

WASTE RDI ROADMAP: HUMAN CAPITAL DEVELOPMENT TRACK AND TRACE IMPACT EVALUATION STUDY

RESEARCH REPORT PRESENTATION
04 February 2025

Equitable Education and Economies Research Programme
Human Sciences Research Council

Contents

- Introduction and study context
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- Research Design
- Key findings
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Study in context

- Environmental challenge of waste management intersects with South Africa's severe socio-economic crisis, marked by the world's highest unemployment rate
- Waste Sector thus presents a strategic opportunity to address both environmental sustainability and unemployment
- However, the sector's growth is constrained by critical skills shortages
- The Waste RDI Roadmap provides an opportunity to support sector job creation through three key interventions, namely Human Capital Development (HCD), Research and Development (R&D), and Innovation
- HSRC appointed to implement a Tracer Impact Evaluation Study of the Waste RDI Roadmap HCD Programme



Waste RDI Roadmap HCD programme

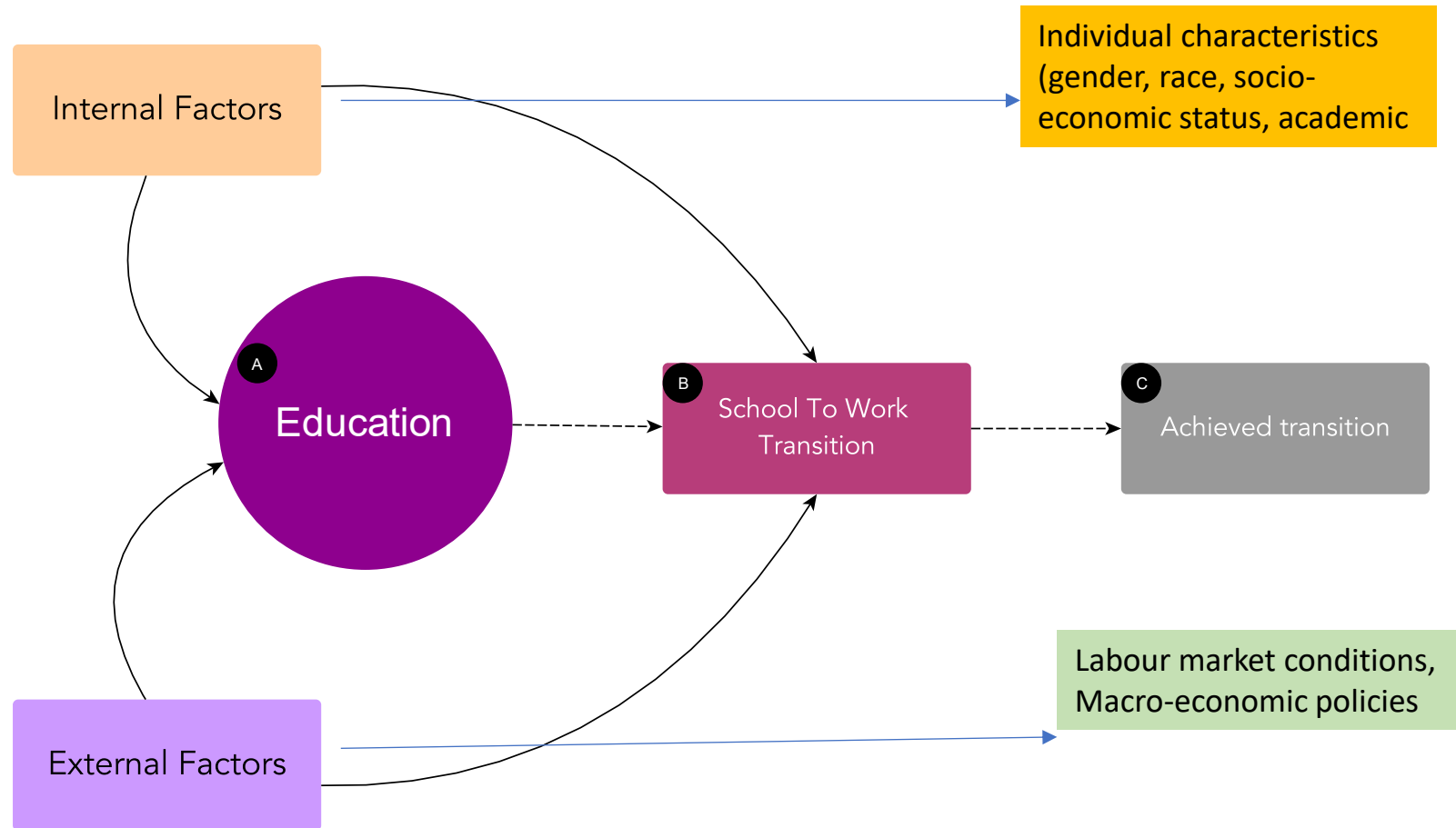
- Funded by the DSI and housed within the CSIR
- Aims to support the development of a proficient public and private sector capable of transforming the South African Waste Sector
- Two primary mechanisms:
 - Postgraduate degrees offering specialisation in solid waste management, and;
 - Development of a pipeline of skilled and qualified postgraduate students into the Waste Sector
- Several funding instruments to build human capacity, namely, direct scholarships for postgraduate students, partial or full funding under Waste RDI Roadmap grant projects, partial or full funding under SARChI Chairs, and internships

Study objectives

As per the TOR, to:

- Gather data about the **effectiveness and impacts** of the programme
- Provide information about **the activities, outcomes, and employment of beneficiaries**
- Determine **the nature of employment of beneficiaries**
- Determine **the extent to which beneficiaries were retained** in the Waste Sector
- Pilot a survey of the **beneficiaries' employers' perceptions of the value** of the programme
- Generate evidence of **key achievements and challenges** regarding programme delivery mechanisms and how these can be improved in the future for sustainability

Conceptual Framework: School to Work Transition (STWT)



