sustainability

MDPI

Review

Harnessing Ecosystem Services from Invasive Alien Grass and Rush Species to Suppress their Aggressive Expansion in South Africa

Luambo Jeffrey Ramarumo

Department of Environmental Science, Faculty of Science, Rhodes University, P.O. Box 94, Makhanda 6140, South Africa; luambo.ramarumo@ru.ac.za or luambo@safrica.com; Tel.: +27-46-603-7011

Abstract: Invasive alien species are regarded as one of the major driving forces of species extinction worldwide. To counteract the invasion's spread and minimize species extinction risk, countries like South Africa are devoted to halting human-induced invasion using various means. The failed efforts to halt the invasion spread have forced South African scientists to start considering social controlling mechanisms, including utilization of these species without propagation as one of the alternatives. It is within this context that this review was aimed at making an inventory of invasive grass species that provide ecosystem services in South Africa. The required data were gathered through rigorous literature surveys and analysis. A total of 19 invasive alien grass and rush species, from 15 genera and two families that are associated with provision of ecosystems services, were documented. The reported species are associated with the provision of nine ecosystem services. The current study argued that although these species are associated with some ecosystem services, they can also threaten the ecological integrity of the ecosystems if not properly managed. Insights about ecosystem services associated with invasive alien grass and rush species are significant in balancing the complex environmental issues and livelihood requirements in rural South Africa.

Keywords: ecosystem services; livelihoods; invasive alien grass and rush species; policy direction; South Africa

check for updates

Citation: Ramarumo, L.J. Harnessing Ecosystem Services from Invasive Alien Grass and Rush Species to Suppress their Aggressive Expansion in South Africa. *Sustainability* **2022**, *14*, 15032. https://doi.org/10.3390/su142215032

Academic Editors: Marc A. Rosen and Irene Petrosillo

Received: 2 September 2022
Accepted: 9 November 2022
Published: 14 November 2022

1. Introduction

Invasive alien species are deemed to be one of the major driving forces in the extinction of native species worldwide [1–6]. Human beings are considered one of the main drivers of the rapid invasion's spread [7–10]; therefore, to counteract this, countries such as South Africa are devoted to halting human-induced invasion [11,12] through various management strategies, such as biological, mechanical, and chemical control [13–16]. Governments throughout the world have invested billions of dollars in efforts towards winning the fight against invasion [17,18]. However, despite these concerted efforts, the literature shows that invasive alien species are still spreading at a rapid pace [19,20]. According to van Wilgen et al. [21], the spread of invasive alien plants in South Africa is increasing, with the appearance of an estimated number of 50 new species since 1980. Scientific knowledge remains the cornerstone in winning the fight against the invasion's spread; however, Sinthumule and Mashau [22] have argued that using scientific knowledge is not the only strategy in obtaining a sustainable society. In addition, the failed efforts to halt the invasion's spread have forced South African scientists to start considering social controlling mechanisms, such as utilization without propagation as one of the various efforts that has potential to suppress the spread of the invasion [17,23–26].

Invasive alien plants are defined as non-native (alien) species that are introduced to ecosystems and tend to spread rapidly, causing damage to the environment, human's socio-economy, and human health [21,27–29]; for example, the introduction of Australian Acacias in South Africa has been associated with serve negative environmental effects such as the displacement of native species, changes to soil nutrients, and water loss [21]. There are regulations in place to manage and control invasive alien plant species in South Africa [21]; however, the spread is dramatically increasing countrywide [30]. In South Africa, invasive alien plants are regulated under the Alien and Invasive Species (A&IS) Regulations of the National Environmental Management: Biodiversity Act (NEMBA; Act 10 of 2004), although various other sector-specific Acts are applicable [31–33].

In South Africa, local people have been using various invasive alien grass species for various purposes since time immemorial [27,34–38]; however, the use of invasive alien grass species for livelihoods has not been well comprehended and factored into the invasion management plans [23,39,40]. Recent scientific evidence shows that invasive alien plant species play a key role in human livelihoods [36–38,41–48]. Consistent with other plants that provide ecosystem services, some invasive alien species provide fundamental cultural value to humankind [49]. Shackleton and Shackleton [23] emphasize the need to appraise and comprehend both the benefits and losses associated with invasive alien species. Amores-Salvadó et al. [50] and Ekblom et al. [51] reiterated that factors influencing the benefits and losses of ecosystem services interlink together, and they should be both evaluated, whereas Heinrich et al. [52] suggested that the conversations about invasive alien plant species management regularly disregard the potential values that local people associate with these species.

The over-exploitation of natural resources is also referred to by natural science researchers as another cause of species extinction risk [53–59]. Having this in mind, in a study done by McGaw et al. [60], it was argued that invasive botanical resources, including invasive grass species, could subsidize or serve as an alternative to highly exploited useful native plants, particularly species with similar phytochemical constituents, in South Africa. Nevertheless, Vitule et al. [61] and Tassin and Kull [62] reported that the utilization of invasive botanical resources is part of today's sociocultural transformation; similarly, Maroyi [63] reported that some invasive botanical resources offer intrinsic benefits. Moreover, McGaw et al. [60] contend that the utilization of invasive plants without propagation could suppress the invasion's spread. In this context, this review not only serves as a fundamental step towards the crafting of better invasive alien species management policies in South Africa, but it could also provide insights to better understand the dynamics pertaining to the transition to a sustainable society.

Nsikani et al. [33] maintain that invasive alien species are an ecosystem service disrupter, whereas Jetz et al. [64] and Milanović et al. [65] argued that invasive alien species are part of biodiversity, and in some cases are of significant socio-economic value to communities. The above studies reaffirm the inherent conflicts not only between the lay-people and mandatory authorities, as articulated in various scientific studies [66–68], but also between scientific scholars themselves. Mugwedi [26] hypothesized that utilization of some invasive botanical resources could suppress the invasion spread. This hypothesis was reaffirmed by Ruwanza and Thondhlana [68], who asset that utilization could limit the expansion of some invasive alien species, particularly those that are of economic benefit to society. It is within this context that the current review aimed at establishing an inventory of invasive alien grass and rush species that are associated with the provision of ecosystem services in South Africa. This study forms part of multidisciplinary efforts to suppress the expansion of invasion in South Africa using various means, including utilization without propagation, as one of the alternatives. Furthermore, the current review is aligned with South Africa's National Development Plan, particularly those aspects related to inclusive economic growth, and the sustainable use of natural resources for human upliftment.

