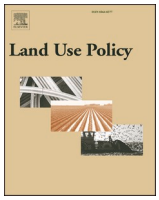
Land Use Policy 133 (2023) 106878

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol



Implications of land restitution as a Transformative Social Policy for Water-Energy-Food (WEF) insecurity in Magareng Local Municipality, South Africa

Saul Ngarava

Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University, Vening Meinesz Building Princetonlaan 8a, Utrecht 3584, CB, Netherlands

ARTICLE INFO

Keywords:
Impact
Land restitution
Propensity Score Matching
South Africa
Sustainable Livelihoods Framework (SLF)
Transformative Social Policy (TSP)
Water-Energy-Food (WEF) insecurity

ABSTRACT

The objective of the study was to assess the impact of land restitution policy on water, energy, and food insecurity in South Africa. The study utilised a cross-sectional survey of 1 184 households from Matatiele, Greater Taung and Magareng Local Municipalities. The Household Water Insecurity Experience, Multidimensional Energy Poverty Index and Household Food In-access Scale were used to analyse water, energy, and food insecurity, respectively, while Propensity Score Matching was used to assess the impact of benefiting from land restitution on insecurities in these resources. The results of the study indicate that beneficiaries of land restitution were relatively more water secure but were however somehow food secure and energy insecure. Furthermore, educational levels, tenure, employment status, household size, gender and main source of income were significant determinants of becoming a beneficiary of land restitution as well as the water, energy, and food insecurities. In addition, benefiting from land restitution increased water and energy insecurities by 15.0% and 24.2%, respectively, while reducing food insecurity by 10.1%. The study concludes that land restitution has improved the food security status of the beneficiaries while it has reduced their water and energy securities. The study recommends augmenting the indigent policy supplementing poor households with free water and energy to improve securities, especially for land restitution beneficiaries. Promotion of renewable energy such as solar, which can provide a nexus in energy for water supply can aid in improving localised water and energy securities for land restitution beneficiaries.

1. Introduction

Land is a precursor in achieving the Sustainable Development Goals (SDGs) (Tirumala and Tiwari, 2022; Wolde et al., 2021). It is essential for providing the agricultural productive base towards ending hunger (SDG 2), accessing clean water (SDG 6) and providing an anchor for sustainable energy production and transmission (SDG 7), and has been identified as a means of poverty alleviation (SDG 1) (Goswami et al., 2018; Land Portal, 2022; Tirumala and Tiwari, 2022). Any stress to land tends to affect the securities in water, energy and food (Li et al., 2022). This is at the backdrop of close to 1 billion people globally being water, energy and food insecure (Wolde et al., 2021). This has been compounded by a growing world population, decreasing per capita land availability and increasing pressure on water, energy and food resources (Tirumala and Tiwari, 2022). In South Africa, 88.7% of households have access to water, 89.3% (electricity as a source of energy) and 79.1% (adequate access to food) (Stats SA, 2022). This is however precarious given that the country has been deemed water scarce, exhibiting power shortages and highly microlevel food insecure (Ngarava, 2022; Nowakowska and Tubis, 2015; NPC, 2020).

Sustainable Development Goal (SDG) 1.4 endeavours to improve equitable rights and access to land and various countries have instituted policies towards achieving these goals. Countries such as South Africa have land reform related policy which include land redistribution, restitution, and tenure reform. However, even though equitable access to land through land policy plays a central role in poverty alleviation, land use changes can affect supply and demand of water, energy and food, and consequently affecting welfare (IISD, 2017; Land Portal, 2022; Li et al., 2022). This is augmented by uneven regional distribution of land, water, energy, and food resources.

South Africa has been actively involved in land reform since 1994 with endeavour to address social inequalities, mainly from the willing buyer willing seller arrangement (Netshipale et al., 2020). Land redistribution has involved three models, namely the Proactive Land

E-mail address: s.ngarava@uu.nl.

https://doi.org/10.1016/j.landusepol.2023.106878
Received 28 November 2022; Received in revised form 13 June 2023; Accepted 19 August 2023
Available online 23 August 2023

Acquisition Strategy (PLAS), Land Redistribution for Agricultural Development (LRAD) and The Settlement/Land Acquisition Grant (SLAG) (Gandidzanwa et al., 2021). Land redistribution in South Africa has mainly targeted the agricultural sector, with government interventions in irrigation, inputs, market access, training and financing (GoSA, 2022) especially in PLAS and LRAD, while the land under SLAG was for settlement (Netshipale et al., 2020). On the other hand, land tenure reform has involved the institutional and legal transformation for land administration, especially in dynamic social, economic, and political circumstances. This provides poor individuals with limited tenure security on the land they resided (GoSA, 2022; Netshipale et al., 2020). However, land restitution has not classified its beneficiaries based on the capital endowments, with beneficiaries not bound on the way they utilise their land (Netshipale et al., 2020).

Institutionalised by the Restitution of Land Rights Act 22 of 1994, land restitution was rights based and restorative in providing land back to the victims of forced removals dating back as far as the Native Land Act in 1913 (Daramola, 2021; Maloka, 2021; Yingi, 2021). In land restitution, beneficiaries had a cash option or award of ancestral land (Akinola and Kaseeram, 2021). In as much as between 3.5 and 6.0 million people were reported as being displaced by evictions during apartheid, only 64 000 – 80 000 land restitution claims had been filed by 1998 (Cousins, 2021; Stickler, 2012). This number had increased to 160 000 until 2014 when the amendment to the Restitution Act of 1994 was deemed invalid by the Constitutional Court (Cousins, 2021). Close to 2.76 million hectares of land was transferred to Indigenous people at a cost of R5 billion (USD 596 million) for cash compensation. However, Maloka (2021) identified that the process of land restitution was an impediment on redistribution. There was a slow pace in handling claims, incapacitation and inadequate funding (Daramola, 2021). Furthermore, when claimants chose restitution through land, they had to form a communal property association (CPA) with its associated group dynamics and competing interests rendering them dysfunctional (Xaba, 2022).

Even though various studies have attempted to attribute livelihood transformation to social transformation induced by land reform (Chipenda, 2020a, 2020b; Tekwa and Adesina, 2018; Tom and Munemo, 2019) most of the studies have been carried out in other countries other than South Africa. In addition, most of these studies have been qualitative and lacked empirical impact evaluations. Dikgang and Muchapondwa (2016) found that land restitution has compounded poverty levels in South Africa. Hall (2007) attributes some of the failure to having no material benefits be it from cash or land, lack of post-transfer support, dysfunctional legal entities, and reinforcement of socio-economic differences.

The objective of the study was to assess the impact of land restitution on water, energy, and food insecurity in South Africa. According to Mokgope (2000) there exists a need to explore institutions and the underlying social processes shaping access to resources aiding in understanding opportunities as well as restrictions to sustainable livelihoods. Furthermore, land use planning should incorporate the water, energy and food sectors due to competitions amongst the sectors (BFAP, 2022). Land reform is a topical issue in South Africa spurred by the country's inequality and evidenced by the Expropriation Bill and recent debates on expropriating without compensation (Akinola, 2020; GoSA, 2020; Kwarteng and Botchway, 2019). However, land reform which neglects the interconnectedness with other socio-ecological systems negatively affects water, energy and food security (Nhamo et al., 2022). In addition, as indicated in the conceptual framework later, the study used an integrated conceptual framework of the Sustainable Livelihoods Framework (SLF) and the Transformative Social Policy (TSP) framework. Besides the fact that most land reform TSP literature in Southern Africa has been conducted in Zimbabwe (Chipenda, 2020b, 2020a; Chipenda and Tom, 2020; Mazwi et al., 2017; Tekwa and Adesina, 2018; Tom and Munemo, 2019; Tom and Mutswanga, 2015), there is lack of empirical analysis on land reform TSP under land restitution in South Africa. Furthermore, most land reform studies utilising the SLF in South Africa have been unpublished theses (Ficks, 2018; Jacobs, 2014; Madonsela, 2021; Msuthu, 2020; Nxesi, 2015; Xaba, 2018), with none to the author's knowledge integrating the SLF and the TSP. Impact assessments on the impact of land restitution especially on water, energy and food security have also been scant in South Africa (Valente, 2009). Land restitution is a social transformative policy in a country such as South Africa, having water, energy, and food welfare implications. This is particularly important for water, energy and food policy and decision makers, besides the micro-household level. This sets out priority areas where decision makers need to complement land restitution benefactors to improve their welfare.

