

GREAT GREEN WALL

Criteria of the GW indicative layout selection and indicative list of the vegetal species

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1. IDENTIFICATION OF THE GEAT GREEN WALL LAYOUT

1. 1 GGW description and Conceptual Approach

The Great Green Wall is a major Regional Project whose specific objective is to bring together all countries in a unique battle the overall aim of which is to contribute to the fight against desertification and to develop Saharo-Sahelian zones in order to ensure sustainable natural resource management and reduce poverty.

The Great Green Wall (GGW) is a strip of multi-specie Vegetation linking Dakar to Djibouti over a length of 7000 km with a width of 15 km, linear and continuous as much as possible. However, due to some factors, the course may divert, move northwards or descend southwards. These factors are among others:

- water courses : rivers, lakes,
- mountains or rocky hills,
- flat but rocky terrain impossible to revitalize,
- marshy areas,
- urban settlements,
- areas the local populations consider haunted or sacred.

The strip should necessarily be located within the Sahel zone with averages rainfall between 100 to 400 mm.

It integrates several systems of land use such as:

- **natural farms:** reserved forests (managed by the State), community forests (Villages, municipalities, rural communities etc.), private forests (belonging to individuals or private groups);
- **old artificial farms** (results of the zone's projects) or new ones (to be established);
- **agro-forestry units:** annual orcharding , wooded hydro-Agricultural areas, paires des terroirs ;
- **grazing zones:** village or community;
- **Animal parks;**
- **community wildlife areas:**
- **national parks:** entirely or in part ;
- **botanical reserves:** for the conservation of plant biodiversity;
- **deferred grazing:** at the level of more or less degraded forest areas
- **orchards:** fruit farms.

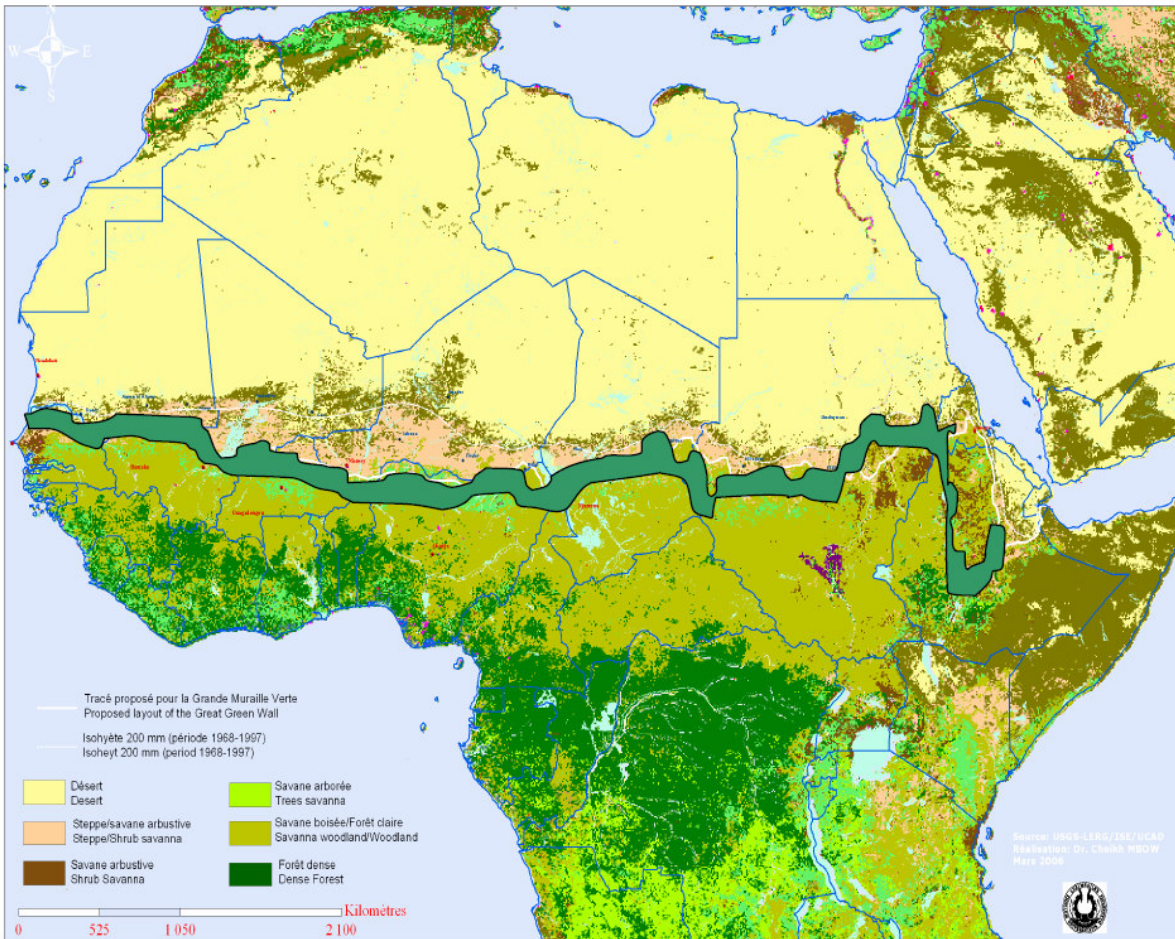
GGW National Component layout is specified for individual countries by their national experts.

