Supplementary material to 'Spatially-differentiated regulation of alien species can be improved using species distribution models: *Psidium guajava* in South Africa as a case study'

Table S1: Responses to questions relating to the invasion of guava (*Psidium guajava*) in South Africa. We sent out the questionnaires at the end of March 2020, but, as not much feedback was received before the initial deadline (end of May 2022), the deadline was extended (until the end of July) and a reminder sent out in June 2022 We received a total of 18 usable responses by the end of the deadline. For most responses we could not categorise the sites to a level higher than naturalised (see **Table 1** for data points that came from the questionnaires).

Interview questions	Responses	Notes
1. Do you know *Psidium guajava*, or the common guava? Yes / No	Yes: 18 No: 0 No replies: 4	None
2. Do you have guavas in your property, or in your area? Yes / No	Yes: 15 No: 3	None
3. How long have you had the plant? An estimate in years.	>50 years: 7 >100 years: 11	None
4. How many plants do you have (estimate if it is an orchard)?	>5-50 plants: 40 >100 plants: 60	None
5. Any animals feeding on guavas? Please elaborate.	Yes: 83 No: No response: .	Birds, monkeys, squirrels, livestock (in the wild).
6. Is the plant spreading outside cultivation? Please elaborate.	% of yes: 39.	Most farmers reported seedling coming out, some near cultivation, others more than 100 m from cultivation.
7. Do you manage the spread, how? Please elaborate.	% of yes: 11.	Seedlings are pulled out, root suckers are cut and treated with a herbicide.
8. Are there any costs related to clearing/managing guavas? Please explain.	% of yes: 11.	Clearing guavas can be labour intensive and costly.

Table S2: Principal component analysis (PCA) results showing the importance of each component. The table reports the standard deviation, proportion of variance explained, and cumulative proportion of variance for the first eight principal components (PC1–PC8). PC1 explains the largest proportion of variance (47.28%), followed by PC2 (20.81%) and PC3 (17.13%), with decreasing contributions from subsequent components.

Importance of components								
	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
Standard deviation	2.9971	1.9883	1.8039	1.16902	0.82042	0.74978	0.29343	0.2179
Proportion of variance	0.4728	0.2081	0.1713	0.07193	0.03543	0.02959	0.00453	0.0025
Cumulative proportion	0.4728	0.6808	0.8521	0.92403	0.95945	0.98904	0.99357	0.9169

Table S3: Pairwise niche overlap indices for *Psidium guajava* across cultivated, naturalised, and invasive monoculture ranges. We calculated niche volumes, unique and shared components, and centroid distances to assess overlap between cultivated populations and those that have naturalised or formed invasive monocultures. The table reports niche volume estimates, proportions of unique and overlapping space, Jaccard indices, and centroid distances for each pairwise comparison. Cultivated populations occupy the largest niche space, with minimal overlap observed with invasive monocultures.

Cultivated vs. Naturalised		**Cultivated vs. Invasive**		**Cultivated vs. Invasive monocultures**	
Volume of Cultivated niche	372.7	Volume of Cultivated niche	372.7	Volume of cultivated niche	372.7
Volume of Naturalised niche	93.2	Volume of Invasive niche	152.5	Volume of monocultures niche	28.0
Totalvolume Cultivated_Naturalised	375.7	Total_volume Cultivated_Invasive	431.7	Total_volume Cultivated_Monocultures	384.0
Unique Cultivated	282.5	Unique Cultivated	279.1	Unique Cultivated	356.4
Proportion_Unique Cultivated (%)	75.2	Proportion_Unique Cultivated (%)	64.7	Proportion_Unique Cultivated (%)	92.8
Unique Naturalised	2.9	Unique Invasive	59.0	Unique Monocultures	11.7
Proportion_Unique Naturalised (%)	0.77	Proportion_Unique Invasive (%)	13.7	Proportion_Unique Monocultures (%)	3.06
Overlap_C_N	90.2	Overlap_C_IN	93.6	Overlap_C_MO	16.2
Proportion_Overlap_C_N(%)	24.0	Proportion_Overlap_C_IN (%)	21.7	Proportion_Overlap_C_MO (%)	4.2
Jacards Index_C_N	0.24	Jacards Index_C_IN	0.22	Jacards Index_C_MO	0.042
Centroid distance_C_N	3.41	Centroid distance_C_IN	4.53	Centroid distance_C_MO	3.87

Figure S1: Climatic niche overlap between cultivated, naturalised, and invasive *Psidium guajava* populations.