2. Material and methods

2.1. Study area

The study was conducted in three Local Municipal areas of South Africa, namely Matatiele (Eastern Cape), Magareng (Northern Cape) and Greater Taung (North West) (Fig. 1). These three study sites were part of a larger project which was focusing on "Water-Energy-Food (WEF) nexus governance for social justice". The project focussed on rural households that had their WEF decision-making driven by user associations, hence both Magareng and Greater Taung were dependent upon Vaarlharts Water User Association while Matatiele was influenced by the Umzimvubu Catchment Partnership, making them ideal study sites. Ward 5 in Magareng (Setswana meaning in the middle) was used to obtain the land restitution beneficiaries while the other municipalities had non-beneficiaries who were used as the counterfactual in the impact assessment as alluded in the analytical framework (see later). The land restitution beneficiaries were selected as they symbolise social justice through institutionalised accumulation from below, albeit from an ethical and rights-based stand point, rather than economic one. The land restitution beneficiaries in Magareng were particularly significant as they appear to be neglected from obtaining basic amenities, and thus present a case for the transformative potential of land restitution. Furthermore, there has been limited studies that have evaluated the welfare implications of land restitution in Magareng. According to Wazimap (2022) Ward 5 in Magareng Local Municipality has a population of 3 139 in 1 075 households. Nearly 60% of the population is between 18 and 64, with 51% being male. Tswana and Afrikaans ethnic groups constitute 45% and 44% of the population, respectively. Close to 27.2% of the households in Ward 5 are female-headed, with average annual household incomes of R29 400. There is a 51% unemployment rate in the Ward, where 37.2% of the population has completed secondary and higher education. Nearly half (49.9%) of the households get water from regional or service providers while 11.9% do not have access to any toilet facilities (Wazimap, 2022). Magareng Local Municipality is comprised of urban, villages and farm nodes, with Ward 5 consisting of Warrenton town and surrounding rural areas (Magareng Local Municipality, 2019, 2012). All residents in Magareng Local Municipality receive 6kl of free water (except farming areas) and Majeng (where the land restitution beneficiaries are located), receive water from borehole and jojo tanks, while indigent beneficiaries also receive 50 kW of free electricity from Eskom and the municipality acting as service provider (Magareng Local Municipality, 2012). According to Municipalities of South Africa (2022) 850 households had received access to free basic water while 2 355 had received access to free basic electricity in 2019/20. However, a report by Magareng Local Municipality (2017) indicated that the Majeng area within the municipality was still to be electrified.

The Majeng land restitution project in Magareng Local Municipality had endeavours to develop an off-grid human settlement of eight hundred households on 10 220 ha of land (Magareng Local Municipality, 2012; Nortje et al., 2022). The community had been disposed of their land between 1962 and 1975, where they had been moved to

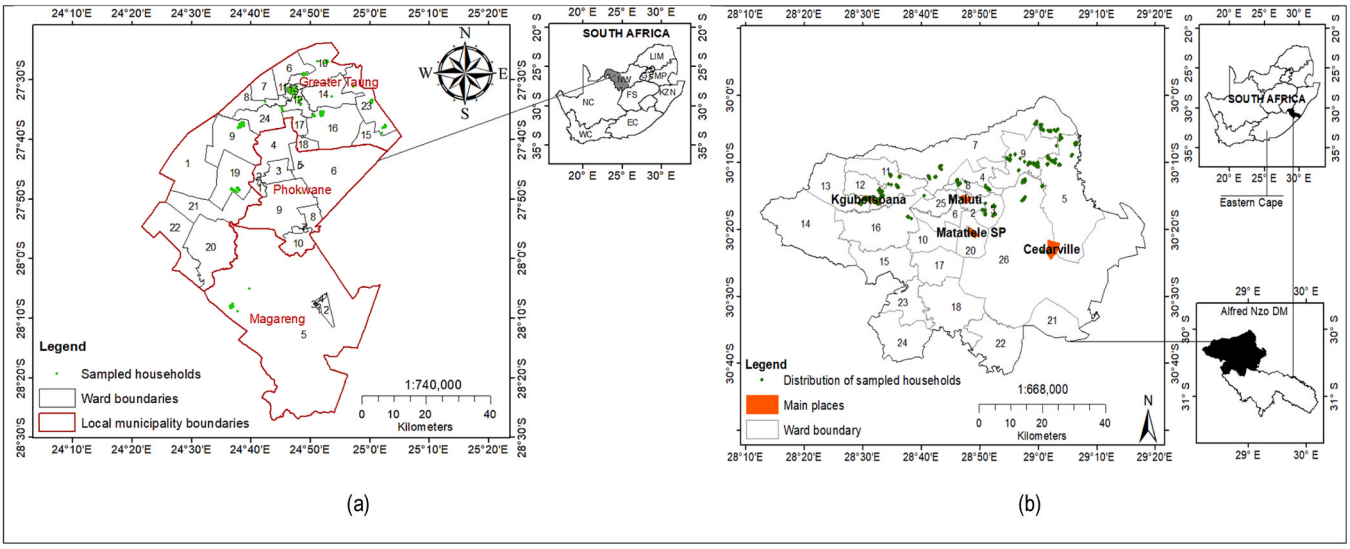


Fig. 1. Study area showing (a) Greater Taung and Magareng Local Municipalities and (b) Matatiele Local Municipality.

Vaalboschoek and then to Kgomotso, some 60 km away, and had illegally resettled back in 1996, with a formal land claim in 2002 (DoENC, 2014). The settlement was to be provided with road infrastructure and an off grid biolitix system for sanitation. Energy requirements were to be met through solar power, including street light requirements. The irrigation system was to be revived as well as the various canal systems in order to meet the subsistence farming requirements of the area as well as establishing a water reservoir (Magareng Local Municipality, 2012). However, there has been limited impact assessments as to the efficacy of the land restitution project on welfare outcomes of water, energy, and food insecurity in the area.

2.2. An integrated conceptual framework

The study integrated the Transformative Social Policy (TSP) and the Sustainable Livelihoods Framework (SLF) (Fig. 2). The SLF assesses and builds capacity of people within communities to make a living and improve their quality of life (Gumede and Ehiane, 2022). It is people centred, initially analysing their livelihoods and how they change over time. The framework acknowledges the various strategies adopted by people to secure their livelihoods and recognises the presence of many actors (Gumede and Ehiane, 2022). The SLF assesses the ability to cope and recover from stress and shock as well as maintain or enhance capabilities and assets (Motala et al., 2016). In the context of the current study, the SLF tries to understand land-based livelihood outcomes by focussing on human capital (skills, knowledge, education and capabilities), social capital (relationships and networks), natural capital (land, water and air), financial capital (income, savings and other economics assets), and physical capital (infrastructure, equipment and other productive assets) (Hall, 2007; Mokgope, 2000). Access and control of resources such as land is different for each individual and has different implications in pursuit of sustainable livelihoods (Mokgope, 2000). According to Mokgope (2000) there exist institutional frameworks enabling achievement of sustainable livelihoods. These include regularised practices structured by societal rules and norms, which may be formalised or informal, dynamic, fluid, and ambiguous, often subject to different interpretations. Land restitution in South Africa is a formalised Transformative Social Policy (TSP) with endeavour to reduce inequality by providing land back to those who were displaced.

The TSP is necessary because social policy has lost its developmental trajectory, whereupon social policy, is the "collective public efforts [for the purposes of] affecting and protecting the wellbeing of people in a given territory] (Adesina, 2009:38; Chipenda, 2020b). The TSP identifies that social and economic are inseparable, with various political and socio-economic relations interacting (Chipenda, 2020b; Tekwa and Adesina, 2018; Tom and Munemo, 2019). According to Yi and Kim (2015), grounding social policy in TSP allows transformation of unequal and unjust social, economic and political relations. Land and agrarian reform are social policy instruments (UNRISD, 2006), with the endeavour to address social inequality and making the agrarian structure more equitable through land redistribution and reform in tenancy (Rao, 2014). Land reform and social policy are intertwined, resulting in improved consumption, welfare production, procurement, storage, and distribution. The TSP framework allows land reform to enhance production and reproduction capacities of beneficiaries, thereby having a positive contribution to their welfare and wellbeing. Thus, both SLF and TSP offer an integrative framework of formalised transformative social policies such as land restitution influenced by formalised policies and institutions (from the SLF) but informed by the desire to achieve social justice (from the TSP). This integrative framework ultimately results in improved welfare outcomes of water, energy and food security.

2.3. Study design

The study followed a cross-sectional survey design, with multi-stage purposive sampling. The initial stage purposively selected Northern Cape, Eastern Cape and North West Provinces in South Africa. The next stage involved purposively selecting Magareng, Matatiele and Greater Taung Local Municipalities from the respective Provinces. Wards, villages, and households were also purposively selected. The discriminatory selecting criteria and sampling frame was informed by beneficiaries of land restitution (Magareng Local Municipality, 2012), the Matatiele Spatial Development Framework Review (Matatiele Local Municipality, 2020), Integrated Development Plans (Dr S Mompati District Municipality, 2017; Greater Taung Local Municipality, 2017) and traditional leadership informants focusing on poor rural households. A proportional sample size was calculated using the Yamane (1967) method as shown in Eq. 1.

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

where n was the sample size, N is the population, which was 35 580 households (from sixteen purposively selected wards in the three study sites), and e was the degree of accuracy, which was 95% in the study. The sample size was calculated as follows:

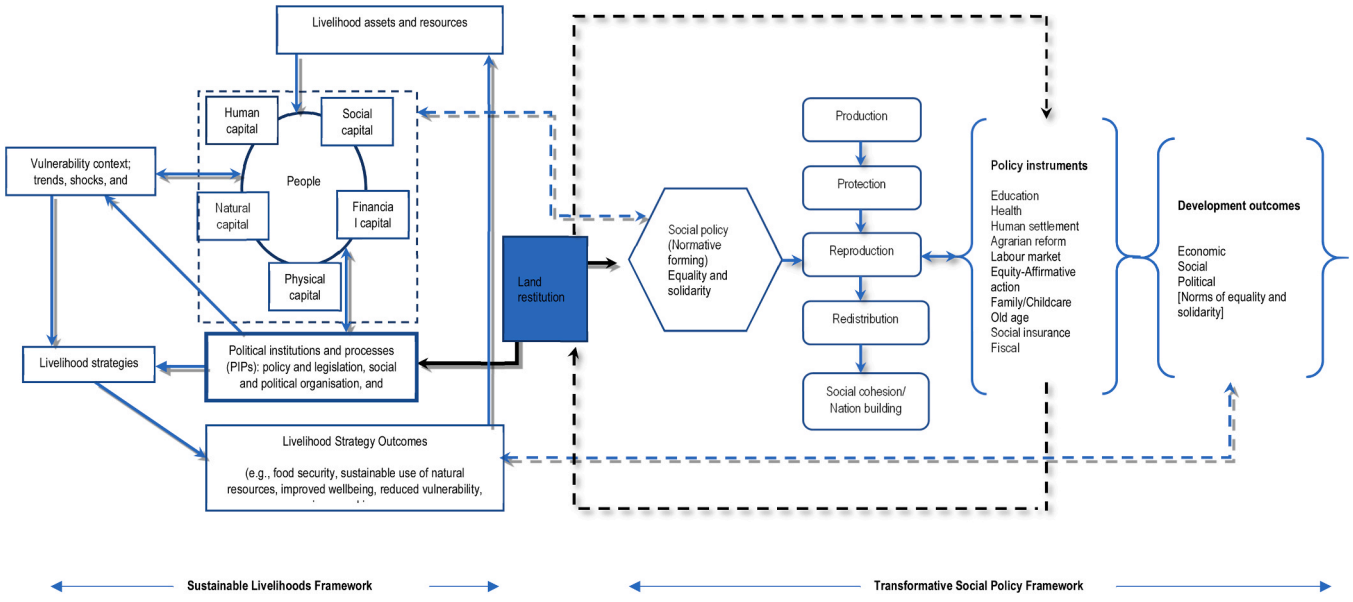


Fig. 2. Conceptual framework.
Adapted and modified from Adésínà (2011) and Chambers and Conway (1992).

$$n = \frac{35580}{1 + 35580(0.05)^2} \tag{2}$$

$$n = 396 \tag{3}$$

The study ended up using a sample of 1 184 households from the three study sites with distribution shown in Table 1.

2.4. Analytical framework

The study used a two-stage process in data analysis. The initial step involved calculating the water, energy, and food insecurity while the last stage involved determining the impact of being a beneficiary of land restitution on water, energy, and food insecurity.

2.4.1. Household water insecurity experience (HWISE) scale

The HWISE scale, developed and validated by Young et al. (2019a), was used to assess the household water insecurity. The scale quantifies experiences of household water insecurity across accessibility, adequacy, reliability and safety, through 12 questions (Stoler et al., 2021; Young et al., 2019a, 2019b). Five categorical responses for each of the questions (i.e., never, rarely, sometime, often, or always) resulted in a HWISE score of $12 \leq HWISE \leq 60$. The status of water insecurity was determined by the following categorisation: 0–12 (water secure), 11–24 (moderately water secure), 25–36 (somehow water secure), 37–45 (water insecure), and (46−60) extremely water insecure.

2.4.2. Household multidimensional energy poverty index (HMEPI)

The study also utilised the MEPI as used by Laldjebaev and Hussain (2021), Munyanyi and Churchill (2020) and Nussbaumer et al. (2012) to measure a set of energy deprivations representing basic energy services, measured using 6 indicators with various weights.[1] According to Nussbaumer et al. (2012), the MEPI highlights energy poverty in x variables across z individuals, where $\sum z$ is the total population. $Y = [y_{ab}]$ represents the $x \times z$ matrix for a persons across b variables. $y_{ab} > 0$ denotes individual a achieving variables b. The distribution of achievements is provided by $y_b = (y_{1b}, y_{2b}, y_{3b}, \ldots y_{xj})$ for each individual $y_a = (y_{1a}, y_{2a}, y_{3a}, \ldots y_{zi})$. The distribution of achievements is then weighted[1], using $\sum_b^x w_j = 1$. Unlike studies by Laldjebaev and Hussain (2021), Munyanyi and Churchill (2020) and Nussbaumer et al. (2012)) where energy poverty is a cut off between $0 \leq Y \leq 0.49$ and energy security is otherwise, the current study used the following categorisation: 0.00–0.20 (energy secure), 0.21–0.40 (moderately energy secure), 0.41–0.60 (somehow energy secure), 0.61–0.80 (energy insecure), and (0.81–1.00) extremely energy insecure.

2.4.3. Household food in access scale (HFIAS)

The HFIAS which was developed by the Food and Nutrition Technical Assistance (FANTA) project (FAO IFAD UNICEF, 2017) was used to measure absolute food insecurity from the food access perspective. The HFIAS questions were asked to recall food insecurity for a period of four weeks. The HFIAS measures food insecurity at the household level based on their behavioural and psychological experience, resulting in responses and reactions which can be collected and quantified in nine questions. Unlike previous studies which had 3 categorical responses to the HFIAS question (i.e., rarely, sometimes or often), providing an HFIAS score of $9 \leq HFIAS \leq 27$, the current study provided five categorical responses to the HFIAS (i.e., never, rarely, sometime, often or always), resulting in a HFIAS score of $9 \leq HFIAS \leq 45$. To determine level of food insecurity, the following categorisation was used: 0–9 (food secure), 10–18 (moderately food secure), 19–27 (somehow food secure), 28–36 (food insecure), and (37−45) extremely food insecure.

2.4.4. Min-max normalization

The Min-Max normalisation was used to standardise the Likert HWISE and HFIAS questions to determine the water and food insecurity indices (Ngarava et al., 2020). There was no need to standardise the HMEPI since it was already standardised between values of 0 – 1. The Min-Max normalisation method produced an indicator which fell in the range of 0–1, using Eq. (4):

$$\gamma_{qi} = \frac{\gamma_{qi(obs)} - \gamma_{qi(\min)}}{\gamma_{qi(\max)} - \gamma_{qi(\min)}} \tag{4}$$

where γ_{qi} is the HWISE or HFIAS indices of question i, $\gamma_{qi(obs)}$ is the observed value of question i, $\gamma_{qi(\min)}$ is the global minimum value of

[1] The MEPI indicators include modern cooking fuel (0.2), indoor pollution from cooking (0.2), electricity access for lighting (0.2), household fridge ownership (0.13), entertainment appliance ownership (0.13) and telecommunications means (0.13)

Table 1
Sample size.

Municipality	Ward 1	3	4	5	7	8	9	11	12	13	14	16	19	21	23	26	Total 16
Matatiele		38	50	71	77	43	78	80	55				2			55	549
Greater Taung	65						80	52	72	75	1	59	73	1	78		556
Magareng				79													79
Total	65	38	50	150	77	43	158	132	127	75	1	59	75	1	78	55	1184

question i and $\gamma_{qi(\max)}$ is the global maximum value of question i. The overall HWISE or HFIAS indices for each household was:

$$\gamma_{overall(j)} = \frac{\sum_{i=1}^{n}\gamma_{qi}}{n} \quad (5)$$

where n is the number of HWISE and HFIAS questions.

2.4.5. Propensity score matching (PSM)

Propensity Score Matching (PSM) was used to determine the impact of being a benefactor of land restitution on water, energy, and food insecurity. For a household p, (where $p = 1 \ldots P$ and P denotes the population of households), the impact evaluation separated the impact of being a beneficiary of land restitution ($D_p = 1$) on a certain outcome $Y_p(D_p)$ [water insecurity ($HWISE_{overall(j)}$)], energy insecurity ($HMEPI_{overall(j)}$)] and food insecurity ($HFIAS_{overall(j)}$)] from what would happen without being a beneficiary of land restitution ($D_p = 0$), the counterfactual. This is the difference between the outcome of being a beneficiary of land restitution for household p and the counterfactual potential before/without being a beneficiary of land restitution.

$$\omega_p = Y_p(1) - Y_p(0) \quad (6)$$

The impact ω_p cannot be observed since a household either is a beneficiary of land restitution or is not, but never both. The next stage was to ascertain the average treatment effect of the treated (ATET):

$$\omega_{ATET} = E[\omega|D = 1] = E[Y(1)|D = 1] - E[Y(0)|D = 1] \quad (7)$$

The resulting PSM estimator for ATET was generalised as:

$$\omega_{ATET}^{PSM} = E_{\Pr(X)|D=1}\{E[Y(1)|D = 1, \Pr(X)] - E[Y(0)|D = 0, \Pr(X)]\} \quad (8)$$

In the PSM, a Probit model was used with variables in Table 2.

The Probit model estimated the probability that a household i, with characteristics X_i was a beneficiary of land restitution based on the following:

$$P(D_i|X_i) = \varphi X_i^{'}\beta) \quad (9)$$

where φ is the cumulative distribution function of the standard normal distribution. Kernel and nearest neighbour methods were used to match households which were beneficiaries of land restitution to those that were not by using propensity score values for estimating the ATET. In the nearest neighbour matching method, for household which was a beneficiary of land restitution i and households not a beneficiary, $i - 1$, the absolute difference between the propensity scores was as follows:

$$|\Pr_i - \Pr_{i-1}| = \min_{k \in I=0}\{\Pr_i - \Pr_k\} \quad (10)$$

The non-parametric kernel matching method compared each household that was a beneficiary of land restitution to a weighted average of outcomes of all household that were not, placing higher weights to non-beneficiaries with propensity scores closer to that of beneficiaries. In the Kernel matching method, for a beneficiary of land restitution i, the associated matching outcome was as follows:

$$\widehat{Y}_i = \frac{\sum_{i-1 \epsilon I=0} K\left(\frac{\Pr_i - \Pr_{i-1}}{h}\right) Y_i}{\sum_{i-1 \epsilon I=0} K\left(\frac{\Pr_i - \Pr_{i-1}}{h}\right) Y_i} \quad (11)$$

where $K(\cdot)$ is a kernel function, and h is a bandwidth parameter. STATA 14 and SPSS 27 were used to analyse the data. Data used in the study was collected through 1 184 questionnaires through face-to-face interviews observing ethical issues such as anonymity, confidentiality, and integrity (Ethical Clearance No: NWU-01216–21-S3 Law) after obtaining informed consent. The questionnaire was in English, however, the enumerators were trained to translate the questions in the local languages of Tswana (Magareng and Greater Taung Local Municipalities) and Sotho and Xhosa (Matatile Local Municipality).