1.2- Major criteria

The following box provides a few leads to some of the selection criteria for GGW layout:

- ☞ In view of the objectives assigned to GGW (containing the advancement of the Sahara, biodiversity conservation/development, soil restoration/conservation, operating system diversification, meeting household needs in ligneous and/or non-ligneous products, promoting income-generating activities, carbon sequestration, infrastructure protection and safety), the land use systems that it provides for (artificial plantations, agro-sylviculture units, grazing areas, safari parks, community reserves, reserved forests, national parks, wild-flower sanctuaries, deferred grazing, orchards) and GGW actors/beneficiaries (States, local communities, primary producers, private businessmen, educational and research structures), an indicative layout has been proposed using both biophysics, ecological and socio-economic criteria.
- ☞ GGW is therefore expected to run through both inhabited areas (village soils zones) where its maintenance could be assured by the rural populations and uninhabited areas (reserved forests, national parks, safari parks, wild-flower sanctuaries, community reserves) where it could be done by the States, local communities or private concerns.
- ☞ Rainfall shortage having appeared in the Sahel as a major constraint to the generation of GGW underlying activities, it has therefore been located in latitudes where annual average rainfall is higher than 200 mm. The transition zone between desert shrubs and Sudano-Sahelian Savannas has been chosen. It is an area where local species are dominated by the Acacia and Balanites (bito tree) species which all have drought adaptation mechanisms. Although it is characterized by a long dry season, this area offers the advantage of having a vegetal and ecological potential allowing the development of plant regrowth projects. Concerning land use by humans, the area that has been selected corresponds to a low density zone dominated by pastoral activity, with extensive stockbreeding and agricultural activity.
- ☞ The layout has been worked out using a database containing A. Aubreville's phytogeographic limits permitting to well locate climatic zoning and a land use map which makes it possible to identify vast plant association limits and country limits in the sub-region.
- ☞ The main input used to propose final layout is the land use map.

The main entrance to offer the final layout given below is the land cover map .



- they must have ecological plasticity such as would allow them to live and develop in ecological zones with up to 100 mm rainfall;
 - they must be useful to the needs of the populations;
 - they must also be common to many neighboring countries crossed by GGW layout.
- Species selection consists in:
- identifying the species most adapted to arid and semi-arid zones and necessary clues on the conditions of successful production and transplanting of seedlings in the eco-geographic zones crossed by the layout, and in particular, those situated in your country;
 - promoting agroforestry as a viable alternative reforestation technique;
 - favoring economically profitable existing species and also accepted by the populations especially fruit forests which contribute to the nutritional balance of the populations and poverty reduction;
 - taking into consideration the populations' needs in selection criteria with a view to meeting most of their needs in ligneous and non-ligneous products.

2.1 Indicative List of the Vegetal Species adapted to Ecological Zones

The following Table gives an indicative list of the vegetal species meeting the major criteria identified earlier herein. Species have been classified based on rainfall

