S1- Survey design and recipient selection

S1.1 Survey design

An online survey was designed in order to validate the vulnerability factors collected by Stenfors et al. (2024a) and analyze the relative importance of vulnerability factors for blue and green water consuming sectors (from now on referred to as "consumers") respectively. The survey was divided into three sections; (1) Collection of background information on respondent, (2) rating of impact of vulnerability factors on drought risk in respondent's main sector of focus, (3) rating of impact of vulnerability factors on drought risk in Swedish society. Section one collected information of the respondent's main sectorial field of focus, how long they had work in this field, what type of organization they worked at, and in which Swedish county they worked in. Respondents were also asked to rate their experience and knowledge of drought related issues in their field of focus on a 5-point scale (0 (no experience) to 4 (Significant experience). In section two, respondents were presented with a list of vulnerability factors relating to direct water consumers (51 vulnerability factors) and governance (23). Using a 5-point rating scale, respondents were asked to rate the impact of each vulnerability factor on experiencing negative effects from drought in their sector. The scale ranged from 0 (no-impact) to 4 (high impact) and respondents could opt out of answering by selecting "I don't know". Section three followed the same design, where respondents were asked to rate the impact of vulnerability factors based on their perceived impact on drought risk in Swedish society. This section contained 23 vulnerability factors connected to governance and nine factors relating to indirect water consumers. In both section two and three, respondents were asked to rate their confidence in their responses on a 5-point scale, ranging from 0 (highly unsure) to 4 (highly confident). Respondents were also able to suggest additional factors that they deemed relevant, in both section two and three. All respondents were presented with the same list of factors, regardless of their primary sectorial field of focus, in order to perform comparative analysis of the relative relevance of vulnerability factors in different societal sectors. The 23 governance factors included in section two and three, were the same in both sections. This allowed for comparative analysis of the impact of governance on drought vulnerability in sectors as well as society as a whole.

Six water dependent sectors were targeted in the survey; agriculture (i.e., crop-, vegetable production, animal husbandry etc), energy (i.e., thermal -, nuclear -, and hydropower production etc.), environmental (aquatic and terrestrial ecosystems), water supply (drinking water production), water resources (water resource management), forestry (production and nature conservation), and water intensive industry (i.e. paper and pulp, chemical production, and metal- and steel works). The survey was provided in both English and Swedish.

S1.2 Survey recipient selection

Survey recipients were identified using an identification matrix consisting of five criteria; sectoral focus, knowledge, geographical location, organization type of employment, main operational scale. Firstly, any potential survey recipient should belong to one of the six water dependent sectors of focus for the online survey. Furthermore, a potential recipient should have knowledge regarding drought vulnerability in their sector. In order to get an accurate representation of drought vulnerability in Sweden, potential recipients should have a large geographical spread as well as be employed in different organization types (i.e., governmental/local authority, research institute/academia, private/municipal/state owned enterprise, national/regional trade association, and NGO). Lastly, an effort was made to identify potential recipient operating on different operational scales, i.e.,

39 local/regional/national scale. This criterion was applied to the recipient groups governmental/local authority,

40 national/regional trade association, and NGOs.

41 Potential recipients working in authorities were primarily identified using public contact list collected from official

42 sites for municipalities (290), counties (21) (SKL.se) and public competence centers (31) (naturvardsverket.se).

43 Four approaches were used for identifying individual respondents within the different organization types (1) by

44 performing google searches combining organization names with Swedish keywords (e.g. "drought" and "water

45 shortage") (30 recipients), (2) using the organizations' website search bars for keyword searches in Swedish (37),

46 (3) Using organizations general contact information (143), (4) snowballing, i.e., identifying authors, co-authors,

47 or contributors to articles, reports and projects relating either to drought or water shortages (9).