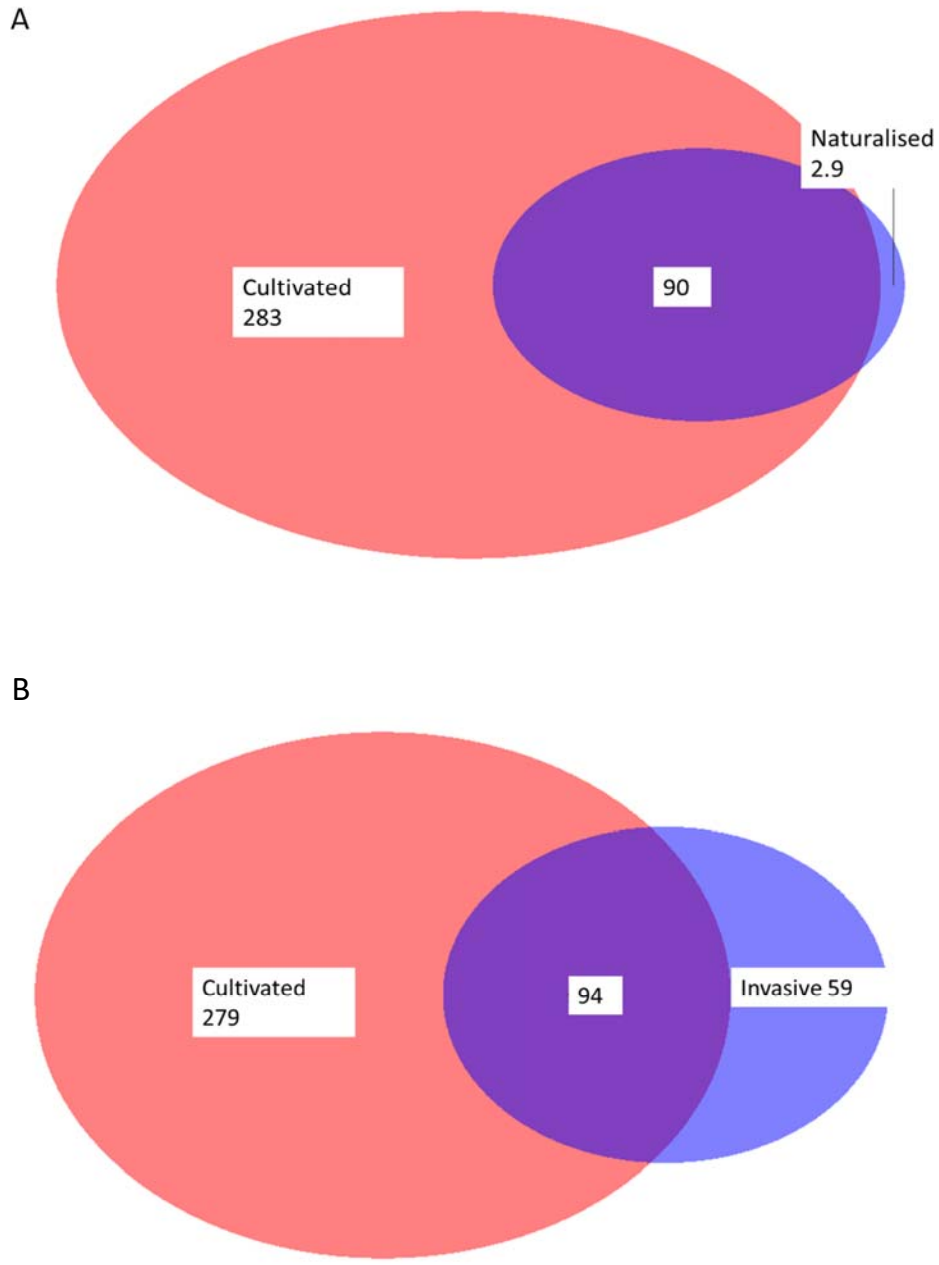


Figure S1: Climatic niche overlap between cultivated, naturalised, and invasive monoculture populations of *Psidium guajava*. We visualised niche relationships using Venn diagrams based on modelled environmental space. Panel A shows the overlap between cultivated and naturalised (non-invasive) populations, while