Food and Agriculture Organization
of the United Nations

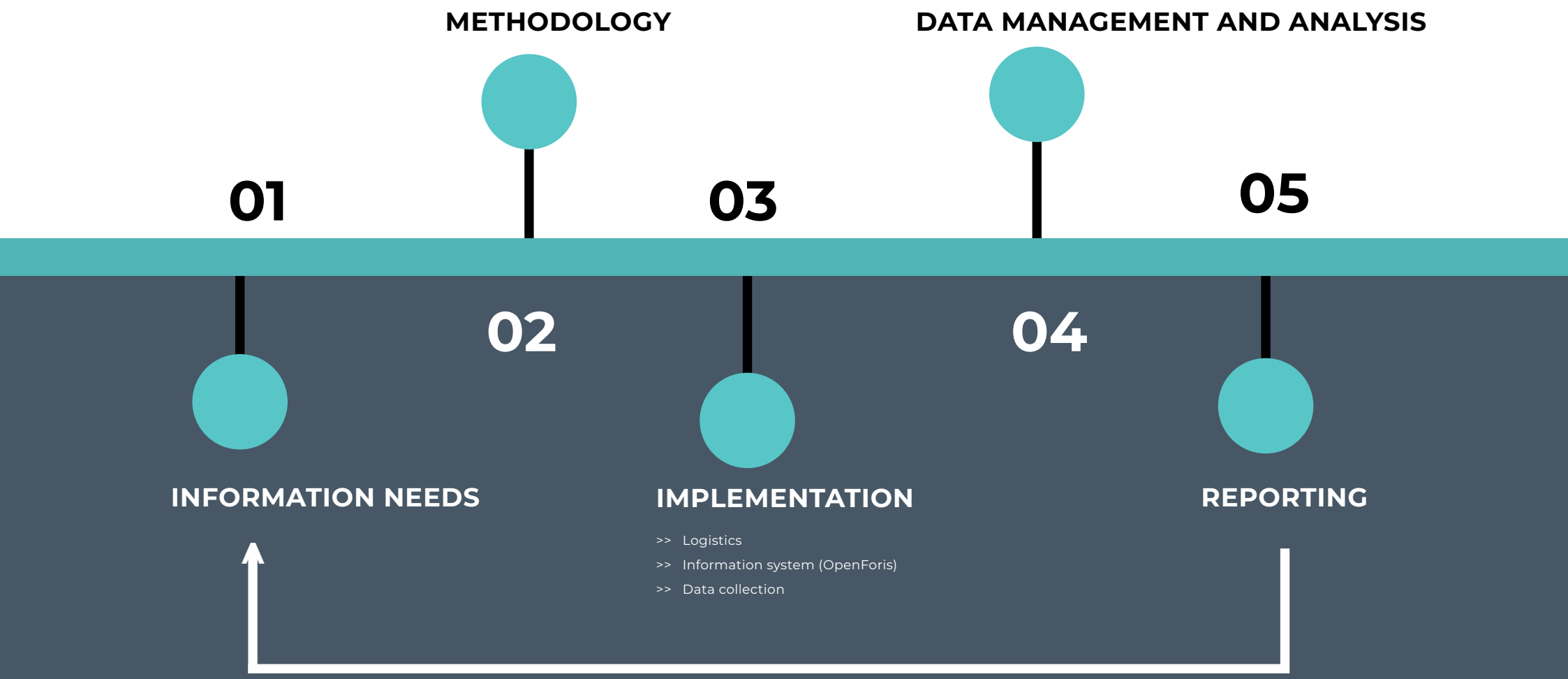
FINAL REPORT

Sudan National Forest Inventory

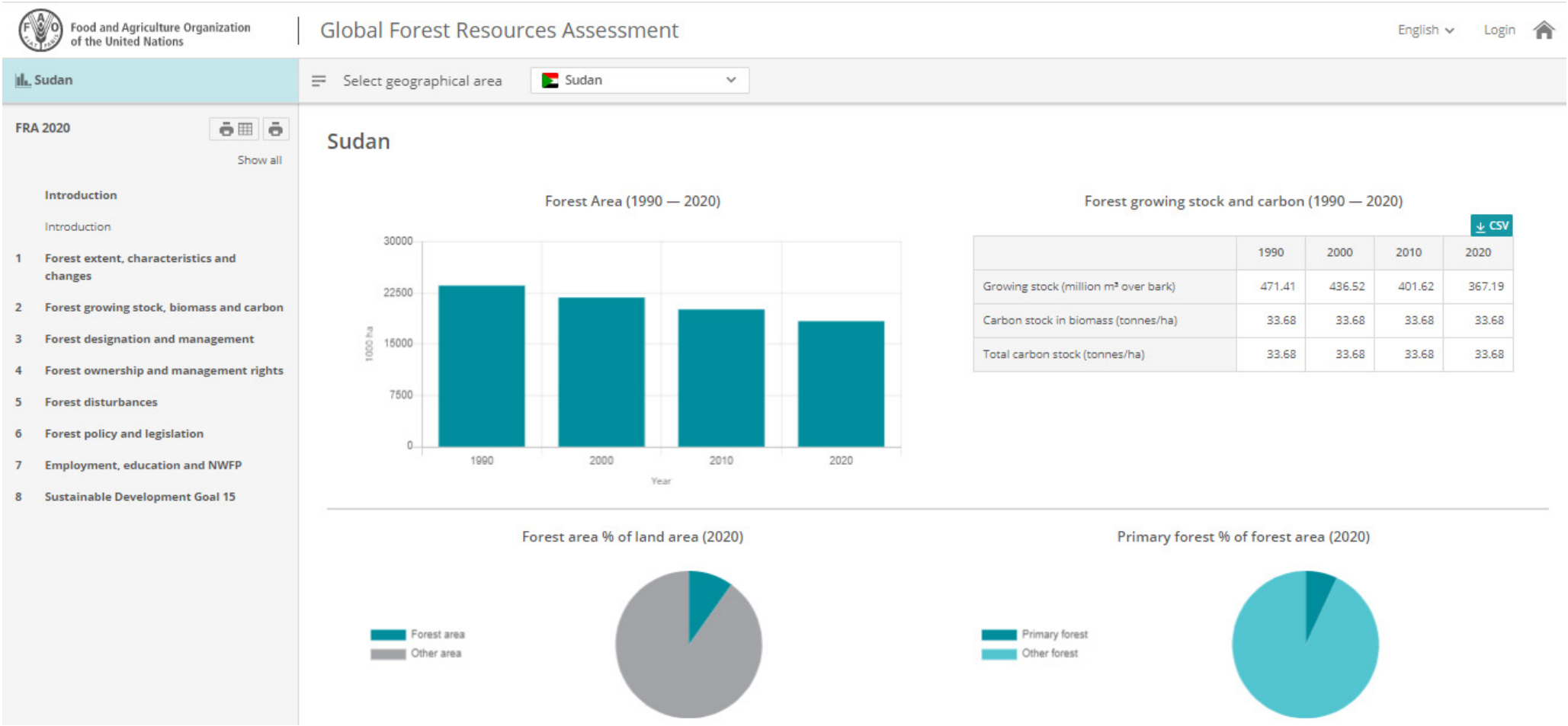
Key results

23.06.2021

SUDAN NFI
A LONG JOURNEY



SUDAN
FRA 2020 DATA



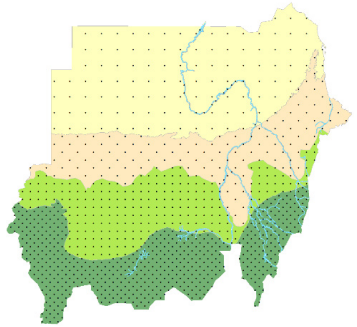
SUDAN NATIONAL FOREST INVENTORY
FINAL REPORT