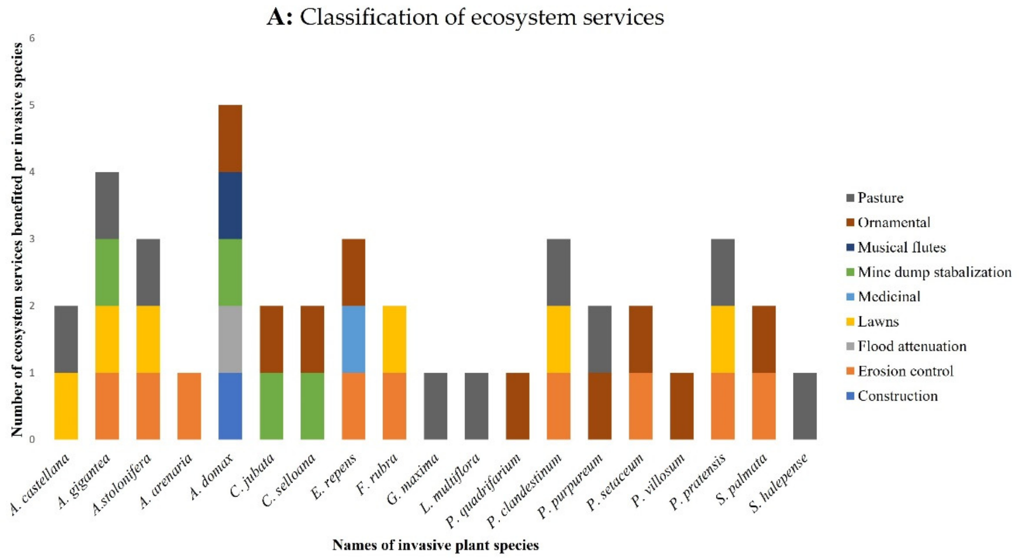
2. Materials and Methods

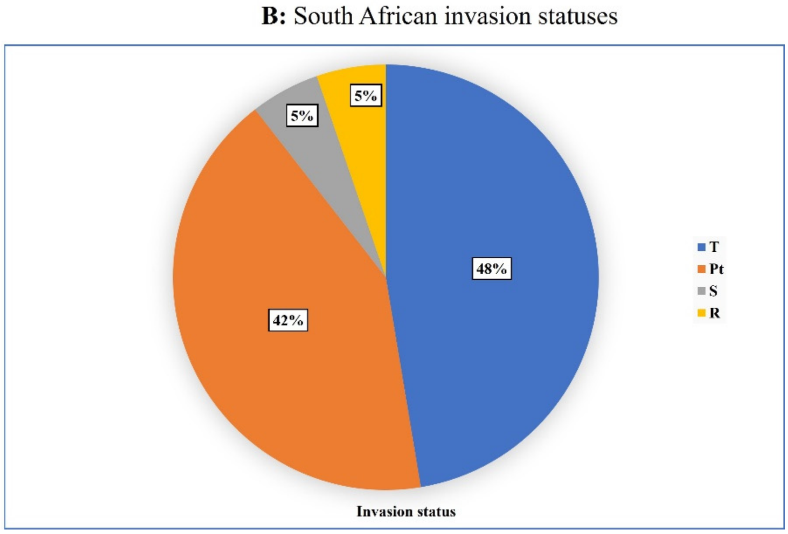
The literature about invasive alien grass species that provide ecosystem services was sourced from electronic databases including Google Scholar, Research-Gate, Springer, Sabinet, Google, Wiley Online Library, Science Direct, Scopus and Web of Science databases, without being restricted by the publication date. The current review, however, only focused on invasive alien grass and rush species that are categorized as per section 70 of the South African's National Environmental Management: Biodiversity Act No. 10 of 2004 (NEMBA) and did not include those that are naturalized and still under review. In other words, the current review excluded naturalized and other grasses that are still to be categorized as invasive aliens in South Africa. All the databases were utilized to increase the possibilities of obtaining relevant comprehensive literature that incorporates the utilization of invasive alien grass and rush species in South Africa. The process enabled the creation of a database of published studies on the provision of ecosystem services by invasive alien grass and rush species; this was generated for the purpose of critically reviewing and analyzing information to be included in the current study. The International Plant Name Index (IPNI) database was also utilized to authentically validate the authority of the reported invasive alien grass and rush species. The following keywords were used during the literature searching: "ecosystem service benefits", "invasive plant species", "invasive grass species" and "problem weeds". The literature-searching keywords were supplemented or used along with other words including: "Invasion management strategy", "socio-cultural benefits", "socio-economic benefits", "socio-ecological benefits", "traditional uses", 'livelihood benefits", "utilization of invasive grass species", "human well-being", "indigenous knowledge systems", "provision of ecosystem services", "art crafting and making", and "medicinal uses". The literature search included the screening of relevant scientific reports, review papers, research papers, books, conference proceedings and theses published in the English language. A total of 433 articles were identified; amongst them, 247 articles were found to be relevant. After the analysis it was, however, discovered that only 23 out of 247 articles incorporated invasive grass and rush species that contain NEMBA Invasion Categories, and these were utilized. Invasive grass and rush plant species were grouped according to the ecosystem services they provide in the table and graph. Some qualitative and gathered literature was grouped according to its similarities, converted to the quantitative format, and then analyzed using percentages and presented in the form of a pie chart graph and table.

3. Results and Discussion

3.1. Taxonomic Nomenclature and Origin of Species

The current review documents 19 invasive alien grass and rush species, from 15 genera and two families, that are linked to the provision of ecosystem services that enhance human livelihood in the Republic of South Africa, as illustrated in Table 1 and Figure 1A. The number of invasive alien grass and rush species recorded in the current study does not necessarily represent all the utilized invasive alien grass and rush species in South Africa; however, those that were previously reported upon in various published scientific literature were included. The documented invasive alien grass and rush species include *Agrostis castellana, Agrostis gigantean, Agrostis stolonifera, Ammophila arenaria, Arundo donax, Cortaderia jubata, Cortaderia selloana, Elymus repens, Festuca rubra, Glyceria maxima, Luzula multiflora, Paspalum quadrifarium, Pennisetum clandestinum, Pennisetum purpureum, Pennisetum setaceum, Pennisetum villosum, Poa pratensis, Sasa palmata* and *Sorghum halepense*. The Poaceae family was found to be the most important botanical family with 94.7% (n = 18) useful invasive grass species, whereas Juncaceae contains only 5.3% (n = 1) rush species. High species richness within the family Poaceae demonstrates species diversity within this family [48,69–73]. The findings of this review are not unique, but serve as confirmation of similar findings in studies done by Schubert et al. [74] and Díaz and Jorquera [75]. The invasive alien grass and rush species presented in the current review originated from various regions and countries, including Asia, South and West Asia, Europe, Tropical Africa, North and West Africa, South America, North America (USA), Brazil, and Argentina (Table 1).





C: legal categories

Invasion Categories (NEMBA/CARA Regulations) in percentage (%)			
1a	1b	2	3
42.1%	31.6%	21.0%	5.3%

Figure 1. Classification of ecosystem services provided by invasive alien grass and rush species, their South African invasion statuses, and legal categories. (Key: Pt, potential transformer; R, ruderal and agrestal; S, special effect weed and T, transformer).

3.2. Ecosystem Service Benefits, Invasion Status and Legal Categories

Table 1 presents an inventory of all the reported invasive alien grass species known to provide ecosystem service benefits in South Africa. Out of the 247 studies that were thought to be relevant for the current study, 93 of them incorporated the provision of ecosystems service benefits by the invasive alien grass for human wellbeing and livelihood. Out of the 93 studies that incorporated the benefits of invasive alien grass species, only 23 studies highlighted their ecosystem services in South Africa, whereas 70 of these studies highlighted the provision of the same ecosystem services elsewhere. The limited number of studies reporting on ecosystem services associated with invasive alien grass species is influenced by the limited quantity of research about the value of invasive grass and rush species to human development in Southern Africa, as emphasized in studies by Jauro et al. [76] and Shayanowako et al. [77]. This point has also been affirmed in studies done by Constant and Taylor [78] and Arabi and Nahman [79].

Table 1. An inventory of useful invasive alien grass and rush species in South Africa (Category 1a, invasive alien grass species that required immediate compulsory control; Category 1b, invasive alien grass species that should be controlled or eradicated where possible; Category 2, invasive alien grass species that must be allowed only in specified areas under controlled conditions; Category 3, invasive alien grass species that must be controlled within riparian zones, and therefore, there should be no further cultivation allowed; Pt, potential transformer—plant species that invade natural or semi-natural habitats and have the potential to dominate vegetation layers; R, ruderal and agrestal—plant species that are normally weeds in waste and cultivated areas; S, special effect weed—plants that can slowly degrade the biodiversity value without dominating; T, transformer— plants that can easily alter the integrity and functionality of ecosystems).

Family Name	Botanical Name	Common Name	NEMBA/CARA Categories	Invasion Status	Provision of Ecosystem Service	Geographic Origin	Citations (A = Local Uses Records; B = Use Records Elsewhere)
Poaceae	*Agrostis castellana* Boiss. & Reut.	Bent grass	1a	Pt	Used as lawns and pasture	Europe, North Africa, and Asia	A: [38,43]; B: [44,80]
Poaceae	*Agrostis gigantea* Roth	Black bent grass, Redtop	1a	T	Used as pasture, lawns, for mine dump stabilization, and erosion control	Europe and Asia	A: [38,48,81–83]; B: [44,84–88]
Poaceae	*Agrostis stolonifera* L.	Creeping bent grass	1a	T	Used as pasture, lawns, and erosion control	Europe and Asia	A: [34,36,38,48,82]; B: [44,89,90]
Poaceae	*Ammophila arenaria* (L.) Link	Marram grass	2	S	Used for erosion control	Europe, North Africa, and Western Asia.	A: [34,38,91–93]; B: [94–97]
Poaceae	*Arundo donax* L.	Giant reed	1b	T	Used for ornamental purposes, construction, flood attenuation, mine damp stabilization and musical flutes	Asia (Middle East)	A: [27,34,36–38,93,98]; B: [41,42,44,99–102]
Poaceae	*Cortaderia jubata* (Lemoine) Stapf	Pampas grass, Purple pampas	1b	T	Used for ornamental purposes, mine dump stabilization, medicine	South America	A: [34,36,38,93,103]; B: [44,104–106]

Table 1. *Cont.*

Family Name	Botanical Name	Common Name	NEMBA/CARA Categories	Invasion Status	Provision of Ecosystem Service	Geographic Origin	Citations (A = Local Uses Records; B = Use Records Elsewhere)
Poaceae	*Cortaderia selloana* (Schult. & Schult.f.) Asch. & Graebn.	Silwergras	1b	Pt	Used for ornamental, and mine dump stabilization	South America	A: [34,36,38,93]; B: [102,105–107]
Poaceae	*Elymus repens* (L.) Gould	Twitch, Quick Grass, Quitch	1a	Pt	Used for ornaments, erosion control and medicine	Europe, North Africa, and Asia	A: [34,36,37]; B: [44,108–110]
Poaceae	*Festuca rubra* L.	Red fescue, Creeping red fescue	1a	Pt	Used as lawns and for erosion control	Europe, North Africa, Asia, and North America	A: [34,38,48]; B: [44,111–113]
Poaceae	*Glyceria maxima* (Hartm.) Holmb.	Reed meadow grass, Reed sweet grass	2	T	Used as pasture	Europe, and Asia	A: [34,36,38,114–116]; B: [90,117–122]
Juncaceae	*Luzula multiflora* (Ehrh.) Lej.	Woodrush	1a	Pt	Used as pasture	Europe, North Africa, Asia, and North America	A: [38,123]; B: [124–127]
Poaceae	*Paspalum quadrifarium* Lam.	Tussock paspalum	1a	Pt	Used for ornaments	Brazil and Argentina	A: [34,36,38,128]; B: [128–132]
Poaceae	*Pennisetum clandestinum* Hochst. ex Chiov.	Kikuyu grass	1b	T	Used as pasture, lawns, and for erosion control	Tropical Africa	A: [34,38,133]; B: [44,134–138]
Poaceae	*Pennisetum purpureum* Schumach.	Elephant or Napier grass	2	Pt	Used as pasture and for ornamental purposes	Tropical Africa	A: [34,38]; B: [44,139–144]
Poaceae	*Pennisetum setaceum* (Forssk.) Chiov.	Fountain grass	1b	T	Used for ornamental and erosion control purposes	North and North-East Africa, and South-West Asia	A: [34,36,38]; B: [145–150]
Poaceae	*Pennisetum villosum* R. Br. ex Fresen.	Feathertop	1b	R	Used for ornaments	Ethiopia	A: [34,36,38]; B: [151–157]