S2- Overview of respondent characteristics

Sector	Place of employment					Work experience			Drought experience			Geographical location	
	Authority	Enterprise	NGO	Research	Trade association	0-5 yrs	5-10 yrs	>10 yrs	1-2	2	3-4	North	South
										1			
Blue	31	7	1	7	2	7	14	27	8	3	27	6	42
Green	14	4		6		6	2	16	1	8	15	4	20
Universal	16	1	1	6	5	8	4	17	7	7	15	6	23

Organization	Work experience			Geographical location		Drought experience		
	0-5 yrs	5-10 yrs	>10 yrs	North	South	1-2	2	3-4
Authority	16	14	31	9	52	13	19	29
Enterprise	2	3	7	5	7		4	8
NGO	1		1		2	1		1
Research	1	1	17	2	17	1	5	13
Trade association	1	2	4		7	1		6

	Work experience			Drought experience		
Geographical location	0-5 yrs	5-10 yrs	>10 yrs	1-2	2	3-4
North	5	2	9	4	6	6
South	16	18	51	12	22	51

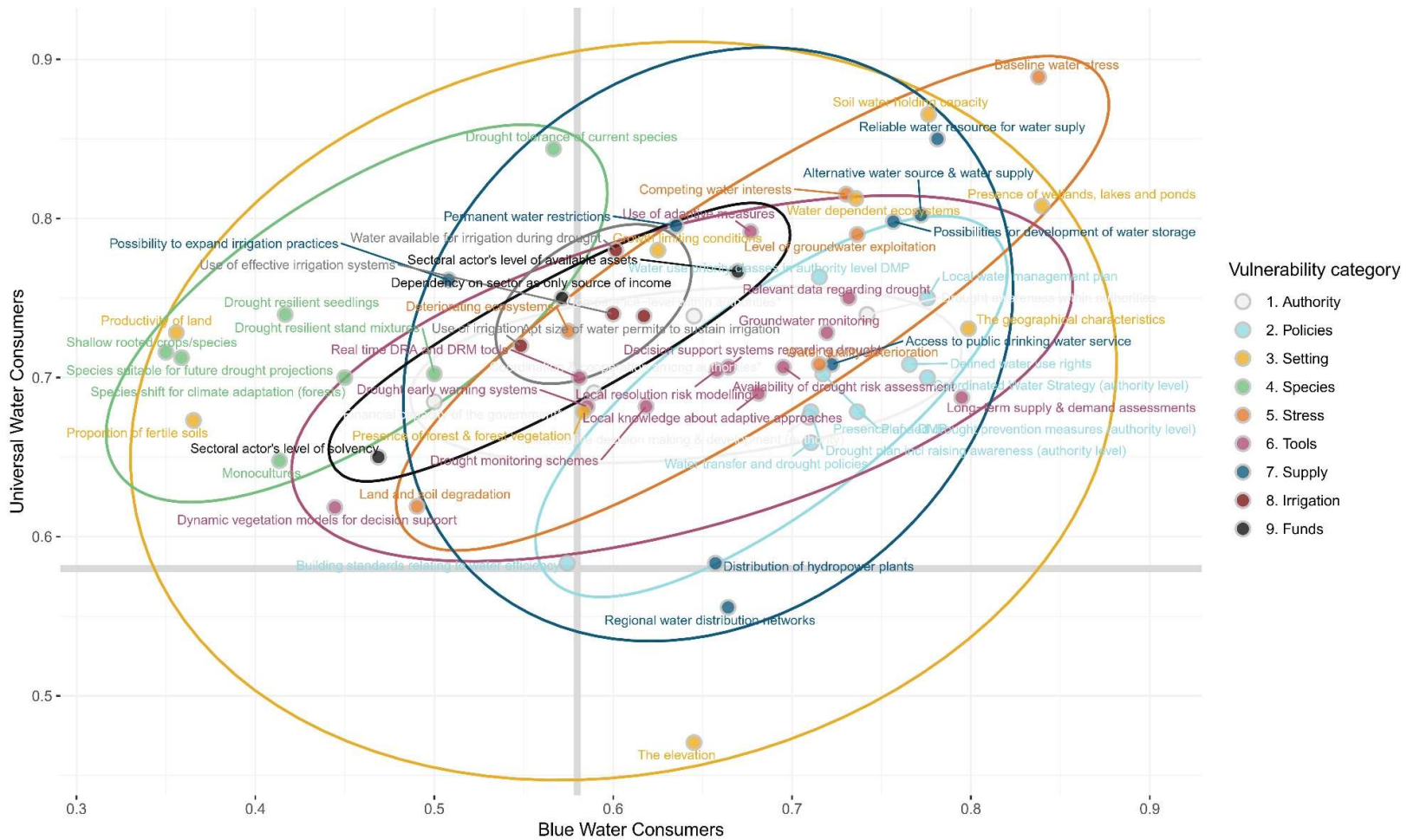
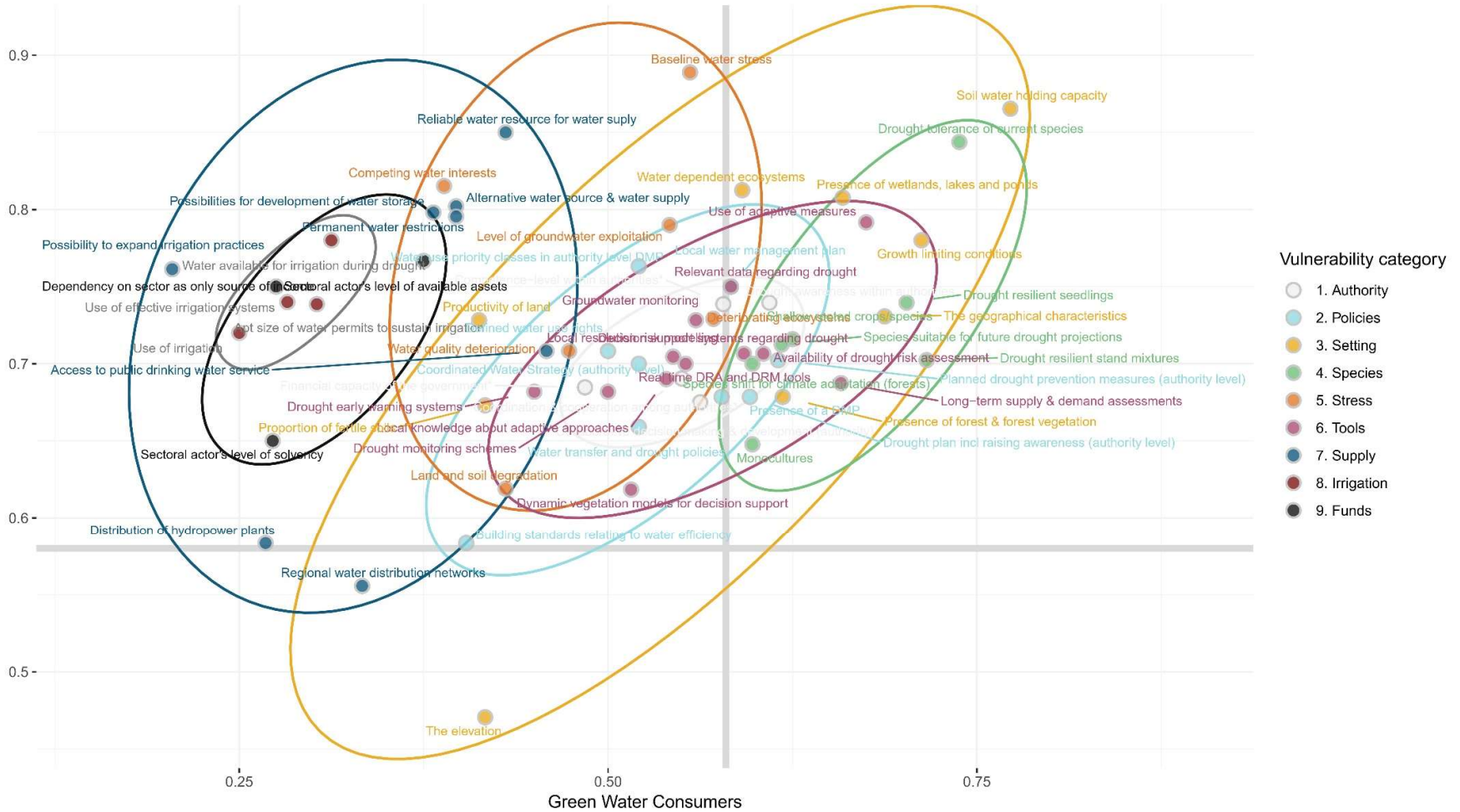
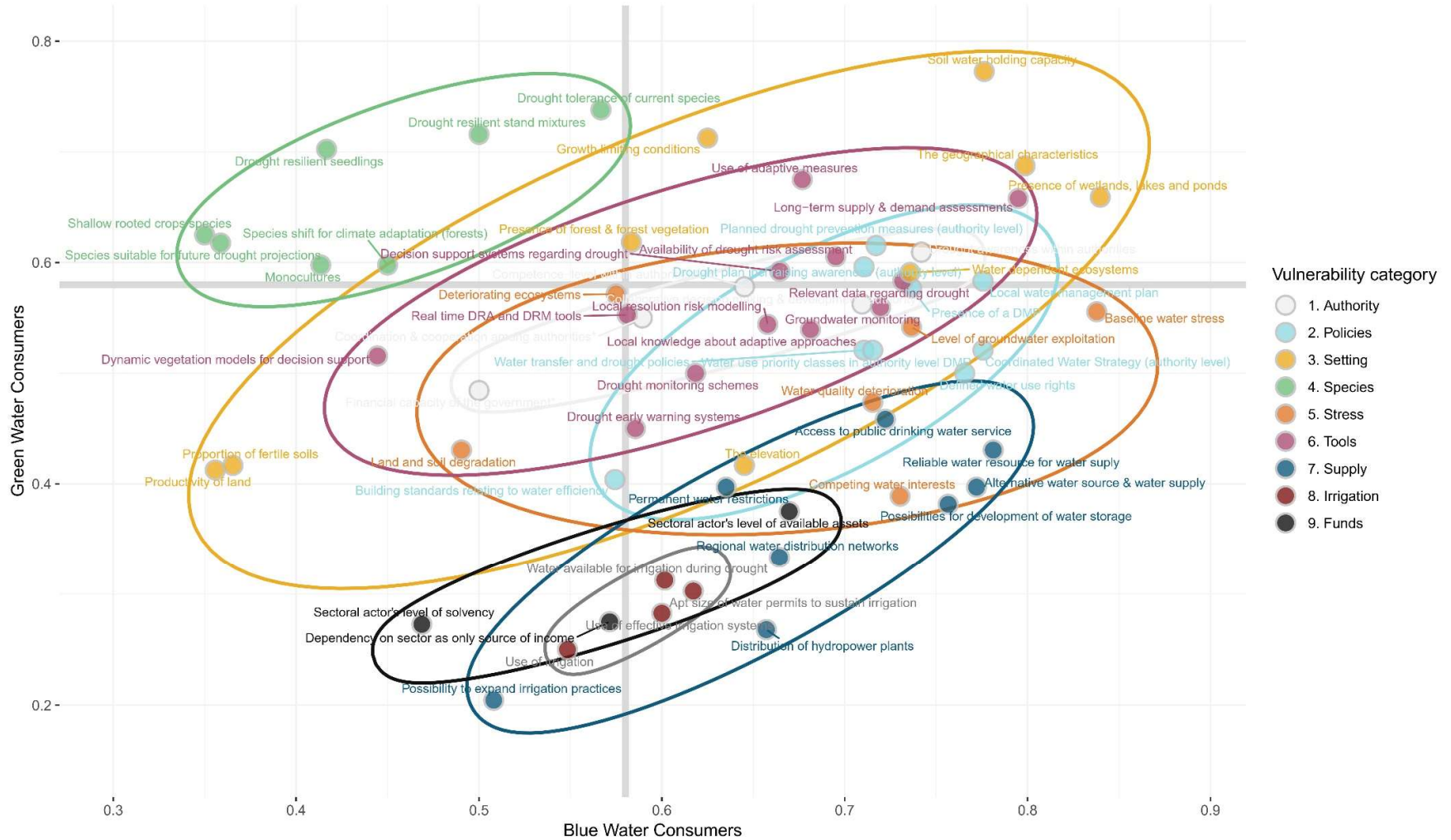
S3 – Vulnerability factors, their subcategories and impact scores for blue, green and universal water consumers