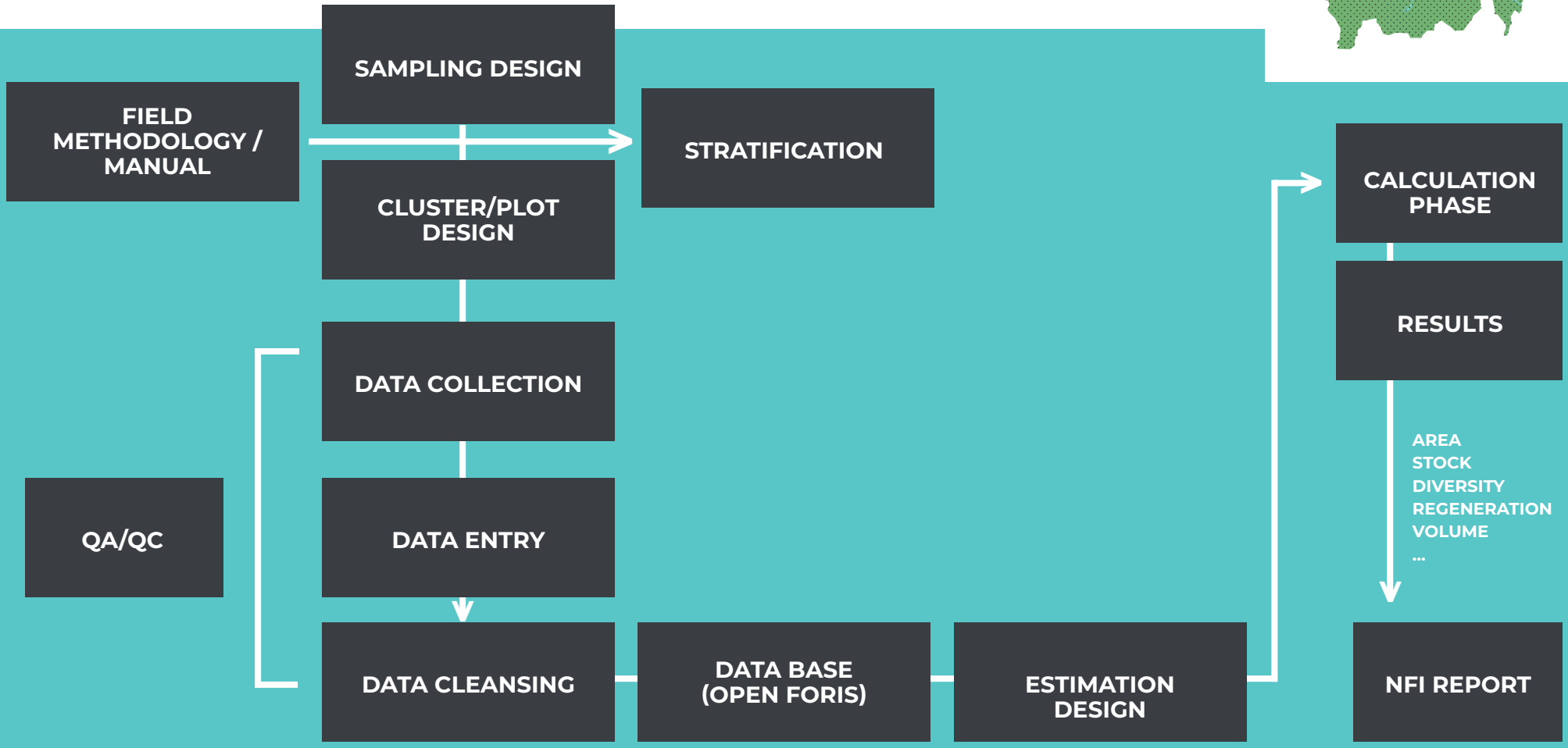
The National Forest Inventory of Sudan (NFI) is among a series of activities to have the data and capacities to monitor, report and verify REDD+ activities, and Sudan's forests. It is a national that provides valuable information for informing policy processes in line with the idea of "better data, better decisions". In addition, the planning and implementation of an NFI yielded a number of by-products, including the overall strengthened capacity of relevant national institution and the improved capacity (technical, equipment, methodologies) of staff including those at subnational stations.

REPORT CONTENT

- BACKGROUND OF FORESTRY CONTEXT IN SUDAN
- NFI PROJECT OBJECTIVES AND PROCESS
- METHODOLOGY
- RESULTS

METHODOLOGY





Calculation phase performed by Mr. Asdrubal Calderon using Silvametricus: http://www.silvahn.com
Supporting Document:
"Calculation Procedures Sudan National Forest Inventory (NFI-2020)"

