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It's not just about the cash: The impact of conservation-based employment on human well-being

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Employment is a sought-after conservation-based benefit. The national Environmental Monitor (EM) programme was established in 2013 to address challenges of unemployment and biodiversity conservation adjacent to and inside South African protected areas (PAs). We used qualitative and quantitative methods to interview 109 EMs working in the Kruger to Canyons Biosphere Region, an area encompassing 72 PAs including the Kruger National Park, to document the positive and negative, tangible and intangible impacts of their jobs at an individual, family and community level. We recorded an extensive list of material (e.g. monetary income, improved health and shelter) and psychological well-being impacts (improved self-esteem, empowerment and personal image). Our findings highlight the role of learning new things and having positive social connections in the workplace. We suggest that positive workplace well-being is important for organisational sustainability in the conservation sector and has a role to play in reducing wildlife crime.

Conservation implications: Understanding workplace well-being in the conservation sector is important not only for ensuring benefit flow by facilitating personal, family and community well-being, but also for enhancing productivity through increased performance and organisational citizenship behaviour. These findings have direct implications for people and wildlife globally in the context of increasing pressure for PAs to demonstrate their societal contributions, while financial resources for PA management decrease and the illegal use of wildlife inside parks is increasingly becoming a threat to both biodiversity and people.

Keywords: constituency; employment; environmental monitor; conservation-related benefits; psychological well-being; protected area; sustainability.

Introduction

Human well-being is central to humanity, being both a state of mind (psychological) and body (physical) including happiness and harmony that is broadly dependant on good health, positive social relations and access to basic services (CDC 2023; Dodge et al. 2012). The natural world contributes to human well-being, through the flow of ecosystem services (provisioning, regulating, supporting and cultural benefits) and dis-services (negative impacts or costs) impacting both positively and negatively over space and time (MEA 2005). These impacts play out in various ways on the multiple dimensions of human well-being (Narayan et al. 2000; Ryff & Singer 2008):

- *Material well-being* accrues from having access to tangible products such as shelter, food, water, assets, livelihoods and money.
- *Physical well-being* refers to the physical state of the human body, such as being strong, healthy, well and looking good.
- *Emotional well-being* includes having self-respect, self-acceptance, dignity, personal growth and having a purpose in life.
- *Social well-being* includes caring for children and having peaceful and good relations.
- *Spiritual well-being* refers to connection to what gives meaning and purpose in life.
- *Security* of living in an environment where there is civil peace, includes feeling safe and secure, having personal physical security and confidence in the future.

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†, 1971–2015.

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Note: Additional supporting information may be found in the online version of this article as Online Appendix 1 and Online Appendix 2.

- *Freedom of choice* of being able to help others, having autonomy and an ability to influence one's surrounding context.

The net impact of ecosystem service and dis-service flow on well-being dimensions, influencing societal perceptions of the importance and value of biodiversity (Swemmer, Mmethi & Twine 2017). An important fraction of global biodiversity is found within formal protected areas (CBD 2023); yet, very few can report adequately on their human well-being impacts (Pullin et al. 2013) making it difficult to demonstrate their societal importance effectively (UNDP 2010). Furthermore, how people are impacted by protected areas (PAs), through their own, their families and their communities' well-being, influences if and how they value, build vested interest towards and develop pro- (or anti-) conservation perceptions, attitudes and behaviour (Swemmer et al. 2020). This is especially important where negative impacts (such as human-wildlife conflict) are felt locally (Anthony 2007) and include prevailing impacts from socially and racially unjust institutions (rules) and governance systems that have influenced benefit distribution and accrual in the past. Examples of the latter include forced removals, restricted access policies, employment structures and organisational culture (Buscher, Koot & Thakoli 2022; Hunt 2014).

Conservation-based employment and human well-being

High unemployment rates in biodiversity-rich countries drive demand for conservation-based jobs (Pereira, Cuneo & Twine 2014; Strickland-Munroe, Moore & Freitag-Ronaldson 2010), contributing significantly to regional and national economies (Chidakel, Eb & Child 2020; Holmes 2013). However, the range of tangible and intangible local impacts of conservation-based employment (including from PAs) on individuals, families and communities is largely unknown. Furthermore, disagreement remains on how to measure employment-related well-being (workplace well-being) in a biodiversity context. While some have argued that best practices are unclear (Woodhouse et al. 2015), others report on number of jobs and/or monetary income earned because of their relative ease of measurement (McKinnon et al. 2016) excluding the psychological dimensions of well-being which can be more important overall (Bartels, Peterson & Reina 2019). Workplace well-being is a state of contentment in the workplace where employees flourish, achieving their full potential, benefitting themselves and their organisation (CIPD 2007). It is determined by both personal context and working environment (Bowling, Eschleman & Wang 2011), and increases self-esteem, self-worth and autonomy (being able to voice opinions in a group setting, having a sense of purpose and mastering tasks in and out of the workplace) (Ryff & Singer 2008).

Understanding the multiple dimensions of workplace well-being in the conservation sector is important for several reasons:

Firstly, in the context of PAs, to facilitate comprehensive reporting on PA benefits and their value. Global biodiversity loss reduces ecosystem service flows (IPBES 2019). Predicting the human well-being impacts from biodiversity loss (including on employment) will assist policy makers to strengthen the case for biodiversity conservation both inside and outside of PAs. Furthermore, in the conservation sector, employment impact reporting focusses mostly on material well-being (e.g. number of jobs and monetary income, likely because it's relatively easy to measure), 'under-accounting' the total impact by excluding negative and intangible impacts. Also, well-being dimensions are linked (e.g., enhanced emotional well-being as a result of being able to help others), well-being of an individual is interconnected with the well-being of family and community (which is seldom considered in impact reporting), family well-being is valued above individual well-being and well-being dimensions can trade off against each other (e.g., a person can have enough tangible assets but be suffering emotionally resulting in a net negative well-being status) (Krys et al. 2021; Snodgrass et al. 2016). A comprehensive well-being assessment in the conservation sector can expose and enable the management of these shortfalls.

Secondly, to guide more effective and fairer distribution of conservation-based benefits from employment, specifically in the context of PAs, there is a need to maximise the positives and minimise the negatives. Local benefits (and costs) associated with conservation-based employment build (or erode) local support for conservation. The 'principle of local support' suggests that dissatisfied PA neighbours can cause conservation efforts to fail, while positive relationships promote vested interest and sustainability (Holmes 2013; Oldekop et al. 2016; Swemmer et al. 2017). Furthermore, combatting increasing illegal wildlife trade requires local support among people working in and living adjacent to PAs, with the latter portrayed as the 'first line of defence' (Brockington 2004; Roe 2017). Understanding employment impact on multiple well-being dimensions can facilitate net positive benefit sharing, subsequent vested interest and conservation support.

