

DIVERGENT VIEWPOINTS ON THE ROLE OF THE GALAPAGOS GIANT TORTOISE ON THE CONSERVATION AND DEVELOPMENT OF THE GALAPAGOS ISLANDS

Conference: 'Systems ecological perspectives on sustainability'

FRANCISCO BENITEZ-CAPISTROS

24 September 2014



OUTLINE

I. Introduction:

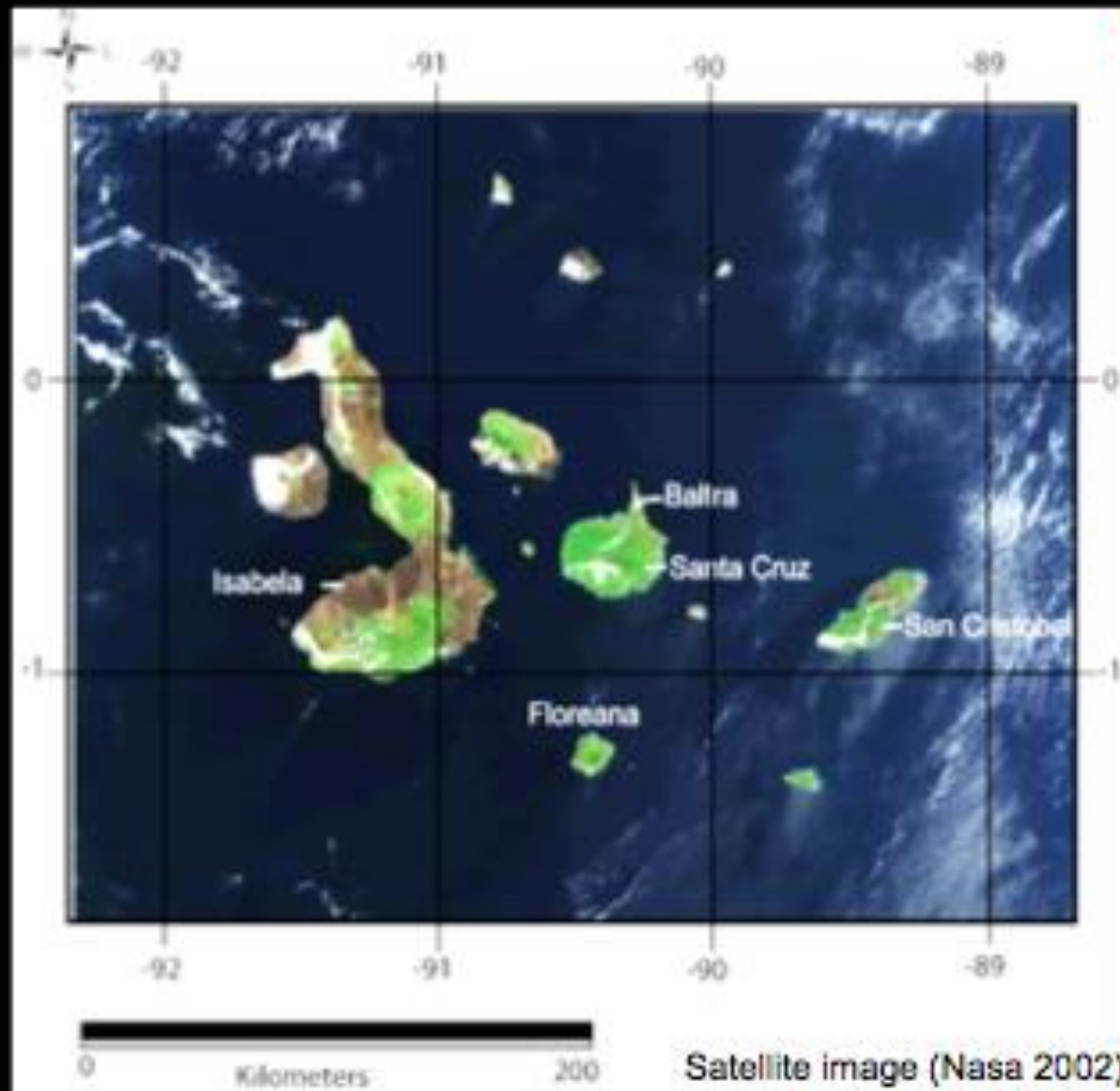
- I. Galapagos Islands and Galapagos giant tortoises overview

- II. Q methodology

II. Results and discussion

III. Conclusions

I. GALAPAGOS ISLANDS OVERVIEW



I. OVERVIEW

Biological and evolutionary importance
(1835)

National level

Islands first settlers 1880s potential
exploitation

Sugar cane

Vegetable inks

1935: Province

1959: GNP & CDF -> Conservation
institution

International level

1972-> UNESCO World heritage site



Human activities over the past decades

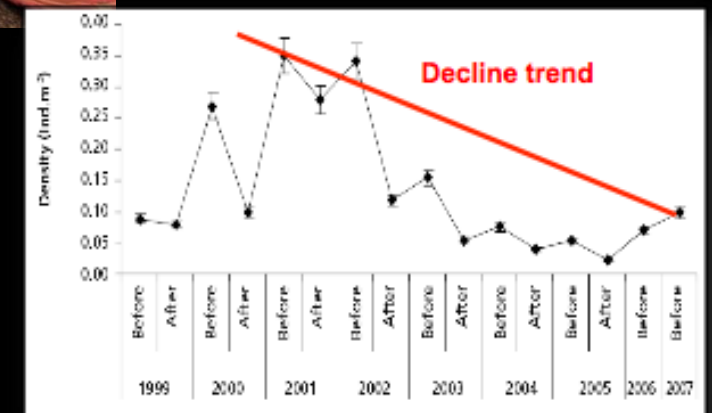
- Pop. Increase: 25000-40000 people



- Tourism: 200 000 visitors/year (GNP, 2012)



- Overexploitation of fisheries (sea cucumber, lobsters etc) (Hearn 2008; Toral-Granda et al., 2008)



I. OVERVIEW

- Biodiversity conservation & sustainable development -> **policy priorities**
 - 1998 & 2008: **GSL**
 - Ecuadorian Constitution: art. 14 - art. 258
 - 2005: GNPMP -> '**Conservation for development**'
- 2012: Creation of Galapagos Governing Council (GGC)

C O N T R O V E R S Y

- Lack of knowledge regarding interactions between the social and ecological components (Rodriguez et., 2008, Benitez-Capistros et al., 2014)
- Divergent viewpoints, interests and perspectives over the conservation and development of the archipelago
 - National and local policies
 - Conservation scientist, policy makers and the local communities

I. OVERVIEW

These complex decision-making dilemmas need urgent attention and require decision-makers to know the views and perspectives driving the debates

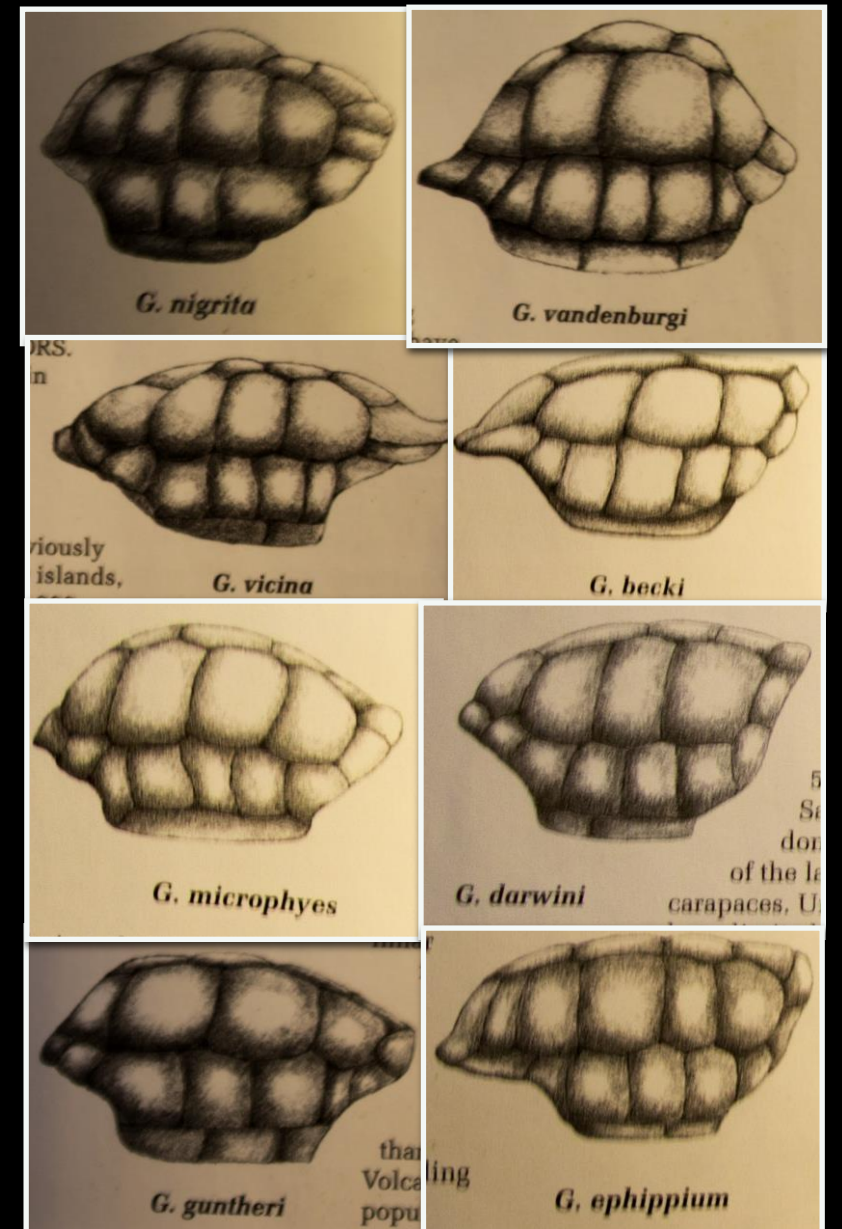


Use Q-methodology to explore the diverse viewpoints on the conservation and development of the Galapagos Islands

GALAPAGOS GIANT TORTOISES OVERVIEW



GALAPAGOS GIANT TORTOISES



Geochelone spp.