Table 2
Variables used in the PSM.

Variable	Explanation	Type of measurement	Expected sign
Outcome variable			
HWISE	Household Water Insecurity Experience Index	Truncated: 0–1	
HMEPI	Household Multidimensional Poverty Index	Truncated: 0–1	
HFIAS	Household Food In-Access Scale Index	Truncated: 0–1	
Treatment variable			
Y	Beneficiation of land restitution	Nominal: 0-Beneficiary of land restitution, 1-Otherwise	
Independent variable			
EDU	Educational level of household head	Nominal: 0-None, 1-Otherwise	-
TEN	Tenure	Nominal: 0-Own, 1-Otherwise	-
EMPL	Employment status of household head	Nominal: 0-Unemployed, 1-Otherwise	-/+
HH	Household size	Ordinal: 0-Less than 3, 1-Otherwise	+
GEN	Gender of household head	Nominal: 0-Male, 1-Female	+
SOURCEINC	Main source of income	Nominal: 0-Formal employment, 1-Otherwise	+

3. Results and discussion

3.1. Descriptive statistics

Fig. 3 shows that 69.62% of the land restitution beneficiaries where aged above 40 years, while 53.16% of the beneficiaries were male. Comparable findings were from Tjale et al. (2020) who found that in the restituted farms of Waterberg District, most of the beneficiaries were aged 50 years and above, dominated by males. This is despite the land restitution programme supporting women, who are regarded as household pillars (Tjale et al., 2020). Age is a proxy for human capital, significant in the willingness to venture into diversified livelihood strategies with the associated risks for food security purposes utilising land resources. In addition, males have been dominant in own food production and decision-making for food security purposes (Netshipale et al., 2020). This is despite Ncapayi (2018) indicating that it is rather women who are more prominent in household food security decision making. In South Africa, land reform is gendered due to productive and reproductive functions of women beyond the household (Batsirai,

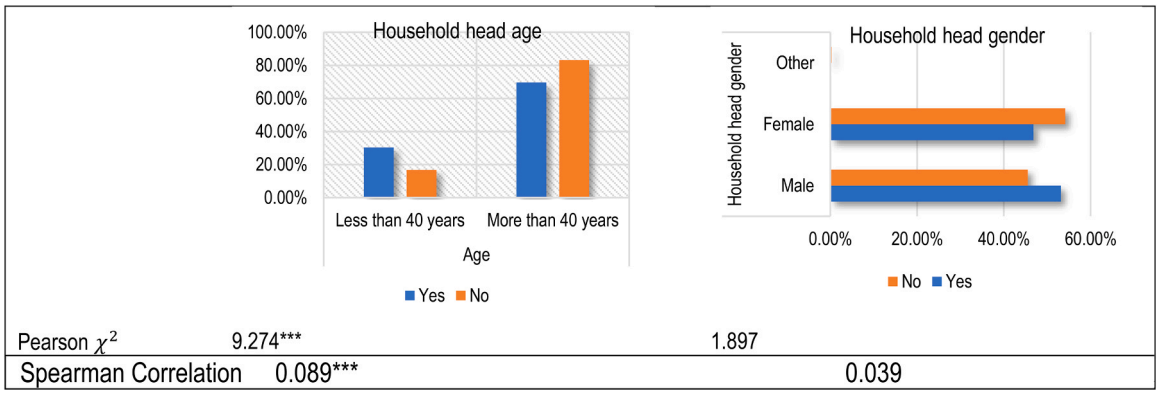


Fig. 3. Beneficiary of land restitution vis-à-vis household head age and gender.

2018). The current study supports Netshipale et al.'s (2020) stand point, with males dominating land restitution beneficiaries due to the nature of the policy itself, which was centred upon restoration of land rights in a patrilineal Tswana society (van Schalkwyk, 2019). Inherently, it is older males who are beneficiaries of the land restitution policy, mainly through patriarchal and cultural inheritance norms, and consequently they tend to benefit from the land restitution policy. Tjale et al. (2020) attributes this skewness to asymmetry in information access between men and women as well as with the youth, and their gendered roles.

Close to 77.22% of the land restitution beneficiaries in Majeng were of Tswana origin, followed by 7.59% Afrikaner and 5.06% Coloured, respectively. Nearly 81.01% of the beneficiaries were not married. According to Bruchhausen and Naicker (2018), ethnicity through traditional boundaries and authorities is inseparable to land governance, sometimes acting in an exclusionary manner. In addition, ethnicity was institutionalised pre-1994 in South Africa to provide a "rightful" dwelling place and political homes for the natives, who were excluded in the mainstream urban economies (Mpofu, 2017). Thus, different ethnic groups were tied down to different geographical locations, explaining the dominance of Tswana ethnic group in the results where they were the previous occupants of the restituted land. This is also cemented by traditional leaders acting as custodians of the restored land to the exclusion of minorities (Mokwena et al., 2020). In terms of marital status, Meertens (2015) avers that marital dynamics contributes to complexity. This is due to marital status being a marker of social difference (Walker, 2009). Marital status is intertwined with women's land rights, making tenure security dependent on relations with their partners (Gilbert, 2013). Thus for women, complexity to be claimant of restorative land is reduced when they are not married, as shown by a high degree of unmarried women. However, since the majority of the beneficiaries were male, the martial status distribution can be better explained by the risk associated with becoming a beneficiary of land restitution (Menon et al., 2017). Married individuals are risk averse and decision-making has spousal considerations. Benefitting from land restitution requires resources which married individuals are constrained with especially given family obligations. Thus, land restitution beneficiaries are likely to be unmarried males.(Fig. 4).

Most of the land restitution beneficiaries had some form of education (82.28%), with however, 59.49% being unemployed. Netshipale et al. (2020) found that beneficiaries of land reform had some form of education in South Africa. Tjale et al. (2022) however indicated that rather it being a pre-cursor of beneficiation of land restitution, unemployment was actually a result of it. This was through its disruptive nature, especially on commercial farm production (Hall et al., 2013; Tjale et al., 2020). Educational levels tend to increase information affinity of individuals (Nxumalo and Antwi, 2017). This can be essential in benefiting from land restitution, and improving water, energy and food security. Zantsi and Greyling (2021) ascribe to educational level being a prerequisite for beneficiation. (Fig. 5).

3.2. *Water, energy and food insecurity status of households*

Amongst the three study sites, the land restitution beneficiaries in Magareng exhibited the highest level of water security at 60.76%, followed by 42.44% from Matatiele who were also water secure and 41.55% from Greater Taung who were somehow water secure (Fig. 6). This was perculiar especially given that the targeted respondents in Magareng and Matatiele did not have municipal water supply, relying on ground water sources. Only 9.98% from Greater Taung and 2.00% from Matatiele exhibited extreme levels of water insecurity. In addition, most of the land restitution beneficiaries from Magareng (51.76%) were energy insecure, with 54.87% in Matatiele who were energy secure and 59.60% from Greater Taung who were moderately energy secure. This was because Majeng was still off-grid, hence affecting energy security (Magareng Local Municipality, 2017). Close to 28.74% and 20.00% exhibited energy insecurity in Matatiele and Greater Taung,

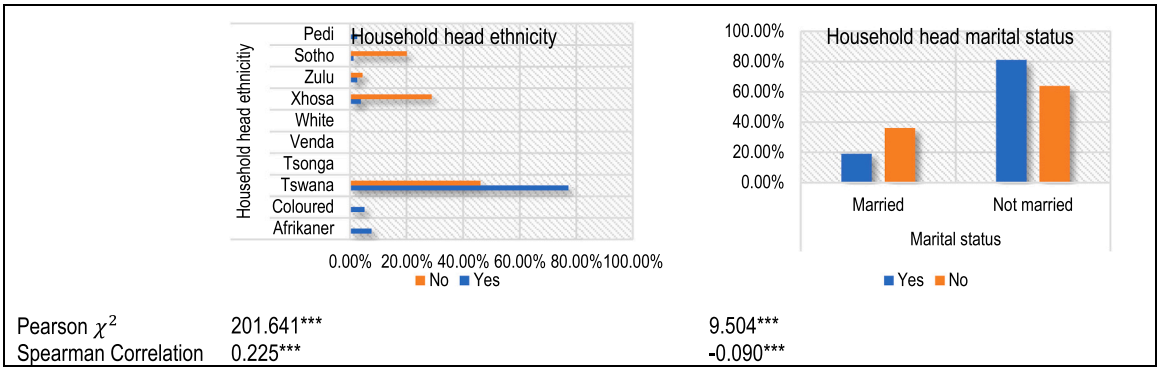


Fig. 4. Beneficiary of land restitution vis-à-vis household head ethnicity and marital status.