Finally, budget limitations across the globe, in the context of both PAs and conservation more broadly, restrict staff capacity, requiring optimal workplace performance to deliver on increasingly difficult mandates. Workplace performance is affected by employee well-being, through productivity and organisational citizenship behaviour (OCB), which is an employee's behaviour that is discretionary (performed by personal choice), not part of paid tasks, but promotes the effective functioning of the organisation (Haddon 2018; Organ, Podsakoff & MacKenzie 2006; Xu, Xie & Chung 2019). Furthermore, reduced workplace well-being (and job satisfaction) reduces employee resilience to shocks, making them vulnerable to deviant behaviour and exploitation through corruption and fraud (Ball et al. 2019; Warchol & Johnson 2009). Measuring workplace well-being will assist

PA's and other conservation-based organisations to manage their staff for increased productivity, OCB and resilience.

Our study aimed to enhance the understanding of the impacts of conservation-based employment on human well-being. We do this by applying the ecosystem service cascade of Haines-Young and Potschin (2012) which outlines the links between the biophysical template, ecosystem products, ecosystem services, well-being benefits and subsequently value. However, we use a version adapted by Swemmer et al. (2017), which allows for inclusion of dis-services and ecosystem costs. These frameworks acknowledge that local community support is essential for conservation success, and that conservation impacts affect the level of community support. We use the Environmental Monitor (EM) programme, a conservation-based employment programme in South Africa, as a case study to develop and test a tool to record the positive and negative impacts of a specific type of conservation-based employment (environmental monitors) employed through various conservation-based organisations including PAs, on multiple dimensions of human well-being. We focus primarily on individual EMs but acknowledge the interconnectedness of people in the spirit of the African concept of *ubuntu* (a person is a person through other persons), embedding our study within the broader context that acknowledges the secondary impact on families and communities (Letseka 2012). We consider well-being dimensions, both independently and collectively, and interpret our results in the context of the implications for the conservation sector.

Background to the environmental monitor programme

High unemployment levels adjacent to PAs in South Africa (Periera et al. 2014) and an increase in rhino (*Diceros bicornis* and *Ceratotherium simum*) poaching since 2008 (Thomas 2010), led to the development of the EM Programme in 2013 (K2C 2013). The programme supports the capacity of conservation-based host organisations that are directly or indirectly linked to PAs, by funding EM salaries, while EMs simultaneously support their hosts by conducting monitoring, patrols, data collection and environmental education (K2C 2013). Unemployed local youths (18–35 years old) are recruited, with 1441 EMs deployed around the country at the time of the study (2014/2015), 265 of whom worked in the Kruger to Canyons Biosphere Region (K2C 2013). As a biosphere, the K2C aims to facilitate mutually beneficial linkages of partnership networks (which include among others, approximately 72 public, private and community-owned PAs as core conservation zones), with the ultimate goal of promoting sustainable life of people and the environment in the region (Figure 1) (K2C 2022). At the time of data collection for this study (June–October 2014), the K2C EMs worked for 38 conservation-based biosphere partner organisations including mostly game reserves, but also socio-ecological research organisations, environmental non-governmental organisations and community-conservation based organisations, each hosting between 1 and 38 EMs. The K2C EM team was led by a coordinator, 4 data collators (DCs) and a leadership group of 12 EMs. The EMs worked on 3-year contracts, earning a monthly salary of ZAR2631 ([1]USD 227.4) at the time of data collection. Many EMs who participated in this study, later worked or continue to work as managers, DCs and project implementers within the conservation sector. Over 80% of the management and administration staff employed directly by the K2C at the time of writing this article (March 2022), started their careers as EMs in 2013. After 9 years (March 2022), the EM programme as run through the K2C itself came to an end. However, multiple, similar youth employment programmes have started up since the start of the EM programme, and continue to run both in the K2C and in other areas of South Africa, within and outside of the conservation sector (Nyangani 2022; YES 2018). Lessons learnt from this specific analysis of the K2C EM programme hence remain directly relevant to existing and future youth employment programmes within and outside of PAs and the conservation sector.