Table 1. *Cont.*

Family Name	Botanical Name	Common Name	NEMBA/CARA Categories	Invasion Status	Provision of Ecosystem Service	Geographic Origin	Citations (A = Local Uses Records; B = Use Records Elsewhere)
Poaceae	*Poa pratensis* L.	Kentucky bluegrass	1a	T	Used as pasture, erosion control and as lawns	Europe, North Africa, Asia, North America	A: [34,36,38]; B: [44]
Poaceae	*Sasa palmata* (hort. ex Burb.) E.G. Camus	Dwarf yellow-striped bamboo	3	Pt	Used for ornamental and erosion control purposes	East Asia	A: [38]; B: [158–161]
Poaceae	*Sorghum halepense* (L.) Pers.	Johnson grass, Aleppo grass	2	T	Used as pasture	Mediterranean	A: [34,36,38,162,163]; B: [44]

Figure 1 classifies the ecosystem services that individuals of the invasive alien grass and rush species provide to humankind, their invasion statuses and their legal standing or categories in South Africa. The current review reveals that the reported invasive alien grass species are associated with the provision of nine ecosystem service benefits in South Africa. These ecosystem services range from being utilized as pasture, ornaments, musical flutes, mine dump stabilizers, medicines, lawns, flood attenuators, erosion controllers and construction materials (Figure 1A). The results of the current review reveal that some individual species contribute more than one ecosystem service. Therefore, *A. donax* (n = 5) was the most utilized invasive alien rush in South Africa, as measured by the number of ecosystem service benefits that it provides, followed by *A. gigantea* (n = 4) (Figure 1A). The provision of diverse ecosystem services by *A. donax* resembles its socio-economic and socio-cultural value to many communities in South Africa and worldwide [27,37,164]; however, its widespread invasion confirms that this species does disrupt the functionality of ecosystems through habitat transformation [165,166]. The legal standing of *A. donax* implies that this species should be controlled through invasive alien species control programs [38,98]. As like many invasive plant species that cause conflicts [66–68], the results of this review have clearly revealed that *A. donax* is also a conflict-making invasive alien grass. This classification is the result of analyzing its contributions in terms of the number of ecosystems services that it provides, its invasion status and its legal standing in South Africa. The four invasive alien plant species contributing equal ecosystem services included *A. stolonifera* (n = 3), *E. repens* (n = 3), *P. clandestinum* (n = 3) and *P. pratensis* (n = 3). Seven invasive alien species were reported to be contributing two ecosystems services each; these are *A. castellana* (n = 2), *C. jubata* (n = 2), *C. selloana* (n = 2), *F. rubra* (n = 2), *P. purpureum* (n = 2), *P. setaceum* (n = 2) and *S. palmata* (n = 2). The invasive species contributing the fewest ecosystem services are A. *arenaria* (n = 1), *G. maxima* (n = 1), *L. multiflora* (n = 1) and *S. halepense* (n = 2). Many of the recorded invasive alien grass and rush species differ morphologically, although the ecosystem services that they provide are more or less the same. This is not unusual, since the study performed by Mbambala et al. [103] has reaffirmed that various invasive alien plant species could be utilized for similar purpose. The invasion statuses of almost all of the reported invasive alien grass and rush species were found to be transformer (T) (48%) or potential transformer (Pt) (42%), while a small portion (10%) were special effect weeds (S) (5%) and ruderal and agrestal (R) (5%) (Figure 1B). The invasion statuses of these invasive alien grasses and rush prove that, although these species are associated with some livelihood benefits, they can also threaten the functionality of the ecosystems if not properly managed. The invasive status of the plant species demonstrates its aggressiveness towards native species, and the habitats where invasive alien species are likely to invade [38]. The results of the current review highlight that more than 42% of all the reported invasive alien grass and rush species fall under Category 1a of the Alien and Invasive Species (A&IS) Regulations of the National Environmental Management: Biodiversity Act (NEMBA Act 10 of 2004), followed by Category 1b (31.6%), then Category 2 (21.0%) and lastly by Category 3 (5.3%) (Figure 1C). According to Cronin et al. [167], Moshobane et al. [168] and Moshobane et al. [169], Category 1a includes species that require immediate and compulsory eradication, whereas Category 1b species are considered widespread, and must be controlled and eradicated wherever possible.

Arundo donax is a well-known useful invasive alien grass species, as indicated by the number of studies (n = 7) that cited it uses countrywide and elsewhere (Figure 2). The least useful of all known invasive grass species, as measured by the number of citations in South Africa, is *S. palmata* (n = 1). This is because *A. donax* has a wide distribution range countrywide and worldwide [35,170,171]. Furthermore, although limited studies have cited the uses of some species including *P. purpureum* and *P. villosum* in South Africa, more studies (n = 7) have cited their uses elsewhere. The low number of citation records for the invasive alien grass species *P. villosum* in South Africa corresponds with its use-value, as illustrated on Table 1 and Figure 1A. According to Atyosi et al. [27], the use-value is considered one of the pivotal components in determining the popularity of invasive alien plant species.

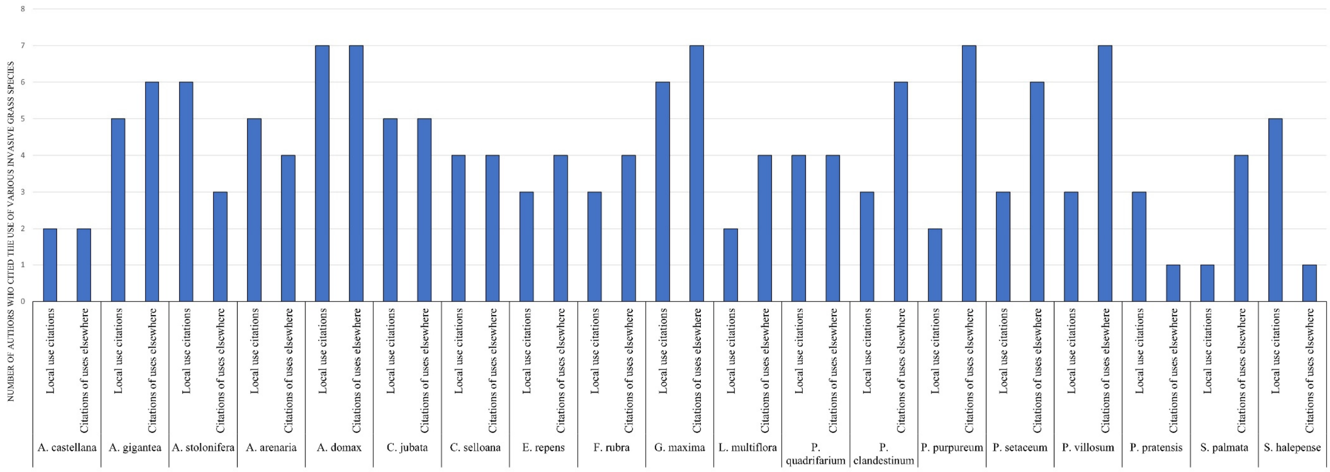


Figure 2. Comparison of studies that have reported the use of invasive alien grass species in South Africa and elsewhere.

4. Conclusions

The current review is a comprehensive summary of the compiled information associated with the provision of ecosystem services by invasive alien grass and rush species in South Africa. The derived insights about ecosystem services associated with invasive alien grasses and rush are significant, not only in seeking to balance the complex environmental issues and livelihood needs in rural South Africa, but also in understanding the dynamics of the transition towards a sustainable society. The current study contributes to the multi-disciplinary effort to suppress the expansion of invasive alien species in South Africa, through various means, including utilization. Although studies have proven that some invasive alien grass and rush species do provide various ecosystem services, including being used as pasture, ornaments, mine dump stabilizers, medicines, lawns, flood attenuators, erosion controllers and construction materials in South Africa, more research studies examining the effectiveness of utilization without propagation as an alternative method for invasion management are required. It is worth noting that the invasion statuses of the invasive alien grass and rush species reported as useful prove that these species can also threaten the ecological integrity of ecosystems, if not properly managed. Documenting detailed information about how these species provide ecosystem services in South Africa is a substantial step towards crafting appropriate management plans and informed policy directions, which would help to maintain a balance between livelihoods and environmental well-being. It is within this context that the current study supports the scientifically accepted notion that the value of invasive alien species is interlinked with their uses. Furthermore, the hypothesis that the utilization of invasive plant species could suppress their spread should not be ignored. This means there is still room for further investigatory studies that focus on utilization without propagation as an alternative to the suppression of the invasion. This study argues that improved coordination between local communities that utilize invasive alien grass and rush species and mandated authorities, on issues pertaining to invasion management, policy directions and science, could help resolve and calm the conflicts highlighted in some studies. A study on the indigenous knowledge associated with invasive alien grass species could provide baseline information required for incorporating stakeholder values that will inform deliberative management plans and policy directions in South African biosphere reserves.

Funding: This research was funded by the Directorate of Research and the Department of Environmental Science at Rhodes University, South Africa.

Data Availability Statement: Not applicable.