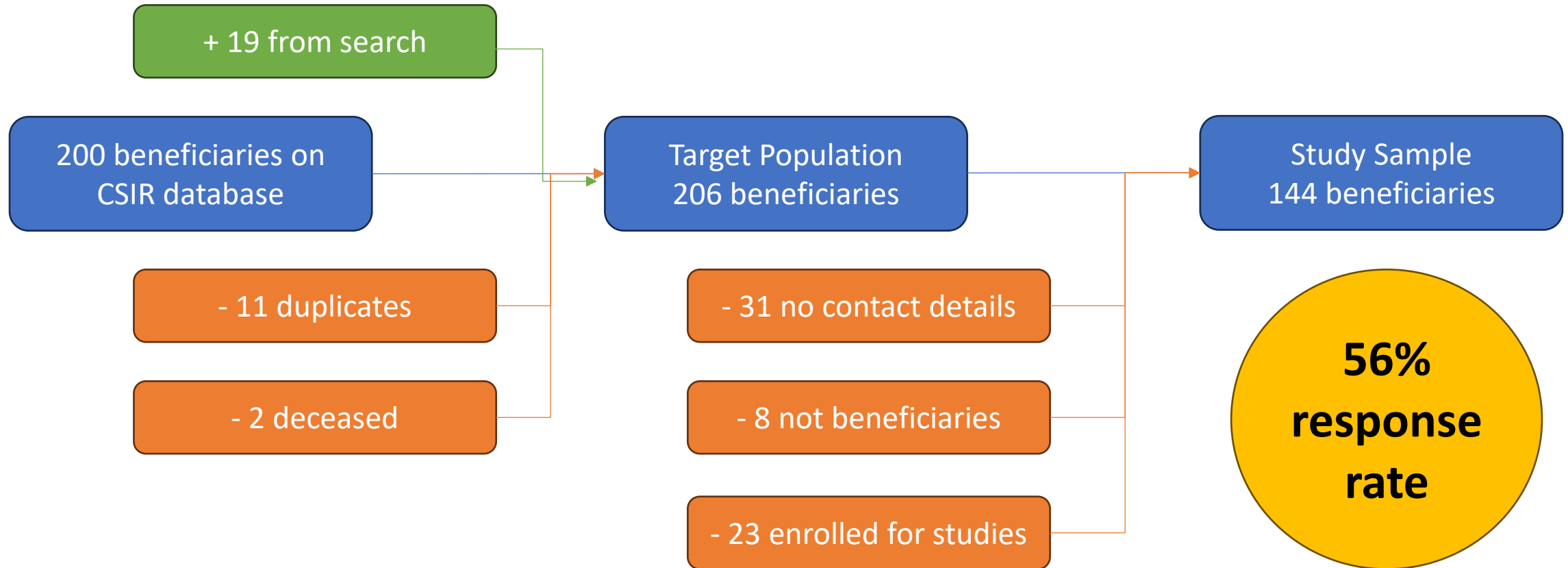
Nilsson, 2019

Research design

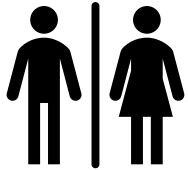
- Tracer study comprising a mixed methods approach including:
 - A desktop review of published and grey literature and available documentation relevant to the study;
 - Survey with beneficiaries of the Waste RDI Roadmap HCD Programme;
 - Focus groups with beneficiaries of the Waste RDI Roadmap HCD Programme; and
 - An employer survey
- Beneficiaries were identified from the Waste RDI Roadmap student database, with the reference period being 2015 to 2023