N°	Species	Distribution	Ecology	Uses
1	Acacia raddiana Savi / tortilis (Forsk.) Hayne	Senegal, Mali, Niger, Chad, Sudan, Eritrea	- 50 to 1000 mm, - sandy (anchored dunes), ferruginous, tropical soils, sandy silt, lateritic talus	Energy wood, lumber fodder tree, medication
2	Boscia senegalensis (Pers.) Lam. ex Poir.	Senegal, Mali, Burkina, Niger, Chad, Soudan	- 50 to 1000 mm - Sandy-argillous (consolidated dunes), argillous, rocky, stony soils	Food, fodder, medication
3	Acacia senegal L. (Willd.)	Senegal, Mali, Niger, Nigeria, Chad, Soudan, Eritrea	- 100 to 800 mm, - arenaceous-loamy (fossil dunes), lightly loamy (depressions), lithosols	Gum (food, medication, cosmetics) fodder, energy wood, lumber
4	Acacia nilotica (L.) Willd. ex Del. var. adansonii and var. tomentosa / scorpioides L. (A. Chev.) var. adstringens Schum	Senegal, Mali, Niger, Nigeria, Cameroon, Sudan	- 100 to 1000 mm, - Deep, arenaceous-loamy (fossil dunes), argillous soils, river shores	Lumber, Energy wood, lumber, fodder, food, medication, gum, tannins
5	Acacia mellifera Benth.	Nigeria, Chad, Soudan, Eritrea	- 250 to 500 mm - Argillous soils	Fodderlumber, energy wood
6	Cadaba farinosa Forsk.	Senegal, Mali, Burkina, Niger, Cameroun, Chad, Sudan	- 250 to 500 mm - Sandy soils (consolidated dunes), rocky, pool shores	Energy wood, food, fodder, medication
7	Cadaba glandulosa Forsk.	Burkina, Mali, Niger, Chad, Sudan	- 250 to 500 mm - Stony soils	fodder
8	Calotropis procera (Ait.) Ait.	Senegal, Mali, Burkina, Niger, Chad, Soudan	- 250 to 500 mm - Degraded soils	medication, fibers, fodder
9	Capparis decidua (Forsk.) Edgew.	Senegal, Mali, Burkina, Niger, Chad, Sudan	- 250 to 500 mm - Sandy soils, river shores and pool shores	medication, fodder

10	Commiphora quadricincta Schweinf.	Niger, Nigeria, Chad, Sudan, Eritrea	- 250 to 500 mm - Sandy, argillous and lateritic soils	
11	Ficus ingens (Miq.) Miq.	Senegal, Mali, Niger, Nigeria, Chad	- 250 to 500 mm - Spring rocks,	medication,
12	Ficus salicifolia Vahl	Niger, Chad, Sudan, Eritrea	- 250 to 500 mm - Mountain rocks	
13	Grewia flavescens Juss.	Senegal, Mali, Niger	- 250 to 500 mm - Pool shores, sandy, argillous, stony and lateritic soils	medication, food, fodder
14	Grewia tenax (Forsk.) Fiori	Senegal, Mali, Niger, Sudan	- 250 to 500 mm - Rocky, argillous soils, pool shores	Fodder, food
15	Grewia villosa Willd.	Niger	- 250 to 500 mm - Sandy, rocky, stony, hardpan soils, river shores	Fodder, medication, food, lumber
16	Leptadenia pyrotechnica (Forsk.) Decne. / spartium Wright.	Senegal, Mali, Niger, Chad, Sudan	- 250 to 500 mm - Sandy soils, dunes	Medication, fodder log fender, food
17	Maerua crassifolia Forsk.	Senegal, Mali, Sudan	- 250 to 500 mm - Sandy soils, dunes	Fodder, lumber, fruits, medication, food
18	Maerua oblongiflora A. Rich.	Niger, Chad, Sudan,	- 250 to 500 mm - Sandy soils, dunes	
19	Maerua aethiopica Oliv.	Niger, Chad, Sudan	- 250 to 500 mm - Sandy soils, dunes	
20	Salvadora persica L.	Senegal, Mali, Niger, Chad	- 250 to 500 mm - River, lake and pool shores	lumber, kitchen salt, medication
21	Tamarix aphylla (L.) Karst.	Sudan,	- 250 to 500 mm - Temporary water points	
22	Tamarix senegalensis DC. / gallica L.	Senegal, Niger	- 250 to 500 mm - Sandy (dunes), salty soils, brackish depressions, river shores	Medication
23	Ziziphus mauritiana Lam.	Senegal, Mali, Niger, Burkina, Chad, Cameroon	- 250 to 500 mm - Sandy, rocky soils, river shores	Edible fruits, medication
24	Acacia laeta R. Br.	Mali, Burkina, Niger, Nigeria, Chad, Sudan, Eritrea	- 250 to 750 mm, - arenaceous-argillous, rocky and stony soils	Gum, fodder, lumber, energy wood
25	Combretum aculeatum Vent.	Senegal, Mali, Burkina, Niger, Chad, Sudan, Eritrea	- 250 to 800 mm - Sandy, argillous, stony soils on termites' nest	Energy wood, food, fodder, medication
26	Commiphora africana (A. Rich.) Engl.	Senegal, Mali, Burkina, Niger, Nigeria, Cameroon, Chad, Soudan, Eritrea	- 250 to 800 mm - Sandy, argillous and lateritic soils	Lumber, energy wood, fodder, food, medication, insecticide
27	Cordia gharaf (Forsk.) Ehrenb.	Senegal, Mali, Burkina, Niger, Nigeria, Chad, Sudan, Eritrea	- 250 to 800 mm - Rocky soils, river shores	
28	Grewia bicolor Juss.	Senegal, Mali, Niger	- 250 to 800 mm - Pool shores, sandy, stony and lateritic soils	Medication, fodder, food, lumber, energy wood
29	Maerua angolensis DC.	Senegal, Mali, Sudan, Eritrea	- 250 to 800 mm - Sandy soils, dunes	Food lumber, fodder, medication
30	Ziziphus nummularia (Burm.) Wight et Arn.	Mali	- 250 to 800 mm - Sandy and rocky soils, river shores	
31	Acacia seyal Del. / stenocarpa Hochst.	Senegal, Mali, Burkina, Niger, Nigeria, Cameroon, Sudan	- 250 to 1000 mm, - Argillous and stony soils, floodable depressions liable to flooding	Fodder, gum, energy wood, lumber, medication
32	Balanites aegyptiaca (L.) Del.	Senegal, Mali, Burkina, Niger, Nigeria, Cameroon, Chad, Sudan	- 250 to 1000 mm, - Great ecological amplitude, sandy, stony, argillous, alluvial soils, pool shores	Energy wood, lumber, fodder, food, medication
33	Boscia angustifolia A. Rich.	Senegal, Mali, Burkina, Niger, Nigeria, Chad, Sudan	- 250 to 1000 mm - Rocky, lateritic and argillous soils, pool shores	Energy wood, lumber, fodder, food, medication
34	Boscia salicifolia Oliv.	Niger, Chad, Sudan, Eritrea	- 250 to 1000 mm - Coarse-textured soils	Energy wood, fodder, food
35	Acacia Ehrenbergiana Hayne / flava (Forsk.) Schwfth.	Niger, Chad, Cameroon, Sudan	- 300 to 400 mm, - Sandy and argillous soils	Fodder
36	Acacia hebecladoides Hams.	Chad, Nigeria, Northern Cameroon	- Silt soils	
37	Rhus oxyacantha Cav.	Niger		