Research methods and design

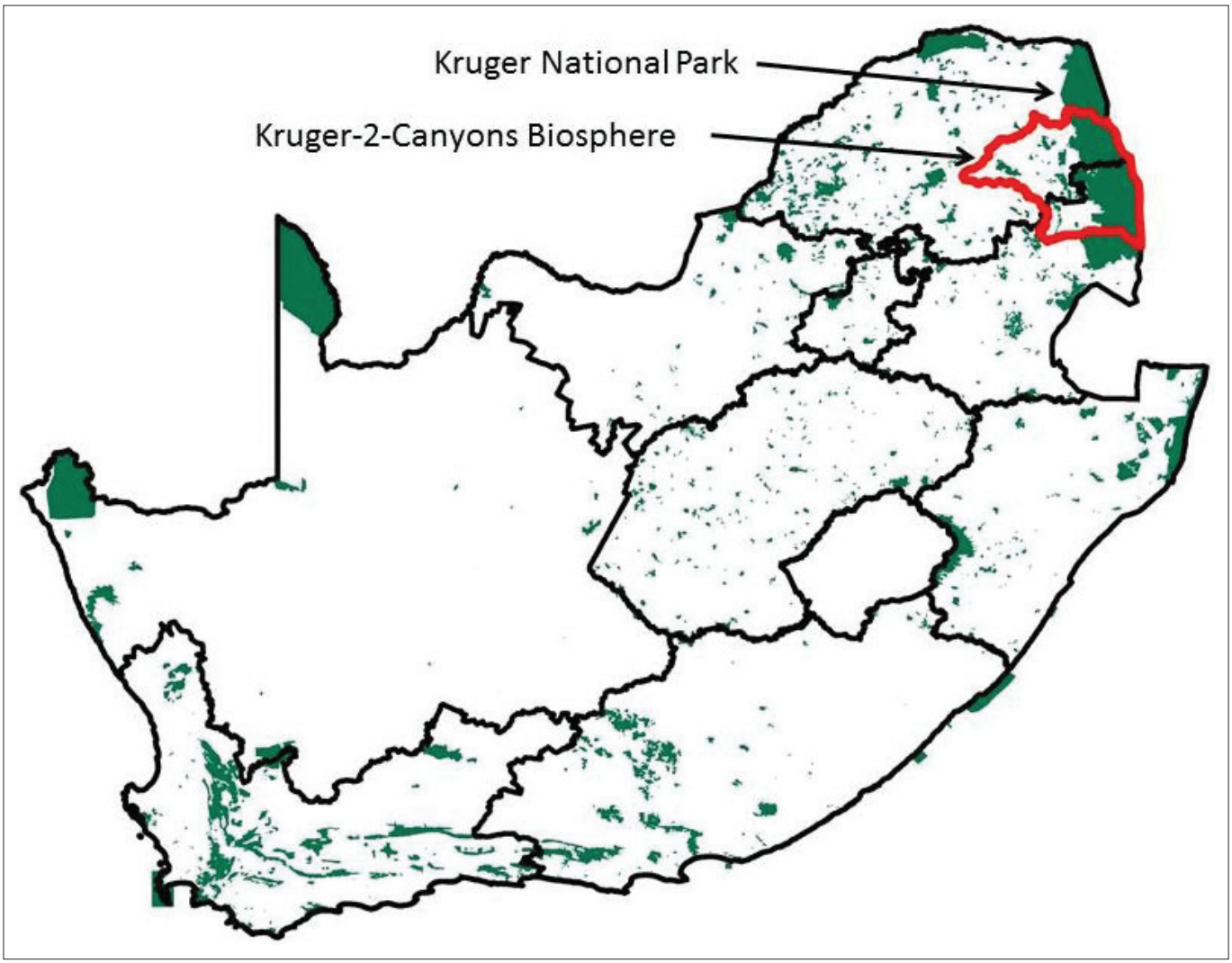
Site and participant selection

The K2C EM programme was chosen because of: (1) its wide geographical footprint, covering a range of PAs (varying in size and type) and associated conservation-based host organisations, (2) its unique approach prioritising capacity building through formal (accredited) and informal (life skills) training, while managing for human well-being and ecosystem integrity, and (3) the opportunity to study the impact of employment on a cohort of individuals who had been employed for the same amount of time. Data were collected using a structured questionnaire. Each DC selected 36 participants from between five and nine host organisations each within their area of responsibility, using non-probability, convenience sampling.

Study design and data collection

A participatory approach involving a series of workshops held between July and October 2014 was used to conceptualise, design, collect, analyse and interpret data. This purposely involved researchers, the EM management team and several EMs, to facilitate a process that enabled reflecting multiple perspectives (Moon et al. 2016). A draft questionnaire was piloted with 10 EMs, adjusted, and a final questionnaire was completed by 109 EM respondents. Questionnaires were conducted in either English (where EMs were comfortable to do this), or the local vernacular (SePedi and XiTsonga), in which cases responses were translated manually into English by the interviewers, who then transcribed the responses onto the questionnaires in English. During the interview training sessions, it was emphasised that responses should be transcribed as close to verbatim as possible.

1.1 USD = ZAR11.57 (December 2014). Note: at the time of data collection, the EM salary was approximately 80% more than the national minimum wage in South Africa of ZAR1450, increasing annually with consumer price inflation. By the end of the programme (March 2022), basic EMs were earning ZAR4784, with EMs in managerial positions earning up to ZAR7153.



Source: Kruger to Canyons Biosphere Region, 2022, *Official Kruger to Canyons Biosphere Region website home page*, viewed 10 December 2022, from https://kruger2canyons.org/
Note: Darker shaded areas represent protected areas.

FIGURE 1: Location of the study area in the context of the Kruger National Park, South Africa.

The final questionnaire included open and closed questions pertaining to (Online Appendix 1):

- Household demographics
- Tangible livelihood strategies (crop production, livestock ownership, use of natural resources and household expenditure)
- Intangible well-being dimensions (psychological well-being)
- Least, most enjoyable and most challenging aspects of employment (as additional proxies for assessing the impact on psychological components of human well-being)
- Impact of training (most and least useful training, knowledge gained)
- Impact of knowledge gained (to elicit responses on perceived changes in environment-related knowledge and behaviour in relation to well-being, using frequency of talking to friends and family about conservation pre- and post-employment)

All questions were framed so as not to lead the respondents by highlighting pre-defined impacts on well-being dimensions.

Data analysis

Data were captured in MS Excel. Once captured, qualitative data were either interpreted through a narrative or transformed manually into quantitative data using content analysis and open thematic coding (Creswell & Plano Clarke 2017; Syed & Nelson 2015; Vaismoradi, Turunen & Bondas 2013). Where relevant, sub-themes were clustered manually into main themes based on human well-being dimensions. Although well-being dimensions are defined as material, physical, emotional, social, spiritual, security and freedom of choice (Narayan et al. 2000), we used both theory and induction (Syed & Nelson 2015) to assign well-being dimensions to themes, to allow for emerging dimensions based on the unique context of the study. Existing ecosystem service themes were used to record pre- and post-perceptions of the role of biodiversity (MEA 2000; Swemmer et al. 2017).

To get a broad overview of overall impact, differences between positive and negative impacts on well-being dimensions were compared. Although not a traditional method of measuring well-being (Diener 2009), we chose this

method as it allowed us to quantitatively consider both tangible and intangible well-being dimensions simultaneously. One-tailed t-tests were used to test if the response for each sub-theme variable was significantly greater than zero (i.e. if the mean response was positive). The distribution of response magnitudes for each variable was checked with a histogram plot and normality confirmed with a Shapiro test for normality at the 0.05 significance level. Multiple linear regression models were used to identify potential determinants of the positive responses, from the respondent demographics. The number of positive responses for the sub-themes were summed to create a single positive response value for each respondent. Independent variables, which were all treated as fixed effects, were marital status, gender, qualification, age, number of dependents and host institution. As these contained some missing data (for 1, 0, 3, 11 and 8 respondents, respectively), model selection could not be carried out by comparing subsets of the full model. Instead, any variable which indicated a marginal significant effect ($p < 0.1$) in the full model was tested separately in a univariate model. Plots of residuals confirmed normality for each model. A Pearson's Chi-squared test assessed differences in how often respondents spoke to their families about conservation (response variable) before and after they were employed (explanatory variable). Statistical analysis of quantitative data and qualitative data that was subsequently transformed into quantitative data, was conducted using the 'stats' package of r (R version 4.4.1; 2021). The first author was the 'master' coder, coding the full data set. However, in order to check that the coding was reliable, the EM coordinator served as a reliability coder, coding 20.0% of the data to establish an interrater percentage agreement reliability index which was an acceptable 90.2% (Syed & Nelson 2015). Direct quotes were taken from open-ended questions to illustrate key findings.

Ethical considerations

Participants were made aware that participation was voluntary, and gave their oral consent to take part in the study once they were aware of the content and extent. Participant names were not included on the hard or soft copies of the questionnaire to enable confidentiality. Participants were made aware of this, in accordance with the required criterion for human research ethics at the University of the Witwatersrand (No. H16/10/21).