Acknowledgments: The author would like to thank Sheunesu Ruwanza and Gladman Thondhlana for reviewing the manuscript draft.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Cassini, M.H. A review of the critics of invasion biology. *Biol. Rev.* **2020**, *95*, 1467–1478. [CrossRef]
2. Sayol, F.; Cooke, R.S.; Pigot, A.L.; Blackburn, T.M.; Tobias, J.A.; Steinbauer, M.J.; Antonelli, A.; Faurby, S. Loss of functional diversity through anthropogenic extinctions of island birds is not offset by biotic invasions. *Sci. Adv.* **2021**, *7*, eabj5790. [CrossRef]
3. Pouteau, R.; Brunel, C.; Dawson, W.; Essl, F.; Kreft, H.; Lenzner, B.; Meyer, C.; Pergl, J.; Pyšek, P.; Seebens, H.; et al. Environmental and socioeconomic correlates of extinction risk in endemic species. *Div. Distrib.* **2022**, *28*, 53–64. [CrossRef]
4. Latombe, G.; Catford, J.A.; Essl, F.; Lenzner, B.; Richardson, D.M.; Wilson, J.R.; McGeoch, M.A. GIRAE: A generalised approach for linking the total impact of invasion to species' range, abundance and per-unit effects. *Biol. Invasions* **2022**, *24*, 3147–3167. Available online: https://link.springer.com/content/pdf/10.1007/s10530-022-02836-0.pdf (accessed on 3 August 2022). [CrossRef]
5. Mantintsilili, A.; Shivambu, N.; Shivambu, T.C.; Downs, C.T. Online and pet stores as sources of trade for reptiles in South Africa. *J. Nat. Conserv.* **2022**, *67*, 126154. [CrossRef]
6. Chakona, A.; Jordaan, M.S.; Raimondo, D.C.; Bills, R.I.; Skelton, P.H.; van Der Colff, D. Diversity, distribution and extinction risk of native freshwater fishes of South Africa. *J. Fish Biol.* **2022**, *100*, 1044–1061. [CrossRef]
7. Sagoff, M. Invasive species denialism: A reply to Ricciardi and Ryan. *Biol. Invasions* **2018**, *20*, 2723–2729. [CrossRef]
8. Howard, P.L. Human adaptation to invasive species: A conceptual framework based on a case study metasynthesis. *Ambio* **2019**, *48*, 1401–1430. [CrossRef]
9. Van Riper, C.J.; Browning, M.H.; Becker, D.; Stewart, W.; Suski, C.D.; Browning, L.; Golebie, E. Human-nature relationships and normative beliefs influence behaviors that reduce the spread of aquatic invasive species. *Environ. Manag.* **2019**, *63*, 69–79. [CrossRef]
10. Ravhuhali, K.E.; Mudau, H.S.; Moyo, B.; Hawu, O.; Msiza, N.H. Prosopis Species—An Invasive Species and a Potential Source of Browse for Livestock in Semi-Arid Areas of South Africa. *Sustainability* **2021**, *13*, 7369. [CrossRef]
11. Shrestha, B.B.; Shrestha, U.B.; Sharma, K.P.; Thapa-Parajuli, R.B.; Devkota, A.; Siwakoti, M. Community perception and prioritization of invasive alien plants in Chitwan-Annapurna Landscape, Nepal. *J. Environ. Manag.* **2019**, *229*, 38–47. [CrossRef] [PubMed]
12. Graham, S.; Metcalf, A.L.; Gill, N.; Niemiec, R.; Moreno, C.; Bach, T.; Ikutegbe, V.; Hallstrom, L.; Ma, Z.; Lubeck, A. Opportunities for better use of collective action theory in research and governance for invasive species management. *Conserv. Biol.* **2019**, *33*, 275–287. [CrossRef] [PubMed]
13. Reitz, S.R.; Gao, Y.; Kirk, W.D.; Hoddle, M.S.; Leiss, K.A.; Funderburk, J.E. Invasion biology, ecology, and management of western flower thrips. *Ann. Rev. Entomol.* **2020**, *65*, 17–37. [CrossRef] [PubMed]
14. Holmes, P.M.; Esler, K.J.; Gaertner, M.; Geerts, S.; Hall, S.A.; Nsikani, M.M.; Richardson, D.M.; Ruwanza, S. Biological invasions and ecological restoration in South Africa. *Biol. Invasions S. Afr.* **2020**, *14*, 665–700.
15. Jubase, N.; Shackleton, R.T.; Measey, J. Motivations and contributions of volunteer groups in the management of invasive alien plants in South Africa's Western Cape province. *Bothalia-Afr. Bio. Conserv.* **2021**, *51*, 1–13. [CrossRef]
16. Yang, X.; Wyckhuys, K.A.; Jia, X.; Nie, F.; Wu, K. Fall armyworm invasion heightens pesticide expenditure among Chinese smallholder farmers. *J. Environ. Manag.* **2021**, *282*, 111949. [CrossRef]
17. Abrahams, B.; Sitas, N.; Esler, K.J. Exploring the dynamics of research collaborations by mapping social networks in invasion science. *J. Environ. Manag.* **2019**, *229*, 27–37. [CrossRef]
18. Moran, V.C.; Zachariades, C.; Hoffmann, J.H. Implementing a system in South Africa for categorizing the outcomes of weed biological control. *Biol. Control* **2021**, *153*, 104431. [CrossRef]
19. Lamsal, P.; Kumar, L.; Aryal, A.; Atreya, K. Invasive alien plant species dynamics in the Himalayan region under climate change. *Ambio* **2018**, *47*, 697–710. [CrossRef]
20. Van Wilgen, B.W.; Raghu, S.; Sheppard, A.W.; Schaffner, U. Quantifying the social and economic benefits of the biological control of invasive alien plants in natural ecosystems. *Curr. Opin. Insect Sci.* **2020**, *38*, 1–5. [CrossRef]
21. Van Wilgen, B.W.; Measey, J.; Richardson, D.M.; Wilson, J.R.; Zengeya, T.A. Biological Invasions in South Africa: An Overview. In *Biological Invasions in South Africa*; Springer: Cham, Switzerland, 2020; Volume 14, p. 975.
22. Sinthumule, N.I.; Mashau, M.L. Traditional ecological knowledge and practices for forest conservation in Thathe Vondo in Limpopo Province, South Africa. *Global Ecol. Conserv.* **2020**, *22*, e00910. [CrossRef]
23. Shackleton, S.E.; Shackleton, R.T. Local knowledge regarding ecosystem services and disservices from invasive alien plants in the arid Kalahari, South Africa. *J. Arid Environ.* **2018**, *159*, 22–33. [CrossRef]
24. Potgieter, L.J.; Gaertner, M.; O'Farrell, P.J.; Richardson, D.M. Perceptions of impact: Invasive alien plants in the urban environment. *J. Environ. Manag.* **2019**, *229*, 76–87. [CrossRef] [PubMed]
25. Shackleton, R.T.; Larson, B.M.; Novoa, A.; Richardson, D.M.; Kull, C.A. The human and social dimensions of invasion science and management. *J. Environ. Manag.* **2019**, *229*, 1–9. [CrossRef] [PubMed]