Sources :

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2.3 Insights on a few experiments in the Use of some Vegetal Species

The following are a few experiments carried out on some of the vegetal species proposed in the indicative list:

- **Acacia saligna** M. J. E. EPHRATH (Israel):

Reforestation and mitigating plant water stress requires irrigation and rain water reclamation. The experiments conducted over five years on *Acacia saligna* in the Negev desert and in other arid regions of Israel showed that the development of *Acacia Saligna* roots is exclusively influenced by watering frequency and not by the quality of irrigation water. The author therefore recommends the use of brackish water layers to meet the tree's water needs.

- **Periploca laevigata** M. Ali FERCHICHI (Tunisia):

This is a promising species that could be used to rehabilitate “degraded arid and Saharan ecosystems”. It can resist low rainfall (<100 mm) and has a way of branching off that allows it to resist livestock pressure. This shrub which has a preference for limestone substrata is much sought to improve pastoral species and to fight desertification.

- **Leptadenia hastata** M. Kawa ROMAIN (Niamey):

This is a cover crop that covers the soil, traps sand and speargrass seeds blown away by the wind. The latter can then grow under it and thus contribute to vegetating degraded zones. It is also a multipurpose plant.

*The **Atriplex species*** (Professeur **Chalbi**) is a genetic resource which is expected to become increasingly important in pastoral pastureland enhancement programs in arid and semi-arid zones (for sheep and goats).

- **Jujube tree** (Mr. Danthu (CIRAD): A species found on the extreme limits of arid zones, is profusely present in arid zones and whose fruits have a real value both nutritionally and economically. The results of the shrub domestication in India have made it possible to increase initial fruit volume twentyfold.

- **Boscia senegalensis pers. lam ex Poir** (Mr. Dogo Seck (FNRAA): This is a species to be considered for the “anti-desertification and environmental preservation program”. The development of this species as an alternative to costly and polluting synthetic insecticides is promising; the species also reveals good pharmacological, fodder and food potentials and significant survival potential on poor and very degraded soils as well.