CONSERVATION OF THE GIANT TORTOISES

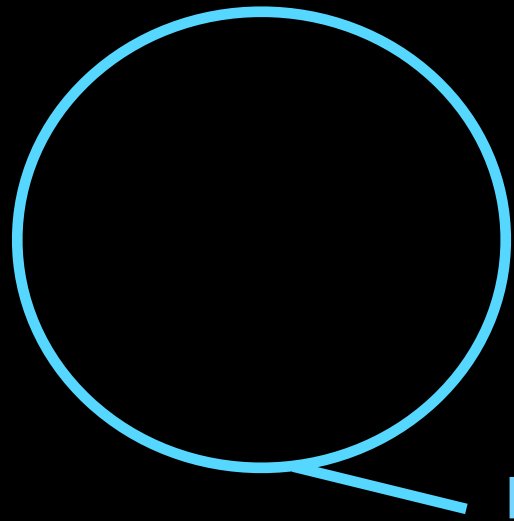
- Centuries of **depredation**: pirate, whalers and colonists
- Mid 1960s: **successful conservation breeding programmes**.
- **Human role** in **shaping nature** seeking to return to a '**pristine past**' (Hennesy 2013)



ECOLOGICAL ROLE

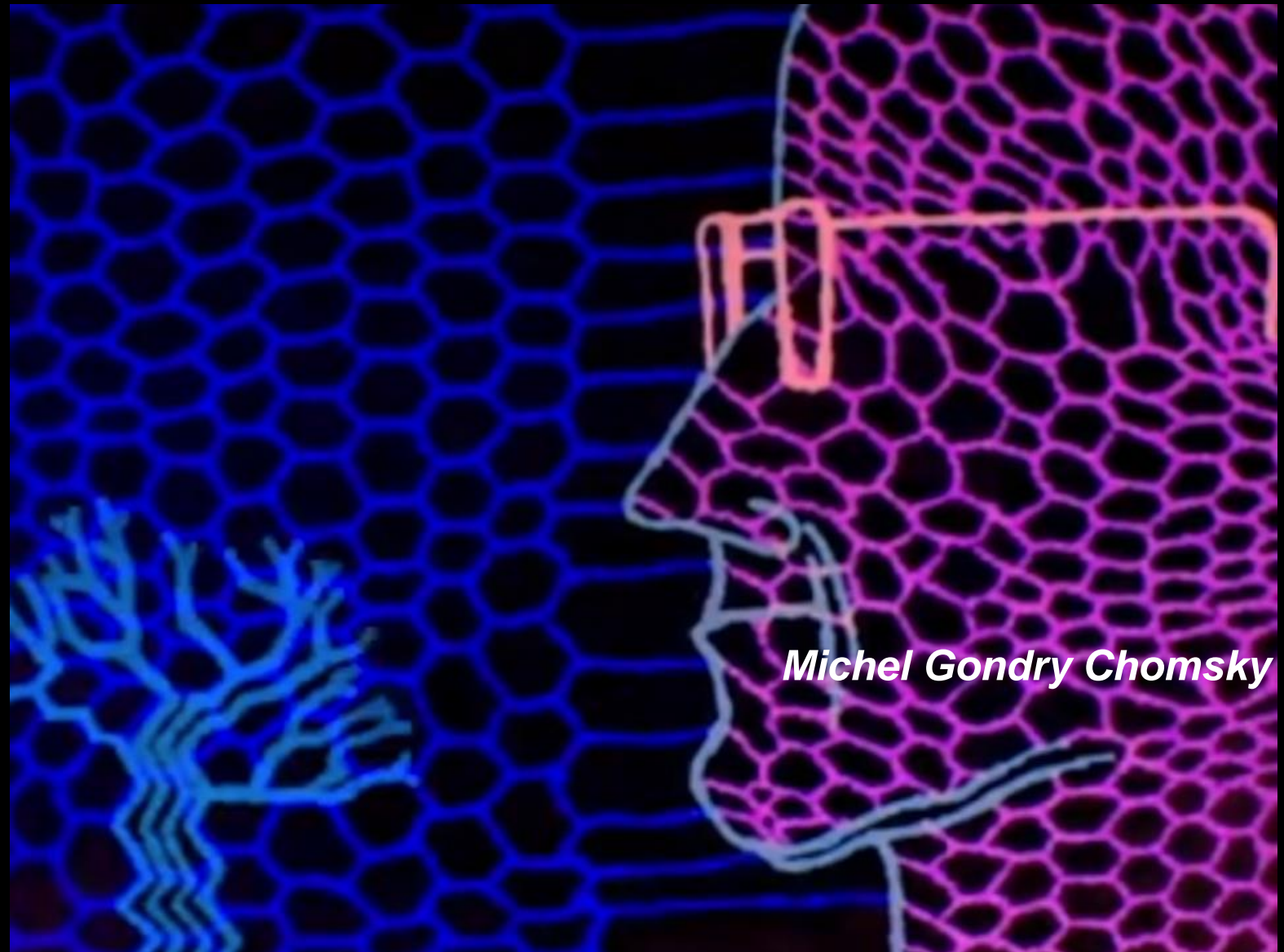
Mega-hervibores, seed dispersor, ecological engineers