Results

Demographic profiles of respondents

Respondents were from 56 villages, representing 17 host organisations (67% of whom worked for game reserves, 25% worked for community-based conservation projects such as environmental education and the remaining 8% worked for community-based organisations, non-governmental organisations or tertiary education and/or research institutes). Participants were mostly single women with tertiary education and a mean of 4.96 dependents (range = 1–13; standard deviation [SD] = 2.87). Households spent a monthly mean of ZAR200 on electricity (range ZAR50–1200; SD = ZAR103), with most households using wood as their primary fuel source. Half of the households bought wood, at a mean rate of ZAR266 per month (range = ZAR13–840; SD = ZAR179.24). Most households planted crops, while half owned livestock and harvested natural resources (Online Appendix 2: Table 1–OA2).

Respondents noted a variety of positive and negative impacts on the material and physical (M), emotional (E), social (S), spiritual (P), security (C) and freedom of choice (F) dimensions of human well-being, as a result of being employed as EMs (Figure 2). We present the impact on: (1) the individual, (2) the perceived impact on EM's families and communities, and (3) the collective impact on well-being as a whole and how this relates to respondent demographics.

Perceived impacts on environmental monitors as individuals

Salaries contributed towards material and physical security and freedom of choice dimensions as a result of income-related cash, savings and having expenditure choices. Household income was mostly from EM salaries (average = 60%; range = 8% – 100%; SD = 25%) and government social grants (average = 16%; range = 0% – 60%; SD = 15%) (Online Appendix 2: Table 2–OA2). Cash income enabled access to building materials, groceries, furniture, clothing, transport, school fees, rent, electricity and cell phone data (M). Respondents (87%) were able to save a mean of R248.53 per month (range = ZAR0 – 2000; SD = ZAR388.99) in the form of cash,[2] stokvels, funeral policies and/or investments (M,C,F).

Most respondents (64%) had one (69%), two (21%) or three (10%) accounts at retail outlets, having opened these since being employed (75%: M). Monthly repayments were a mean of ZAR362 (range = ZAR50–1500; SD = ZAR300) each. Most account holders experienced positive impacts (84%) including being able to buy items without money (40%: M) for family members (31%: M,S), enabling themselves and their families to dress better (11%: M,S), save money (11%: M) and buy furniture with monthly instalments (9%: M). Additional impacts included being able to budget (M) and do house renovations (M). The few respondents who experienced negative impacts from having accounts (13%) attributed these to buying items under pressure (40%: M), buying things for family members (20%: M), not having enough money to buy groceries because of account repayments (20%: M) and having to ask family members to help to pay debt (20%: S). Respondents who did not have accounts (36%) preferred using cash for purchases (37%: M) and perceived accounts to be unaffordable (21%) especially considering the EM posts were only 3-year contracts, employment beyond which was not guaranteed (21%).

2. An informal savings pool or syndicate in which funds are contributed on a rotational basis, allowing participants lump sums for family needs.

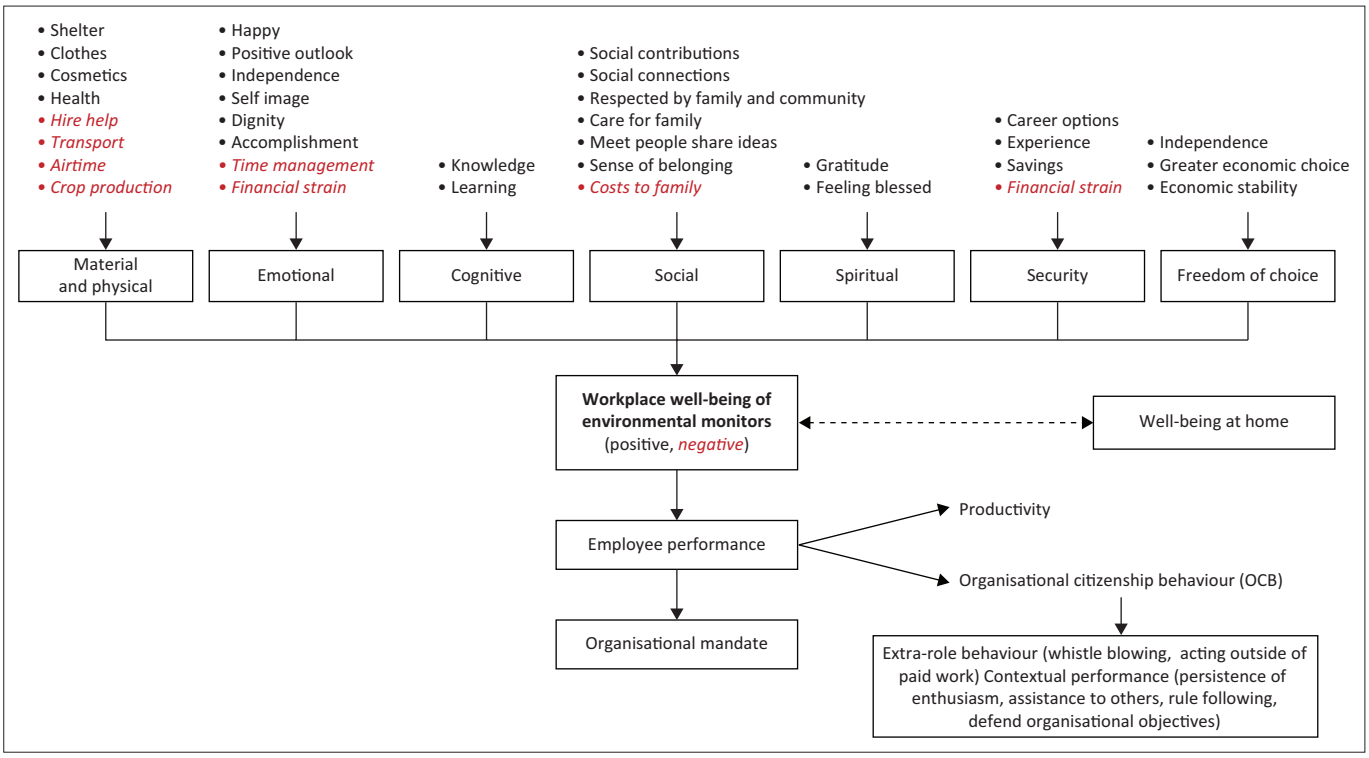


FIGURE 2: Impacts of the Kruger to Canyons Biosphere Region environmental monitor programme on human well-being (negative impacts in italics), as determined using coded data collected using a structured research questionnaire.

Most respondents made improvements to their homes (66%), as extensions (41%: M), repairs or refurbishments (33%: M), buying building material (16%: M) or building new houses (9%: M). Other impacts included investing in property, furniture and appliances (M). A positive impact of the household improvements was attributed to a feeling of independence that had positive impacts on both the EMs and a perceived positive impact on family well-being (E, S, C).