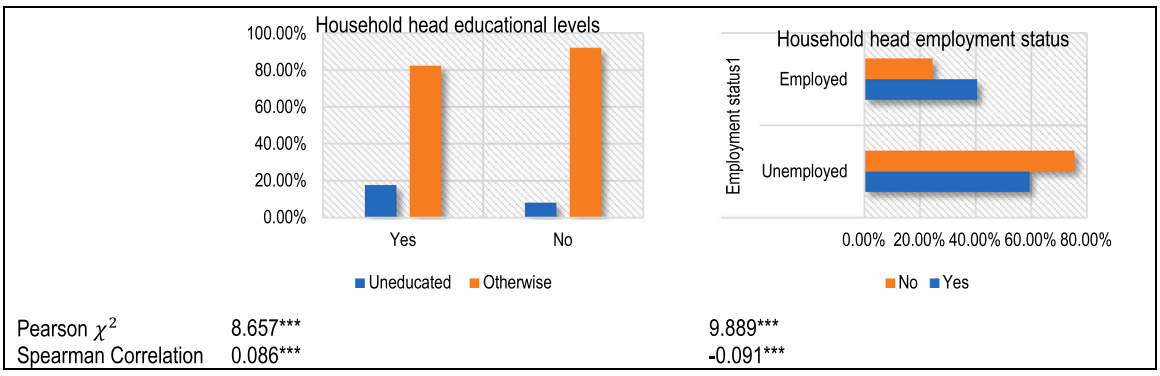


Fig. 5. Beneficiary of land restitution vis-à-vis household head educational levels and employment status.

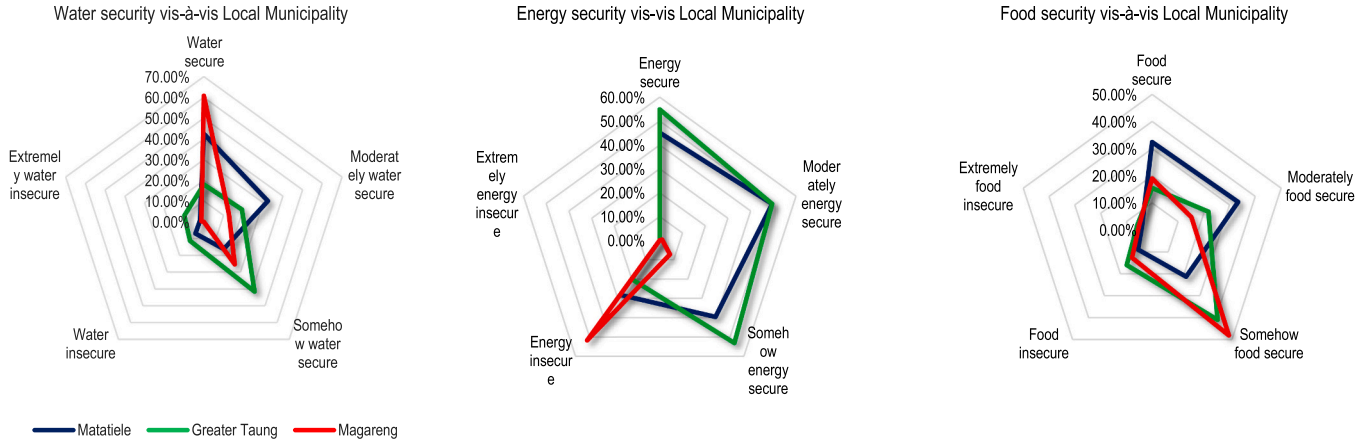


Fig. 6. Water, energy, and food security in the study areas.

respectively. Close to 48.10% of the land restitution beneficiaries from Magareng were somehow food secure, while 33.33% and 21.76% were moderately food secure from Matatiele and Greater Taung, respectively (Fig. 6). There were 16.01% in Greater Taung, 12.66% in Magareng and 8.93% in Matatiele who exhibited levels of food insecurity.

Table 3 shows that benefiting from land restitution was significant for water, energy, and food security. This is because it affects access to these resources as there will be overburden on the infrastructure for provision. In addition, employment status was significant in benefiting from land restitution as well as water and food security while household size was significant in benefiting from land restitution, energy, and water security. Gender and main source of income were also significant in water and food security, respectively, while educational level was significant in benefiting from land restitution.

3.3. *Impact of land restitution on water, energy and food insecurity status of households*

Table 4 shows that being a land restitution beneficiary has an impact on the water, energy, and food security status of households at the 1%

Table 3
Determinants of being a beneficiary of land restitution, water, energy, and food insecurities.

	Land restitution				HWISE				HMEPI				HFIAS			
	β	Std. Err.	t	*P* > *t*	*β*	Std. Err.	t	*P* > *t*	*β*	Std. Err.	t	*P* > *t*	*β*	Std. Err.	t	*P* > *t*
Land restitution					**0.168**	**0.028**	**5.92**	**0.000**	**-1.123**	**0.085**	**-13.27**	**0.000**	**-0.076**	**0.027**	**-2.83**	**0.005**
Educational level	**0.520**	**0.171**	**3.03**	**0.002**	-0.030	0.025	-1.19	0.234	0.176	0.075	2.36	0.018	-0.029	0.023	-1.23	0.218
Tenure	0.255	0.177	1.44	0.150	0.017	0.019	0.87	0.385	0.067	0.060	1.12	0.264	**0.066**	**0.018**	**3.63**	**0.000**
Employment status	**-0.353**	**0.150**	**-2.35**	**0.019**	**-0.032**	**0.019**	**-1.71**	**0.087**	0.063	0.060	1.08	0.279	**-0.084**	**0.017**	**-4.80**	**0.000**
Household size	**0.493**	**0.122**	**4.06**	**0.000**	**-0.037**	**0.015**	**-2.45**	**0.014**	**-0.154**	**0.046**	**-3.37**	**0.001**	-0.007	0.014	-0.49	0.627
Gender	0.037	0.123	0.30	0.765	**0.025**	**0.015**	**1.71**	**0.088**	0.040	0.046	0.87	0.384	**0.050**	**0.013**	**3.59**	**0.000**
Main source of income	0.064	0.044	1.44	0.149	**0.014**	**0.006**	**2.50**	**0.013**	-0.016	0.017	-0.92	0.358	**0.028**	**0.005**	**5.34**	**0.000**
Constant	0.617	0.257	2.40	0.016	0.173	0.042	4.16	0.000	2.405	0.125	19.16	0.000	0.378	0.039	9.65	0.000
Summary statistics																
Prob > Chi2	0.000			Prob > F		0.000			Prob > F	0.000			Prob > F	0.000		
R^2	0.067			R^2		0.056			R^2	0.162			R^2	0.103		

Table 4
Impact of being a beneficiary of land restitution on water, energy, and food insecurities.

	β	Std. Err.	z	$P > z$
HWISE	0.150	0.035	4.31	0.000
HMEPI	0.242	0.024	-10.11	0.000
HFIAS	-0.101	0.035	-2.87	0.004

level. Becoming a beneficiary of land restitution increases HWISE by 15.0%, HMEPI by 24.2% while reducing HFIAS by 10.1%. Thus, there is an increase in the water insecurity experiences as well as energy poverty while a decrease in food insecurity. Therefore, benefiting from land restitution increases both water and energy insecurity while decreasing food insecurity. The findings exhibit the integrative institutional and social transformative role of land restitution to achieve welfare outcomes. From the SLF perspective, the institutional policy increased access to land resources and shapes livelihood strategies shaping the welfare outcomes. The TSP angle indicates that redistribution through land reform results in developmental outcomes. However, the developmental and welfare outcomes are not the same across water, energy and food resources. The study showed that developmental and welfare outcomes can be achieved by integrating land restitution's institutional and social policy. A study by Mazwi et al. (2017) in Zimbabwe came to the same conclusion, highlighting the achievement of redistributive perspective of the TSP, however not backed by other elements leading to constrained capacity of the state to provide essential services, affecting livelihood strategies (Ndhlovu, 2021, 2018). In South Africa's land restitution, Gumede and Ehiane (2022) advocated for complementary measures to achieve poverty alleviation. These include access to water, energy and food services.

A study by Dikgang and Muchapondwa (2016) found that land restitution beneficiaries had increased poverty level. This was based on the restitution planning emphasizing the minimization of land use rather than maximizing on livelihood changes (Hall, 2007). This could lead to their heightened water and energy insecurities. However, Hall (2007) found that land restitution beneficiaries had increased their access to social grants, which could have a positive impact on households, especially for food security reasons. This is confirmed by Tjale et al. (2020) where land restitution beneficiaries were not satisfied with the performance of their agricultural productive capacity. This is confirmed by Valente (2009) who found beneficiaries of land reform exhibiting higher levels of food insecurity.

According to Bablin (2021), water reform was necessary especially given the effects of land restitution claims on water and land access. This will go a long way in addressing water inequality and insecurity. Msibi and Dlamini (2011) indicate that water re-allocation must be preceded by land restitution. In South Africa, land restitution beneficiaries were considered disadvantaged households and were offered intermittent periods were they were exempted from paying the full cost of water (Reddy, 2002). Furthermore, even though land restitution was supposed to transfer all water related infrastructure, in reality it only transferred the land. This was also compounded by looting of equipment (Cochet et al., 2015). In Majeng, there were plans to revive the various irrigation and canal systems to improve water security especially for small scale agricultural production (Magareng Local Municipality, 2012). This, however, did not materialise. Furthermore, Majeng has experienced persistent water problems as the boreholes provided by Magareng Local Municipality were not reliable and villagers have had to rely on neighbouring villages for their water needs (Augustus Consulting, 2016). Water security in Majeng has been compromised by inadequate water rights, having only 300 ha worth of water rights out of the total 10 220 ha (Nortje et al., 2022). The residents have resorted to water harvesting, but this is not adequate and sustainable to meet both their household and agricultural needs.