methodology

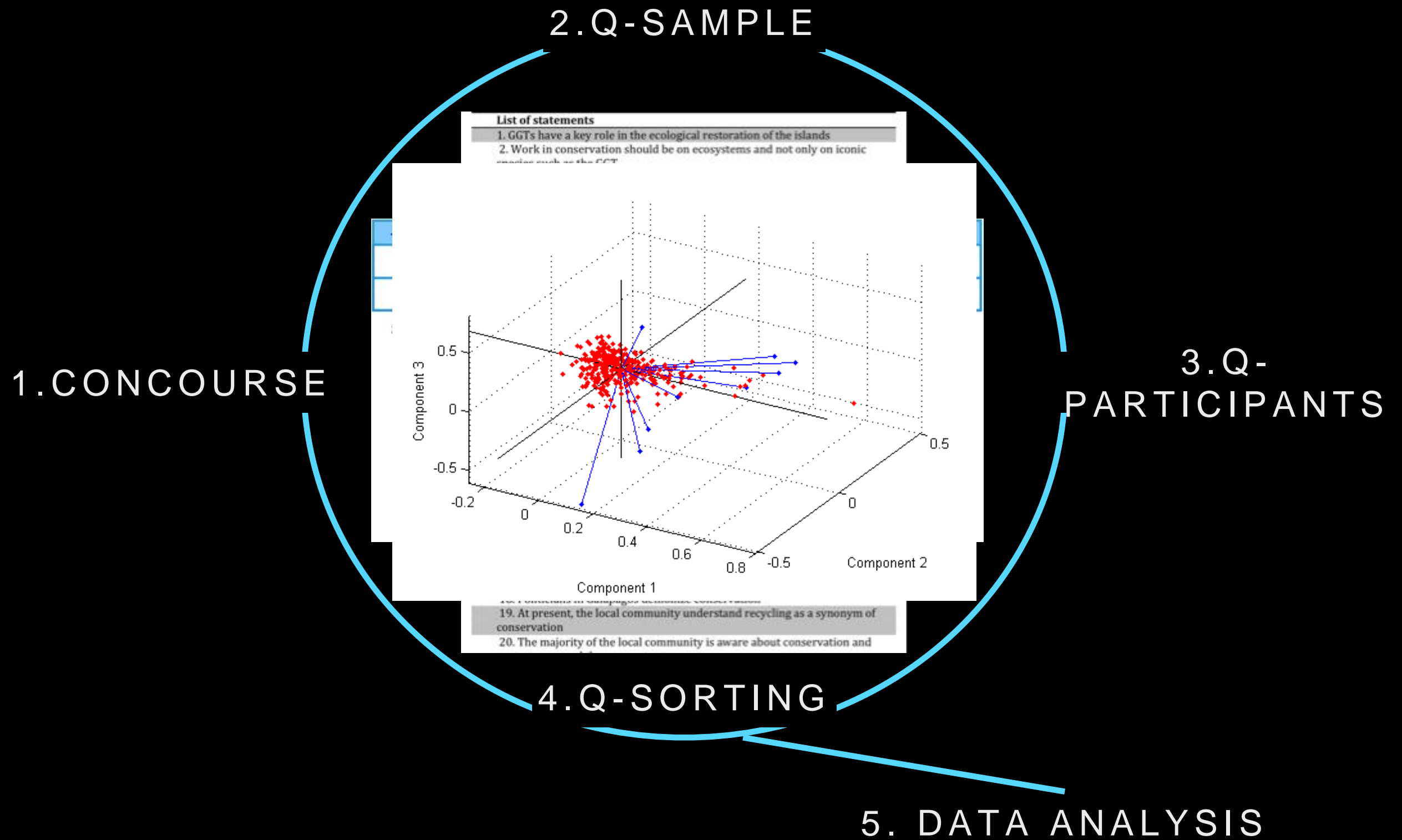
MEASURING
SUBJECTIVIT
Y



Q METHODOLOGY

- Developed by William Stephenson-> 1930s
- Scientific approach to the study of **human subjectivity** and **intersubjectivity** in an organised and statistical form (Barry and Proops 1999; Doodey et al., 2009)
- It combines the qualitative **study of attitudes** with statistical rigour of **quantitative research** techniques (Doody et al., 2009).
- The method is broadly used in **social science** research, and is being more and more used in **conservation biology and policy related research** (Addams and Proops, 2000; Barry and Proops, 2000; Cuppen et al., 2010; Davies and Hodge, 2007; Frantzi et al., 2009; Kalof, 2000; Rastogi et al., 2013; Sandbrook et al., 2011)

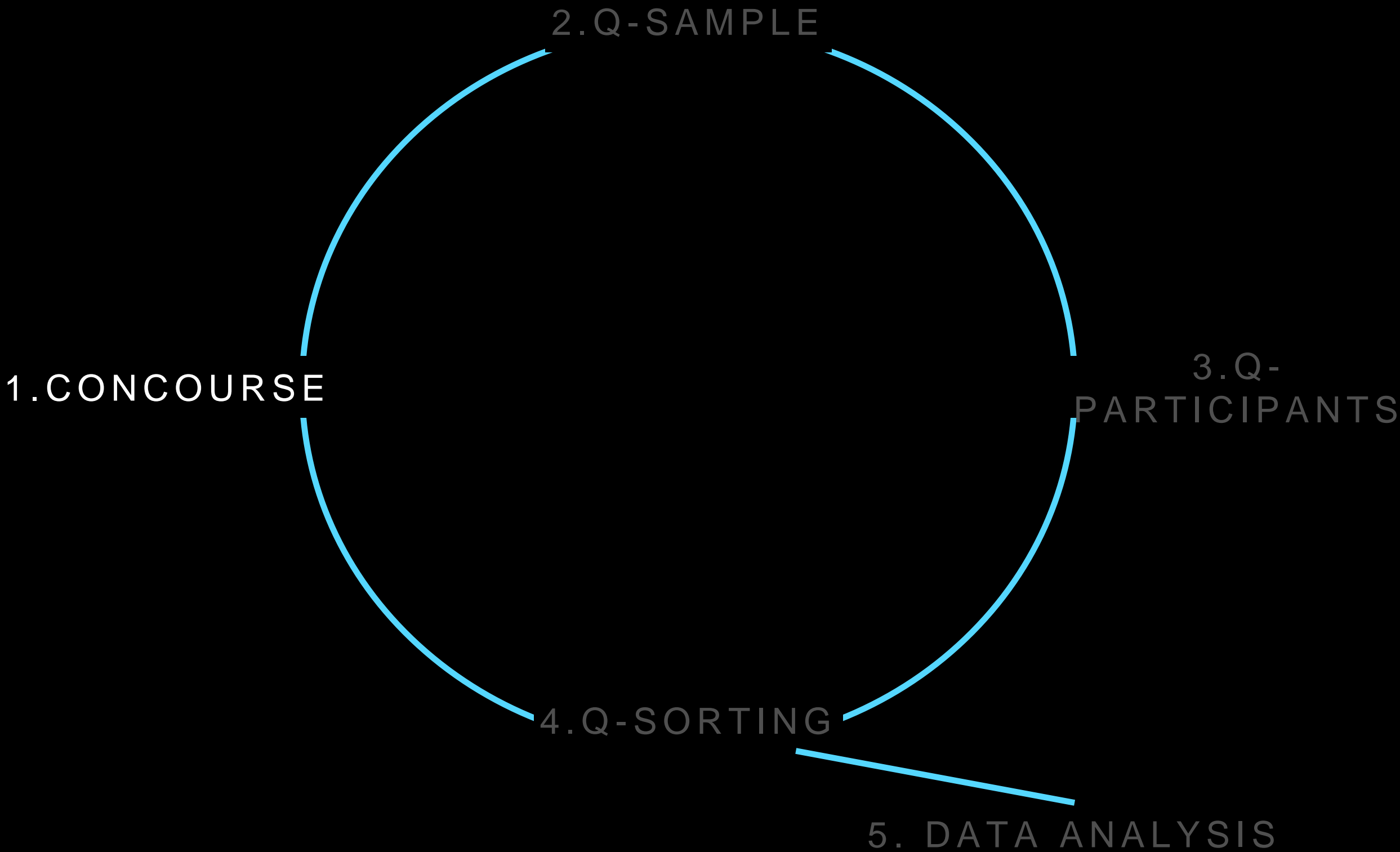
THE Q PROCESS



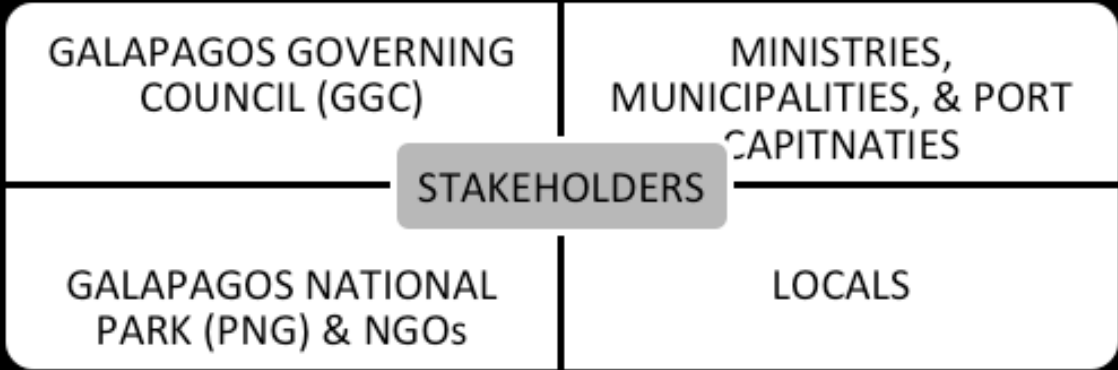
DATA COLLECTION



DATA COLLECTION



1.1.Stakeholder analysis (SAN)