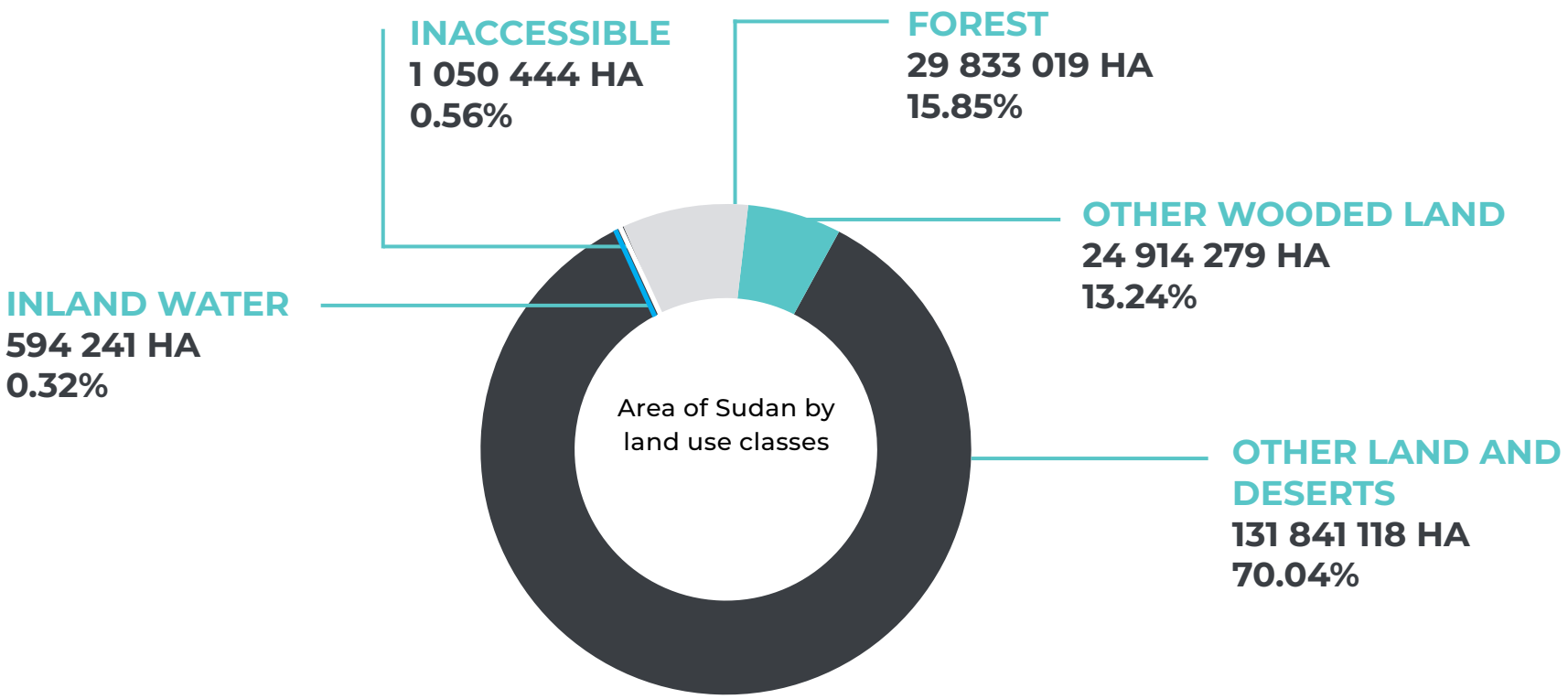
Area – Total and by State from Sudan Survey Authority (SSA)
Volume – form factor (ff) by species + Volume equations
Biomass – incl. AG and BG, equations from Chave et al. (2014) and Wood Density by IPPC

RESULTS

All estimates are presented by Strata, State, FRA class, LUC, etc.

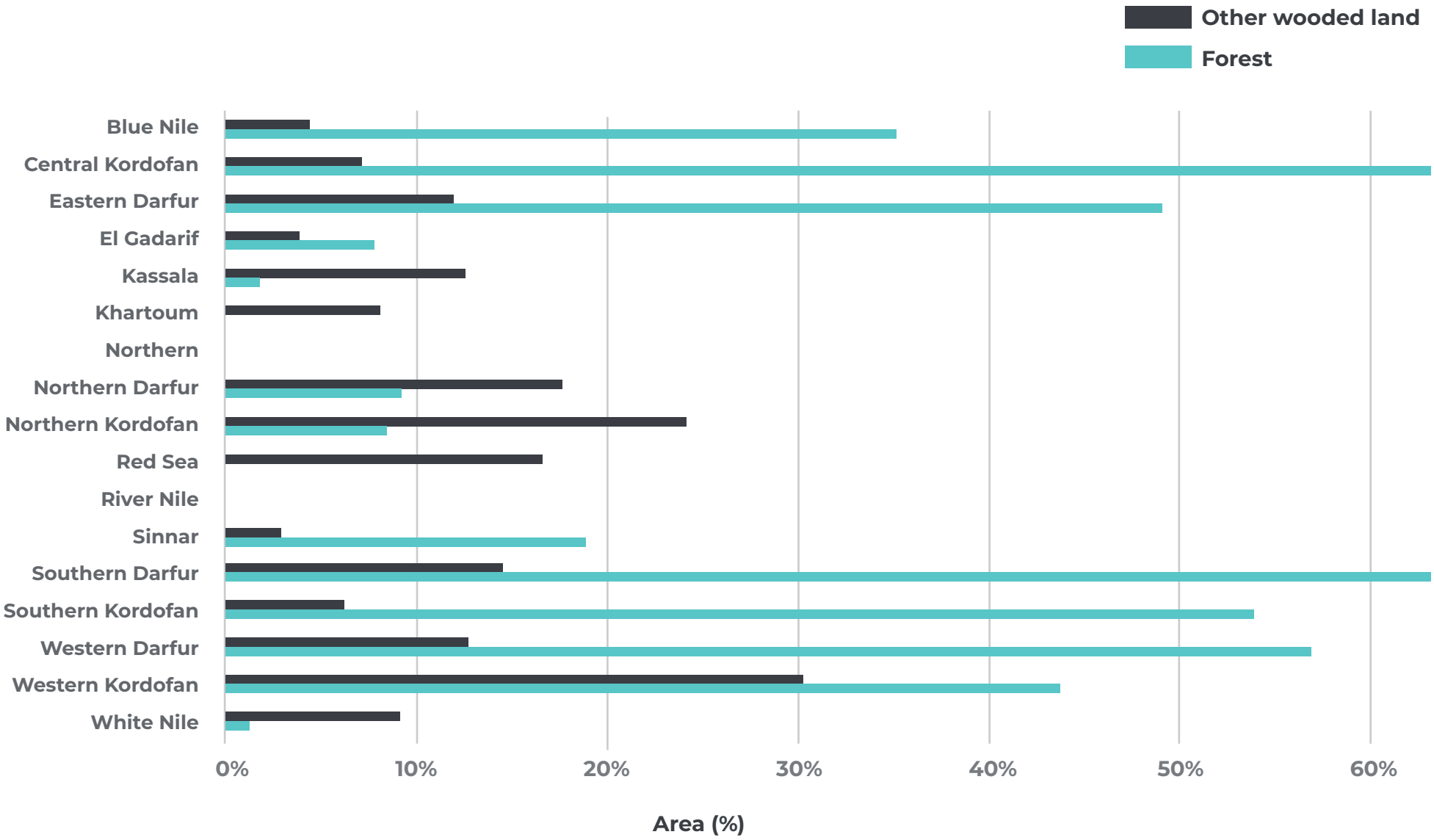
The NFI Report includes estimates for:

- Area, Canopy Cover, Fire Evidence, Tree density, Regeneration, Basal Area, Volume, Biomass, Carbon, Species and biodiversity, Products and Services.
- The data-base can (and should) be used for further analysis and investigations.