Study population and sampling



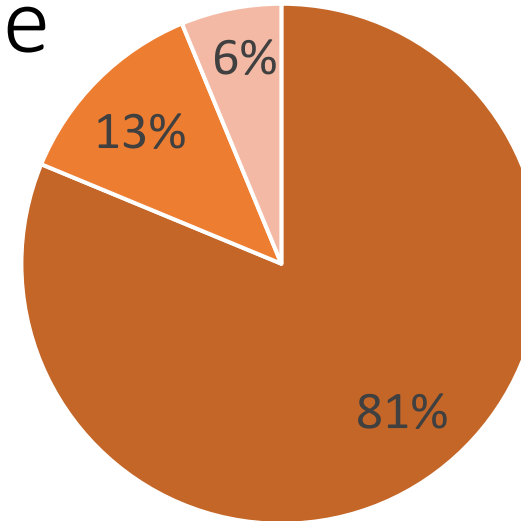
Respondents Demographic Profile



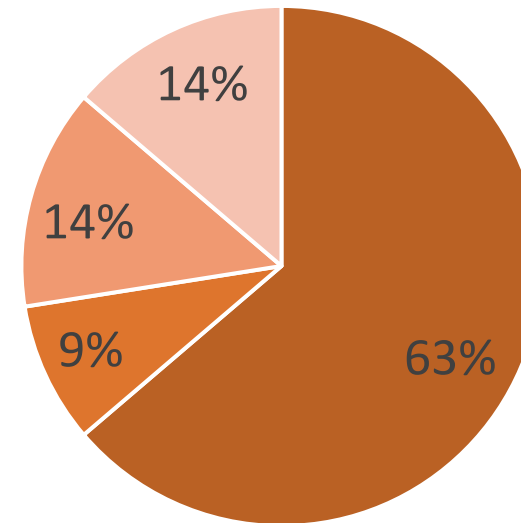
59% female with mean age of 32 years



3% beneficiaries reported a disability



■ South African
■ Other African
■ Other



■ Black African
■ Coloured
■ Indian/Asian
■ White



27%

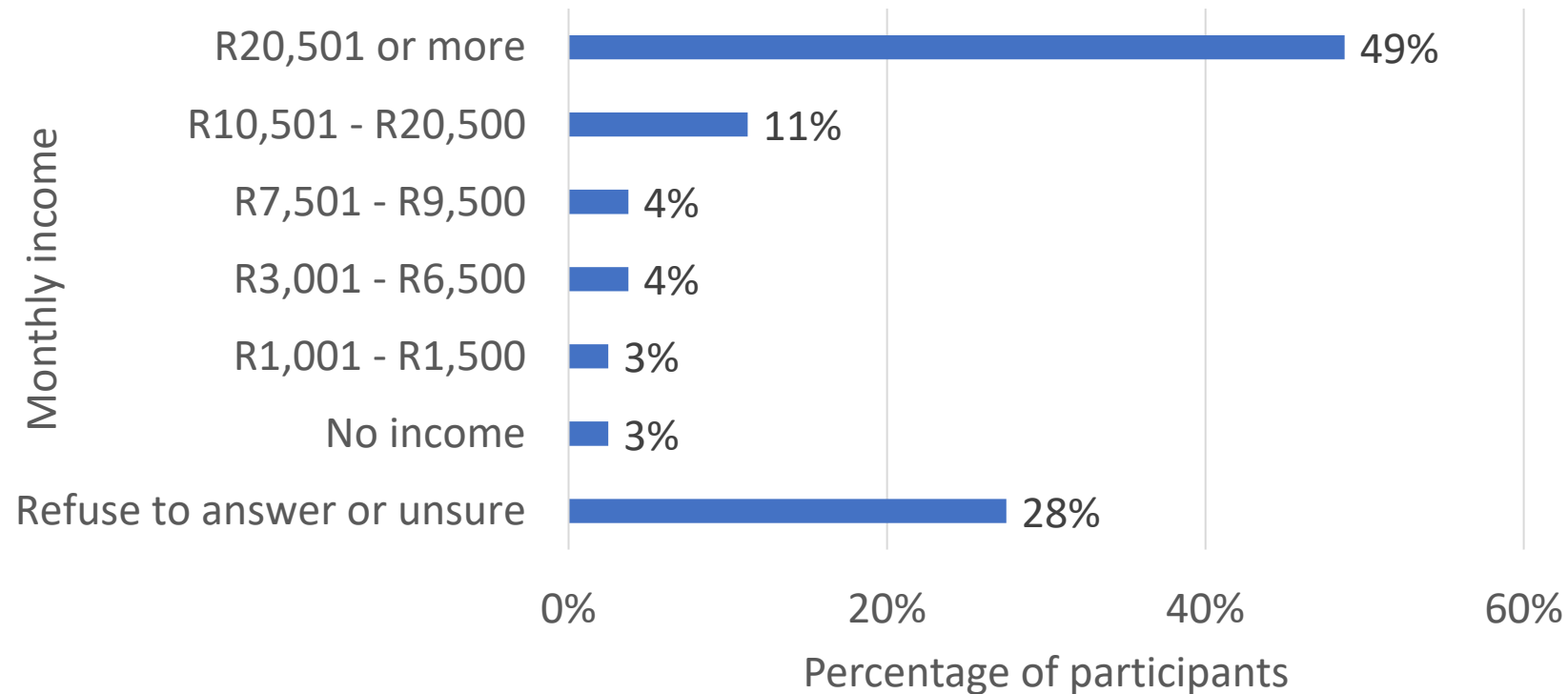


14%



10%

Current gross total monthly income for HH (n = 80)



- Beneficiaries mainly within middle to upper-income brackets
- Aligns with national trends – disparities in access to Higher Education
- 14% come from households with income R9500 or less per month- lower quintiles
- Barriers to access extend beyond financial – structural inequality

Nature of financial support provided

Nature of support received	No.	%
Full scholarship	39	49
Partial scholarship	24	30
Fieldwork funding	3	4
Day to day research expenses	1	1
Other	13	16

Qualification/ post-doctoral placement/ internship funded

Qualification	No.	%
Master's	49	62%
PhD	13	16%
Honours	9	11%
Bachelors	3	4%
Post-doctoral placement	3	4%
Other: Honours and Master's	1	1%
Other: Research assistant	1	1%

Residential mobility (n = 73)

National & international mobility trends: strong tendency to remain in orig province; 7 left the country

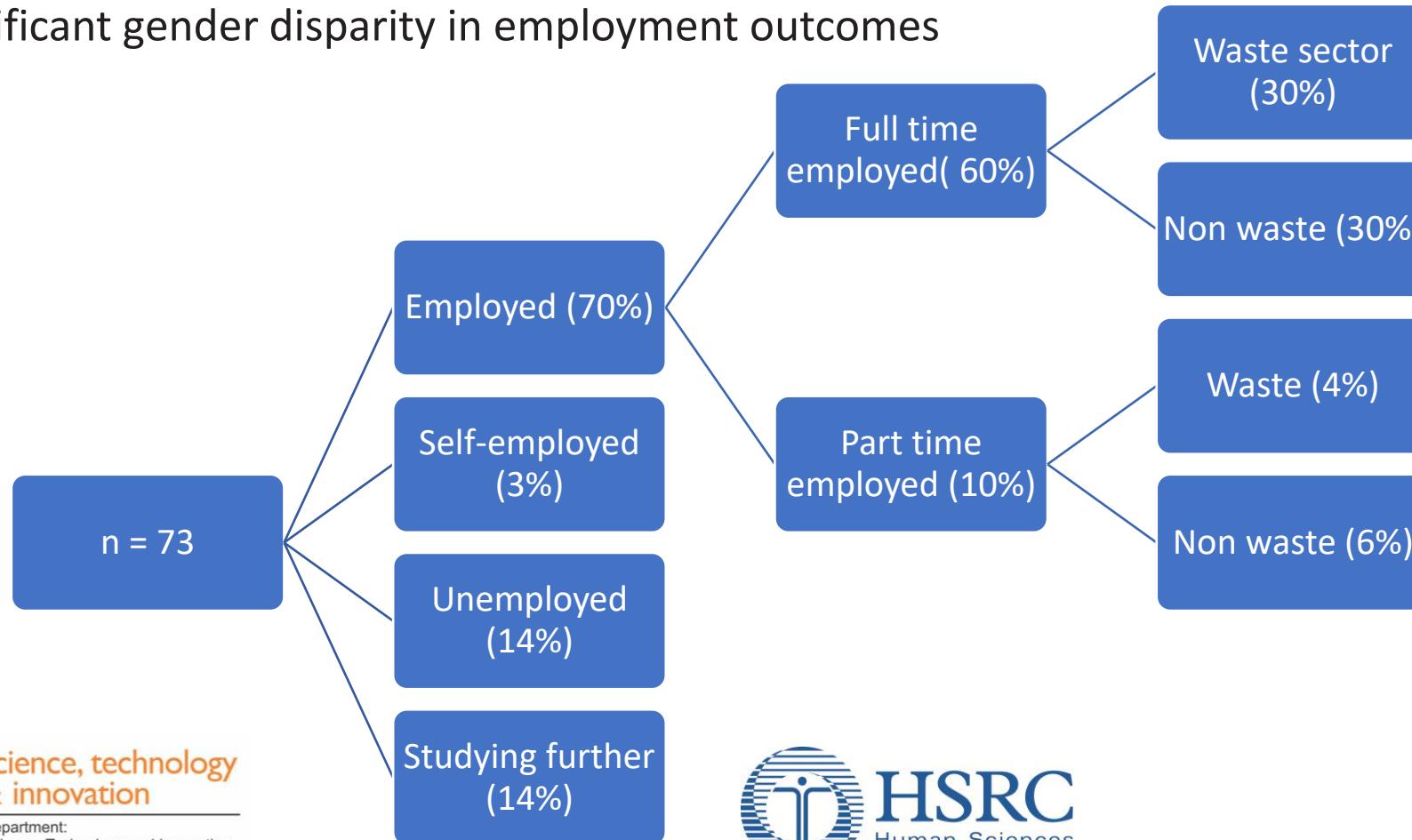
		After completion of the qualification											
		EC	FS	GT	KZN	LP	MP	NC	NW	WC	Africa	World	Total
During completion of qualification	EC	4	0	1	0	0	0	0	0	0	0	0	5
	FS	0	1	0	0	0	0	0	0	0	0	0	1
	GT	0	0	14	0	0	0	1	0	3	0	2	20
	KZN	0	1	3	10	0	0	0	1	2	1	2	20
	LP	0	0	0	0	0	1	0	0	0	0	0	1
	MP	0	0	0	0	0	0	0	0	0	0	0	0
	NC	0	0	0	0	0	0	1	0	0	0	0	1
	NW	0	0	0	0	1	0	0	0	0	0	0	1
	WC	0	0	1	1	0	0	0	0	17	1	1	21
	Africa	0	0	0	0	0	0	0	0	0	1	1	2
	World	0	0	0	0	0	0	0	0	0	0	1	1
	Total	4	2	19	11	1	1	2	1	22	3	7	73