One EM indicated:

> '[*Being employed as an EM*] helps us a lot because we have a house to sleep in.' (EM, P88, female, community organisation)

Another said:

> '... [*because of my job*] I'm currently renovating my parents' house and built a room for myself. This had a positive impact on me and my family because I now have my own room. I no longer share with my mother.' (EM, P67, female, community organisation)

Respondents incurred impacts on livestock and crop production (M) because of their employment. Of the livestock-owning respondents who experienced a change in numbers of livestock since they were employed (38%; M), 71% experienced an increase. This was attributed to employment-related impacts (60%: M) including better food and health care (46%), purchasing more cattle (24%), slaughtering fewer animals because of being able to purchase fresh meat (12%) and employing a herder to care for the cattle (6%). Of those who experienced a decline in numbers (19%), this was attributed to non-employment-related threats (livestock eaten, death from disease or cattle being stolen). A small number of respondents (9%) did not indicate the direction of change. Some households reported a change in crop production within their household (30%: M), because of the EMs no longer having time to tend the fields (27%). In response to this, either another family member took over (13%; S) or they hired help (7%: M). Some had more resources to manage their crops better by having access to a tractor and being able to buy fertiliser (40%: M) while others had their unattended crops damaged by livestock (7%: M) or they planted fewer crops because of time constraints (7%: M). Of the respondents who reported a change in household fuelwood collection since being employed (39%), some had converted to buying wood (48%: M) because of time constraints of collection or having cash available to buy. Other impacts included collecting and using less wood but more electricity (17%: M) or someone else collecting wood on the EM's behalf (4%: S).

Impacts on emotional well-being (E) included having a happy and positive outlook (25%) and feeling more confident (16%), with most respondents indicating that since being employed, they could voice their opinion if it differed from that of a larger group (88%: E). Respondents also noted an improved physical self-image (15%) (linked in part to being able to buy nice clothes), greater dignity (1%) and a sense of accomplishment (1%), as illustrated by one respondent who said:

> '[*As a result of my job*] I am a happy person, confident and beautiful always.' (EM, P4, female, community organisation)

(Online Appendix 2: Table 3–OA2). Respondents felt more independent (25%: E,C) being able to look after themselves and not depending on others with one respondent saying:

'[*I am now*] stress free, I am independent.' (EM, P30, male, game reserve)

Additional positive impacts included greater economic choice and stability being able to afford what they couldn't before (23%: M,C,F), learning new things (13%: K), improved health (3%: M) and enhanced spiritual well-being (2%: P).

Most incurred negative impacts (60%) such as financial costs (68%: M, mean = ZAR330.94; range ZAR12 = ZAR1400; SD = ZAR242.85), because of hiring someone to do household chores (66%: M), spending money on transport (33%: M, mean = ZAR341.90; range = ZAR50 – ZAR1400; SD = ZAR257.78), spending money on items they would have got for free previously such as wood (17%: M) and the costs of cell phone data (8%: M, mean = ZAR143.56; range = ZAR12 – ZAR300; SD = ZAR113.83) (Online Appendix 2: Table 4–OA2). Some felt a burden of time management having to do household duties over weekends and holidays (32%: E). Additional negative impacts included the emotional burden of knowing that their jobs have negative impacts on their families (E,S).

Benefits associated with learning and knowledge contributed positively to workplace and subsequently overall well-being and has been referred to as 'intellectual well-being' (K) (CSU Pueblo 2024). Respondents participated in a mean of 2.65 formal training events (range = 1 – 6 formal training events; SD = 1.34 formal training events), on 25 unique topics (Online Appendix 2: Table 5–OA2). Some topics were more useful than others, but overall, the formal training was perceived to assist EMs to do their work more effectively (88%: E), as illustrated by one EM who said:

'It has helped me with knowledge I didn't have before.' (EM, P12, female, community organisation)

Most wanted more formal training (81%) to protect themselves at work (49%: C), to learn new things (23%; K), to stop poaching in their communities and PAs (23%: E), to know more about the subjects they teach the community (15%: K; S) and to do their jobs better, make more informed decisions and be more passionate about what they do (7%: E). One respondent indicated:

'[*I would like more*] EE Training [***so that***] I can teach family, community and learners about the environment.' (EM, P46, female, community organisation)

Informal training covered 33 unique topics linked to health and safety, environmental education or life skills (Online Appendix 2: Table 6–OA2). Most respondents found the informal training valuable (90%), with varying perceptions of the degree of usefulness between individual topics. Some did not find it useful as they did not learn anything (10%: K), already having the knowledge that was presented (82%), the topic not being well presented (20%), the trainees not being well informed (20%) or the training being irrelevant to their work (18%).

Apart from training, we used respondents' perceptions of the value of biodiversity, prior to and after being employed as an additional proxy for intellectual well-being (Online Appendix 2: Table 7–OA2), noting that half of the respondents indicated that they did not specifically think that biodiversity conservation was important before they started working. This was attributed to not having information about nature, its value and meaning (46%; K), with one respondent indicating:

'It didn't mean anything to me, I didn't know the importance of it.' (EM, P88, female, community organisation)

Most respondents' felt that their perceptions of biodiversity had changed since employment (92%), valuing biodiversity for provisioning services such as food, shelter and furniture (45%), to sustain life (15%), for ecological reasons (15%), for current and future generations to experience and learn from (12%), as a contributor to mental well-being (6%), regulating services (2%) and economic and health benefits (2%). Although not a comprehensive indicator, we used the frequency with which the EMs talked to friends and family about biodiversity and nature as a proxy for OCB, noting that 98% did so, with the frequency of doing so increasing significantly since being employed ($X^2 = 103$, $p < 0.01$).

The realisation of job expectations influences workplace well-being, with most EMs wanting their jobs for the salary (45%: M) or an interest in or concern for nature (20%: E), was illustrated by one respondent who said:

'I always wanted to work in a nature reserve taking care of [*the*] environment.' (EM, P14, male, game reserve)

Others wanted job experience (12%: K), personal improvement, status and economic benefits (8%: M,E,S), to fund further studies (7%: K) or to help their communities (4%: S). Most expected their jobs to enable them to help their families with their needs (28%: K) with one respondent indicating:

'I wanted the job to take good care of my family.' (EM, P9, female, community organisation)

(Online Appendix 2: Table 8–OA2). Others wanted to buy what they needed without depending on others (17%: M, E, S) or to build a home (12%: M). Respondents felt that their expectations were either fully (59%), partially (24%) or not met (17%).