Vulnerability factor	Subcategory	Blue	Universal	Green
Drought awareness within authorities	1. Authority	0,74	0,74	0,61
Competence-level within authorities*	1. Authority	0,65	0,74	0,58
Coordination & cooperation among authorities*	1. Authority	0,59	0,69	0,55
Financial capacity of the government*	1. Authority	0,5	0,68	0,48
Collaborative decision making & development (authority)	1. Authority	0,71	0,68	0,56
Water use priority classes in authority level DMP	2. Policies	0,72	0,76	0,52
Local water management plan	2. Policies	0,78	0,75	0,58
Defined water-use rights	2. Policies	0,77	0,71	0,5
Planned drought prevention measures (authority level)	2. Policies	0,72	0,7	0,62
Coordinated Water Strategy (authority level)	2. Policies	0,78	0,7	0,52
Presence of a drought management plan (DMP)	2. Policies	0,74	0,68	0,58
Drought plan incl raising awareness (authority level)	2. Policies	0,71	0,68	0,6
Water transfer and drought policies	2. Policies	0,71	0,66	0,52
Building standards relating to water efficiency	2. Policies	0,57	0,58	0,4
Soil water holding capacity	3. Setting	0,78	0,87	0,77
Water dependent ecosystems	3. Setting	0,74	0,81	0,59
Presence of wetlands, lakes and ponds	3. Setting	0,84	0,81	0,66
Growth limiting conditions	3. Setting	0,63	0,78	0,71
The geographical characteristics	3. Setting	0,8	0,73	0,69
Productivity of land	3. Setting	0,36	0,73	0,41
Presence of forest & forest vegetation	3. Setting	0,58	0,68	0,62
Proportion of fertile soils	3. Setting	0,37	0,67	0,42
The elevation	3. Setting	0,65	0,47	0,42
Drought tolerance of current species	4. Species	0,57	0,84	0,74
Drought resilient seedlings	4. Species	0,42	0,74	0,7
Shallow rooted crops/species	4. Species	0,35	0,72	0,63
Species suitable for future drought projections	4. Species	0,36	0,71	0,62
Drought resilient stand mixtures	4. Species	0,5	0,7	0,72
Species shift for climate adaptation (forests)	4. Species	0,45	0,7	0,6
Monocultures	4. Species	0,41	0,65	0,6
Baseline water stress	5. Stress	0,84	0,89	0,56
Competing water interests	5. Stress	0,73	0,82	0,39
Level of groundwater exploitation	5. Stress	0,74	0,79	0,54
Deteriorating ecosystems	5. Stress	0,58	0,73	0,57
Water quality deterioration	5. Stress	0,72	0,71	0,47
Land and soil degradation	5. Stress	0,49	0,62	0,43
Use of adaptive measures	6. Tools	0,68	0,79	0,68
Relevant data regarding drought	6. Tools	0,73	0,75	0,58
Groundwater monitoring	6. Tools	0,72	0,73	0,56
Availability of drought risk assessment	6. Tools	0,7	0,71	0,61
Decision support systems regarding drought	6. Tools	0,66	0,71	0,59
Local resolution risk modelling	6. Tools	0,66	0,7	0,54
Real time drought risk assessment (DRA) and drought risk management tools (DRM)	6. Tools	0,58	0,7	0,55