1.CONCOURSE

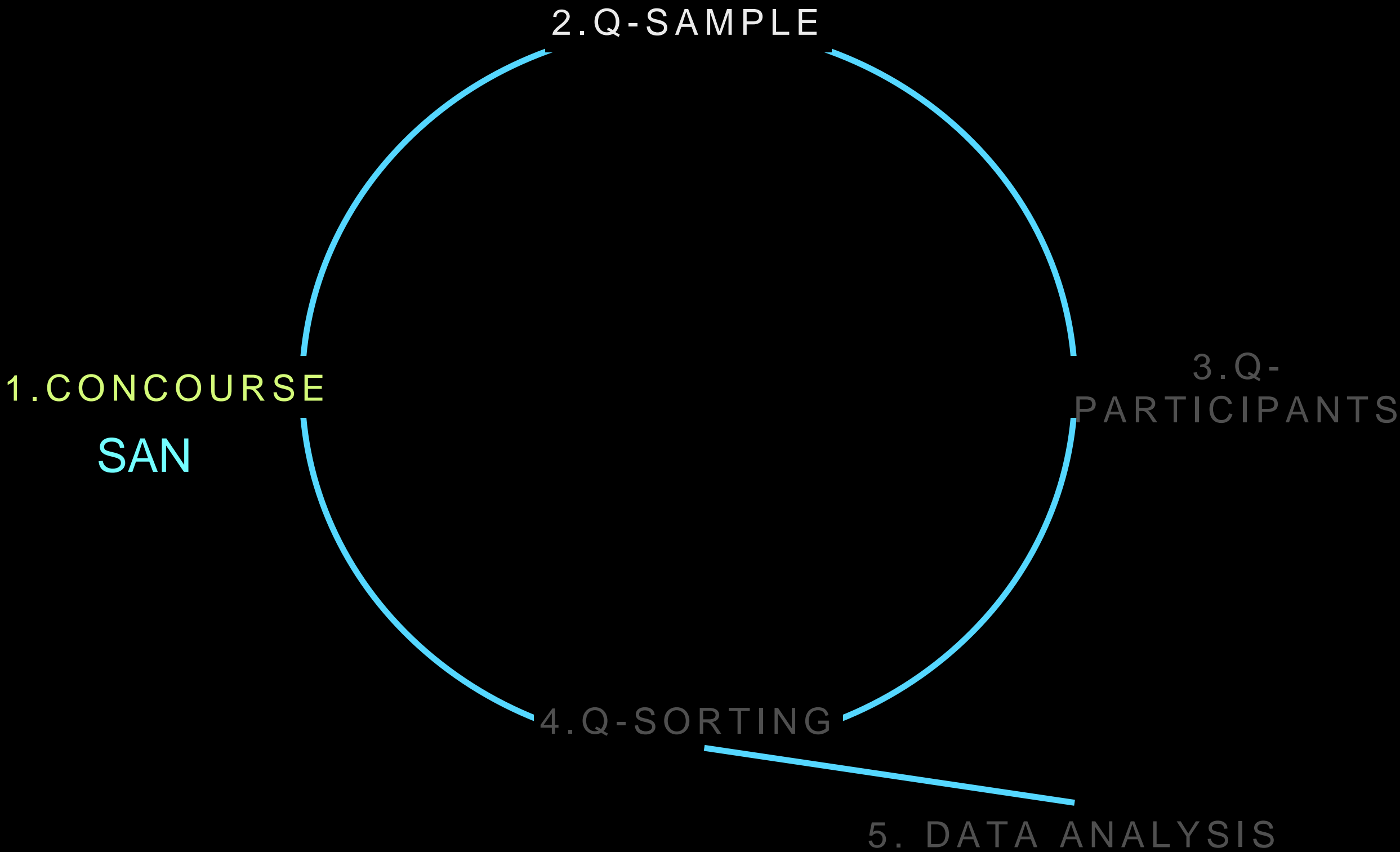


SE-interviews

Table 1. Number of interviewees by institutions					
Institution	Number of interviewees per island				
	SC RZ	SCB	ISAB	FLO	Total
Ministries					
Urban development and livelihood (MIDUVI)	1				1
Agriculture, farming and fisheries (MAGAP)	1				1
Social inclusion (MIES)	1		1		2
Tourism			1		1
GNP officers		1	2	1	4
Tourism chamber	1				1
Biosecurity agency (ABG)	1	1	1	1	4
Port captaincy	1	1	1	1	4
Parrish board	1			1	2
NGOs					
Conservation International (CI)	1				1
WWF	1				1
FUNDAR	1				1
Isabela Oceanographic Institute (IOI)			1		1
Education centers					
Colegio Nacional Galapagos	1				1
Colegio Amazonas			1		1
Colegio Ignacio Hernandez		1			1
Colegio Santa Maria				1	1
Universidad San Francisco de Quito (USFQ)		1			1
Galapagos Governing Council (GGC)		1	1		2
Municipalities	1	1	1		3
Locals					
Educator/artist	1				1
Farmers			4	1	5
Independent	1				1
Giant tortoise touristic ranches	2		1		3
Foreign scientist giant tortoises	1				1
Local scientist	1				1
Retired scientist giant tortoises	1				1
Fishermen		1		1	2