Most of the energy and land restitution studies focussed on energy generation vis-à-vis returning land back to its original owners (McEwan, 2017). There has been limited focus on the actual impact on household energy security. Beneficiaries of land restitution in Majeng have no access to grid electricity (Augustus Consulting, 2016). This was due to the fact that the original plans were to provide energy through solar (Magareng Local Municipality, 2012). However, this has not materialised, and the community relies on other sources of energy which include firewood for cooking and heating purposes while candles and limited individual solar installations have provided lighting energy. This has compromised their energy security.

According to Matondi et al. (2011), land restitution in Africa has failed to address the land imbalances, tending to favour large commercial interests thereby compromising support for smallholder farmers. Cochet et al. (2015) highlighted that land was restituted without any farming equipment compromising food production and security for the beneficiaries, especially in agricultural areas. It is worth noting that in Majeng, most of the households were benefiting from indigent supply of food through soup kitchens to supplement their food security (PMG, 2022). This can be a determining factor in the improved food security relative to water and energy which had no formalised system within the area, and hence non-beneficial in the provision of free services. Overall, land restitution has compromised the commercial viable production systems within the affected areas, thereby affecting employment and job creation, affecting the beneficiary ability to achieve welfare gains of water, energy and food security (Cochet et al., 2015).

The matching methods in Table 5 confirm the impact of being land restitution beneficiary, with significant bias reduction in the impact assessment.

Diagnostics as shown in the Kernel density plot and box plot in Fig. 7 show that the impact assessment was reliable and useful in assessing land restitution beneficiation impact on water, energy, and food security.

4. Conclusion and recommendation

The study sought to determine the impact of land restitution on water, energy, and food insecurity in Majeng which is located in Magareng Local Municipality in South Africa. Two further study sites, namely Matatiele and Greater Taung, were included to provide the counterfactual measure of non-beneficiary of land restitution. Household Water Insecurity Experiences (HWISE), Household Multidimensional Energy Poverty Index (HMEPI) and Household Food In Access Scale (HFIAS) were used to analyze the water, energy and food insecurity. Propensity Score Matching (PSM) was used to assess the impact of benefiting from land restitution on water, energy and food insecurity. The absolute measures found beneficiaries of land reform being water secure, somehow food secure and energy insecure. In addition, there were socio-economic factors such as educational levels, tenure,

Table 5
Matching methods.

	ATT	Std. Err.	t	Bias%
HWISE				
Nearest neighbour	0.150	0.025	6.024	-0.032
Kernel	0.165	0.027	6.018	-0.005
Radius	0.165	0.016	10.104	-0.014
Stratified	0.170	0.020	8.408	0.009
HMEPI				
Nearest neighbour	-1.083	0.100	-10.823	-0.007
Kernel	-1.123	0.075	-14.937	0.049
Radius				
Stratified	-1.096	0.126	-8.676	-0.008
HFIAS				
Nearest neighbour	-0.076	0.014	-5.316	-0.019
Kernel	-0.052	0.035	-1.464	0.005
Radius	-0.047	0.069	-0.690	0.012
Stratified	-0.061	0.028	-2.184	-0.003

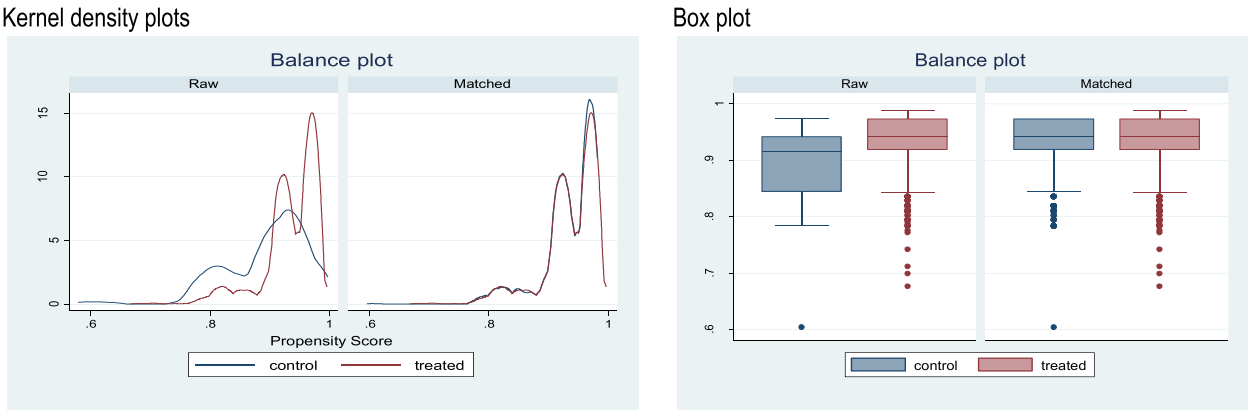


Fig. 7. Kernel density and box diagnostics plots.

employment, household size, gender and main source of income which determined land restitution beneficiation as well as water, energy, and food insecurity. Benefiting from land restitution increased water and energy insecurities while decreasing food insecurity. The study concludes that land restitution has differentiated impact on water, energy, and food security. However, it is also worth noting that food security was increased, not because of increased productive capacity due to availability of land, but to access of social grants and soup kitchens. This is indicative of a land restitution induced social transformation which is not backed by a more holistic agrarian transformation to provide beneficiaries the ability to produce or access their own food. The study recommends use of renewable energy such as solar especially in borehole water supply which can complement existing localised efforts in improving water and energy securities for land restitution beneficiaries. This is in recognition of the energy deficiencies in the area, especially from the national grid. This also provides a nexus approach to problem solving, with both energy and water insecurities being tackled simultaneously. If the water provided is used for food production, then it also adds to food security. Efforts underway to revamp the existing water canal system within the area should be prioritised especially given existing infrastructure which can improve water supply within the area. There is also need to revisit the water rights in Majeng where out of the 10 200 ha under land restitution there is only 300 ha worth of water rights. Improving water access is anchored upon improving water rights. Having access to water will have a multiplier effect on food security as the water base is expanded. Even though food security was improved for land restitution beneficiaries, it was not through expanded productive capacity but rather reliance on social grants and soup kitchens, which is unsustainable. Agro-based programs should be encouraged to further improve and augment the food security status of the households. Access to the national grid should also be a long-lasting solution to energy insecurities within the land restitution beneficiaries for energy security.

4.1. Strengths, limitations and areas for future study

This study was significant in providing a quantitative perspective given that most studies have been qualitative and not conducted in South Africa. The study also took an integrative approach, with livelihood induced outcomes on the one hand and social transformation outcomes on the other. The study was however geographically limited to land restitution beneficiaries in Majeng Local Municipality. Although the study provides a compelling case on the impact of social transformative land restitution on livelihood outcomes of water, energy and food security, the study can be expanded to other land restitution areas, with more beneficiaries. Equally important aspects of food security such as nutrition and availability can be incorporated into future studies to provide a more nuanced case on the impact of land restitution on water, energy and food security in South Africa, and/or beyond. Nexus and systems approach should also be incorporated in further studies to cater for the synergies and trade-offs that exists between water, energy and food resources.

CRediT authorship contribution statement

Ngarava Saul: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

The authors do not have permission to share data.

Acknowledgements

This work is based on the research supported wholly by the National Research Foundation (NRF) of South Africa and the Dutch Research Council (de Nederlandse Organisatie voor Wetenschappelijk Onderzoek - NWO) of The Netherlands Project UID 129352. The NRF and NWO are thanked for their financial contribution. Any opinion, finding, conclusion or recommendation expressed in this material is that of the author (s) and the NRF and NWO do not accept any liability in this regard. Further acknowledgement is targeted towards Environmental Rural Solution (ERS), Vaalharts Water User Association and World Wildlife Fund (WWF)-South Africa in assistance with the data collection process. In addition, the anonymous reviewers are also acknowledged for their constructive and critical reviews.

References

Adesina, J., 2009. Social policy in sub-Saharan Africa: a glance in the rear-view mirror. Int. J. Soc. Welf. 8, s37–s51. https://doi.org/10.1111/j.1468-2397.2009.00629.x.

Adésínà, J., 2011. Beyond the social protection paradigm: social policy in Africa's development. Can. J. Dev. Stud. 32, 454–470.

Akinola, A.O., 2020. Land reform in South Africa: interrogating the securitisation of land expropriation without compensation. Politikon 47, 215–232. https://doi.org/10.1080/02589346.2020.1715178.

Akinola, A.O., Kaseeram, I., 2021. Globalisation of South African land reform scheme: An interrogation. In: Akinola, A.O., Kaseeram, I., Jili, N.N. (Eds.), The New Political Economy of Land Reform in South Africa. Palgrave MacMillan, Cham, Switzerland, pp. 35–54.

Augustus Consulting, 2016. Majeng community without water for three months [WWW Document]. URL ⟨http://www.augustusconsulting.co.za/majeng-community-without-water-three-months/⟩ (Accessed 11.18.22).

Bablin, E., 2021. South African Water History. Proc. Gt. Day 2020, 29–58.