The most and least enjoyable and most challenging aspects of a job directly impact workplace well-being. Respondents mostly enjoyed learning through their work (about the environment and gaining life skills) (31%: K), engaging with people (25%: S), conserving (25%: E) and experiencing (23%: E) nature and sharing knowledge (18%: E, S, K), with one respondent indicating:

'I get to do what I love, improve my knowledge and help people.' (EM, P53, male, community organisation)

(Online Appendix 2: Table 9–OA2). For those who experienced unenjoyable aspects (90%), these were attributed to repetitive, mundane tasks that did not involve learning (19%: E, K), with one respondent saying:

> '[*The part I like least about my job is*] doing [*the*] same thing over and over again. I like doing different things that challenges my mind.' (EM, P88, female, community organisation)

(Online Appendix 2: Table 10–OA2). Others least enjoyed risks (15%: C) and conflict (10%: S) associated with the work. The most challenging aspects related to people engagement, including conflict situations (30%: S) and not having community acceptance and support (14%: S), as said by one respondent:

> 'When doing household surveys, people chase you out of their house.' (EM, P46, female, community organisation)

(Online Appendix 2: Table 11–OA2). Others found the working environment physically difficult (14%: M). Suggestions to make the work more appealing included increased salaries, better uniform and moving from contract-based to permanent jobs (Online Appendix 2: Table 12–OA2). Most would recommend the job to friends and family (95%) for the material benefits of receiving a salary (21%: M) and the opportunity to learn about nature and its importance (19%: K) (Online Appendix 2: Table 13–OA2).

The security dimension of human well-being is influenced by the degree to which employees feel positive about the stability of their future. Most felt they were more employable having worked on the EM programme (92%: C), because of knowledge, capacity and experience gained (56%: K), the certifications of formal training (14%: K) and having greater self-confidence (6%: E) (Online Appendix 2: Table 14–OA2). As noted by a respondent:

> 'Since I became an EM, I've gained knowledge that I can also use in future.' (EM, P68, female, game reserve)

Employee retention is an indicator of job satisfaction, influenced by workplace well-being. Most respondents did not know anyone who had left the programme (74%), but those who did, attributed this to wanting higher salaries (48%), better opportunities (30%), permanent jobs (19%), obtaining scholarships (7%) or being dissatisfied with the job (4%).

Perceived impact on environmental monitor's families and communities

Respondents noted positive impacts on their emotional well-being, including fulfilment (38%: E), responsibility (10%: E), pride and self-esteem (10%: E), empowerment (6%: E, S), happiness at being an inspiration and role model (6%: E, S) and satisfaction (6%: E, S), as a result of being able to help their families and the subsequent respect, appreciation and value that their families projected towards them as a result. Although we did not interview families directly, most EMs perceived their families well-being had improved (97%) as a result of furniture, clothing, shelter, electricity and groceries (36%: M), being able to depend on the EM for support and decision making (30%: E, M), families feeling pride and respect for the EMs and using the EMs as role models (13%: E,S), families feeling happy and satisfied (13%: E) and being financially stable (8%: M,C). Other positive impacts included families being recipients of knowledge (K), having increased access to a healthier and safer environment (M, K, C), stronger family ties (S), EMs working in place of a parent (S), spoiling the children in the family (S) and helping the family to save natural resources (S,M). One respondent perceived no change in their family's lives as a result of their employment. Most indicated that their families were also affected negatively (69%), by taking on extra burdens (30%: S), not having anyone to care for the children (20%: S) and not spending time with the EMs (19%: S). One respondent noted:

> 'I used to baby sit my siblings, but now there is no one to baby sit.' (EM, P88, female, community organisation)

Most respondents experienced a change in the role they played in their families (84%). Positive changes (95%) were attributed to being able to contribute financially (69%: M), as the main income earner (15%: M) and take part in family decision-making, being seen as valuable and given increased responsibility (11%: E). Families were also able to eat healthily and well (M), siblings had a role model to look up to (S), families had a source of knowledge about nature (K), had someone to fix things that were no longer working (M), were able to contribute to funeral schemes (S) and were able to open accounts (M, C), with one respondent indicating:

> 'They [*my family*] are happy because I am working and able to take care of them.' (EM, P30, male, research organisation)

Two respondents perceived negative changes as a result of not being able to use their money for themselves, having to buy various items for the home instead (M).

The EMs perceived that their households were seen differently by their communities since they were employed, with most noting an improvement (69%: S), including families perceived to be getting more attention and respect, being treated with dignity and being appreciated by their communities (40%: S, E), communities being supportive and happy for respondents' families as they no longer needed to ask for assistance (19%: S), the community taking the family more seriously (7%: E), the community being comfortable to lend various items to the family and the family being able to lend items to others (7%: M) and the family being perceived by the community as having a positive future and no longer being categorised as 'poor' (7%: S,E,C). Some perceived their families to be viewed negatively by their communities as a result of their employment, because of jealousies, suspicion and unhappiness (23%: E,S). Most respondents felt they contributed positively to community well-being through their ability to support development and benefit sharing projects on account of their increased capacity and good understanding of community context (87%: S),

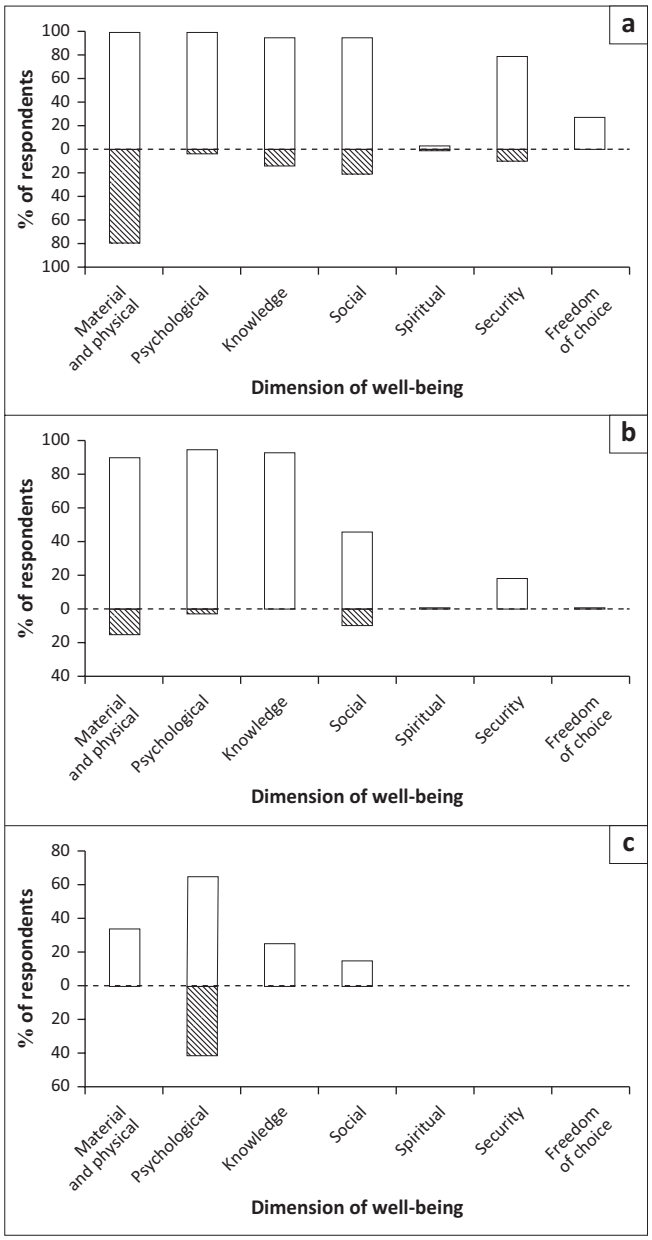


FIGURE 3: Respondents incurring positive and negative well-being impacts at the (a) individual, (b) family and (c) community level (clear bars indicate positive responses, lined bars indicate negative responses).

unlocking community-level benefits (46%: M), increased environmental knowledge (42%: K), being well connected and known (13%: S), communities feeling happy for the EMs and their success (6%: E) and making contributions to community-level saving schemes and/or stokvels (2%: M, C).