Labour Market Destinations of the Beneficiaries

What happened after the programme?

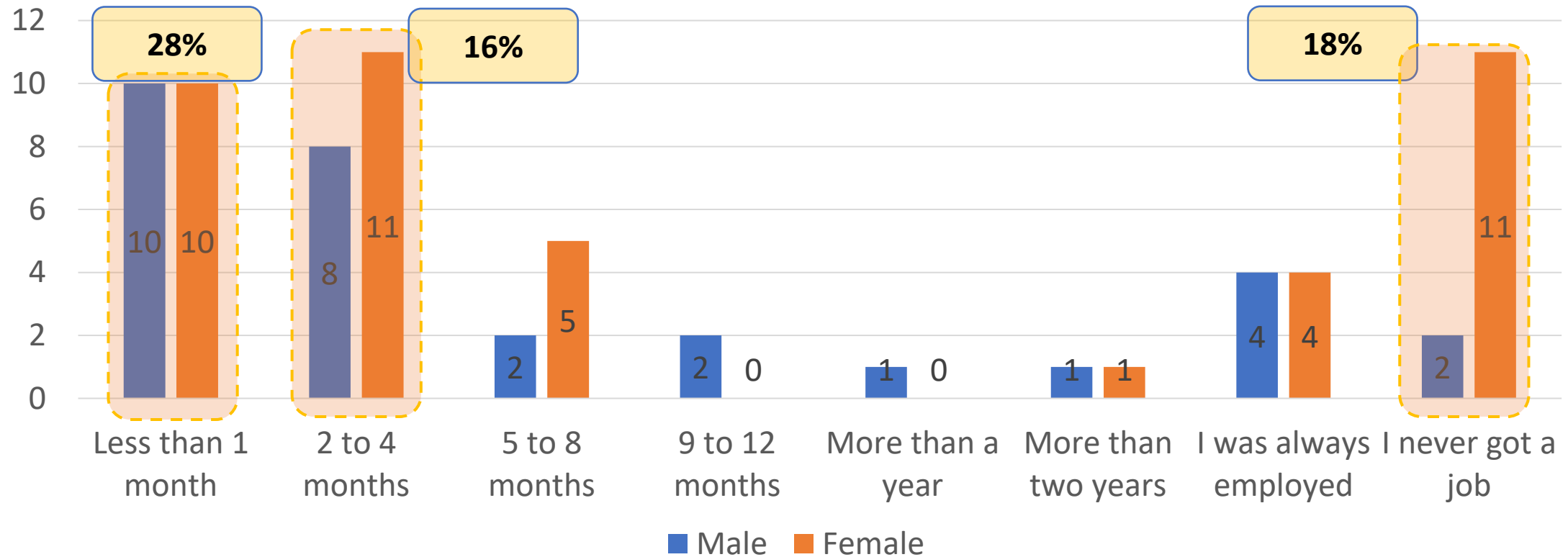
Labour market destinations (n = 73)

- Strong overall employment success rate: 73% of graduates successfully transitioned into employment
- About 60% successfully secured full-time employment
- Significant gender disparity in employment outcomes