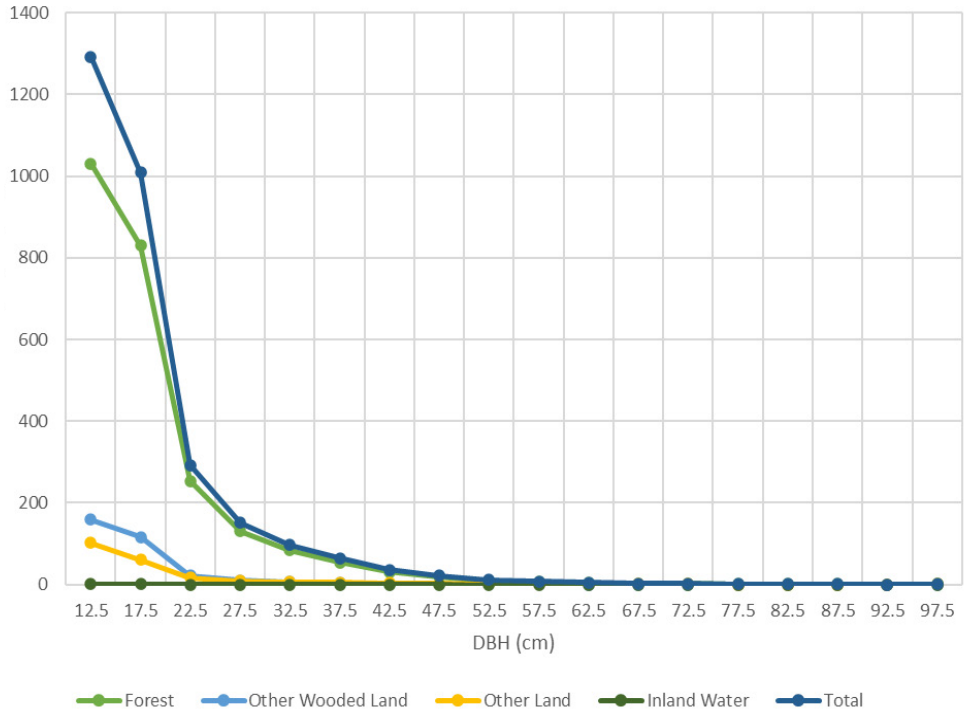
KEY RESULTS: FOREST AND OTHER WOODED LAND AREAS BY STATE

Central Kordofan, Southern Darfur and Western Darfur are the most forested in Sudan (over 55% of the land is covered by forests)

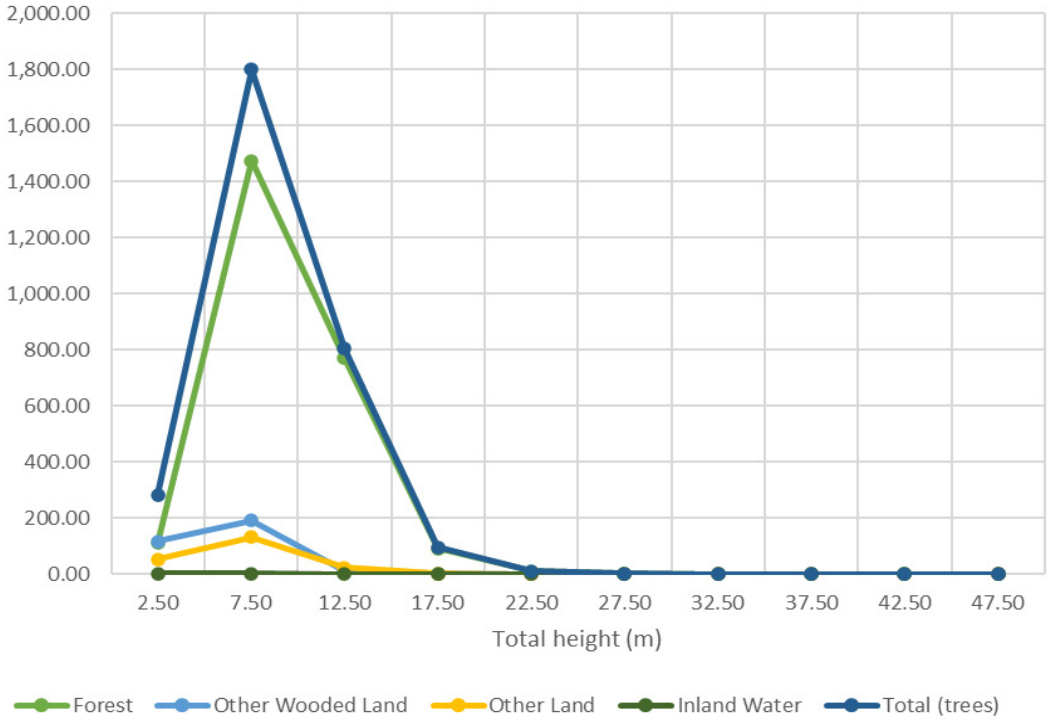


Number of trees/ha by DBH class and Height class

NUMBER FO TREES (TOTAL) BY DBH CLASSES



TREES DENSITY BY FRA AND HEIGHT CLASSES



REGENERATION
BY FRA CLASSES, AND NATIONAL LUCS

LUC level 0	FRA classes (LUC level 1)	National land use classes		Regeneration mean (N/ha)
		LUC level 2	LUC level 3	
Forest	Forest	Natural regenerated forest	Other forest type	83.33
			Bamboo forest	0.00
			Deciduous forest	599.54
			Evergreen forest	835.56
			Raffia/palms	2 283.56
			Semi-deciduous forest	403.27
		Plantation	Broadleaved planted forest	0.00
			Coniferous planted forest	0.00

REGENERATION
BY SPECIES

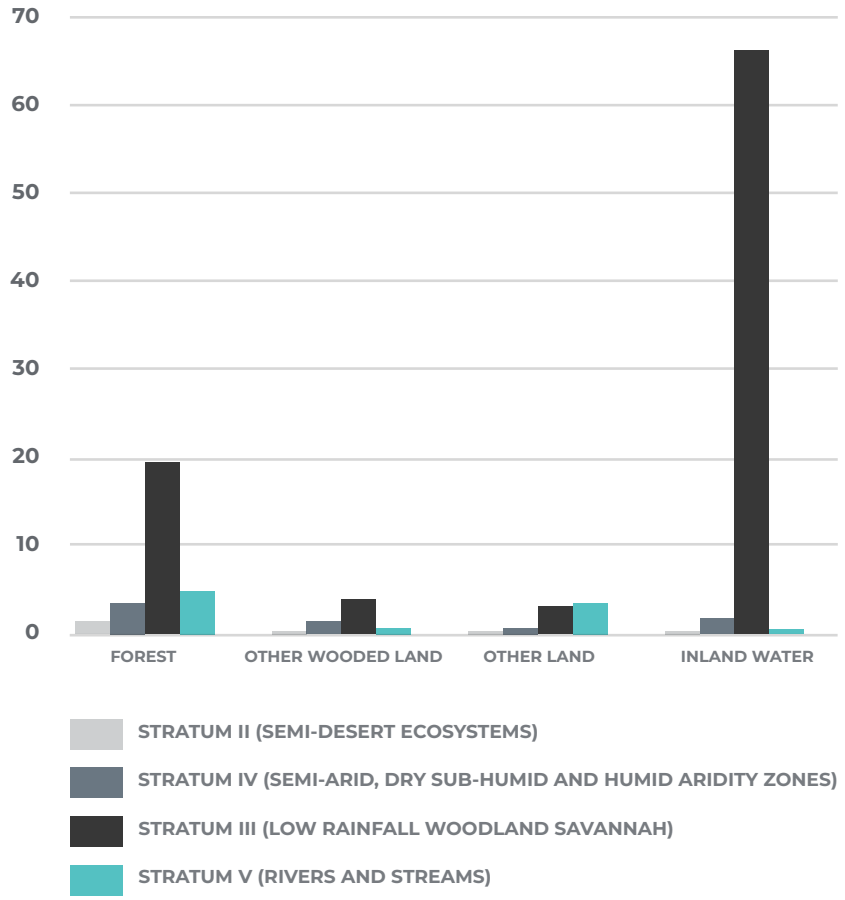
Species	FRA classes				Regeneration mean (N/ha)
	Forest	Other wooded land	Other land	Inland water	
Suaeda monoica	1 983.34				1 983.34
Acacia tortilis subsp. spirocarpa	133.33	1 762.96	1 674.18		1 644.36
Boscia salicifolia	1 616.67	200.00			908.34
Lannea humilis	616.67				616.67
Acacia drepanolobium	904.76	124.38	186.67		566.10
Guiera senegalensis	641.41	502.32	495.46		551.41
Cassia siamea	466.67				466.67
Dichrostachys cinerea	366.71	1 294.20	135.27	11 666.69	358.79
Boswellia papyrifera	333.33				333.33
Combretum glutinosum	300.00				300.00

