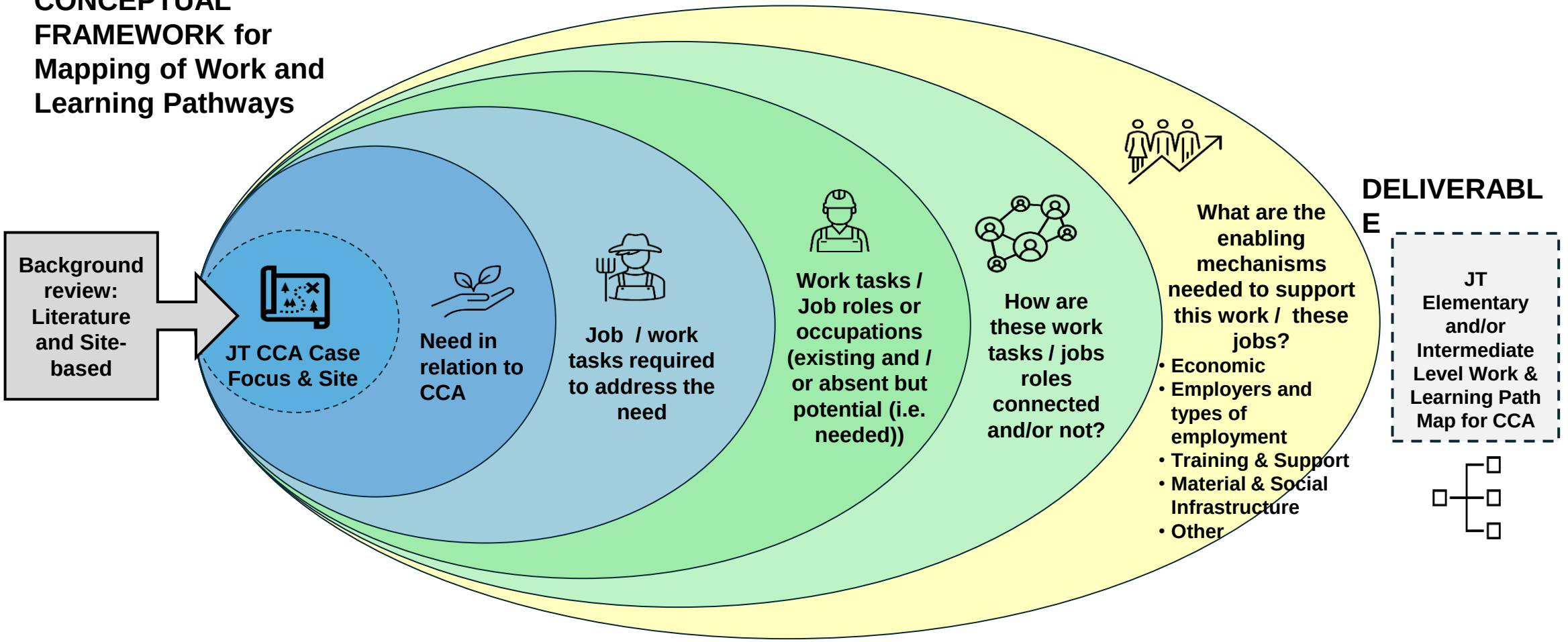
CONCEPTUAL FRAMEWORK for Mapping of Work and Learning Pathways



1. Guideline for background review	2. Questions for describing the JT CCA case site	3. Questions for probing the need in relation to CCA	4. Questions to map the job /work tasks	5. Questions to frame these in terms of jobs / occupations / recognized work	6. Levels of work and Connections between jobs in the site	7. Insights into what makes the work / jobs viable and what enables / constrains them	8. Stakeholder map : Who is involved in this work and how e.g. beneficiaries, funders, other groups etc.	9. Any other comments or insights that will be useful

Deliverables