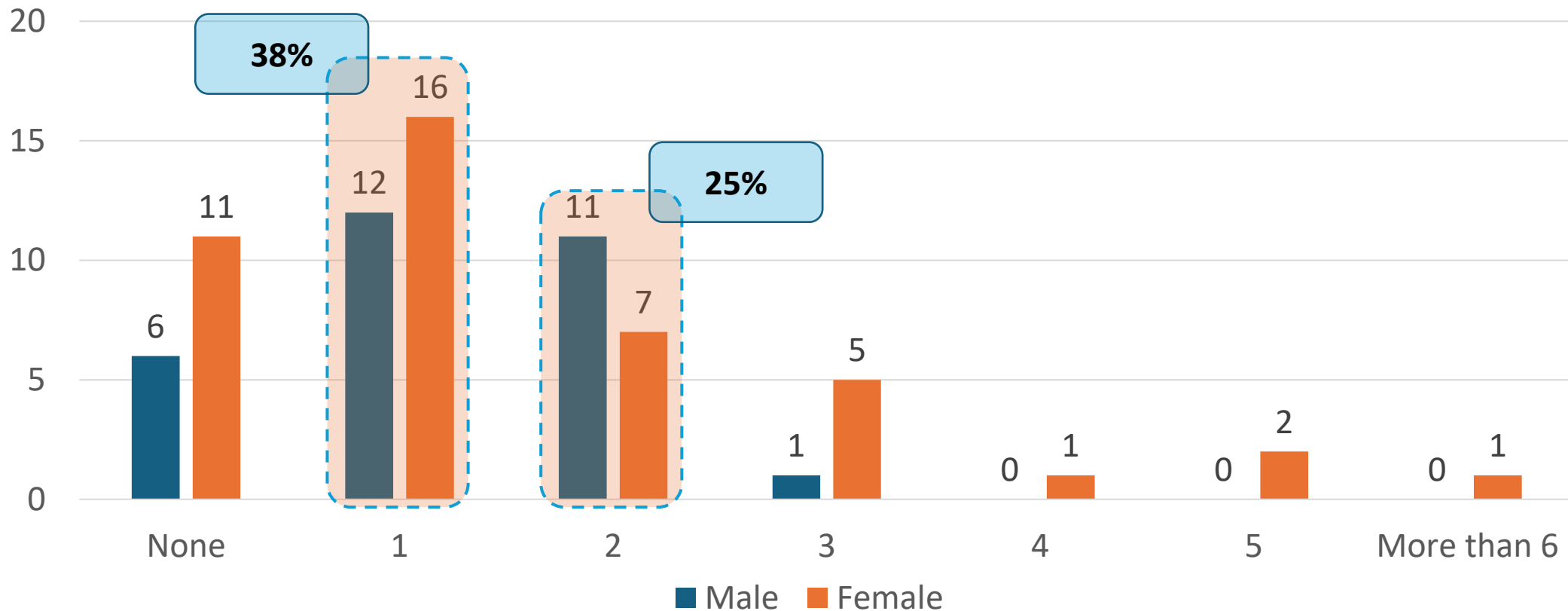
Time taken to secure employment (n = 72) (Self Reported)

- Initial employment accessibility is strong, with more than a quarter (28%) of graduates finding work within one month
- Notable employment gap emerges after first month, with women taking longer to secure positions
- Significant long-term gender disparity, with 11 women vs 2 men never securing employment, indicating systemic barriers in the sector



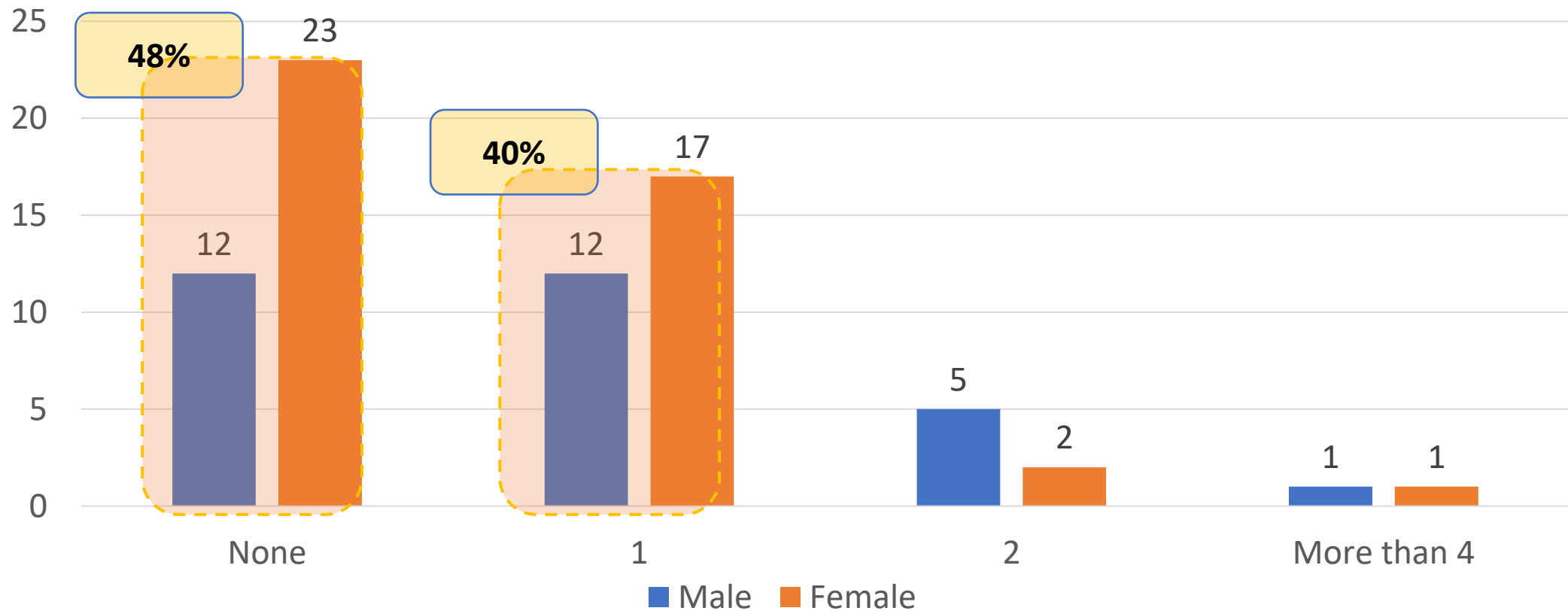
Number of jobs since completing the qualification

- Most graduates showed career stability, with 63% holding 1-2 jobs post-program (38% one job, 25% two jobs)
- 36% held 3+ jobs post-program, suggesting either active career advancement or possible instability due to short-term contracts - contrasting with typical South African employment patterns where young workers tend to stay in first jobs longer due to limited mobility opportunities



Number of jobs in the Waste Sector (n = 73)

- 48% never worked in waste sector post-graduation, indicating significant sector retention challenges
- 40% secured at least one waste sector position, demonstrating the programmes partial success in creating industry pathways while highlighting room for improvement



Quality of Programme Intervention mentorship and training Relevance of knowledge transfer

- ❑ 71% rated quality of mentorship/training received as Excellent
- ❑ 70% rated relevance of knowledge transfer to job as Excellent



Pivotal to impactful participation

93% likely or very likely to recommend the HCD programme to others

I never had problems with my funding. Everything was taken care of, including my tuition fees, of course.