KEY RESULTS

AVERAGE GROSS VOLUME/HA BY FRA CLASSES AND STRATA

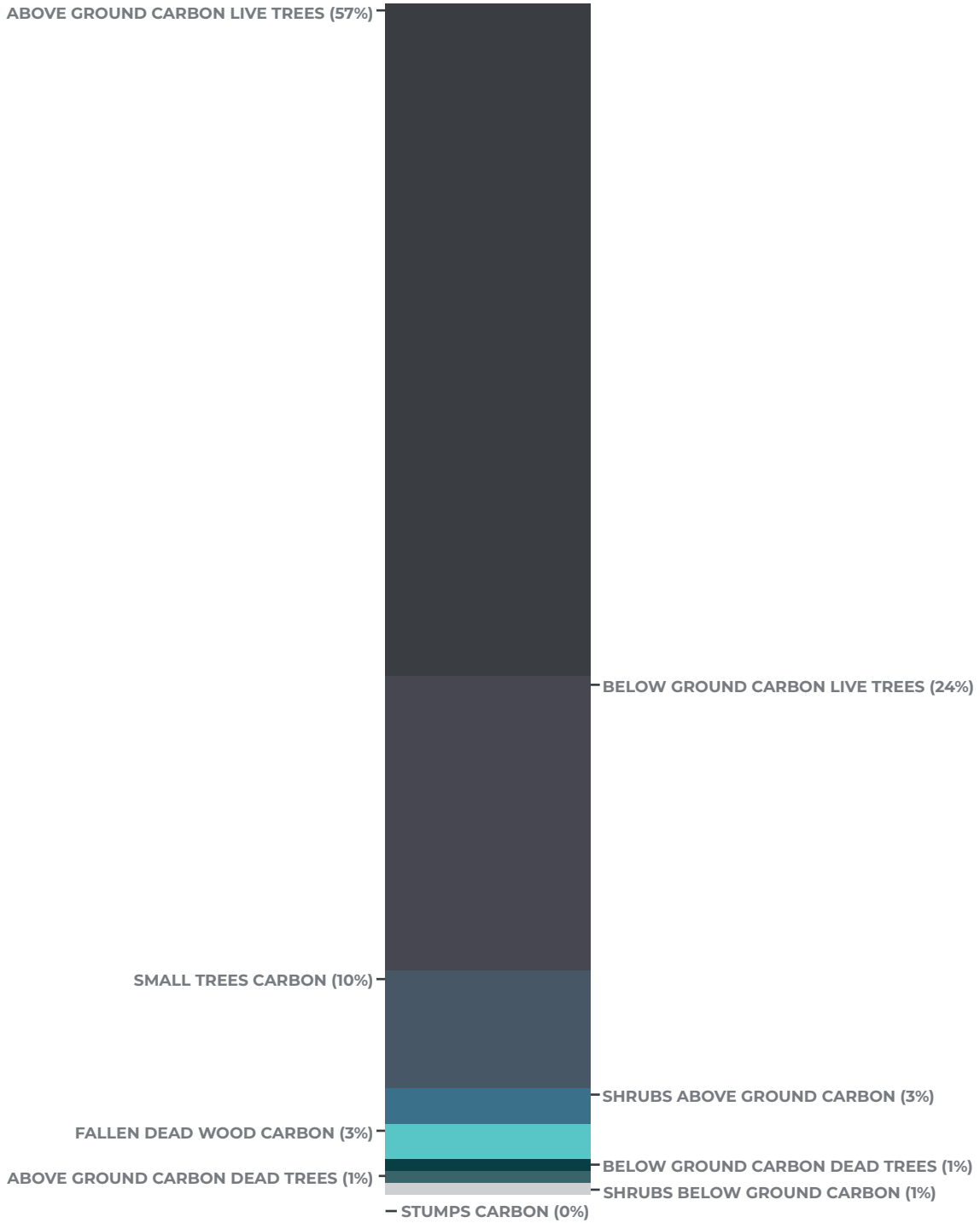
- Forests cover is 29.8 million hectares, which accounts for 85.7% of the volume stock.
- Other wooded lands cover 24.9 million ha and contain 6.1% of the volume stock.
- The remaining 133.5 million ha are other land and inland water.

Strata	FRA classes				Volume mean (m^3/ha)
	Forest	Other wood-ed land	Other land	Inland water	
Stratum II (semi-desert ecosystems)	0.000	0.6292	0.1189	0.000	0.1941
Stratum III (low rainfall woodland Savannah)	3.7528	1.4498	0.8950	1.7392	1.3562
Stratum IV (semi-arid, dry sub-humid and aridity zones)	19.5575	3.9496	3.4089	66.3402	11.7827
Stratum V (rivers and streams)	5.0514	1.0133	3.8071	0.0000	1.1220
Volume mean (m^3/ha)	15.8129	1.311	0.6587	4.5879	4.6055