26. Mugwedi, L. Harnessing opportunities provided by the invasive *Chromolaena odorata* to keep it under control. *Sustainability* **2020**, *12*, 6505. [CrossRef]
27. Atyosi, Z.; Ramarumo, L.J.; Maroyi, A. Alien plants in the Eastern Cape province in South Africa: Perceptions of their contributions to livelihoods of local communities. *Sustainability* **2019**, *11*, 5043. [CrossRef]
28. Kariyawasam, C.S.; Kumar, L.; Ratnayake, S.S. Invasive plant species establishment and range dynamics in Sri Lanka under climate change. *Entropy* **2019**, *21*, 571. [CrossRef]
29. Weidlich, E.W.; Flórido, F.G.; Sorrini, T.B.; Brancalion, P.H. Controlling invasive plant species in ecological restoration: A global review. *J. Appl. Ecol.* **2020**, *57*, 1806–1817. [CrossRef]
30. Bennett, B.M.; van Sittert, L. Historicising perceptions and the national management framework for invasive alien plants in South Africa. *J. Environ. Manag.* **2019**, *229*, 174–181. [CrossRef]
31. Dzerefos, C.M.; Witkowski, E.T.; Kremer-Köhne, S. Aiming for the biodiversity target with the social welfare arrow: Medicinal and other useful plants from a Critically Endangered grassland ecosystem in Limpopo Province, South Africa. *Int. J. Sustain. Dev. World Ecol.* **2017**, *24*, 52–64. [CrossRef]
32. Kraaij, T.; Baard, J.A. Use of a rapid roadside survey to detect potentially invasive plant species along the Garden Route, South Africa. *Koedoe* **2019**, *61*, 1–10.
33. Nsikani, M.M.; Geerts, S.; Ruwanza, S.; Richardson, D.M. Secondary invasion and weedy native species dominance after clearing invasive alien plants in South Africa: Status quo and prognosis. *S. Afr. J. Bot.* **2020**, *132*, 338–345. [CrossRef]
34. Visser, V.; Maitre, D.; Wilson, J.R.; Nänni, I.; Canavan, K.; Canavan, S.; Fish, L.; Mashau, C.; O'Connor, T.G.; Ivey, P.; et al. Grasses as invasive plants in South Africa revisited: Patterns, pathways and management. *Bothalia-Afr. Bio. Conserv.* **2017**, *47*, 1–29. [CrossRef]
35. Canavan, K.; Paterson, I.D.; Hill, M.P.; Dudley, T.L. Testing the Enemy Release Hypothesis on tall-statured grasses in South Africa, using *Arundo donax*, *Phragmites australis*, and *Phragmites mauritianus* as models. *Bulletin Entomol. Res.* **2019**, *109*, 287–299. [CrossRef] [PubMed]
36. Nkuna, K.V.; Visser, V.; Wilson, J.R.U.; Kumschick, S. Global environmental and socio-economic impacts of selected alien grasses as a basis for ranking threats to South Africa. *NeoBiota* **2018**, *41*, 19–65. [CrossRef]
37. Magwede, K.; van Wyk, B.E.; van Wyk, A.E. An inventory of Vhavenda useful plants. *S. Afr. J. Bot.* **2019**, *122*, 57–89. [CrossRef]
38. Henderson, L. *Invasive Alien Plants in South Africa*; Novus Print: Cape Town, South Africa, 2020; pp. 1–384.
39. Novoa, A.; Shackleton, R.; Canavan, S.; Cybele, C.; Davies, S.J.; Dehnen-Schmutz, K.; Fried, J.; Gaertner, M.; Geerts, S.; Griffiths, C.L.; et al. A framework for engaging stakeholders on the management of alien species. *J. Environ. Manag.* **2018**, *205*, 286–297. [CrossRef]
40. Shackleton, R.T.; Shackleton, C.M.; Kull, C.A. The role of invasive alien species in shaping local livelihoods and human well-being: A review. *J. Environ. Manag.* **2019**, *229*, 145–157. [CrossRef]
41. Al-Snafi, A.E. The constituents and biological effects of *Arundo donax*—A review. *Int. J. Phytopharm. Res.* **2015**, *6*, 34–40.
42. Webster, R.J.; Driever, S.M.; Kromdijk, J.; McGrath, J.; Leakey, A.D.; Siebke, K.; Demetriades-Shah, T.; Bonnage, S.; Peloe, T.; Lawson, T.; et al. High C3 photosynthetic capacity and high intrinsic water use efficiency underlies the high productivity of the bioenergy grass *Arundo donax*. *Sci. Rep.* **2016**, *6*, 20694. [CrossRef] [PubMed]
43. Dilley, B.J.; Schramm, M.; Ryan, P.G. Modest increases in densities of burrow-nesting petrels following the removal of cats (*Felis catus*) from Marion Island. *Polar Biol.* **2017**, *40*, 625–637. [CrossRef]
44. Rabêlo, F.H.; Borgo, L.; Lavres, J. The Use of Forage Grasses for the Phytoremediation of Heavy Metals: Plant Tolerance Mechanisms, Classifications, and New Prospects. In *Phytoremediation: Methods, Management and Assessment*; Nova Science Publishers: New York, NY, USA, 2018; pp. 59–103.
45. Aarts, N.; Drenthen, M. Socio-Ecological Interactions and Sustainable Development—Introduction to a Special Issue. *Sustainability* **2020**, *12*, 6967. [CrossRef]
46. Reynolds, C.; Venter, N.; Cowie, B.W.; Marlin, D.; Mayonde, S.; Tocco, C.; Byrne, M.J. Mapping the socio-ecological impacts of invasive plants in South Africa: Are poorer households with high ecosystem service use most at risk? *Eco. Serv.* **2020**, *42*, 101075. [CrossRef]
47. Sintayehu, D.W.; Dalle, G.; Bobasa, A.F. Impacts of climate change on current and future invasion of Prosopis juliflora in Ethiopia: Environmental and socio-economic implications. *Heliyon* **2020**, *6*, e04596. [CrossRef] [PubMed]
48. Sylvester, S.P.; Soreng, R.J.; Sylvester, M.D.; Mapaura, A.; Clark, V.R. New records of alien and potentially invasive grass (Poaceae) species for southern Africa. *Bothalia-Afr. Bio. Conserv.* **2021**, *51*, 1–9. [CrossRef]
49. Dos Santos, L.L.; do Nascimento, A.L.B.; Vieira, F.J.; da Silva, V.A.; Voeks, R.; Albuquerque, U.P. The cultural value of invasive species: A case study from semi–arid northeastern Brazil. *Econ. Bot.* **2014**, *68*, 283–300. [CrossRef]
50. Amores-Salvadó, J.; Martin-de Castro, G.; Navas-López, J.E. The importance of the complementarity between environmental management systems and environmental innovation capabilities: A firm level approach to environmental and business performance benefits. *Tech. Forecasting Soc. Change* **2015**, *96*, 288–297. [CrossRef]
51. Ekblom, A.; Shoemaker, A.; Gillson, L.; Lane, P.; Lindholm, K.J. Conservation through biocultural heritage—Examples from sub-Saharan Africa. *Land* **2019**, *8*, 5. [CrossRef]
52. Heinrich, M.; Kufer, J.; Leonti, M.; Pardo-de-Santayana, M. Ethnobotany and ethnopharmacology—Interdisciplinary links with the historical sciences. *J. Ethnopharmacol.* **2006**, *107*, 157–160. [CrossRef]

53. Ogunkunle, T.J.; Adewumi, A.; Adepoju, A.O. Biodiversity: Overexploited but underutilized natural resource for human existence and economic development. *Environ. Eco. Sci.* **2019**, *3*, 26–34.
54. Mustafa, M.O. Implications of environmental and natural resources education among rural stakeholders of forestry and wildlife administration: A review. *Nigeria Agric. J.* **2019**, *50*, 135–138.
55. Verma, A.K. Sustainable development and environmental ethics. *Int. J. Environ. Sci.* **2019**, *10*, 1–5.
56. Volenzo, T.; Odiyo, J. Integrating endemic medicinal plants into the global value chains: The ecological degradation challenges and opportunities. *Heliyon* **2020**, *6*, e04970. [CrossRef]
57. Maja, M.M.; Ayano, S.F. The impact of population growth on natural resources and farmers' capacity to adapt to climate change in low-income countries. *Earth Systems Environ.* **2021**, *5*, 271–283. [CrossRef]
58. Vuorinen, K.E.; Oksanen, T.; Oksanen, L.; Vuorisalo, T.; Speed, J.D. Why don't all species overexploit? *Oikos* **2021**, *130*, 1835–1848. [CrossRef]
59. Rull, V. Biodiversity crisis or sixth mass extinction? Does the current anthropogenic biodiversity crisis really qualify as a mass extinction? *EMBO Rep.* **2022**, *23*, e54193. [CrossRef]
60. McGaw, L.J.; Omokhua-Uyi, A.G.; Finnie, J.F.; van Staden, J. Invasive alien plants and weeds in South Africa: A review of their applications in traditional medicine and potential pharmaceutical properties. *J. Ethnopharmacol.* **2022**, *283*, 114564. [CrossRef]
61. Vitule, J.R.S.; Freire, C.A.; Vazquez, D.P.; Nuñez, M.A.; Simberloffs, D. Revisiting the potential conservation value of non-native species. *Conserv. Biol.* **2012**, *26*, 1153–1155. [CrossRef]
62. Tassin, J.; Kull, C.A. Facing the broader dimensions of biological invasions. *Land Use Policy* **2015**, *42*, 165–169. [CrossRef]
63. Maroyi, A. Traditional uses of wild and tended plants in maintaining ecosystem services in agricultural landscapes of the Eastern Cape Province in South Africa. *J. Ethnobiol. Ethnomed.* **2022**, *18*, 17. [CrossRef] [PubMed]
64. Jetz, W.; McGeoch, M.A.; Guralnick, R.; Ferrier, S.; Beck, J.; Costello, M.J.; Fernandez, M.; Geller, G.N.; Keil, P.; Merow, C.; et al. Essential biodiversity variables for mapping and monitoring species populations. *Nat. Ecol. Evol.* **2019**, *3*, 539–551. [CrossRef] [PubMed]
65. Milanović, M.; Knapp, S.; Pyšek, P.; Kühn, I. Linking traits of invasive plants with ecosystem services and disservices. *Eco. Serv.* **2020**, *42*, 101072. [CrossRef]
66. Crowley, S.L.; Hinchliffe, S.; McDonald, R.A. Conflict in invasive species management. *Front. Ecol. Environ.* **2017**, *15*, 133–141. [CrossRef]
67. Sardeshpande, M.; Shackleton, C. Urban foraging: Land management policy, perspectives, and potential. *PLoS ONE* **2020**, *15*, e0230693. [CrossRef]
68. Ruwanza, S.; Thondhlana, G. People's perceptions and uses of invasive plant *Psidium guajava* in Vhembe Biosphere Reserve, Limpopo Province of South Africa. *Eco. People* **2022**, *18*, 64–75. [CrossRef]
69. Trytsman, M.; Müller, F.L.; van Wyk, A.E. Diversity of grasses (Poaceae) in southern Africa, with emphasis on the conservation of pasture genetic resources. *Gen. Res. Crop Evol.* **2020**, *67*, 875–894. [CrossRef]
70. Muller, M.; Siebert, S.J.; Ntloko, B.R.; Siebert, F. A floristic assessment of grassland diversity loss in South Africa. *Bothalia-Afr. Bio. Conserv.* **2021**, *51*, 1–9. [CrossRef]
71. Trytsman, M.; Muller, F.L.; Morris, C.D.; van Wyk, A.E. Biogeographical patterns of grasses (Poaceae) indigenous to South Africa, Lesotho and Eswatini. *Afr. J. Range Forage Sci.* **2021**, *38*, S73–S89. [CrossRef]
72. Mashau, A.C.; Hempson, G.P.; Lehmann, C.E.; Vorontsova, M.S.; Visser, V.; Archibald, S. Plant height and lifespan predict range size in southern African grasses. *J. Biogeogr.* **2012**, *48*, 3047–3059. [CrossRef]
73. Gallaher, T.J.; Peterson, P.M.; Soreng, R.J.; Zuloaga, F.O.; Li, D.Z.; Clark, L.G.; Tyrrell, C.D.; Welker, C.A.; Kellogg, E.A.; Teisher, J.K. Grasses through space and time: An overview of the biogeographical and macroevolutionary history of Poaceae. *J. System. Evol.* **2022**, *60*, 522–569. Available online: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jse.12857 (accessed on 20 June 2022). [CrossRef]
74. Schubert, M.; Humphreys, A.M.; Lindberg, C.L.; Preston, J.C.; Fjellheim, S. To coldly go where no grass has gone before: A multidisciplinary review of cold adaptation in Poaceae. *Ann. Plant Rev. Online* **2020**, *3*, 523–562.
75. Díaz, E.D.; Jorquera, P.S. Naturalized and introduced plants of the Magallanes Region Associated with Agricultural and forestry activity and Protected Areas: Life attributes, Distribution, and Invasion Status. *Chloris Chil.* **2021**, *24*, 21–47.
76. Jauro, T.I.; Tesfamichael, S.G.; Rampedi, I.T. Tracking conservation effectiveness in the Vhembe Biosphere Reserve in South Africa using Landsat imagery. *Environ. Monit. Assess.* **2020**, *192*, 469. [CrossRef] [PubMed]
77. Shayanowako, A.I.T.; Morrissey, O.; Tanzi, A.; Muchuweti, M.; Mendiondo, G.M.; Mayes, S.; Modi, A.T.; Mabhaudhi, T. African leafy vegetables for improved human nutrition and food system resilience in Southern Africa: A scoping review. *Sustainability* **2021**, *13*, 2896. [CrossRef]
78. Constant, N.L.; Taylor, P.J. Restoring the forest revives our culture: Ecosystem services and values for ecological restoration across the rural-urban nexus in South Africa. *Forest Policy Econ.* **2020**, *118*, 102222. [CrossRef]
79. Arabi, S.; Nahman, A. Impacts of marine plastic on ecosystem services and economy: State of South African research. *S. Afr. J. Sci.* **2020**, *116*, 1–7. [CrossRef]
80. Radonjic, D.; Djordjevic, N.; Markovic, B.; Markovic, M.; Stesevic, D.; Dajic-Stevanovic, Z. Effect of phenological phase of dry grazing pasture on fatty acid composition of cows' milk. *Chil. J. Agri. Res.* **2019**, *79*, 278–287. [CrossRef]