If it wasn't for that bursary, I don't know, I do have financial issues, Maybe I would have dropped out, because of funding

Employer Assessment of Value of employing HCD Graduate



"She went into a data analysis role, and she was very comfortable, and so the company benefited from such skills and exposure. I'm going to presume that that comes from her experience while she was working under your scheme"

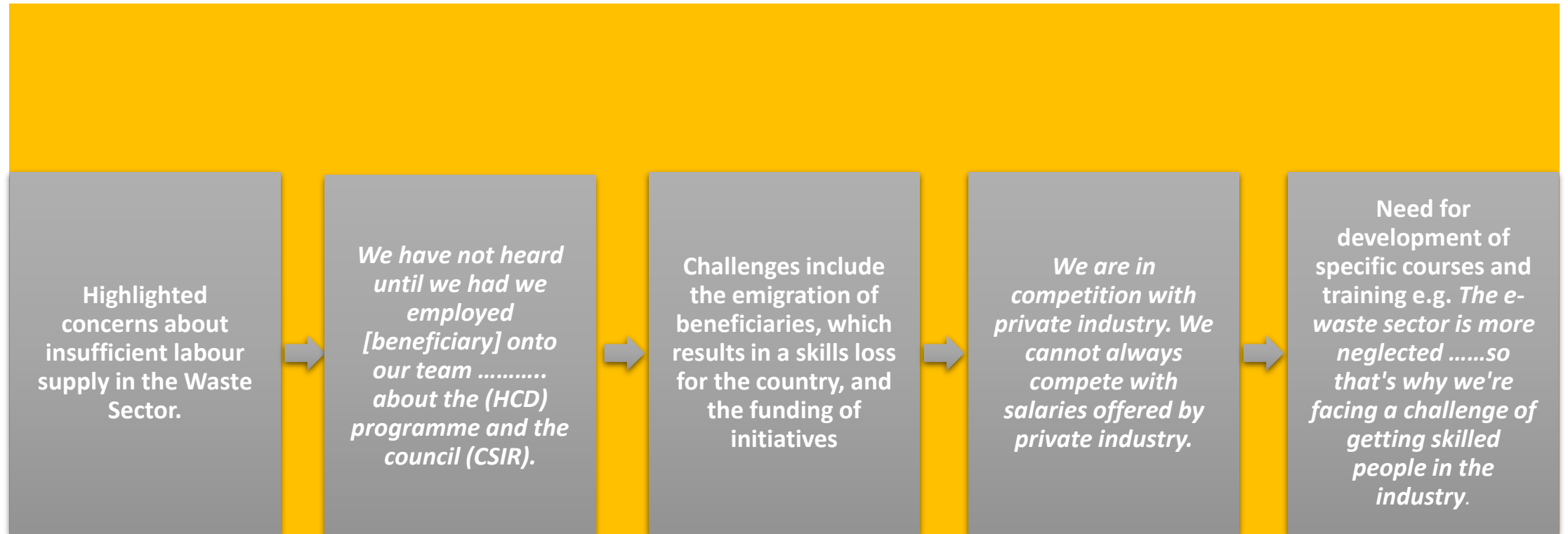
"We were seeking an employee with specific expertise in plant species, etc. and [they] had this expertise"

"Since [the beneficiary] has been here, we have been doing so much better with passing all of our audits, not like before when we had challenges with that"

"It allowed us to do quality research, you know, not wishy-washy research as I call it. It helps in gathering of information that can assist policymakers in decisions".

"they have set a good example into our company"

Employer Perceptions of the HCD Programme



Employed in Waste Sector (n = 25)

- ☐ Where are they employed
- ☐ Nature of work
- ☐ Programme benefits

Employment in the Waste Sector

- Of 73 graduates:
 - 34% Employed in waste sector (n=25) (34%)
 - 84% reported qualification and work alignment (n=21)
 - 52% in employment under formal contracts, with 12 (48%) holding fixed-term contracts and 13 (52%) in permanent positions.
 - 80% (20) have secured full-time positions.
 - Part-time and temporary positions each account for 8% (n = 2) of employment.
 - Casual employment represents the smallest category at 4% (n = 1).
 - This distribution reflects a relatively stable employment pattern in the waste sector

Employer characteristics

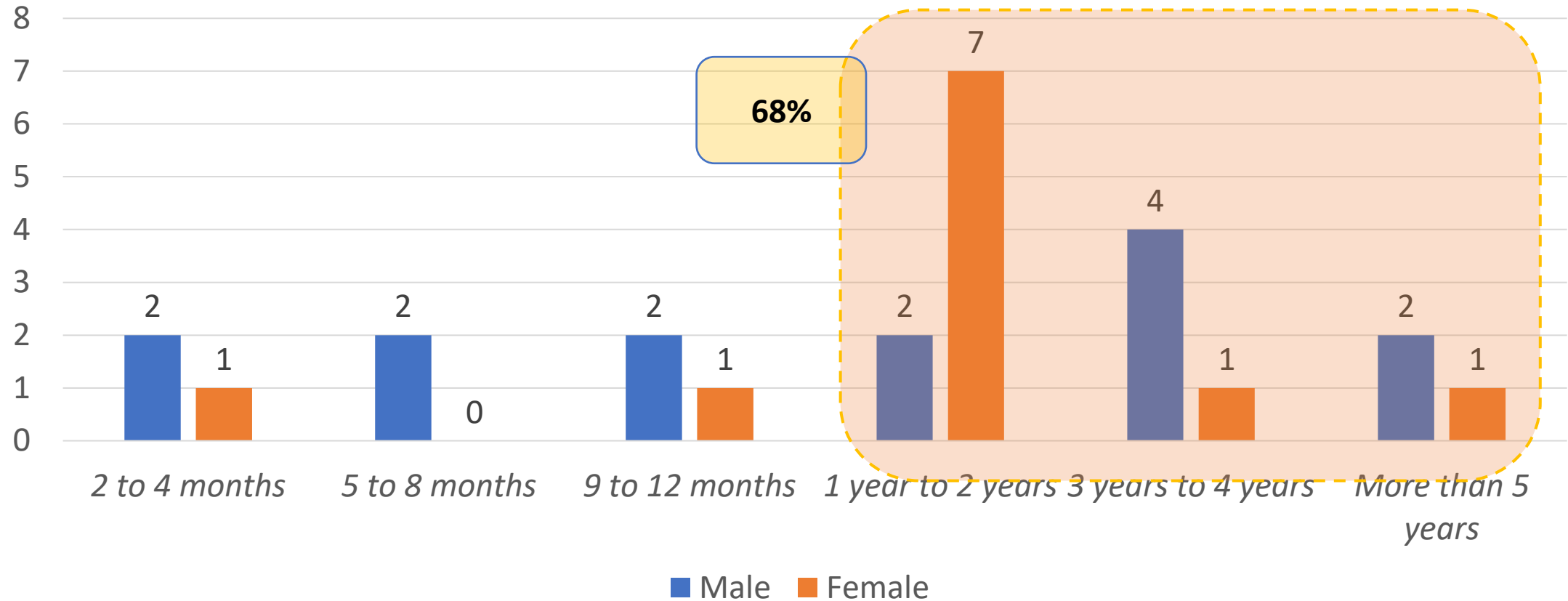
Employer type:

- Employers spread across government, public institutions, and private companies.
- 40% work in large enterprises, suggesting significant absorption of program graduates by well-established organisations in the sector
- A fifth of graduates (n = 5;20%) were employed at the HEI institution where they completed their qualifications

Employed in Specific Waste Streams

- 20% were working in municipal waste (all male employees)
- 16% were each in organic and plastic waste
- 44% in cross-cutting or specialised roles (balanced gender split)
- 4% in e-waste (WEEE)

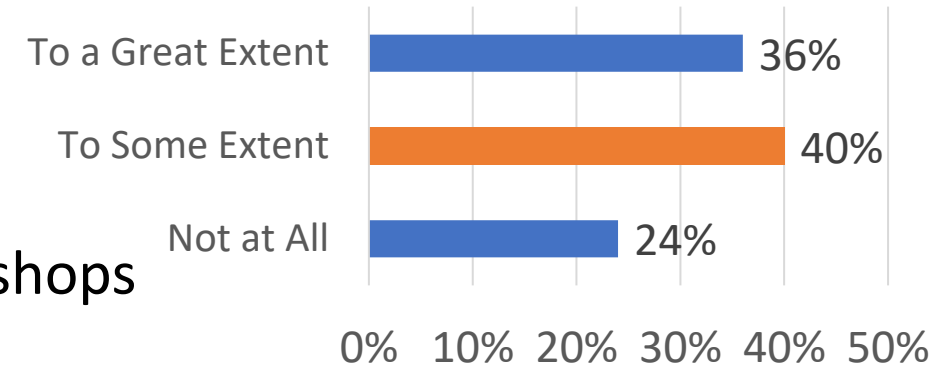
Employment duration in current role



68% employed for over a year with 18% employed for more than 5 years

Extent to which programme assisted in finding employment

- Networking opportunities provided by supervisors
- Exposure to industry-related conferences and workshops
- Prestige of CSIR-related experience on resume



“Recently, I got selected into the [] programme where there are a number of global researchers from different universities. I was selected specifically for my growing expertise in the waste sector focusing on food waste. These contacts and interactions with people in the waste sector, have had a great contribution in my growth and development”. (Employed in the Waste Sector FG)

“Having CSIR on my CV definitely has helped. People seem to be impressed with that”. (Employed in the Waste Sector FG)

Barriers to employment in Waste Sector

- Gatekeeping in the Waste Sector Research
- Lack of or poor quality mentorship
- Limited practical experience provided by employers
- Limited knowledge about employers in the waste sector

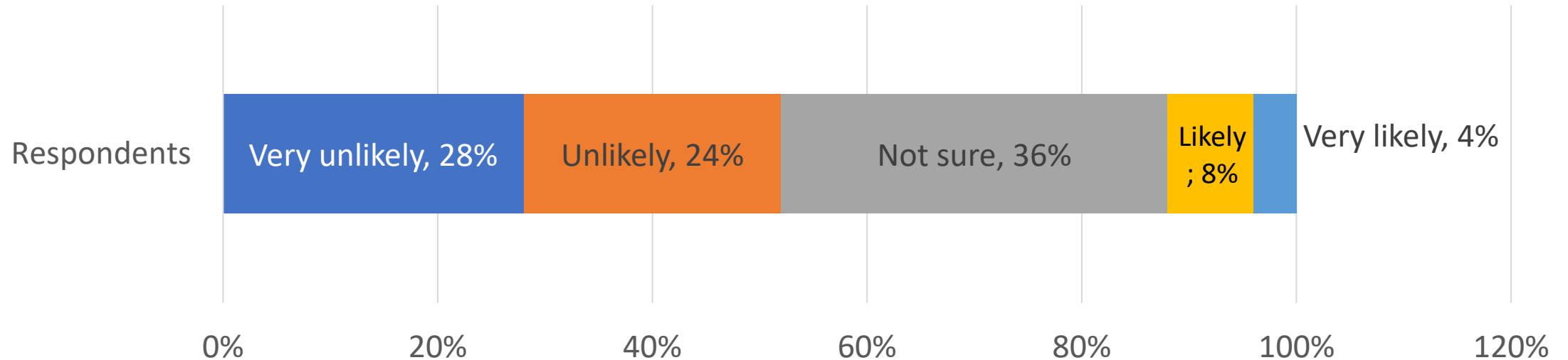
I don't know where to find jobs in the waste sector

- Financial constraints by employers
- Personal challenges leading to withdrawal from programme

A participant's loss of a grandmother and food affordability challenges led to them exiting the programme.



Likelihood of moving away from Waste Sector



“Am open to any other funding”

“It’s just lack of job opportunities in the Waste Sector”

“enjoy the Waste Sector but for growth, I need to explore other areas as well”

Employed in non-Waste Sector (n = 26)

Barriers to employment in Waste Sector

*“I couldn't get any job in the sector because there's no real opportunity unless you prepare to develop the technology for the market”
(Employed in a non-Waste Sector FG)*

“...It is difficult to get into the Waste Sector, especially in research. It is hard to penetrate that sector, with gatekeeping, especially on the research side.

Municipalities' Waste Sector usually hire engineers with diplomas in environmental health. Even with a Ph.D., they may not look at you in the Waste Sector.

The Private sector is also difficult, you need to know someone. It's tough if you can't network enough.”