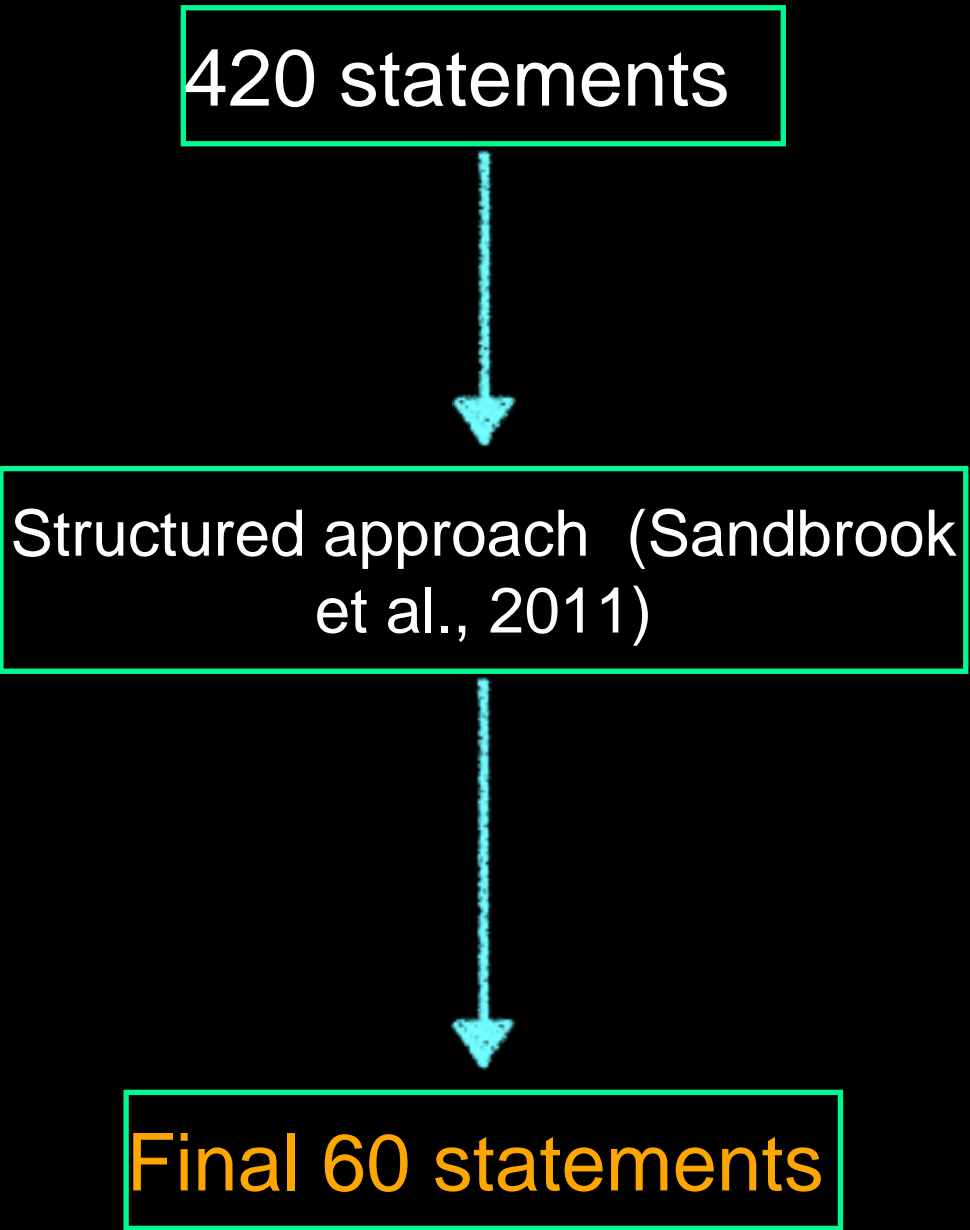
1.2. Literature revision

DATA COLLECTION

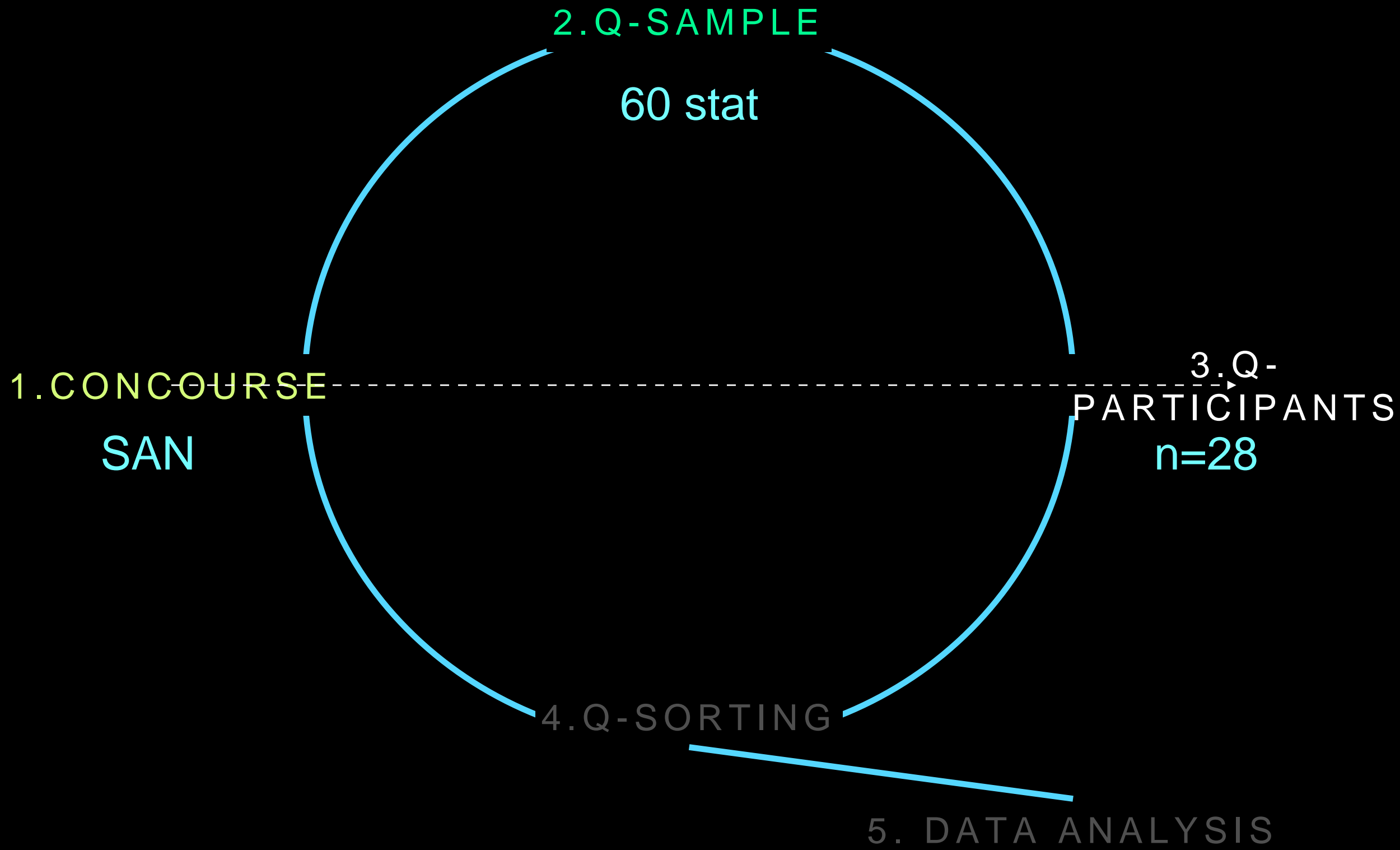


DATA COLLECTION

2.Q-SAMPLE



DATA COLLECTION

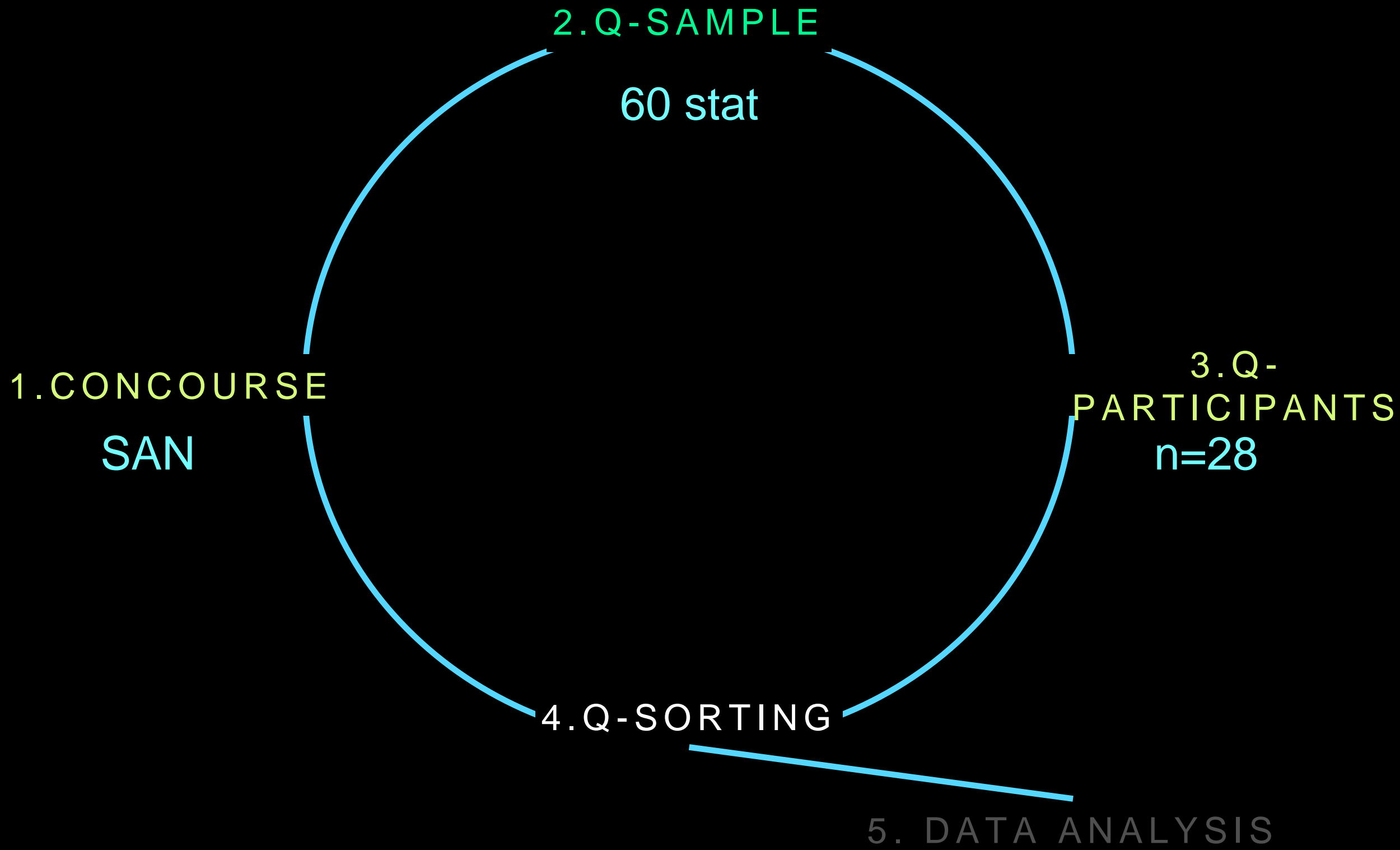


3.Q- PARTICIPANTS

Table 2. Q- Participants sex and place of birth		
Sex	Female	12
	Male	16
Place of birth	Santa Cruz	4
	San Cristobal	2
	Isabela	1
	Floreana	2
	Ecuador	16
	Foreign country	3
Total		28

Table 3. Q-participants Working sector and working area.		
Working sector		
	Independent	1
	Public	14
	Private	8
	NGO	5
Total		28
Working area		
	Conservation	
	Scientist giant tortoises	3
	Conservation giant tortoises	1
	Restoration of island's ecosystems	1
	Conservation and sustainable development	2
	Environmental management	1
	Policy and decision makers	
	Parrish board	1
	Tourism in Santa Cruz	1
	Giant tortoises	1
	Science ecology	1
	Agriculture	1
	Galapagos Governing Council	1
	GNP-San Cristobal	1
	Tourism in San Cristobal	1
	Sustainable development Santa Cruz	1
	Tourism	
	Giant tortoises ranches	5
	Hotel	1
	Restaurant	1
	Guide	1
	Biosecurity	2
	Fisheries	1
Total		28