Panel B compares cultivated populations with invasive monocultures. The values represent niche volumes (in arbitrary units), with overlapping areas indicating shared climatic space.

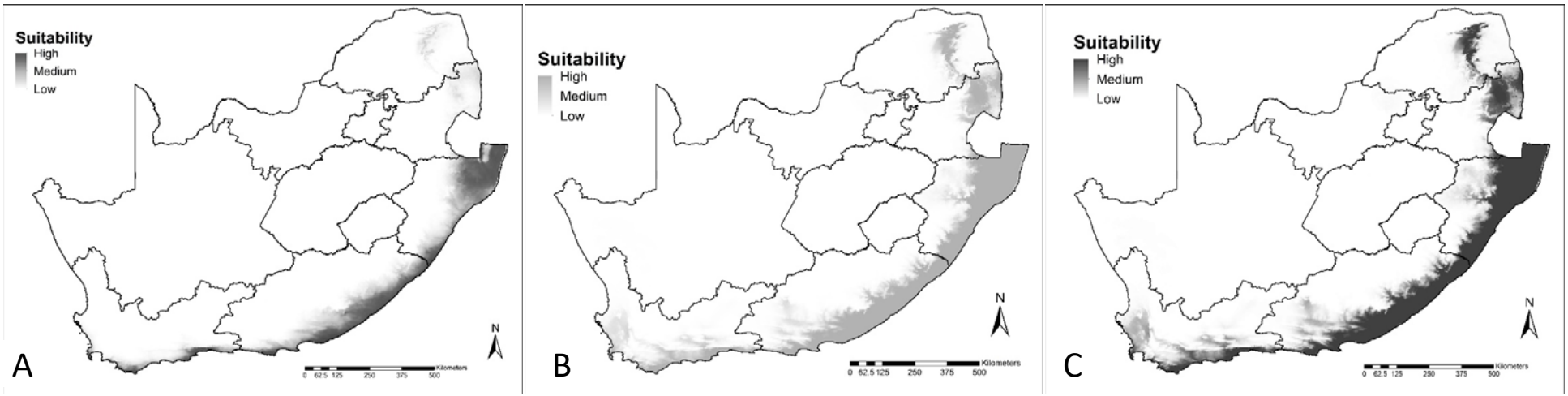
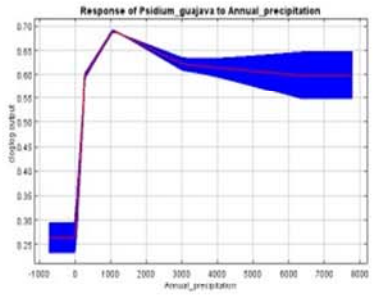
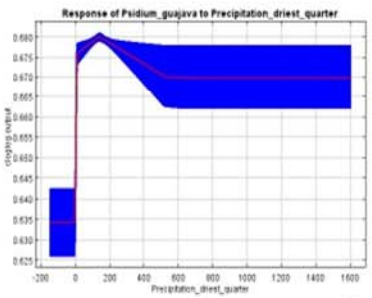
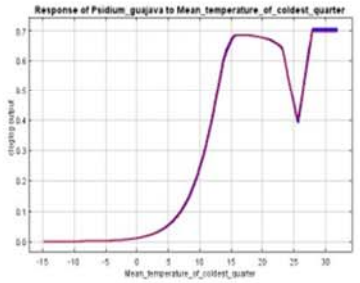