Local knowledge about adaptive approaches	6. Tools	0,68	0,69	0,54
Long-term supply & demand assessments	6. Tools	0,79	0,69	0,66
Drought monitoring schemes	6. Tools	0,62	0,68	0,5
Drought early warning systems	6. Tools	0,59	0,68	0,45
Dynamic vegetation models for decision support	6. Tools	0,44	0,62	0,52
Reliable water resource for water supply	7. Supply	0,78	0,85	0,43
Alternative water source & water supply	7. Supply	0,77	0,8	0,4
Possibilities for development of water storage	7. Supply	0,76	0,8	0,38
Permanent water restrictions	7. Supply	0,64	0,8	0,4
Possibility to expand irrigation practices	7. Supply	0,51	0,76	0,2
Access to public drinking water service	7. Supply	0,72	0,71	0,46
Distribution of hydropower plants	7. Supply	0,66	0,58	0,27
Regional water distribution networks	7. Supply	0,66	0,56	0,33
Water available for irrigation during drought	8. Irrigation	0,6	0,78	0,31
Use of effective irrigation systems	8. Irrigation	0,6	0,74	0,28
Apt size of water permits to sustain irrigation	8. Irrigation	0,62	0,74	0,3
Use of irrigation	8. Irrigation	0,55	0,72	0,25
Sectoral actor's level of available assets	9. Funds	0,67	0,77	0,38
Dependency on sector as only source of income	9. Funds	0,57	0,75	0,28
Sectoral actor's level of solvency	9. Funds	0,47	0,65	0,27