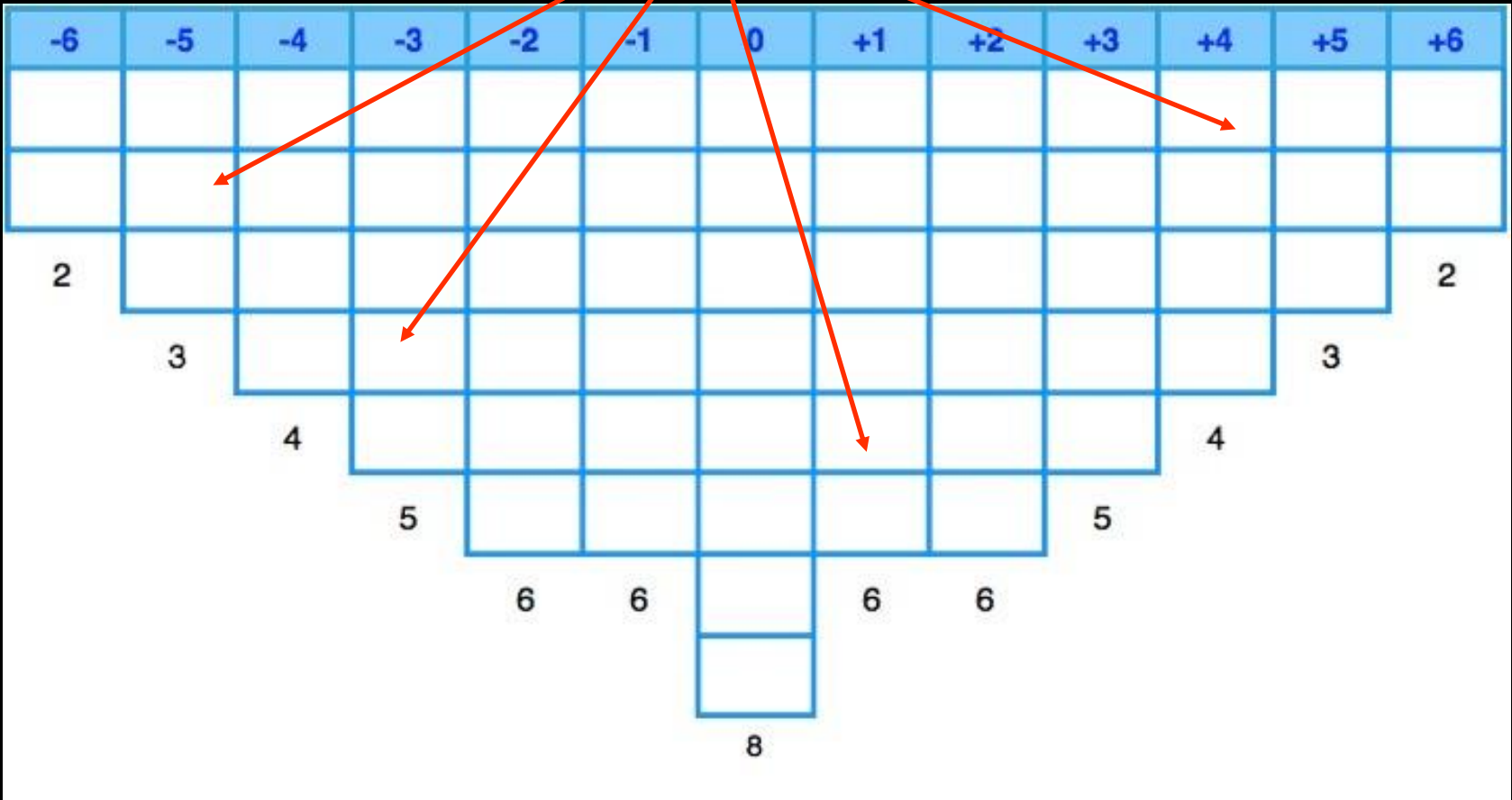
DATA COLLECTION



DATA COLLECTION

Q-SAMPLE

60 stat



Least like my point of view

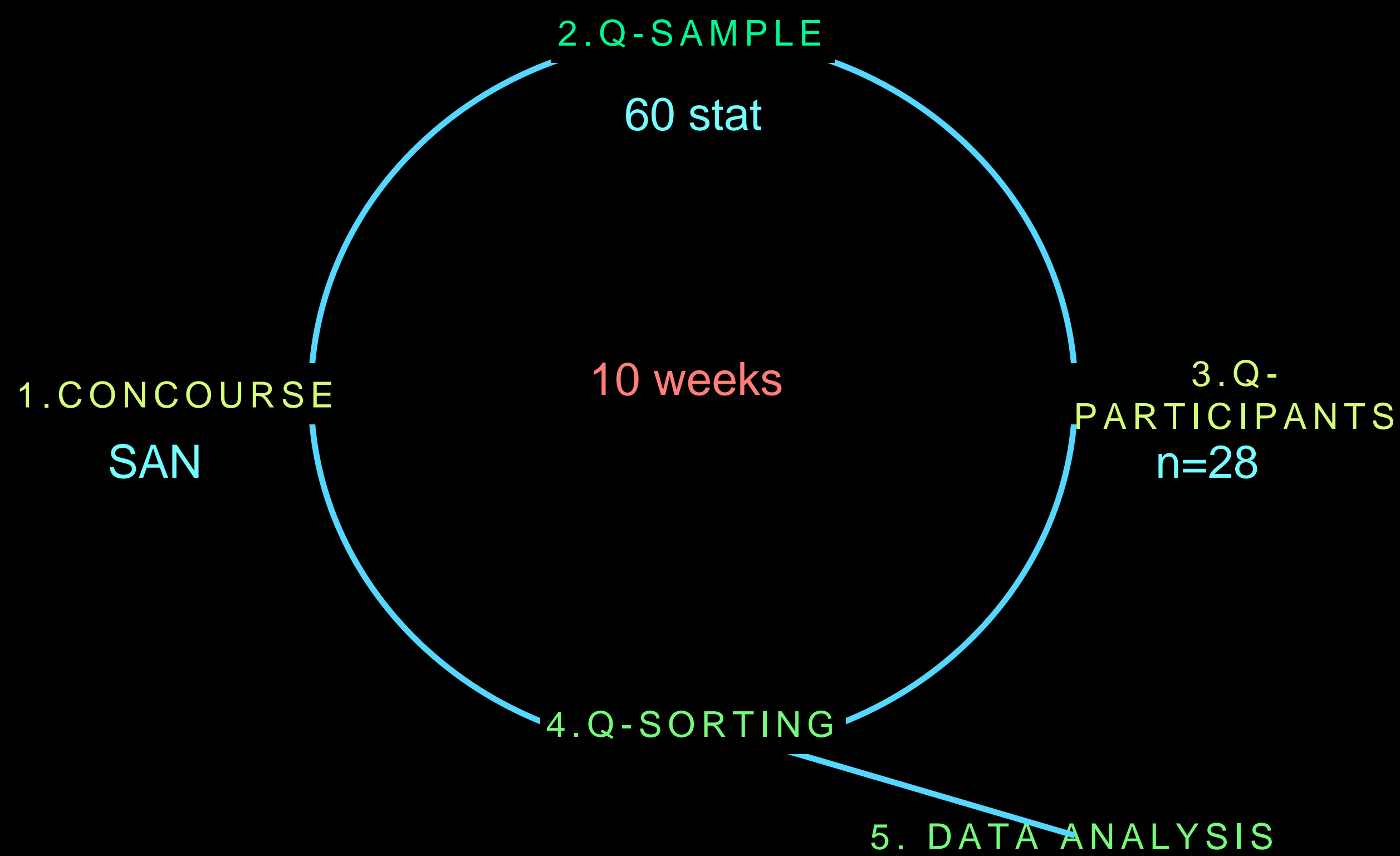
Most like my point of view

4.Q-SORTING

DATA COLLECTION: Q-SORTING

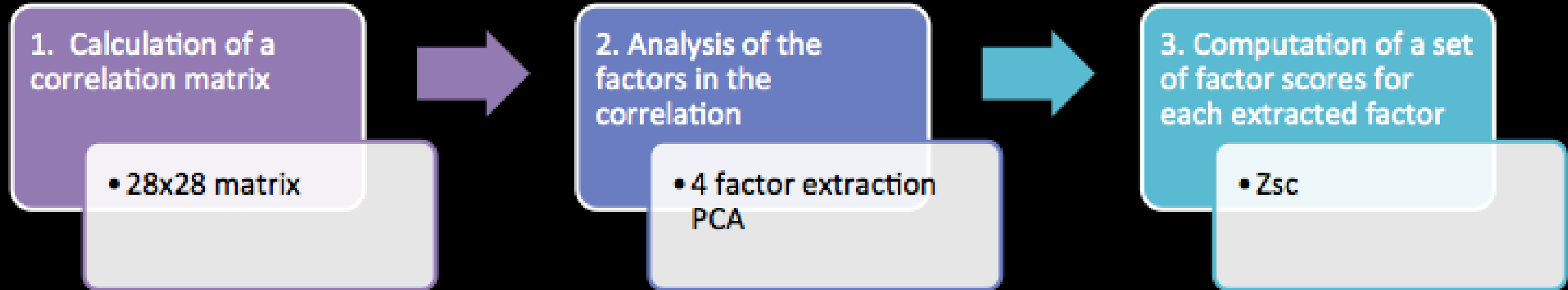


DATA COLLECTION

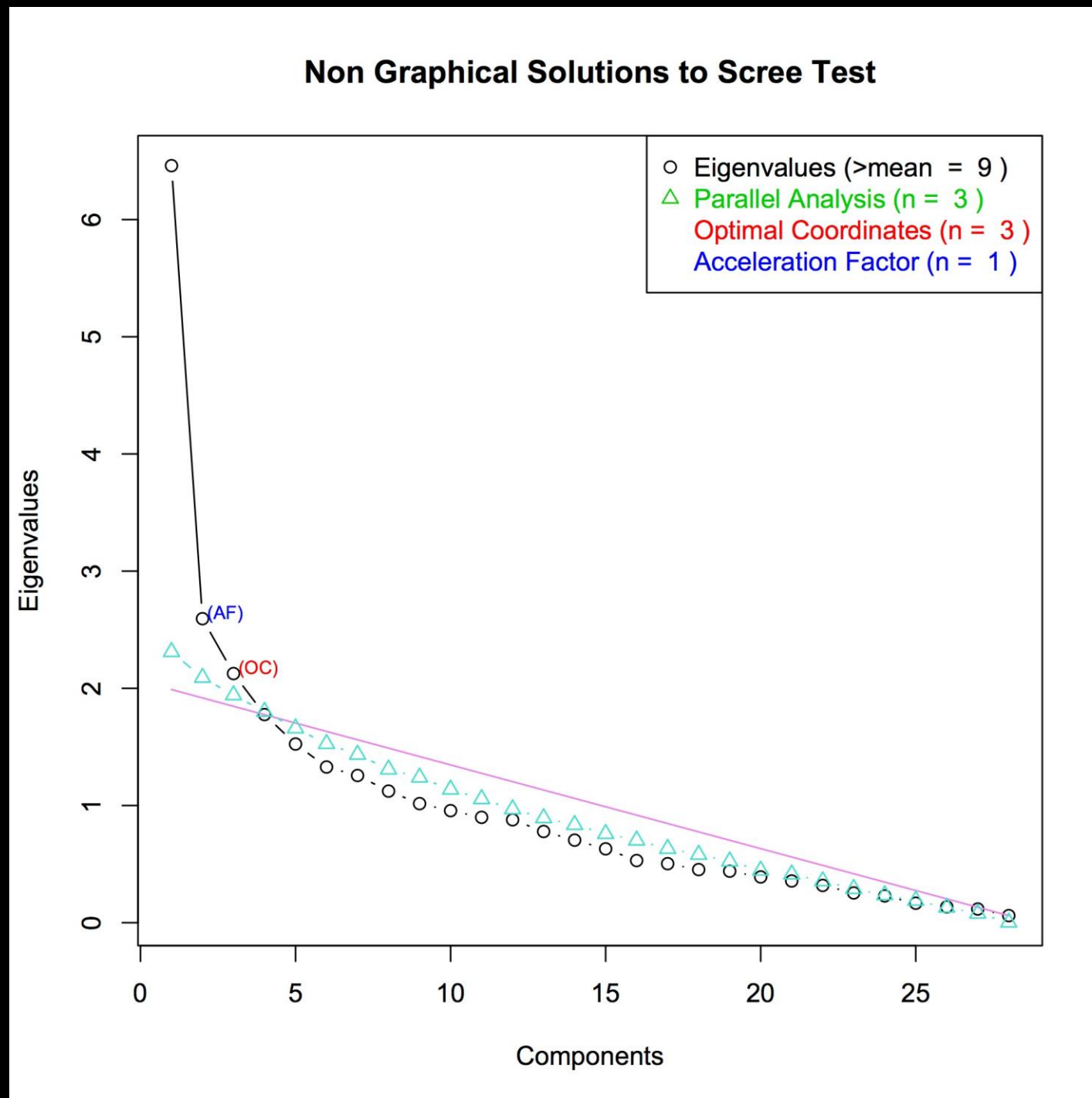


DATA ANALYSIS

- Software: PQ method Schmolck (2014) & R 'qmethod package'
- Three statistical procedures:



2. Extraction and rotation of significant factors



R : package nFactors

2.1. Varimax rotation of factors

Table 4. Rotated factor matrix with an (*) indicating a defining QSort at $p < 0.01$ level

Qsort	Loadings			
	F1	F2	F3	F4
1	-0.1243	0.3956	0.4291	0.0245
2	-0.0006	0.4101	-0.0012	0.5840
3	-0.0997	0.3566	0.4877	-0.0076
4	0.1698	-0.0001	0.0054	0.5724*
5	0.5362	0.0587	0.4750	-0.1508
6	0.7121*	-0.1308	0.1596	-0.2558
7	-0.1308	0.0961	0.6377*	0.1859
8	0.3521	0.1340	0.1184	0.4339
9	0.3055	-0.1395	0.5078*	0.1740