Batsirai, K., 2018. Gendered Nationhod and the land question in South Africa 20 years afetr democracy. In: Brandt, F., Mkodzongi, G. (Eds.), Land Reform Revisited: DEmocracy, State Making and Agrarian Transformation in Post-Apartheid South Africa. Broill, Massachusetts.
BFAP, 2022. South Africa ' s Land Resource in the Water-Energy-Food (WEF) Nexus Context The role of land in the South African landscape. Pretoria, South Africa.
Bruchhausen, S., Naicker, C., 2018. Broadening conceptions of democracy and citizenship: the Subaltern history of rural resistance in Mpondoland and Marikana. In: Brandt, F., Mkodzongi, G. (Eds.), Land Reform Revisited: DEmocracy, State Making and Agrarian Transformation in Post-Apartheid South Africa. Brill, Massachusetts.
Chambers, R., Conway, G.R., 1992. Sustainable Rural Livelihoods: Practical Concepts for the 21st Century (No. IDS Discussion Paper 296). IDS Discussion paper, Brighton, UK.
Chipenda, C., 2020a. The youth after land reform in Zimbabwe: exploring the redistributive and social protection outcomes from a transformative social policy perspective. Can. J. Afr. Stud. 54, 497–518. https://doi.org/10.1080/00083968.2019.1648308.
Chipenda, C., 2020b. The social and cultural dynamics of Zimbabwe's land reform programme on the 'new generation' of farmers: a transformative social policy perspective. Afr. Identit-.-. 00, 1–28. https://doi.org/10.1080/14725843.2020.1813553.
Chipenda, C., Tom, T., 2020. The generational questions after land reform in Zimbabwe: a social reproduction perspective. Afr. J. Econ. Manag. Stud. 11, 403–425. https://doi.org/10.1108/AJEMS-02-2019-0072.
Cochet, H., Anseeuw, W., Gresh, S.F., 2015. South Africa's Agrarian Question. HSRC Press, Cape Town, South Africa.
Cousins, B., 2021. Rights to land: a guide to tenure upgrading and restitution in South Africa. South Afr. Hist. J. 73, 187–195. https://doi.org/10.1080/02582473.2021.1896572.
Daramola, M.A., 2021. Land reform and the quest for women's land rights in South Africa: A case of KwaZulu-Natal Province. In: Akinola, A.O., Kaseeram, I., Jili, N.N. (Eds.), The New Political Economy of Land Reform in South Africa. Palgrave MacMillan, Cham, Switzerland, pp. 255–278.
Dikgang, J., Muchapondwa, E., 2016. The effect of land restitution on poverty reduction among the Khomani San "bushmen" in South Africa. South Afr. J. Econ. 84, 63–80. https://doi.org/10.1111/saje.12088.
Dr S Mompati District Municipality, 2017. Integrated development planning fourth generation 2017/2022 draft 2021/2022 review. Vryburg.
FAO IFAD UNICEF, W.& W., 2017. The State of Food Security and Nutrition in the World 2017. Building Resilience for Peace and Food Security Rome FAO,. https://doi.org/10.1080/15226514.2012.751351.
Ficks, W.E., 2018. Is land reform working? A critical evaluation of the Bergland Development Trust (BDT) Land Reform Project in Porterville, Western Cape. University of the Western Cape.
Gandidzanwa, C., Verschoor, A.J., Sacolo, T., 2021. Evaluating factors affecting performance of land reform beneficiaries in South Africa. Sustain 13, 1–15. https://doi.org/10.3390/su13169325.
Gilbert, J., 2013. Land rights as human rights: the case for a specific right to land. Int. J. Hum. Rights 10.
GoSA, 2020. Expropriation Bill. South Africa. ⟨https://doi.org/10.1163/9789004272224_029⟩.
GoSA, 2022. Land Reform [WWW Document]. URL ⟨https://www.gov.za/issues/land-reform⟩ (accessed 11.24.22).
Goswami, A., Mitra, D.J.S., Lushington, K., 2018. Land and Sustainable Development Goals. UNCCD Publications, Mumbai, India.
Greater Taung Local Municipality, 2017. Greater Taung LM Fourth Generation Integrated Development Plan. Taung.
Gumede, M., Ehiane, S., 2022. The challenges of sustainable livelihoods through land restoration in South Africa. J. Asian Afr. Stud. 57, 391–405. https://doi.org/10.1177/00219096211025809.
Hall, R., 2007. The impact of land restitution and land reform on livelihoods. Cape Town, South Africa.
Hall, R., Wisborg, P., Shirinda, S., Zamchiya, P., 2013. Farm workers and farm dwellers in Limpopo Province. South Afr. J. Agric. Chang. 13, 47–70.
IISD, 2017. World Bank conference discusses role of land tenure in sustainable development [WWW Document]. URL ⟨https://sdg.iisd.org/news/world-bank-conference-discusses-role-of-land-tenure-in-sustainable-development/⟩ (accessed 11.23.22).
Jacobs, G., 2014. Successful land reform? A critical analysis of the Harmony Trust Land Reform Project, Koue Bokkeveld, Western Cape. University of the Western Cape.
Kwarteng, A.H., Botchway, T.P., 2019. State responsibility and the question of expropriation: a preliminary to the "land expropriation without compensation" policy in South Africa. J. Polit. Law 12, 98. https://doi.org/10.5539/jpl.v12n1p98.
Laldjebaev, M., Hussain, A., 2021. Significance of context, metrics and datasets in assessment of multidimensional energy poverty: a case study of Tajikistan. Renew. Sustain. Energy Rev. 152, 111477 https://doi.org/10.1016/j.rser.2021.111477.
Land Portal, 2022. SDGs: Indicator 1.4.2 [WWW Document]. URL ⟨https://landportal.org/node/52264⟩ (Accessed 11.23.22).
Li, Q., Yang, L., Jiang, F., Liu, Y., Guo, C., Han, S., 2022. Distribution Characteristics, Regional Differences and Spatial Convergence of the Water-Energy-Land-Food Nexus: A Case Study of China. Land 11. https://doi.org/10.3390/land11091543.
Madonsela, B.S., 2021. Evaluating the impact of LIMA Rural Development Foundation on the land reform policy in light of changing the livelihoods of previsously disadvantaged people in Hammarsdale, KwaZulu-Natal, South Africa. University of KwaZulu-Natal.
Magareng Local Municipality, 2012. Integrated Development Plan Review. Warrenton.
Magareng Local Municipality, 2017. Annual Report. Warrenton.
Magareng Local Municipality, 2019. Integrated Development Plan. Warrenton.
Maloka, T., 2021. Balancing land redistribution and public interest in South African socio-economi development: A critical appraisal of the Restitution of Land Rights Act. In: Akinola, A.O., Kaseeram, I., Jili, N.N. (Eds.), The New Political Economy of Land Reform in South Africa. Palgrave MacMillan, Cham, Switzerland, pp. 199–216.
Matatiele Local Municipality, 2020. Matatiele Local Municipality Spatial Development Framework Review. Matatiele.
Matondi, P.B., Havnevik, K., Beyene, A., 2011. Introduction: Biofuels, food security and land grabbing in Africa. In: Matondi, P.B., Havnevik, K., Beyene, A. (Eds.), Biofuels, Land Grabbing and Food Security in Africa. Zed Books, New York, USA.
Mazwi, F., Muchetu, R., Chibwana, M., 2017. Land, agrarian reform in Zimbabwe viewed from a transformative social policy perspective. Afr. J. Dev. Stud. 47, 1–17. https://doi.org/10.25159/0304-615x/2168.
McEwan, C., 2017. Spatial processes and politics of renewable energy transition: land, zones and frictions in South Africa. Polit. Geogr. 56, 1–12. https://doi.org/10.1016/j.polgeo.2016.10.001.
Meertens, D., 2015. Discursive frictions: the transitional justice paradigm. Land Restit. Gend. Colomb. Pap. Polit. 20, 353–381. https://doi.org/10.11144/Javeriana.papo20-2.dftj.
Menon, N., van der meulen Rodgers, Y., Kennedy, A.R., 2017. Land reform and welfare in Vietnam: why gender of the land-rights holder matters. J. Int. Dev. 29, 454–472. https://doi.org/10.1002/jid.3203.
Mokgope, K., 2000. Land reform, sustainable rural livelihoods and gender relations: A case study of Gallawater A farm. Cape Town, South Africa.
Mokwena, R.J., Motsepe, L.L., Maluleke, W., Shandu, S.N., 2020. A study of land restitution to rural communities in South Africa: an analysis of traditional leaders perceptives. Gend. Behav. 18, 16132–16145.
Motala, S., Ngandu, S., Mpungose, A., Motala, S., Ngandu, S., Mpungose, A., 2016. Gains for women from farmland redistribution in South Africa and sustainable pathways out of poverty – insights from recent evidence focus Gains for women from farmland redistribution in South Africa and sustainable pathways out of poverty – insights from. Agenda Empower. Women Gend. Equity 30, 85–98. https://doi.org/10.1080/10130950.2017.1328806.
Mpofu, B., 2017. The urban land question, land reform and the spectre of extrajudicial land occupations in South Africa. Afr. Insight 46, 96–112, 46 96-111.
Msibi, M.I., Dlamini, P.Z., 2011. Water allocation reform in South Africa: History, processes and prospects for future implementation. Pretoria, South Africa.
Msuthu, S.T., 2020. Now that we have land: Analysing the experiences of land reform beneficiaries in the Makana Municipal District of the Eastern Cape, South Africa. Rhodes University.
Municipalities of South Africa, 2022. Magareng Local Municipality - Services [WWW Document]. URL ⟨https://municipalities.co.za/services/1161/magareng-local-municipality⟩ (accessed 10.20.22).
Munyanyi, M.E., Churchill, S.A., 2020. Foreign aid and energy poverty: Sub-national evidence from Senegal. SSRN Electron. J. 1–34. https://doi.org/10.2139/ssrn.3673243.
Ncapayi, F., 2018. The land reform programme and its contribution to the livelihoods of poor people. In: Brandt, F., Mkodzongi, G. (Eds.), Land Reform Revisited: DEmocracy, State Making and Agrarian Transformation in Post-Apartheid South Africa. Brill, Massachusetts.
Ndhlovu, E., 2018. Relevance of sustainable livelihood approach in Zimbabwe's land reform programme. Afr. Insight 47, 72–88.
Ndhlovu, E., 2021. An Analysis of Household Livelihoods under the Fast Track Land Reform Programme in Chiredzi, Zimbabwe. University of South Africa.
Netshipale, A.J., Oosting, S.J., Mashiloane, M.L., van Reenen, C.G., de Boer, I.J.M., Raidimi, E.N., 2020. Agriculture in land reform farms: Impact on livelihoods of beneficiaries in the Waterberg district, South Africa. Land Use Policy 97, 104710. https://doi.org/10.1016/j.landusepol.2020.104710.
Ngarava, S., 2022. Empirical analysis on the impact of the COVID-19 pandemic on food insecurity in South Africa. Phys. Chem. Earth, 103180. https://doi.org/10.1016/j.pce.2022.103180.
Ngarava, S., Mushunje, A., Chaminuka, P., 2020. Qualitative Benefits of Livestock Development Programmes. Evidence from the Kaonafatso ya Dikgomo (KyD) Scheme in South Africa. Eval. Program Plann. 78, 1–12. https://doi.org/10.1016/j.evalprogplan.2019.101722.
Nhamo, L., Mpandeli, S., Liphadzi, S., Mabhaudhi, T., 2022. Securing land and water for food production through sustainable land reform: a nexus planning perspective. Land 11. https://doi.org/10.3390/land11070974.
Nortje, K., Mbhele, R., Polasi, T., Zulu, S., Meissner, R., Muller, M., 2022. Legal and institutional barriers to community owned water supply schemes. Pretoria, South Africa.
Nowakowska, M., Tubis, A., 2015. Load shedding and the energy security of Republic of South Africa. J. Pol. Saf. Reliab. Assoc. 6, 99–108.
NPC, 2020. National Water Security Framework for South Africa: Summary, Principles and Recommendations. Pretoria, South Africa.
Nussbaumer, P., Bazilian, M., Modi, V., 2012. Measuring energy poverty: focusing on what matters. Renew. Sustain. Energy Rev. 16, 231–243. https://doi.org/10.1016/j.rser.2011.07.150.
Nxesi, T.W., 2015. Socio-Economic Impact of Land Restitution in the Ehlanzeni District, Mpumalanga. Witswatersrand University.
Nxumalo, K.K.S., Antwi, M.A., 2017. Impact of proactive land acquisition strategy on physical capital livelihood of beneficiaries in Dr. Kenneth Kaunda District, South Africa. J. Hum. Ecol. 161–169. https://doi.org/10.1080/09709274.2013.11906654.