*to offer drought related support

S4- Impact scores for relevant vulnerability factors

S4.1 Impact scores for 63 drought vulnerability factors rated by blue water consumers (x-axis) and universal water consumers (y-axis). The thicker grey lines, mark the threshold above which vulnerability factors have a medium high to high impact score.

S4.2 Impact scores for 63 drought vulnerability factors rated by green water consumers (x-axis) and universal water consumers (y-axis). The thicker grey lines, mark the threshold above which vulnerability factors have a medium high to high impact score.

S4.3 Impact scores for 63 drought vulnerability factors rated by blue water consumers (x-axis) and green water consumers (y-axis). The thicker grey lines, mark the threshold above which vulnerability factors have a medium high to high impact score.

S5 –Significant differences in factor ratings (p-value <0.05) between the water consumer groups based on pairwise Wilcoxon Rank sum test, with corrections for multiple testing, using the Benjamini-Hochberg method for p-value adjustment.

Vulnerability factor	*Green-Blue*	*Universal-Blue*	*Universal-Green*
Access to public drinking water service	0,0420		0,0420
Age of hydropower plants	0,0100		0,0199
Alternative water source & water supply	0,0006		0,0006
Apt size of water permits to sustain irrigation	0,0062		0,0016
Baseline water stress	0,0034		0,0010
Competing water interests	0,0004		0,0003
Coordinated Water Strategy (authority level)	0,0153		
Defined water use rights	0,0418		
Dependency on sector as only source of income			0,0086
Distribution of hydropower plants	0,0114		
Drought insurance	0,0173	0,0173	
Drought resilient seedlings	0,0098	0,0043	
Drought tolerance of current species		0,0274	
Permanent water restrictions	0,0232		0,0006
Possibilities for development of water storage	0,0003		0,0002
Possibility to expand irrigation practices	0,0018	0,0055	0,0000
Productivity of land		0,0006	0,0010
Proportion of fertile soils		0,0049	0,0242
Regional water distribution networks	0,0051		
Reliable water resource for water supply	0,0012		0,0007
Sectoral actor's level of available assets	0,0104		0,0104
Sectoral actor's level of solvency			0,0437
Shallow rooted crops/species	0,0087	0,0013	
Species outside its natural range	0,0485	0,0485	
Species suitable for future drought projections	0,0367	0,0047	
The elevation	0,0173		
Use of effective irrigation systems	0,0051		0,0002
Use of irrigation	0,0023	0,0490	0,0001
Water available for irrigation during drought	0,0082		0,0001
Water quality deterioration	0,0195		0,0195