10	0.3159	0.2636	0.5357*	-0.1067
11	0.1521	-0.1632	0.5587	0.3505
12	0.6201*	0.3268	-0.1872	0.0138
13	0.6179*	0.2804	-0.2795	0.2651
14	0.6330*	0.1462	0.0731	0.1563
15	0.5988*	0.1490	0.1908	0.0470
16	0.2372	0.6420*	0.1412	-0.0659
17	0.4074	0.5389	0.0229	0.1281
18	-0.1701	0.0862	0.2369	0.4588*
19	0.4212	0.4591	0.2846	0.2319
20	0.3203	0.2751	0.3027	-0.2724
21	0.1844	-0.0268	0.0927	0.6785*
22	0.1078	0.5823*	-0.0091	-0.0982
23	0.6650*	-0.0103	-0.1037	0.3243
24	0.6586*	0.0561	0.0518	0.2704
25	0.6690*	0.2486	0.0916	0.0090
26	0.1695	0.5621	0.4319	0.0913
27	0.1437	0.6106*	0.0814	0.2973
28	0.0384	0.8325*	-0.0002	0.1559
%Variance	17	13	9	8

Table 5. Factors Z-scores correlation, % variance explained, number of sorts loading on each factor at $p < 0.01$ level.

Z-scores	F1	F2	F3	F4	Variance explained (%)	Number of sorts loading
F1	1.00	0.30	0.23	0.23	17	8
F2		1.00	0.25	0.18	13	4
F3			1.00	0.21	9	3
F4				1.00	8	3

Relevant loaders

*Brown (1980) equation:

$$x = 2.58 (1/\sqrt{n})$$

where n=the number of statements in the Q sample

$$x = 2.58 (1/\sqrt{60}) x = \pm 0.33$$

3. Final factor scores by statement

Table 6. List of Q statements, Z-score and rank associated with each factor, and Eigenvalues.									
	Statements	Factors							
		1		2		3		4	
		Z-score	Rank	Z-score	Rank	Z-score	Rank	Z-score	Rank
1	GGTs have a key role in the ecological restoration of the islands	-0.11	-1	1.88*	6*	-0.15	0	-0.96*	-3*
2	Work in conservation should be on ecosystems and not only on iconic species such as the GGT	1.35	5	1.59	5	0.43*	1*	-0.76*	-2*
3	GGTs are living examples of evolution that deserve to be studied	-0.04	0	0.23	1	1.03*	4*	-0.92*	-3*
4	It is sad that certain individuals such as Lonesome George disappear; they are a loss both for humanity and science	0.54	2	0.00	0	-0.03	0	0.07	0
5	Despite the fact that GGT are so iconic, they have been studied very little	-0.67*	-2*	-1.37*	-4*	0.51	1	0.20	1
6	Scientists coming to Galapagos should change their way of researching from not only doing science IN Galapagos but also FOR Galapagos	1.09*	3*	-0.44	-2	0.60	2	-0.39	-1
7	Scientific knowledge about GGTs and their natural history must be generated and disseminated so that people can understand what is being done	0.40	1	0.78	2	1.68*	5*	-0.38*	-1*
8	Genetic and migratory studies about GGTs are key for ecological restoration of their population	0.29	1	1.43*	5*	0.39	1	0.16	0
9	GGT conservation is a priority for the archipelago because of its social, economic, cultural and scientific value	0.02	0	1.16*	4*	0.23	0	1.85*	6*
10	GGTs conservation and breeding programmes serve two purposes: ecological restoration and tourism	0.17	0	0.49	1	0.60	2	0.81*	3*
11	The success in conservation with GGTs maintains public interest in conservation, which is essential to raise funding and influence political or community organizations	0.10	0	1.20*	4*	-0.92*	-2*	-0.10	0
12	Conservation is the best business that exists, it is the capital that sustains activities in Galapagos	-0.30	-1	0.11*	0*	-0.36	-1	-0.71	-2
13	Conservation means protecting species but also making use of those species, natural resources and landscapes	0.69*	3*	-1.56*	-4*	-0.60	-2	-0.34	-1
14	The efforts from the GNP to relate to the community are very isolated and specific. A holistic approach spanning the growing and dynamic community of the islands is needed	1.25	4	-0.23*	-1*	0.95	3	0.19*	1*
15	Much has been invested in conservation and little in social issues such as health, mobility and environmental education	0.58*	2*	-0.32	-1	0.42	1	-0.99*	-4*
16	The State and institutions have adequately managed human settlement in Galapagos	-2.30	-6*	-1.69*	-5*	-1.13	-4	-2.39*	-6*
17	Introduced species are a great threat for the conservation of GGTs	-0.01	0	1.29	4	1.94	6	0.10	0
18	Politicians in Galapagos demonize conservation	-0.63	-2	-0.30	-1	1.13*	4*	-1.46*	-5*
19	At present, the local community understand recycling as a synonym of conservation	-1.41	-4	-0.41*	-1*	-1.28	-4	-1.15	-4
20	The majority of the local community is aware about conservation and protect, care and they respect nature	-1.00	-3	-1.26	-4	-1.37	-4	-0.76	-2
21	GGT is a wonderful animal because it attracts many tourists	-1.32*	-4*	-0.12	0	1.26*	4*	0.31	1
22	To a large degree the Galapagos economy is based on tourism and consequently in the conservation of GGTs	-1.02*	-4*	0.82	2	-0.62*	-2*	0.99	3
23	Economically one GGT is worth more alive than dead	0.69	2	0.71	2	0.49	1	0.22	1
24	Tourism is the only productive activity in Galapagos	-2.38*	-6*	-1.70	-5	0.43*	1*	-1.73	-6
25	Tourism has generated economic benefits to the local community; and at the same time, locals have begun to realize the benefits of conservation	0.18	0*	0.93*	3	-0.08	0	-0.60	-1
26	GGTs are convenient because they are another product that can be promoted, as long as the rules and codes of conduct established by the GNP are followed	-1.04	-4	-1.19	-3	-0.66*	-2*	-1.03	-4
27	Handicrafts, fisheries and agro-production should be promoted as alternative productive sectors and of identity in Galapagos	1.85*	6*	-0.63*	-3*	0.15*	0*	1.09*	3*
28	Lonesome George was a commercial flagship individual that represented very little to conservation	-0.84	-3	-1.68*	-5*	-0.51	-2	-0.05	0
29	Galapagos needs to be managed socially, economically and environmentally by all the Galapagueños and people that live on the archipelago	-0.47	-2	-0.61	-2	1.63*	5*	2.48*	6*
30	The Galapagos Islands that are visited by tourists are usually completely unknown by a large proportion of the local community	0.52	2	0.96*	3*	0.98	4	0.03	0
31	The physical and emotional connection with nature is very low in the local community	-0.23	-1	-0.45	-2	-0.98	-3	-0.70	-2
32	The touristic attraction of GGTs is a synonym of respect for nature by tourists and the community	-0.49	-2	-0.60	-2	0.54*	2*	0.54*	2*
33	Fishermen and farmers respect nature equally	-1.63	-5	-0.70	-3	-1.38	-5	-1.26	-5
34	Environmental education in the archipelago must be established as a policy priority for the decision makers”: Galapagos Governing Council (GGC).Municipalities, Galapagos National Park (GNP) and ministries	1.22	4	0.60*	2*	-0.33*	-1*	1.59	5
35	In Galapagos there is a negative environmentalism, everything is prohibited. There should be opportunities in accordance with the islands' reality	0.58	2	-1.94*	-6*	0.37	0	-0.86*	-3*
36	Nature has rights but the human race is the one that needs to survive over all the rest	-0.30*	-1*	-1.95	-6	-2.12	-6	0.90*	3*
37	The successful conservation of the Galapagos Islands is a result of the hard work of different organizations and a public policy for the conservation of the archipelago	0.48	1	1.20	4	-1.13*	-4*	0.58	2
38	The GNP has done a good job in conservation issues, but has sought to intervene in things that are not within its competence	1.39*	5*	-0.31	-1	-0.91	-3	-0.65	-1
39	The strengthening of the Galapagos Governing Council (GGC) is key to helping all parts to coordinate and establish planning policies in the short and long term	1.84*	6*	0.34	1	-0.39*	-1*	0.87	3
40	The web of corruption and cronyism in Galapagos needs to be broken, it prevents Galapagos from boosting	1.62	5	-0.93*	-3*	1.96	6	1.12	4
41	All institutions in Galapagos have a responsibility in conservation	1.15*	4*	1.95	6	0.31*	0*	-0.68*	-2*
42	The sponsorship (godparenting) of GGTs following all the established regulations from the GNP is an interesting proposal for the development of community tourism	-0.52	-2	-0.01	0	0.79	3	1.24	4
43	Municipalities should be empowered and the excessive number of governmental institutions should be reduced	0.64*	2*	-0.02*	0*	-2.18*	-6*	-0.86*	-3*
44	GNP decision-making is based on many scientific and technical criteria	-1.68	-5	0.63*	2*	-1.42	-5	-0.71	-2
45	Galapagos' political model is a replica of the continent (Ecuador) but geographically and socio-economically the archipelago reality is very different	1.18*	4*	0.02	0	-0.25	-1	-0.65	-1
46	Galapagos economic model needs to be rethought towards a model of fair community tourism	-0.17	-1	-0.57	-2	0.80*	3*	-1.18	-4
47	More support from the communities towards the institutions is needed (i.e. locals respecting, promoting biosecurity restrictions to prevent the introduction of invasive species)	-0.75	-3	0.65*	2*	-0.15	-1	-0.85	-3
48	Galapagos belongs to its original inhabitants, this means”: the tortoises and all its flora and fauna	-1.01*	-3*	0.02*	0*	0.86	3	0.78	2
49	Human activities in the archipelago are directly and indirectly related to the GGT	-2.18	-5	-1.04*	-3*	-1.81	-5	1.59*	5*
50	GGT is the name that represents the islands globally and that has achieved that Ecuador positions itself as a country and owner of the archipelago	0.43	1	-0.20	0	0.18	0	1.82*	5*
51	Beyond the economic benefits that GGTs can generate, there is also the advantage of living surrounded by Galapagos' natural wonders	1.08	3	0.34	1	0.77	2	0.66	2
52	GGTs are animals that help us to understand and value the complex and interconnected world we live	-0.36	-2	0.13	1	-0.45	-1	1.27*	4*
53	GGTs are the example of what has to be done with the archipelago, this means”: protecting and conserving it so that it can last for many generations	-0.23	-1	1.39	5	0.69	2	0.29	1
54	GGTs are unique and endemic species and this is why we all should contribute to their conservation in order to avoid their extinction	0.75	3	1.13	3	0.75	2	0.54	2
55	GGT is a charismatic and harmless species with which man can peacefully live side by side	0.37	1	0.33	1	0.83	3	0.41	1
56	GGT symbolizes the survival and adaptation of all the species of the world to different circumstances	0.73*	3*	-0.57	-2	-1.02	-3	-0.02	0

RESULTS AND DISCUSSION

Factor 1. Governance centered

- Factor focuses **governance issues**. **Strengthening** government instituciones (GGC, GNP, Municipalities) [stat 39] and **breaking** the **webs of corruption and cronyism** [stat 40]
- It considers that Galapagos needs promotion of **alternative productive sectores** beyond tourism [stat 27, 24]
- **Conservation** should be **ecosystem** and not on iconic species [stat 2] and that will only work **with a community involvement** [stat 47] and for that environmental education is needed as a policy priority [stat34] (Rastogui et al.,2013)
- Value giant tortoises beyond **utilitarian approach** [stat 21,26], and as a symbol for evolution [stat 56], but do not consider giant tortoises conservation important for tourism or the economy.

"There is a governance component that for me is not working. This is why governance and environmental education and in general social issues are mandatory. If you correct this, then everyone including giant tortoises have a chance to thrive." Qsort 25

(Svarstad et al.,2008)

Promethean discourse

Factor 2. Giant tortoise conservation centered

- Focus on **giant tortoises conservation as a priority** because of their ecological, scientific and socio-economic value [stat1, 8, 54, 11] and that giant tortoises are an example of the success in conservation [stat 28, 53]
- Considers **ecosystems approach** to conservation [stat 2], but that conservation should **not** be **about economic benefits** [stat 13].
- Considers that the local community is not aware about conservation [stat 20]; but that economic **benefits from tourism** have raised **conservation locals awareness** [stat 25]. It disagrees with the promotion of alternative productive sectores such as fisheries and agro-production [stat 27]
- Consideres that there is a **positive environmentalism** in Galapagos [stat 35] and that the strengthening of institution is not relevant[stat 36, 43]. It consider that all institutions should have a responsibility with conservation [stat 41]

I think that the management that has been carried with giant tortoises can be an example for the rest of activities or goals in Galapagos. It is an example for the community.” -Qsort16-

(Svarstad et al.,2008)

Preservationist discourse

Factor 3. Community centered

- Reflects concerns of the local communities, particularly in terms of social **needs and inclusion** (e.g. environmental education) [stat 14] and conservation awareness in the local community [stat 7]
- Supports a **moral duty to protect giant tortoises** [stat 57]. It considered the possibility of coexistence among the community [stat 55], that it is important for tourism [stat 21] considering humans and nature as equals [stat 36]
- Considers that **locals** should **manage the archipelago** [stat29]
- Considers that **institutions** have **not** done a **good job** neither in **social** [stat 16] and **conservation** issues [stat 44] and this is related to the **webs of corruption**[stat 40] **Disagrees** with the **empowering** institutions is not an option [stat 43]

"If politics would not be involved we could do a much better work in conservation. We could prioritise issues that are really needed and not those that are politically convenient. ...- Qsort10

Galapagos has to be managed by people that know the islands, there is people that has a position and they do not even know the islands. -Qsort7-

Factor 4. Tourism centered-utilitarian

- This factors consider that **humans are over nature** [stat 36] and Galapagos needs to be **managed by local people** [stat 29]
- It consider **giant tortoises conservation** is a priority. Human activities are related to giant tortoises [stat 49] and their conservation is important for **tourism and the economy** [stat 22] and science [stat 9]
- Giant tortoise represent the work in conservation [stat 58] and have represented the archipelago at a global scale [stat 50]
- The current **economic model** based on tourism **does not need to change** [stat 46] God-parenting of **giant tortoises should be promoted** [stat 42]
- Environmental education should be promoted [stat 34]

“God-parenting is interesting, because on the one hand you help generating awareness about conservation, you protect giant tortoises; and on the other you can have an economic benefit. For example, you can have restaurant and this also promotes the local economy”-

Qsort18-

(Svarstad et al.,2008)

Win–win discourse

CONCLUSIONS

These findings allow us to identify foreseeable points of disagreement, areas of consensus and to discuss the implication of the findings to address socio-ecological conservation and sustainability challenges.

The conservation of the Galapagos giant tortoises, although considered successful in terms of captivity breeding appear to have failed to integrate local communities as part of its conservation processes, jeopardizing a long-term sustainability.

Identify areas of overlap between the four factors bet

Fostering consensus discourses around these views can help managers, decision makers and local communities to understand this complex socio-ecological system more comprehensively.