PMG, 2022. Question NW2280 to the Minister of Social Development [WWW Document]. URL ⟨https://pmg.org.za/committee-question/19671/⟩ (accessed 11.18.22).

Rao, N., 2014. Land reform and social policy with a focus on women's rights, in: UNRISD Conference on New Directions in Social Policy: Alternatives from and for the Global South: UNRISD Conference on New Directions in Social Policy: Alternatives from and for the Global South. UNRISD, Geneva, Switzerland.

Reddy, R.V., 2002. Water security and management: lessons from South Africa. Econ. Polit. Wkly. 37, 2878–2881.

Stats SA, 2022. 2021 General Household Survey. Pretoria, South Africa.

Stickler, M., 2012. Focus on land in Africa Brief: South Africa: Lesson 2: Land restitution in South Africa. Washington D C.

Stoler, J., Miller, J.D., Adams, E.A., Ahmed, F., Alexander, M., Asiki, G., Balogun, M., Boivin, M.J., Brewis, A., Carrillo, G., Chapman, K., Cole, S., Collins, S.M., Escobar-vargas, J., Eini-zinab, H., Freeman, M.C., Ghorbani, M., Hagaman, A., Hawley, N., Jamaluddine, Z., Jepson, W.E., Krishnakumar, D., Maes, K., Mathad, J., Maupin, J., Mbullo, P., Marin, M., Morán-martínez, J., Omidvar, N., Pearson, A.L., Rasheed, S., Rosinger, A.Y., Samayoa-figueroa, L., Sánchez-rodríguez, E.C., Santoso, M.V., Schuster, R.C., Sheikhi, M., Srivastava, S., Staddon, C., Sullivan, A., Tesfaye, Y., Trowell, A., Tshala-katumbay, D., Tutu, R., Workman, C.L., Wutich, A., Young, S.L., 2021. The Household Water Insecurity Experiences (HWISE) scale: comparison scores from 27 sites in 22 countries. J. Water, Sanit. Hyg. Dev. 11, 1103–1110. https://doi.org/10.2166/washdev.2021.108.

Tekwa, N., Adesina, J., 2018. Gender, poverty and inequality in the aftermath of Zimbabwe's land reform: a transformative social policy perspective. J. Int. Women's. Stud. 19, 45–62.

Tirumala, R.D., Tiwari, P., 2022. Importance of land in SDG policy instruments: a study of ASEAN developing countries. Land 11. https://doi.org/10.3390/land11020218.

Tjale, M.M., Mwale, M., Kilonzo, B.M., 2020. Satisfaction of restituted farms beneficiaries with performance of farms in Waterberg district, south Africa. Agraris 6, 24–37. https://doi.org/10.18196/agr.6188.

Tjale, M.M., Mwale, M., Kilonzo, B.M., 2022. Can restitution change lives of farm beneficiaries? Case of Waterberg District Municipality, South Africa. South Afr. J. Agric. Ext. 50, 156–172. https://doi.org/10.21608/pshj.2022.250026.

Tom, T., Munemo, E., 2019. Gender facets of Zimbabwe's fast tracked land reform viewed from a transformative social policy perspective. Am. J. Humanit. Soc. Sci. Res. 3, 77–85.

Tom, T., Mutswanga, —Phillipa, 2015. Zimbabwe's Fast Track Land Reform Programme (FTLRP): a transformative social policy approach to Mupfurudzi Resettlement (Shamva District, Zimbabwe). IOSR J. Humanit. Soc. Sci. 20, 51–61. https://doi.org/10.9790/0837-20815161.

UNRISD, 2006. Transformative Social Policy: Lessons from the Research, Labour.

Valente, C., 2009. The Food (In) security impact of land redistribution in South Africa: microeconometric evidence from National Data. World Dev. 37, 1540–1553. https://doi.org/10.1016/j.worlddev.2009.01.005.

van Schalkwyk, J., 2019. A cognitive approach to the ordering of the world: Some case studies from the Sotho- and Tswana-speaking people of South Africa. In: Whitley, D., Loubser, J., Whitelow, G. (Eds.), Cognitive Archaelogy. Routledge, London, UK, pp. 184–200. https://doi.org/10.4324/9781315157696.

Walker, C., 2009. Elusive equality: women, property rights and land reform in South Africa. S. Afr. J. Hum. Rights 25, 467–490.

Wazimap, 2022. Magareng Ward 5 [WWW Document]. URL ⟨https://wazimap.co.za/profiles/ward-30903005-magareng-ward-5–30903005/⟩ (Accessed 10.19.22).

Wolde, Z., Wei, W., Ketema, H., Karikari, B., 2021. Quantifying and linking sustainable land - water - energy - food nexus resources and livelihoods of local community in Ethiopia. Preprints. https://doi.org/10.20944/preprints202108.0061.v1.

Xaba, M.B., 2018. The Impact of Land Restitution and Resettlement in the Eastern Cape, South Africa: Restoring Dignity without Strengthening Livelihoods? Rhodes University.

Xaba, M.B., 2022. Examining the meanings of 'restitution' for beneficiaries of the Macleantown and Salem restitution cases in the Eastern Cape, South Africa. Soc. Dyn. 48, 338–356. https://doi.org/10.1080/02533952.2022.2103617.

Yamane, T., 1967. Statistics: An Introductory Analysis, 2nd editio. ed.,. Harper and Row, New York, USA.

Yi, I., Kim, T., 2015. Post 2015 Development Goals(SDGs) and Transformative Social Policy. Oughtopia J. Soc. Paradig. Stud. 30, 307–335.

Yingi, L., 2021. Motivation for land reform in contemporary South Africa: The case of Balobedu in Tzaneen Province, South Africa. In: Akinola, A.O., Kaseeram, I., Jili, N. N. (Eds.), The New Political Economy of Land Reform in South Africa. Palgrave MacMillan, Cham, Switzerland, pp. 143–160.

Young, S.L., Boateng, G.O., Jamaluddine, Z., Miller, J.D., Frongillo, E.A., Neilands, T.B., Collins, S.M., Wutich, A., Jepson, W.E., Stoler, J., 2019a. The Household Water InSecurity Experiences (HWISE) scale: Development and validation of a household water insecurity measure for income countries. BMJ Glob. Heal 4, 11. https://doi.org/10.1136/bmjgh-2019-001750.

Young, S.L., Collins, S.M., Boateng, G.O., Neilands, T.B., Jamaluddine, Z., Miller, J.D., Brewis, A.A., Frongillo, E.A., Jepson, W.E., Melgar-quiñonez, H., Schuster, R.C., 2019b. Development and validation protocol for an instrument to measure household water insecurity across cultures and ecologies: the Household Water InSecurity Experiences (HWISE) Scale. BMJ Glob. Heal 9, 14. https://doi.org/10.1136/bmjopen-2018-023558.

Zantsi, S., Greyling, J.C., 2021. Land redistribution in South Africa ' s land reform policy: a better way to select beneficiaries. Agrekon 60, 108–127. https://doi.org/10.1080/03031853.2021.1906286.