Consolidated impacts on human well-being and demographics

Most respondents recorded positive impacts on six, five and four well-being dimensions at an individual, family and community level respectively (Figure 3). Some were direct, others were as a result of a secondary impact as illustrated by one respondent who said:

> '[*It gives me*] great fulfilment that I can help my family financially.' (EM, P88, female, community organisation)

TABLE 1: Mean of differences between the number of positive and negative impacts per respondent, for each of the well-being dimensions, for questions related to individual, family and community impacts.

Dimension of well-being	Individual		Family		Community	
	Mean	SE	Mean	SE	Mean	SE
Material	**2.45**	**0.17**	**1.73**	**0.09**	**0.34**	**0.04**
Psychological	**3.92**	**0.11**	**1.43**	**0.07**	**0.20**	**0.08**
Knowledge	**2.06**	**0.08**	**1.03**	**0.04**	**0.28**	**0.04**
Social	**1.58**	**0.08**	**0.46**	**0.07**	**0.15**	**0.03**
Spiritual	0.02	0.02	0.01	0.01	0.00	0.00
Security	**0.87**	**0.06**	**0.18**	**0.03**	0.00	0.00
Freedom of choice	**0.30**	**0.05**	0.01	0.01	0.00	0.00

Note: Bold values are significant at $p < 0.05$ according to a paired-samples T-test.
SE, standard error.

Fewer respondents recorded negative impacts on five, three and one well-being dimension at an individual, family and community level. respectively. Across respondents, there were significantly more positive than negative impacts recorded for six, five and four of the seven well-being dimensions respectively (Table 1).

The number of negative responses was correlated to the number of positive responses (per respondent). The regression models indicated possible effects for marital status (positive responses) and qualification, age and host institution (negative responses) (Online Appendix 2: Table 15–OA2). However, univariate regressions for each of these indicated that only host institution had significant effects (Online Appendix 2: Figure 1–OA2). Despite this result suggesting that host institution can and likely does play an important role in workplace well-being, sample sizes varied considerably among the 19 host institutions, making this result tenuous. Further in-depth investigation into the role of host institution in shaping workplace well-being in the context of youth employment programmes would be most valuable.

Discussion

Our tool demonstrated how conservation-based employment can enhance human well-being at an individual, family and community level, using well-being dimensions taken both from the literature and induced from the data. Although some of the outcomes from this research may not be unique to conservation, in this section we highlight the specific relevance of measuring employee well-being within the conservation sector and reflect on limitations from our study while exploring future research possibilities.

Well-being dimensions and conservation

In keeping with *ubuntu*, the positive social connections that were noted in our study, facilitate social cohesion, benefiting individual and group well-being at various levels among employees, between employees and employers, and between employees and their families and communities (Bartels et al. 2019; Truss et al. 2013). In some parts of the world, the remote locations of PAs break household social connections when employees live far from home for extended periods (Reid-Hresko 2018). More recently,

conservation employee's involvement in illegal activities relating to wildlife crime has broken trust within organisations, impacting negatively on individual and group social cohesion and well-being (Ball et al. 2019; Warchol & Johnson 2009). Conservation employment approaches that enhance the social dimension of employee and employer well-being would have many benefits.

Noteworthy was the finding that learning new things contributed to intellectual well-being, the opposite being true of mundane, repetitive work, despite the latter being 'easy.' Intellectual well-being refers to brain health and growth via thought-provoking mental activities (CSU Pueblo 2024). Learning new things outside of the conservation sector has been known to boost self-esteem and confidence, fostering the ability to master tasks, enabling a feeling of independence leading to personal growth and enhanced psychological well-being (NHS 2019; Ryff & Singer 2008). Informal learning leads to higher well-being (Jenkins & Mostafa 2015), learning in a group develops social skills and promotes connections (S,E) (Field 2009) and learning 'in nature' has positive impacts on psychological well-being (Edwards et al. 2005). Most respondents applied for their jobs for financial reasons; however, many subsequently valued conserving nature, suggesting that learning about the environment while being employed in the conservation sector enhances workplace well-being, and subsequently influences perceptions. This can be especially successful when learning fosters a sense of environmental self-identity through repeated, reinforcing messaging (McGuire 2015). Regardless of the type of work, learning enhances psychological well-being in the workplace, and this is important to the conservation sector.

Our respondents, mostly youth, highlighted that employment benefits went beyond the salary, including being valued, and making a difference. Youth flourish in a working environment that promotes a sense of purpose, an opportunity to make a difference in society and to contribute to a greater good (White 2015). The public good mandate of PAs provides an opportunity for conservation-based employees, in comparison to people working in sectors outside of conservation, to add value, and in so doing, feel valued with a greater purpose, provided they are familiar with and supportive of the organisational mandate and culture (this may be similar for fields such as nursing and care giving). Conservation managers may benefit by taking note of what inspires the youth, in the context of contributing to the greater good, and the role that this plays in enhancing workplace well-being among the younger generation.

Despite the benefits from employment, the EM programme also came with new financial and emotional challenges for some participants. Most negative impacts were associated with material costs (airtime and travel) and a shifted burden of domestic responsibilities (emotional and social well-being). Mobile phones can compete with basic needs in low to middle income households (Malm & Toyama 2021), while the benefits of employment including both financial and emotional relief for women, especially those who are parents, can be off-set by negative consequences of increased caregiving strain (Ali & Avison 1997; Nyangani 2022), an important consideration for conservation organisations with a large proportion of female employees. Noteworthy, the majority of EMs perceived opening retail outlet accounts positively, as opposed to the negative impacts of purchasing goods on credit. However, this may change with time. Participants in our study desired the longer-term security of having permanent employment, as extending employment contracts to beyond 3 years enhances financial and emotional security (Nyangani 2022).