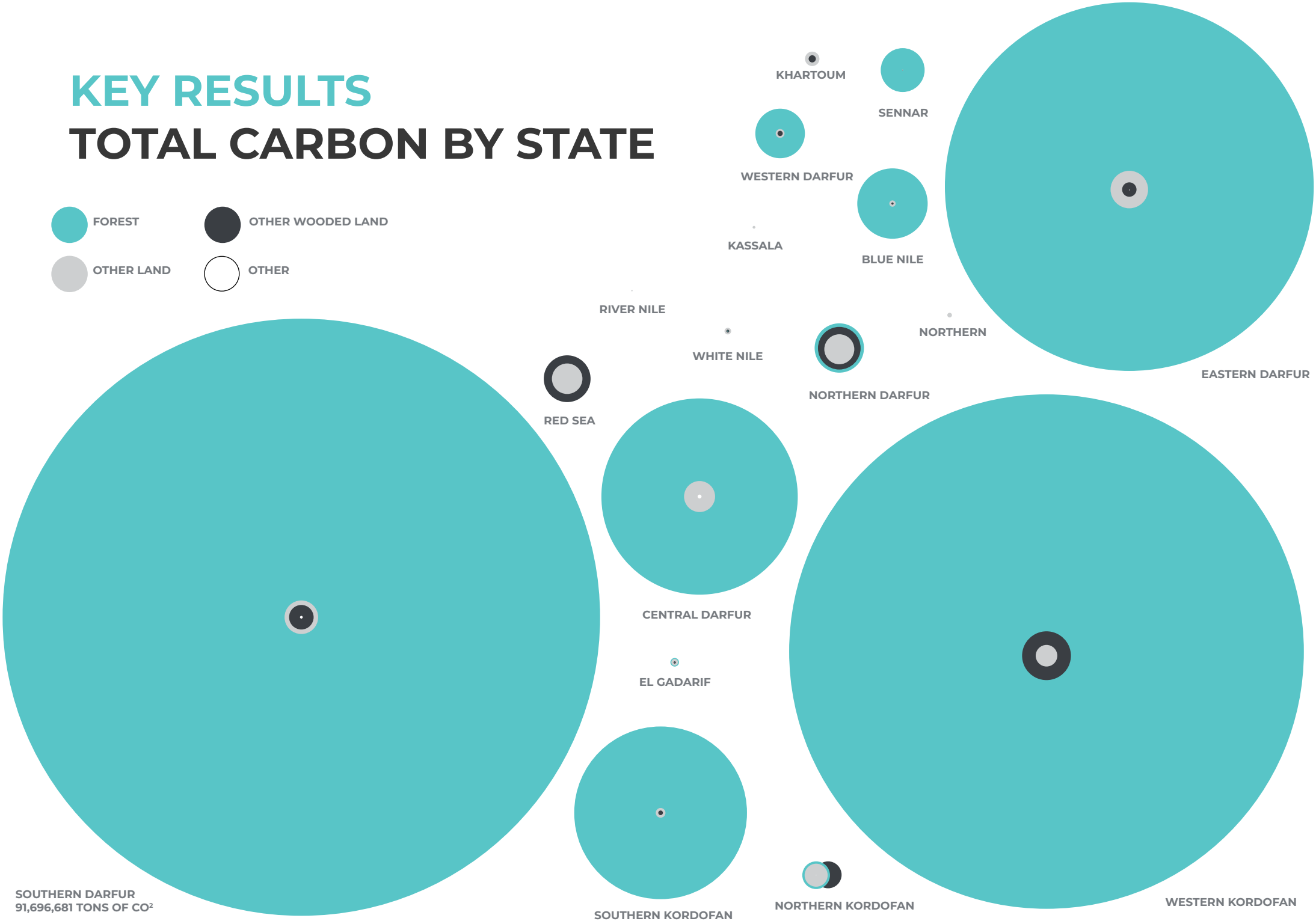
In Sudan the average gross volume per hectare is 4.6055 m^3/ha. Forest is the LUC with the highest gross volume per hectare.