81. Bergstrom, D.M.; Smith, V.R. Alien vascular flora of Marion and Prince Edward Islands: New species, present distribution and status. *Antarct. Sci.* **1990**, *2*, 301–308. [CrossRef]
82. Gremmen, N.J.; Smith, V.R. New records of alien vascular plants from Marion and Prince Edward Islands, sub-Antarctic. *Polar Biol.* **1999**, *21*, 401–409. [CrossRef]
83. Van den Berg, J.; Rebe, M.; de Bruyn, J.; van Hamburg, H. Developing habitat management systems for gramineous stemborers in South Africa. *Int. J. Tropical Insect Sci.* **2001**, *21*, 381–388. [CrossRef]
84. Błońska, A.; Kompała-Bąba, A.; Sierka, E.; Bierza, W.; Magurno, F.; Besenyei, L.; Ryś, K.; Woźniak, G. Diversity of Vegetation Dominated by Selected Grass Species on Coal-Mine Spoil Heaps in Terms of Reclamation of Post-Industrial Areas. *J. Ecol. Engine.* **2019**, *20*, 209–217. [CrossRef]
85. Tasset, E.; Boulanger, T.; Diquélou, S.; Laîné, P.; Lemauviel-Lavenant, S. Plant trait to fodder quality relationships at both species and community levels in wet grasslands. *Ecol. Indic.* **2019**, *97*, 389–397. [CrossRef]
86. Burges, A.; Oustriere, N.; Galende, M.; Marchand, L.; Bes, C.M.; Paidjan, E.; Puschenreiter, M.; Becerril, J.M.; Mench, M. Phytomanagement with grassy species, compost and dolomitic limestone rehabilitates a meadow at a wood preservation site. *Ecol. Engine.* **2021**, *160*, 106132. [CrossRef]
87. Vickery, J. Ecological Services of Weeds. 2020. Available online: https://www.researchgate.net/publication/345820849_Ecological_Services_of_Weeds (accessed on 2 September 2022).
88. Dostatny, D.F.; Żurek, G.; Kapler, A.; Podyma, W. The *Ex-Situ* Conservation and Potential Usage of Crop Wild Relatives in Poland on the Example of Grasses. *Agronomy* **2021**, *11*, 94. [CrossRef]
89. Biró, M.; Molnár, Z.; Öllerer, K.; Lengyel, A.; Ulicsni, V.; Szabados, K.; Kiš, A.; Perić, R.; Demeter, L.; Babai, D. Conservation and herding co-benefit from traditional extensive wetland grazing. *Agric. Ecosyst. Environ.* **2020**, *300*, 106983. [CrossRef]
90. Liu, H.; Kong, F.; Yin, H.; Middel, A.; Zheng, X.; Huang, J.; Xu, H.; Wang, D.; Wen, Z. Impacts of green roofs on water, temperature, and air quality: A bibliometric review. *Building Environ.* **2021**, *196*, 107794. [CrossRef]
91. Hertling, U.M.; Lubke, R.A. Use of *Ammophila arenaria* for dune stabilization in South Africa and its current distribution—Perceptions and problems. *Environ. Manag.* **1999**, *24*, 467–482. [CrossRef]
92. Hertling, U.M.; Lubke, R.A. Assessing the potential for biological invasion—The case of *Ammophila arenaria* in South Africa. *S. Afr. J. Sci.* **2000**, *96*, 520–527.
93. Milton, S.J. Grasses as invasive alien plants in South Africa: Working for water. *S. Afr. J. Sci.* **2004**, *100*, 69–75.
94. Gadgil, R.L. Marram grass (*Ammophila arenaria*) and coastal sand stability in New Zealand. *N. Z. J. Forest. Sci.* **2002**, *32*, 165–180.
95. Knevel, I.C.; Lans, T.; Menting, F.B.; Hertling, U.M.; van der Putten, W.H. Release from native root herbivores and biotic resistance by soil pathogens in a new habitat both affect the alien *Ammophila arenaria* in South Africa. *Oecologia* **2004**, *141*, 502–510. [CrossRef] [PubMed]
96. Van der Putten, W.H.; Yeates, G.W.; Duyts, H.; Reis, C.S.; Karssen, G. Invasive plants and their escape from root herbivory: A worldwide comparison of the root-feeding nematode communities of the dune grass Ammophila arenaria in natural and introduced ranges. *Biol. Invasions* **2005**, *7*, 733–746. [CrossRef]
97. Hayes, M.; Kirkpatrick, J.B. Influence of *Ammophila arenaria* on half a century of vegetation change in eastern Tasmanian sand dune systems. *Aust. J. Bot.* **2012**, *60*, 450–460. [CrossRef]
98. Canavan, K.; Paterson, I.D.; Hill, M.P. Exploring the origin and genetic diversity of the giant reed, *Arundo donax* in South Africa. *Invasive Plant Sci. Manag.* **2017**, *10*, 53–60. [CrossRef]
99. Lambert, A.M.; Dudley, T.L.; Robbins, J. Nutrient enrichment and soil conditions drive productivity in the large-statured invasive grass *Arundo donax*. *Aquatic Bot.* **2014**, *112*, 16–22. [CrossRef]
100. Lambert, A.M.; Dudley, T.L.; Saltonstall, K. Ecology and impacts of the large-statured invasive grasses *Arundo donax* and *Phragmites australis* in North America. *Invasive Plant Sci. Manag.* **2010**, *3*, 489–494. [CrossRef]
101. Goolsby, J.A.; Hathcock, C.R.; Vacek, A.T.; Kariyat, R.R.; Moran, P.J.; Martinez Jimenez, M. No evidence of non-target use of native or economic grasses and broadleaf plants by *Arundo donax* biological control agents. *Biocontrol Sci. Tech.* **2020**, *30*, 795–805. [CrossRef]
102. Da Costa, R.M.; Winters, A.; Hauck, B.; Martín, D.; Bosch, M.; Simister, R.; Gomez, L.D.; Batista de Carvalho, L.A.; Canhoto, J.M. Biorefining potential of wild-grown *Arundo donax, Cortaderia selloana* and *Phragmites australis* and the feasibility of white-rot fungi-mediated pretreatments. *Front. Plant Sci.* **2021**, *12*, 679966. [CrossRef]
103. Mbambala, S.G.; Tshisikhawe, M.P.; Masevhe, N.A. Invasive alien plants used in the treatment of HIV/AIDS-related symptoms by traditional healers of Vhembe municipality, Limpopo Province, South Africa. *Afr. J. Tradit. Complement. Alt. Med.* **2017**, *14*, 80–88. [CrossRef]
104. Okada, M.; Lyle, M.; Jasieniuk, M. Inferring the introduction history of the invasive apomictic grass *Cortaderia jubata* using microsatellite markers. *Div. Distrib.* **2009**, *15*, 148–157. [CrossRef]
105. Sorensen, D.G. The Invasion Risk in the Pacific Northwest of Two Closely Related Grass Species in the Genus *Cortaderia*. Master's Thesis, University of Washington, Washington, DC, USA, 2016.
106. Houliston, G.J.; Goeke, D.F. *Cortaderia* spp. in New Zealand: Patterns of genetic variation in two widespread invasive species. *N. Z. J. Ecol.* **2017**, *41*, 107–112.