Overall, our study participants noted and valued the improvement in their psychological well-being as a result of their employment as EMs in the conservation sector. Positive psychological well-being in the workplace enhances contract-based performance (efficiency and productivity) (Baptiste 2008) and can positively influence OCB (behaviour that goes beyond existing role expectations), in turn contributing towards organisational objectives (Organ et al. 2006). This includes persistence of enthusiasm, assistance to others, prescribed rule or procedure following, openly defending organisational objectives and whistle blowing (reporting unethical or illegal activities of one employee by another) (Borman & Motowildo 1993; Organ et al. 2006). Recent estimates suggest between 40% and 70% of conservation law enforcement staff working in conservation areas have been known to be involved in illegal activities related to wildlife crime (Rademeyer 2023). Furthermore, in many PAs the majority of employees are recruited from areas directly adjacent to parks, yet only a small fraction of staff (1%) are contractually tasked to engage and work with local neighbours (the majority of employees work in tourism or nature conservation) (Swemmer et al. 2017). Enhancing the psychological well-being of all conservation staff has the potential to increase productivity, enhance the human resource potential for promoting pro-conservation attitudes and behaviour at an individual, family and community level outside of the workplace, and through OCB, and increased resilience, discourage conservation employees from becoming involved in illegal activities relating to wildlife crime. These findings are especially relevant in the context of dwindling financial resources and increasing levels of illegal wildlife crime facing PAs across the globe (SANBI 2018; Tilman et al. 2017).

Research limitations and future research

Social desirability bias elicits responses deemed favourable, as opposed to 'the truth', over-reporting positive, and under-reporting negative aspects (Grimm 2010). Having data collectors who are part of a project raises the risk of this, which in our case was unavoidable because of the collaborative nature of our study design, data collection, analysis and interpretation. We purposely attempted to manage this risk by assuring participants that their answers would not compromise their employment and by framing

our questions neutrally. We further believe that the nature of the open relationship between the DCs and EMs, provided us with relatively unbiased responses to our questionnaire (Nederhof 1985). This is supported by the willingness for participants to talk about parts of their employment that they did not enjoy, suggesting that they felt reasonably comfortable with the interview process. Using EM perceptions of impact on families and communities may be susceptible to bias, and we took this into consideration when interpreting the data. Convenience sampling accommodated time constraints of host organisations for whom the EMs were working at the time, risking a biased sample which we mitigated through increasing our sample size. Quantifying qualitative data can facilitate discoveries of patterns (Scherp 2013), but reducing words to numbers, risks losing value, meaning and context (Viljoen 2018). We purposely kept coding themes and sub-themes detailed and descriptive to retain context. Making use of translators when collecting qualitative data can be a source of data dilution and error, in cases where the responses are summarised by the data capturers and subtle contributions can be missed in such cases. The data collectors were briefed on this potential risk and asked to translate as near to the original response as possible.

We used the frequency of talking about conservation as a proxy for OCB. This has several limitations, including that we did not include any detail on the type of conversations that EMs had with their friends and families (i.e. positive, negative or neutral). This would be useful to include in future such work. Furthermore, future work could explore if and to what degree other components of OCB are realised (e.g. defending organisation objectives and whistle blowing), particularly in an environment where conservation-based staff are facing intimidation and entrapment linked to illegal wildlife trade (IWT).

We recorded the most and least enjoyable parts of the EM job, but the presence and/or absence of well-being dimensions does not account for the relative contributions of each. Because of the way the data were collected (using open ended questions pertaining to impact, meaning that the well-being dimensions only emerged post-data collection during the analysis phase), we were not able to include a Likert-type scale analysis (Diner et al. 2008; Watson, Clarke & Tellegen 1988) to weight the relative well-being dimensions during the interviews. Furthermore, these methods have limitations in that they do not easily include all dimensions of well-being simultaneously, especially when considering the emergence of themes post data collection. However, future work could consider a ranking or prioritisation component as part of the original data collection tool to elicit the most important impacts relative to each other.

Furthermore, this study did not have a control group, and the EMs are likely to be socio-economically similar as was evident by the lack of relationships between demographic variables and well-being responses. However, future research could consider comparing employees both inside and outside of conservation, from different economic and employment groups (permanent vs. temporary, time since employment) and after a longer time since the start of employment to further unpack well-being impacts over space and time.

Our single sample taken from a relatively small programme that had been running for 18 months at the time of data collection does not necessarily reflect the sustainability of the well-being impacts recorded. Furthermore, the 8-year gap between data collection and article submission raises questions on the current relevance. A more recent, follow-up interview with participants would yield additional insight and longer-term studies with repeated sampling would add further understanding. Despite this, the results of this study remain directly relevant to numerous current, conservation-based employment programmes in South Africa (e.g. Yes-for-Youth programme and tourism, fence and citizen science monitors), that have concurrent objectives pertaining to enhancing human well-being while supporting biodiversity objectives in a climate of increasing wildlife crime.

We highlight the impact of conservation-based employment on human well-being at an individual (and to a lesser degree, at a family and community) level, and we acknowledge that the impact of ecosystem services (such as employment) on human well-being, influences how people see and value biodiversity. However, building widescale local support for conservation will require significant investments of both time and money, into a diversity of tangible and intangible engagement and benefit-sharing opportunities at community level beyond employment (e.g. awareness and outreach, capacity building, resource access) in order to redress historical injustice and to garner broader societal support.

Conclusion

Our tool measured the impact of conservation-based employment on the material and psychological dimensions of human well-being. Acknowledging the links between workplace well-being and productivity, we demonstrated the important contribution that intellectual well-being and social connections make to overall well-being. Such tools can inform conservation policy and practice towards effective management of staff, with benefits for people and wildlife. Positive impacts from conservation-based employment on human well-being are not only morally appealing, but also enhance employee resilience, local conservation ambassadorship and OCB. These findings are relevant to PAs globally where levels of unemployment are high, resources for conservation are limited, and wildlife crime is becoming an increasing threat to conservation.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

L.K.S., M.-T.U. were the project leaders. L.K.S., M.-T.U., I.B., M.M., T.M. and K.M. contributed to the conceptualisation and design of the study. I.B., M.M., T.M., K.M. and M.-T.U. were involved in acquisition of data. L.K.S., M.-T.U., W.T., A.S., I.B.,M.M. and T.M. contributed to analysis and interpretation of data. L.K.S. drafted the article, I.B., M.M., T.M., W.T., M.-T.U. and A.S. critically reviewed the article for important intellectual content and L.K.S., I.B., M.M., T.M., W.T., M.-T.U. and A.S. approved the final version of the article.

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Data availability

Due to the nature of the qualitative data set, and the clauses contained in the human research ethics certificate under which the data for this article were collected, the primary data for this manuscript are not open for public use.

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