KEY RESULTS
CARBON STOCKS



KEY RESULTS

TOTAL CARBON BY STATE

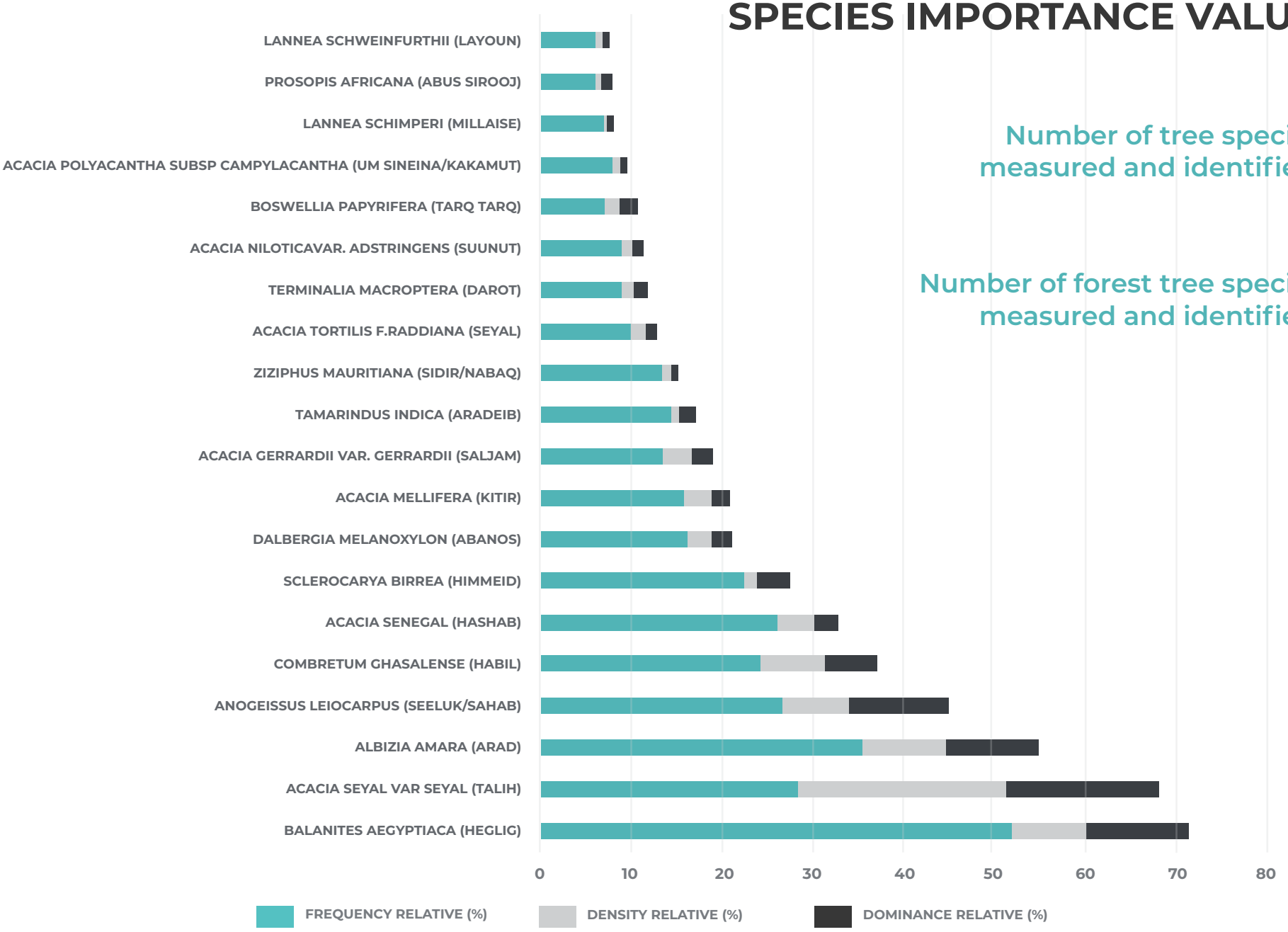


KEY RESULTS
TOTAL CARBON BY STATE

State	FRA Classes					Total (tons)	%
	Forest	Other Wooded Land	Other Land	Inland Water	Other		
Blue Nile	9,779,009	321,195	873,036	113,505	0	11,086,745	3.04
Central Darfur	27,277,532	1,010,501	4,314,928	547,211	111	33,150,283	9.08
Eastern Darfur	51,239,834	2,013,293	4,212,236	0	0	57,465,364	15.74
El Gadarif	1,193,972	327,819	927,274	50,941	100	2,500,105	0.68
Kassala	47,077	390,239	30,721	0	0	468,036	0.13
Khartoum	0	1,098,295	2,044,088	0	0	3,142,382	0.86
Northern	0	0	643,620	0	0	643,620	0.18
Northern Darfur	7,803,347	6,854,909	4,165,834	0	0	18,824,089	5.16
Northern Kordofan	3847,247	3,741,667	3,203,925	88,899	0	10,881,737	2.98
Red Sea	0	6,506,876	4,241,885	0	0	10,748,761	2.94
River Nile	0	0	193,896	0	0	193,896	0.05
Sennar	6,108,055	108,449	179,795	0	11,587	6,407,887	1.76
Southern Darfur	83,237,630	3,410,319	4,666,299	382,432	0	91,696,681	25.11
Southern Kordofan	24,185,215	639,684	1,359,000	0	5,961	26,189,860	7.17
Western Kordofan	71,569,916	6,787,353	3,030,489	0	249	81,388,008	22.29
Western Darfur	6,887,171	728,939	1,226,463	0	0	8,842,573	2.42
White Nile	159,388	407,577	921,354	0	0	1,488,318	0.41
Total (tons)	293,335,393	34,347,115	36,234,842	1,182,987	18,007	365,118,345	100.00

KEY RESULTS

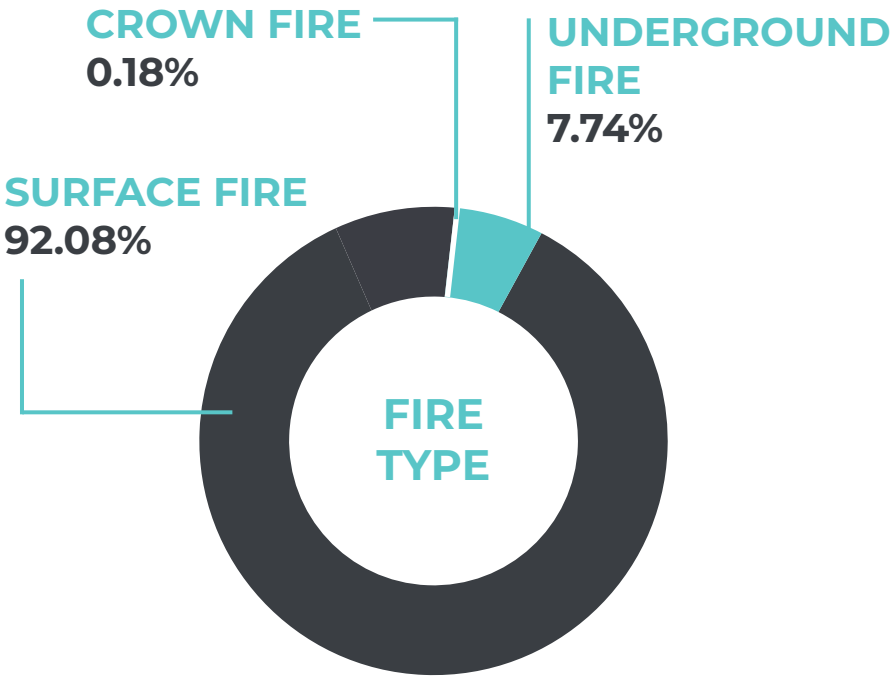
SPECIES IMPORTANCE VALUE INDEX



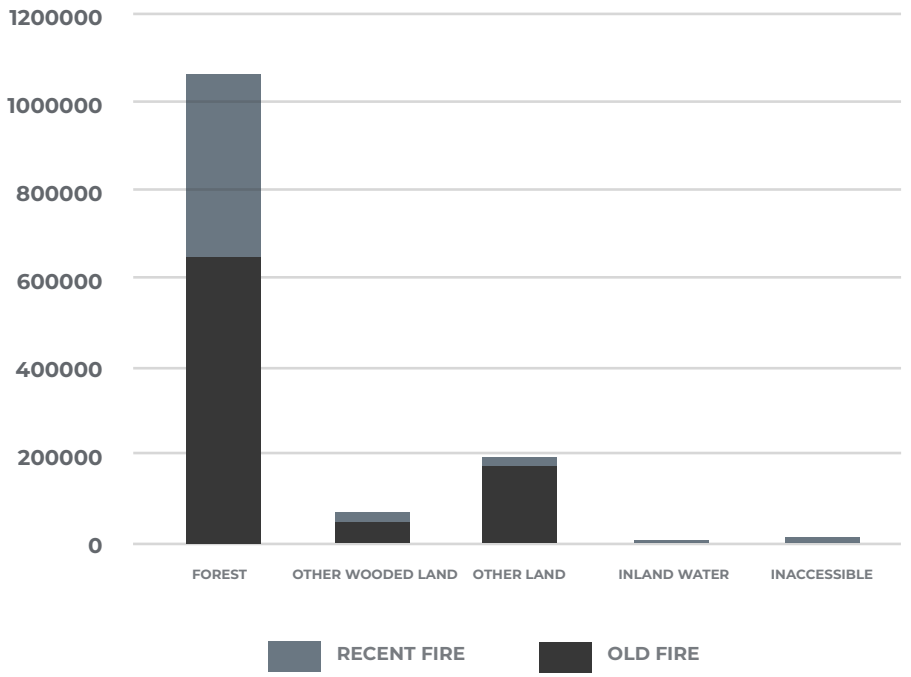
Number of tree species measured and identified: **319**