107. Almeida, M.R.; Marchante, E.; Marchante, H. Public Perceptions about the Invasive Plant Pampas Grass, *Cortaderia selloana*. Research Square. 2022. Available online: https://assets.researchsquare.com/files/rs-1343268/v1/cc4cf774-820e-480e-b049-0e06f340826f.pdf?c=1646671684 (accessed on 24 June 2022).
108. Marais, D.; Rethman, N.; Annandale, J. Dry matter yield and water use efficiency of five perennial subtropical grasses at four levels of water availability. *Afr. J. Range Forage Sci.* **2006**, *23*, 165–169. [CrossRef]
109. Al-Snafi, A.E. Chemical constituents and pharmacological importance of *Agropyron repens*—A review. *Res. J. Pharmacol. Toxicol.* **2015**, *1*, 37–41.
110. Gupta, A.; Ranjan, R. December. Grasses as an Immense Source of Pharmacologically Active Medicinal Properties: An Overview. *In. Proc. Indian Nat. Sci. Acad.* **2020**, *86*, 1323–1329. [CrossRef]
111. Kotanen, P.M.; Abraham, K.F. Geese and grazing lawns: Responses of the grass Festuca rubra to defoliation in a subarctic coastal marsh. *Canadian. J. Bot.* **2007**, *84*, 1732–1739.
112. Stewart, G.H.; Ignatieva, M.E.; Meurk, C.D.; Buckley, H.; Horne, B.; Braddick, T. URban Biotopes of Aotearoa New Zealand (URBANZ)(I): Composition and diversity of temperate urban lawns in Christchurch. *Urban Eco.* **2009**, *12*, 233–248. [CrossRef]
113. De, L.C. Lawn grasses-a review. *Int. J. Hortic.* **2017**, *7*, 82–94. [CrossRef]
114. Mugwedi, L.F. Invasion Ecology of *Glyceria maxima* in KZN Rivers and Wetlands. Master's Thesis, University of the Witwatersrand, Johannesburg, South Africa, 2012.
115. Mugwedi, L.F.; Goodall, J.M.; Witkowski, E.T.F.; Byrne, M.J. Effect of temperature on seed production in the invasive grass *Glyceria maxima* (Hartm.) Holmb. (Poaceae) in South Africa. *Afr. J. Aquatic Sci.* **2018**, *43*, 79–84. [CrossRef]
116. Mugwedi, L.F.; Goodall, J.M.; Witkowski, E.T.F.; Byrne, M.J. Post-fire vegetative recruitment of the alien grass *Glyceria maxima* at a KwaZulu-Natal Midlands dam, South Africa. *Afr. J. Aquatic Sci.* **2015**, *40*, 443–445. [CrossRef]
117. Gilson, E. Biogas Production Potential and Cost-Benefit Analysis of Harvesting Wetland Plants (*Phragmites australis* and *Glyceria maxima*). Master's Thesis, Halmstad University, Halmstad, Sweden, 2017.
118. Roj-Rojewski, S.; Wysocka-Czubaszek, A.; Czubaszek, R.; Kamocki, A.; Banaszuk, P. Anaerobic digestion of wetland biomass from conservation management for biogas production. *Biomass Bioenergy* **2019**, *122*, 126–132. [CrossRef]
119. Liu, D.; Zou, C.; Xu, M. Environmental, ecological, and economic benefits of biofuel production using a constructed wetland: A case study in China. *Int. J. Environ. Res. Public Health* **2019**, *16*, 827. [CrossRef] [PubMed]
120. Tomaskin, J.; Tomaskinova, J. evaluation of assortment of ornamental grasses and their environmental importance in the urban landscape. *J. Environ. Protect. Ecol.* **2020**, *21*, 1673–1682.
121. Banaszuk, P.; Kamocki, A.K.; Wysocka-Czubaszek, A.; Czubaszek, R.; Roj-Rojewski, S. Closing the loop-Recovery of nutrients and energy from wetland biomass. *Ecol. Engine.* **2020**, *143*, 105643. [CrossRef]
122. Biro, A.S.; Ivaşcu, C.; Ciobotă, A.; Arsene, G. Assessment of ecosystem services through habitat diversity within a Peri-Urban River Area-Bega River in the eastern part of Timișoara. *Res. J. Agric. Sci.* **2021**, *53*, 21–36.
123. le Roux, P.C.; Ramaswiela, T.; Kalwij, J.M.; Shaw, J.D.; Ryan, P.G.; Treasure, A.M.; McClelland, G.T.; McGeoch, M.A.; Chown, S.L. Human activities, propagule pressure and alien plants in the sub-Antarctic: Tests of generalities and evidence in support of management. *Biol. Conserv.* **2013**, *161*, 18–27. [CrossRef]
124. Belonovskaya, E.; Gracheva, R.; Shorkunov, I.; Vinogradova, V. Grasslands of intermontane basins of Central Caucasus: Land use legacies and present-day state. *Hacquetia* **2016**, *15*, 37–47. [CrossRef]
125. Drake, P.; Grimshaw-Surette, H.; Heim, A.; Lundholm, J. Mosses inhibit germination of vascular plants on an extensive green roof. *Ecol. Engine.* **2018**, *117*, 111–114. [CrossRef]
126. Dubljević, R.; Marković, B.; Radonjić, D.; Stešević, D.; Marković, M. Influence of changes in botanical diversity and quality of wet grasslands through phenological phases on cow milk fatty acid composition. *Sustainability* **2020**, *12*, 6320. [CrossRef]
127. Momose, T.; Lundholm, J. Use of a thermo-module as a soil heat flux sensor: Applications in the evaluation of extensive green roof thermal performance. *Energy Build.* **2021**, *231*, 110562. [CrossRef]
128. Mkhize, N.L.F. Biology, Seasonal Abundance and Host Range of Capitulum-Feeding Insects Associated with the Invasive Weed *Senecio madagascariensis* (Asteraceae) in Its Native Range in KwaZulu-Natal, South Africa. Masters' Thesis, University of KwaZulu Natal, Durban, South Africa, 2021.
129. Sosa, L.L.; Jozami, E.; Oakley, L.J.; Montero, G.A.; Ferreras, L.A.; Venturi, G.; Feldman, S.R. Using C4 perennial rangeland grasses for bioenergy. *Biomass Bioenergy* **2019**, *128*, 105299. [CrossRef]
130. Gandini, M.L.; Lara, B.D.; Moreno, L.B.; Cañibano, M.A.; Gandini, P.A. Trends in fragmentation and connectivity of *Paspalum quadrifarium* grasslands in the Buenos Aires province, Argentina. *PeerJ* **2019**, *7*, e6450. [CrossRef] [PubMed]
131. Gutiérrez, F.; Gallego, F.; Paruelo, J.M.; Rodríguez, C. Damping and lag effects of precipitation variability across trophic levels in Uruguayan rangelands. *Agri. Syst.* **2020**, *185*, 102956. [CrossRef]
132. Rayment, J.; French, K.; Bedward, M. Understanding patterns and pathways of exotic perennial grass invasion in South-eastern Australian grassy communities. *Div. Distrib.* **2022**, *28*, 1136–1150. [CrossRef]
133. Hlophe, S.N.; Moyo, N.A.G. A comparative study on the use of *Pennisetum clandestinum* and *Moringa oleifera* as protein sources in the diet of the herbivorous *Tilapia rendalli*. *Aquac. Int.* **2014**, *22*, 1245–1262. [CrossRef]
134. Seeman, O.D.; Loch, D.S.; Knihinicki, D.K.; McMaugh, P.E. A new species of *Steneotarsonemus* (Acari: Tarsonemidae) from kikuyu grass, *Pennisetum clandestinum* (Poaceae), in Australia. *System. Appl. Acarol.* **2016**, *21*, 889–906. [CrossRef]