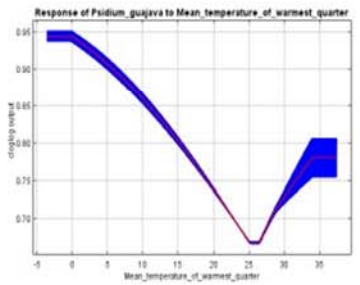
Figure S2: Average suitability maps showing the potential distribution of *Psidium guajava* across South Africa based on different occurrence datasets. Panel A) uses records from the native range only. Panel B includes global occurrence records (including native) but excludes records from South Africa. Panel C incorporates global records (including native) along with records from South Africa. These maps illustrate how the inclusion of different data sources influences predicted climatic suitability.

Response curves for native, global (-SA) and global (+SA) models

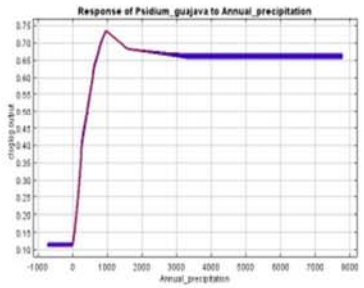


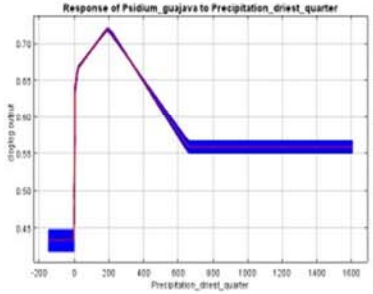


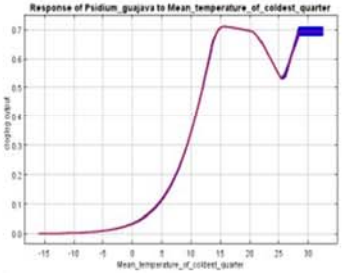


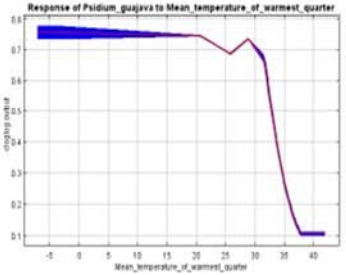


Native model

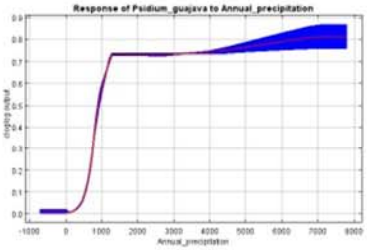


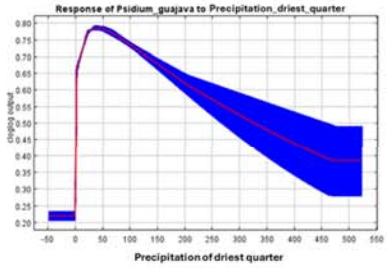


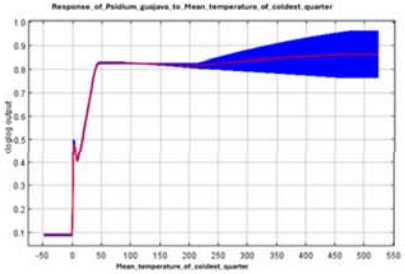


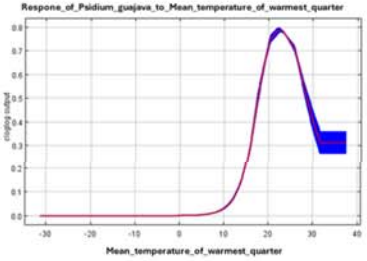


Global model (-SA)