Number of forest tree species measured and identified: **142**

KEY RESULTS
FIRE EVIDENCE



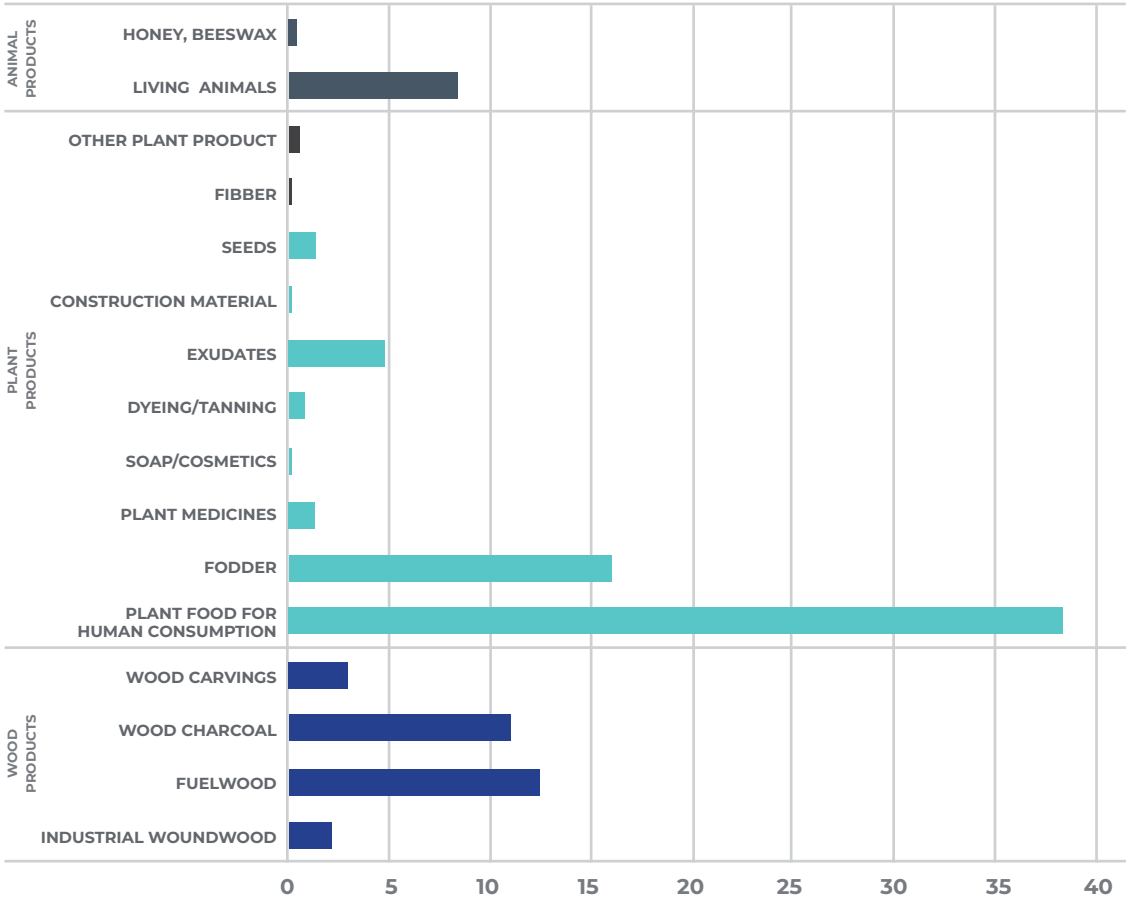
Evidence of fire	FRA classes				Total
	Forest	Other wooded land	Other land	Inland water	
Recent fire	671,152	59,194	176,498	0.000	906,844
Old fire	413,155	14,949	19,651	1.7392	447,756
Total	1,084,307	74,144	196,149	66.3402	1,354,600

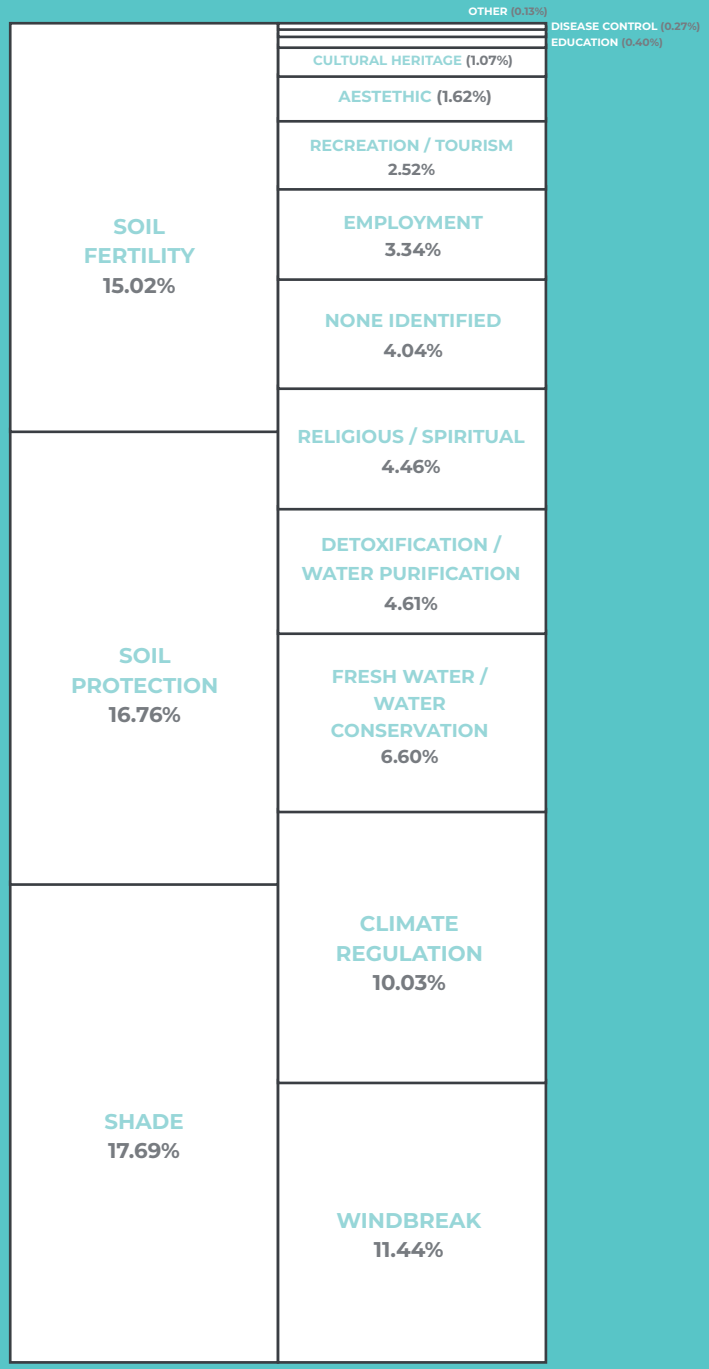


- Only 3.63% of the total forest area has experienced burning
- The most common type is surface fire

KEY RESULTS

PRODUCTS AND SERVICES (%)





KEY RESULTS
CONCLUSIONS

SUDAN'S NATIONAL FOREST INVENTORY...

- is a major achievement that supports the country in enhancing the sustainable management of its forest resources to reach various climate, environmental and livelihood goals;
- is a significant achievement for the country to enhance the sustainable management of its forest resources to reach multiple environmental and livelihood goals.
- is built on the accumulated experience of the FNC in systematic sampling.
- provides baseline information based on genuine ground measurements.
- has established a grid of permanent sample plots, geo-referenced, to be re-visited in future inventories.
- incorporated variables which made possible calculations of biomass and carbon stock complying with the international practices.
- generated new capacities at country level, knowledge and resources.
- paved the way for conducting systematic inventories at the sub-national level.
- is a crucial tool for sustainable forest management and to inform forest policy decisions.

KEY RESULTS
CONCLUSIONS

- The built capacity should be maintained and renewed with new generations of forestry professionals.
- The developed database should be maintained as a national asset and made available for further investigations (data sharing).
- Sub-sets of results should be prepared and packaged for various stakeholders (data dissemination).
- Additional variables and measurements can be added as new needs arise.
- Species identification should be strengthened to minimize the number of unknowns.
- Country specific allometric equations should be developed.

Sudan is committed to implementing REDD+ in the context of the UNFCCC by putting in place policies and actions to reduce emissions from deforestation and forest degradation. It has received international support to prepare for and implement REDD+, notably receiving funding assistance from the World Bank's Forest Carbon Partnership Program (FCPF) and technical support from FAO.

CONTACT US

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