- Waste Sector required work experience which beneficiaries did not have
- Sectoral gate-keeping
- Limited networking opportunities
- Lack of mentorship
- Inadequate funding
- Unappealing job conditions

Pursuing full-time studies (n = 10)



Reasons for pursuing Waste-Sector-related Qualification

To increase my knowledge and understanding of the Waste Sector industry (n = 7)

To achieve a higher qualification in the Waste Sector (n = 5)

To help me get a better job in the Waste Sector (n = 4)

To further my interest in a particular subject area (n = 4)

To develop skills in a different industry (n = 3)

This is a gap identified in the industry, and I wish to fulfil that need (n = 2)

To help me earn more money (n = 2)

To improve my chance of finding a job in the Waste Sector (n = 1)

To improve my promotion opportunities (n = 1)

Withdrawn beneficiaries (n = 7)

Reasons for withdrawal from HCD Programme

- Challenges with supervisor communication

“He kept sending me back and forth. This is not what I want. Do it like this. I really became frustrated. OK, I really don't know what you want and I just need to quit”.– Withdrawn Respondent FG

- Lack of support and monitoring

You guys need to put more effort into supervising the supervisors who supervise us... I think if I had something like this, had somebody to talk to and voice out all my frustrations and everything that I'm going through, I think my outcome would have turned out differently – Withdrawn FG

- Financial and personal challenges

Key Conclusions

1. *Programme Effectiveness:*

- ❑ Programme achieved 60% full-time employment among graduates, showcasing success in STWT.
- ❑ A further 14% of graduates pursued further studies, contributing to advanced research capacity.
- ❑ Over 70% of beneficiaries rated their academic training and mentorship as excellent, highlighting the programme's strength in education and training quality.
- ❑ Low level of employment secured in the Waste Sector (30%)
 - Challenges include transitioning graduates into Waste Sector-specific employment, with gaps in practical experience and industry exposure.
 - Employers recognise graduates' technical skills but note deficiencies in practical application.

Summary Findings and Conclusions (1)

1. *Programme Effectiveness:*

- ❑ Programme achieved 60% full-time employment among graduates, showcasing success in STWT. Commendable given South Africa's economic and employment challenges.
- ❑ A further 14% of graduates pursued further studies, contributing to advanced research capacity.
- ❑ Over 70% of beneficiaries rated their academic training and mentorship as excellent, highlighting the programme's strength in education and training quality.

2. *Labour Market Integration in the Waste Sector:*

- 30% of graduates are retained within the Waste Sector, indicating structural barriers to sectoral absorption and career development.
- There is a need to better align programme outputs with industry needs and create direct pathways to waste sector employment.

Summary Findings and Conclusions cont. (2)

3. Gender Equity:

- ❑ A 17-percentage point gap exists in full-time employment rates between male (70%) and female (53%) graduates.
 - Female graduates face longer transition periods to employment, reflecting systemic barriers in a male-dominated sector.
 - These disparities align with broader patterns of gender inequality in South Africa's labour market, necessitating targeted interventions.

4. Geographic Mobility:

- ❑ Majority Graduates tend to remain in or move to major economic hubs (GP, WC and KZN)
- ❑ 10% migrate to countries in Africa and to developing countries, reflecting commitment to regional capacity development. Concern over potential skills drain to developed economies. Strengthening local career pathways is essential to retain talent within the country.

Summary Findings and Conclusions cont. (3)

5. Waste Sector Development:

The programme significantly contributes to advanced capabilities in waste management, with many master's and doctoral graduates produced – contribution to STI Decadal Plan targets.

- Retaining skilled professionals within the sector remains a challenge
- Employers value graduates' adaptability and initiative, however some cited limited practical experience as a barrier to employment. Requiring significant investment in further training
- Stronger industry partnerships are needed to bridge the gap between academic training and practical application, to enhance sector retention.

Recommendations (1)

1. Improve Programme and Waste Sector Awareness

- ❑ **Enhanced programme advocacy and awareness initiatives.** Elevating the visibility of the Waste RDI Roadmap HCD programme and the broader Waste Sector is crucial, particularly in targeting both potential beneficiaries and employers. Encourage more students to pursue study in the Waste discipline and to encourage employers to employ skilled labour in the sector.
- **Undergraduate outreach for career awareness.** Expose undergraduates to the waste sector to encourage more to graduates to the sector. Opportunities include the National Science Week, Job Fairs etc.

2. Expand Practical Experience and Industry Exposure

- Bridge the gap between academic knowledge and the practical skills required by employers.
- The HCD Grant holders should explore providing opportunities for work experience, job shadowing, and securing internship placements with industry partners.

Recommendations (2)

3. Promote Employment Opportunities in the Waste Sector

- ❑ **Career guidance and employment support.** To facilitate the transition from academia to employment, the grant holders should offer access career guidance services, including CV writing workshops, job search strategies, and interview preparation. These services can be delivered through workshops, mentorship programmes, and industry partnerships to enhance graduates' employability.
- ❑ **Align education with industry needs.** Strengthening collaboration between academic institutions and the Waste Sector is vital for ensuring that graduates' skills match industry requirements. Facilitating joint research projects (HEIs and Industry), industry seminars, and co-developing curricula can create a dynamic knowledge exchange.
- ❑ **Build partnerships for skills development.** Forming strategic partnerships with Waste Sector companies to offer internships, learnerships, and mentorship programmes can help bridge the gap between theory and practice. Industry-informed curricula and real-world learning experiences will enhance the employability of graduates while employers gain access to skilled, job-ready candidates.

Recommendations (3)

4. Strengthening Mentorship and Networking Opportunities

- ❑ The importance of high-quality mentorship cannot be overstated. Beneficiaries who received strong mentorship reported better outcomes and greater satisfaction with the programme. The programme is recommended to formalise a structured mentorship component, ensuring that mentors are trained and equipped to provide meaningful guidance. Mentorship training, guidelines and quality assurance.

5. Enhancing Beneficiary Information Management Systems

- ❑ Need to create, manage and track Beneficiary Information System from enrolment to graduation and post exit follow up.
- ❑ HEIs, as the primary point of contact during beneficiaries' academic journeys, must take central responsibility for this working with the DSI



- ☐ Do the findings resonate with your experience?
- ☐ Is there a more nuanced understanding of the employment dynamics in the sector?

Issues for Discussion

- How do we help the graduates find jobs faster?
- ***Strengthening transformation of the Sector***: How to address barriers to entry for women, persons with disabilities and those from lower quintile households?
- What ***innovations*** can we adopt to support the expansion of the graduate skills base in the Waste Sector?
- What more needs to be done to ***enhance industry and academic engagement?***
- What is required to ***ramp up waste sector graduate employment in local government?***