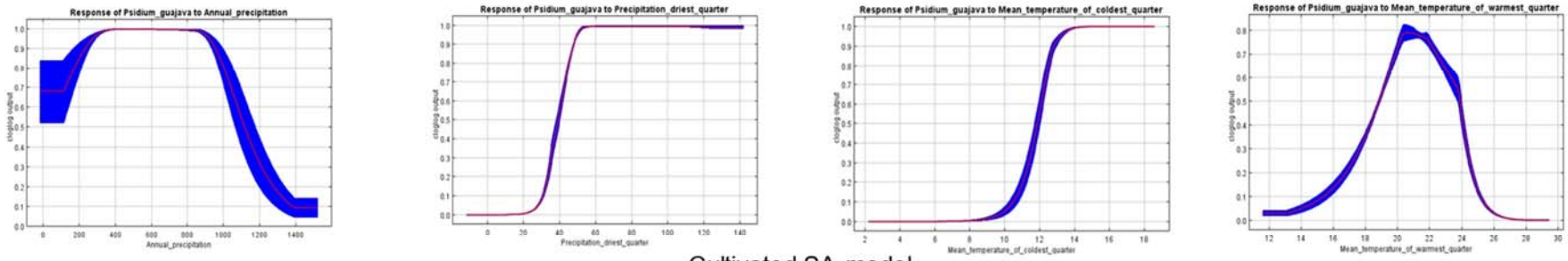




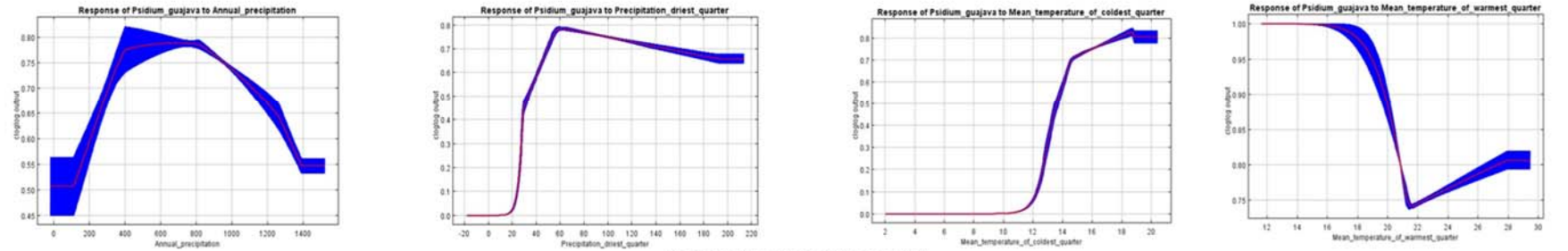


Global model (+SA)

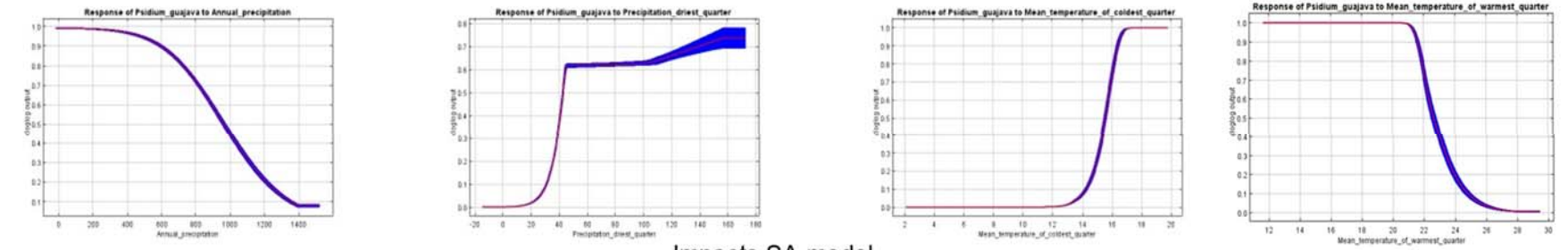
Response curves for cultivated, naturalisation, and impacts models



Cultivated SA-model



Naturalisation SA-model



Impacts SA-model

Figure S3: Response curves for each SDM model we constructed. Curves show how each environmental variable affects the Maxent prediction and how the predicted probability of presence changes each environmental variable is varied, keeping all other environmental variables at their average sample value.