135. Vurayai, R.; Nkoane, B.; Moseki, B.; Chaturvedi, P. Phytoremediation potential of *Jatropha curcas* and *Pennisetum clandestinum* grown in polluted soil with and without coal fly ash: Selibe-Phikwe, Botswana. *J. Biodiv. Environ. Sci.* **2017**, *10*, 193–206.
136. Romero-Perdomo, F.; Ocampo-Gallego, J.; Camelo-Rusinque, M.; Bonilla, R. Plant growth promoting rhizobacteria and their potential as bioinoculants on *Pennisetum clandestinum* (Poaceae). *Rev. Biol. Tropic.* **2019**, *67*, 825–832. [CrossRef]
137. Aghajani-Shahrivar, A.; Hagare, D.; Maheshwari, B.; Muhitur Rahman, M. The effect of irrigation using recycled waters obtained from MBR and IDAL wastewater treatment systems on soil pH and EC under kikuyu grass (*Pennisetum clandestinum*) production. *Water Supply* **2020**, *20*, 1313–1320. [CrossRef]
138. Fokom, W.D.; Tendonkeng, F.; Azangue, G.J.; Miégoué, E.; Djoumessi, F.G.T.; Kwayep, N.C.; Mouchili, M. Effects of Different Levels of Fertilization with Hen Droppings on the Production and Chemical Composition of *Pennisetum clandestinum* (Poaceae). *Open J. Animal Sci.* **2021**, *11*, 543–558. [CrossRef]
139. Chen, X.F.; Huang, C.; Xiong, L.; Wang, B.; Qi, G.X.; Lin, X.Q.; Wang, C.; Chen, X.D. Use of elephant grass (*Pennisetum purpureum*) acid hydrolysate for microbial oil production by *Trichosporon cutaneum*. *Preparative Biochem. Biotech.* **2016**, *46*, 704–708. [CrossRef] [PubMed]
140. Negawo, A.T.; Teshome, A.; Kumar, A.; Hanson, J.; Jones, C.S. Opportunities for Napier grass (*Pennisetum purpureum*) improvement using molecular genetics. *Agronomy* **2017**, *7*, 28. [CrossRef]
141. Negawo, A.T.; Jorge, A.; Hanson, J.; Teshome, A.; Muktar, M.S.; Azevedo, A.L.S.; Ledo, F.J.; Machado, J.C.; Jones, C.H.R.I.S. Molecular markers as a tool for germplasm acquisition to enhance the genetic diversity of a Napier grass (*Cenchruspurpureus* syn. *Pennisetum purpureum*) collection. *Tropic. Grasslands-Forrajes Tropic.* **2018**, *6*, 58–69. [CrossRef]
142. Danquah, J.A.; Roberts, C.O.; Appiah, M. Elephant grass (*Pennisetum purpureum*): A potential source of biomass for power generation in Ghana. *Curr. J. Appl. Sci. Tech.* **2018**, *30*, 1–12. [CrossRef]
143. Zhou, Z.; Guo, Y.; Hu, L.; He, L.; Xu, B.; Huang, Z.; Wang, G.; Chen, Y. Potential use of king grass (*Pennisetum purpureum* Schumach, *Pennisetum glaucum* (L.) R. Br.) for phytoextraction of cadmium from fields. *Environ. Sci. Pollution Res.* **2020**, *27*, 35249–35260. [CrossRef] [PubMed]
144. Antunes, F.A.F.; Machado, P.E.M.; Rocha, T.M.; Melo, Y.C.S.; Santos, J.C.; da Silva, S.S. Column reactors in fluidized bed configuration as intensification system for xylitol and ethanol production from napier grass (*Pennisetum Purpureum*). *Chem. Engine. Process. Int.* **2021**, *164*, 108399. [CrossRef]
145. Badalamenti, E.; Militello, M.; La Mantia, T.; Gugliuzza, G. Seedling growth of a native (*Ampelodesmos mauritanicus*) and an exotic (*Pennisetum setaceum*) grass. *Acta Oecol.* **2016**, *77*, 37–42. [CrossRef]
146. Rodríguez-Caballero, G.; Caravaca, F.; Alguacil, M.M.; Fernández-López, M.; Fernández-González, A.J.; Roldán, A. Striking alterations in the soil bacterial community structure and functioning of the biological N cycle induced by *Pennisetum setaceum* invasion in a semiarid environment. *Soil Biol. Biochem.* **2017**, *109*, 176–187. [CrossRef]
147. Da Re, D.; Tordoni, E.; de Pascalis, F.; Negrín-Pérez, Z.; Fernández-Palacios, J.M.; Arévalo, J.R.; Rocchini, D.; Medina, F.M.; Otto, R.; Arlé, E.; et al. Invasive fountain grass (*Pennisetum setaceum* (Forssk.) Chiov.) increases its potential area of distribution in Tenerife Island under future climatic scenarios. *Plant Ecol.* **2020**, *221*, 867–882. [CrossRef]
148. Badagliacco, D.; Sanfilippo, C.; Megna, B.; La Mantia, T.; Valenza, A. Mechanical and Thermal Properties of Insulating Sustainable Mortars with *Ampelodesmos mauritanicus* and *Pennisetum setaceum* Plants as Aggregates. *Appl. Sci.* **2021**, *11*, 5910. [CrossRef]
149. Charai, M.; Salhi, M.; Horma, O.; Mezrhab, A.; Karkri, M.; Amraqui, S. Thermal and mechanical characterization of adobes bio-sourced with *Pennisetum setaceum* fibers and an application for modern buildings. *Cons. Build. Mater.* **2022**, *326*, 126809. [CrossRef]
150. Liu, L.; Teng, K.; Fan, X.; Han, C.; Zhang, H.; Wu, J.; Chang, Z. Combination analysis of single-molecule long-read and Illumina sequencing provides insights into the anthocyanin accumulation mechanism in an ornamental grass, *Pennisetum setaceum* cv. *Rubrum*. *Plant Mol. Biol.* **2022**, *109*, 159–175. [CrossRef] [PubMed]
151. Zhang, Y.; Yuan, X.; Teng, W.; Chen, C.; Wu, J. Identification and phylogenetic classification of *Pennisetum* (Poaceae) ornamental grasses based on ssr locus polymorphisms. *Plant Mol. Biol. Report.* **2016**, *34*, 1181–1192. [CrossRef]
152. Gupta, N.; Biswas, N.; Sudhakar, V.J. Amazing world of grasses. *Rai J. Tech. Res. Inn.* **2016**, *4*, 5–11.
153. Mobamed-Saleem, M.A.; Woldu, Z. 23 Land Use and Biodiversity in the Upland Pastures in Ethiopia. *Mountain biodiversity: Global Assess.* **2019**, *7*, 277.
154. Abdi, S.; Dwivedi, A.; Kumar, S.; Bhat, V. Development of EST-SSR markers in Tomaskin, J. and Tomaskinova and their applicability in studying the genetic diversity and cross-species transferability. *J. Gen.* **2019**, *98*, 1–16. [CrossRef]
155. Wang, Q. The plastid genome of an ornamental grass *Pennisetum villosum* (Poaceae: Paniceae). *Mitochondrial DNA Part B* **2020**, *5*, 1586–1587. [CrossRef]
156. Salas-Luevano, M.A.; Puente-Cuevas, R.; Vega-Carrillo, H.R. Concentrations of heavy metals and measurement of 40K in mine tailings in Zacatecas, Mexico. *Environ. Earth Sci.* **2021**, *80*, 186. [CrossRef]
157. Kim, J. The Current State and Characteristics of Ornamental Grasses in South Korea. *J. Korean Ins. Landsc. Arch.* **2021**, *49*, 151–162. [CrossRef]
158. Nirala, P.D.; Jain, S.C.; Kumari, P. Distribution of different bamboo species in different areas of North Chota Nagpur division of Jharkhand. *Biosci. Disc.* **2016**, *7*, 21–24.

159. Stephan, J.G.; Pourazari, F.; Tattersdill, K.; Kobayashi, T.; Nishizawa, K.; de Long, J.R. Long-term deer exclosure alters soil properties, plant traits, understory plant community and insect herbivory, but not the functional relationships among them. *Oecologia* **2017**, *184*, 685–699. [CrossRef] [PubMed]
160. Smith, M.C.; Mack, R.N. Apparent tolerance of low water availability in temperate Asian bamboos. *J. Environ. Hortic.* **2018**, *36*, 7–13. [CrossRef]
161. Akaji, Y.; Fujiyoshi, K.; Wu, C.; Hattori, I.; Hirobe, M.; Sakamoto, K. Survival and recruitment of *Sasa kurilensis* culms in response to local light conditions in a cool temperate forest. *J. Forest Res.* **2019**, *24*, 365–370. [CrossRef]
162. Reinhardt, C. Thread of herbicide-resistant weeds in soya beans: Prognosis for South Africa in light of global trends: Chemicals and fertiliser. *Oilseeds Focus* **2016**, *2*, 11–13.
163. Sezen, U.U.; Barney, J.N.; Atwater, D.Z.; Pederson, G.A.; Pederson, J.F.; Chandler, J.M.; Cox, T.S.; Cox, S.; Dotray, P.; Kopec, D.; et al. Multi-phase US spread and habitat switching of a post-Columbian invasive, *Sorghum halepense*. *PLoS ONE* **2016**, *11*, e0164584. [CrossRef] [PubMed]
164. Zhang, S.C.; Lin, S.; Shen, A.; Chen, H.; Wang, F.; Huai, H.Y. Traditional knowledge on "Luchai" [*Phragmites australis* (Cav.) Trin. ex Steud. and *Arundo donax* L.] and their dynamics through urbanization in Yangzhou area, East China. *Indian J. Tradit. Knowl.* **2016**, *15*, 580–586.
165. Watts, D.A.; Moore, G.W. Water-use dynamics of an invasive reed, *Arundo donax*, from leaf to stand. *Wetlands* **2011**, *31*, 725–734. [CrossRef]
166. Mararakanye, N.; Magoro, M.N.; Matshaya, N.N.; Rabothata, M.C.; Ncobeni, S.R. Railway side mapping of alien plant distributions in Mpumalanga, South Africa. *Bothalia-Afr. Biodiv Conserv.* **2017**, *47*, 1–11. [CrossRef]
167. Cronin, K.; Kaplan, H.; Gaertner, M.; Irlich, U.M.; Timm Hoffman, M. Aliens in the nursery: Assessing the attitudes of nursery managers to invasive species regulations. *Biol. Invasions* **2017**, *19*, 925–937. [CrossRef]
168. Moshobane, M.C.; Nnzeru, L.R.; Nelukalo, K.; Mothapo, N.P. Patterns of permit requests and issuance for regulated alien and invasive species in South Africa for the period 2015–2018. *Afr. J. Ecol.* **2020**, *58*, 514–528. [CrossRef]
169. Moshobane, M.C.; Olowoyo, J.O.; Middleton, L. Alien plant species of Haenertsburg Village, Limpopo Province, South Africa. *BioInvasions Rec.* **2022**, *11*, 23–39. [CrossRef]
170. Jiménez-Ruiz, J.; Hardion, L.; Del Monte, J.P.; Vila, B.; Santín-Montanyá, M.I. Monographs on invasive plants in Europe N° 4: *Arundo donax* L. *Bot. Lett.* **2021**, *168*, 131–151. [CrossRef]
171. Racelis, A.; Wagle, P.; Escamilla, J.; Goolsby, J.; Gowda, P. Interannual Variability and Seasonal Dynamics of Evapotranspiration of *Arundo donax* L. and Populations of its Biological Control Agent (*Tetramesa romana*). *Ecohydrol. Hydrobiol.* **2022**, *22*, 178–187. [CrossRef]