Global Forest Biodiversity Study

This research project is aimed at mapping global forest diversity. The main objective is to calculate alpha-, beta-, and gamma-diversity in terms of tree species, based on forest inventory data, and extrapolate the point data to map the forested regions across the world.

There seems to be no study on this topic at the global scale, and following two recent publications on this topic (Liang et al. 2016, *Science 354*; Crowther et al. 2015, *Nature: 525,201-205*), our study will utilize Global Forest Biodiversity Initiative (GFBI) data to help answer the key questions on how many tree species there are in the world's forests and what their geographic distribution is. We are developing a manuscript based on this study for a top journal such as *Nature* or *Science*.

Data Guidelines

We are collecting forest inventory data from all permanent sample plots around the world. The only criteria are listed below.

Mandatory attributes

1. All the sample plots must have geographic coordinates (latitude and longitude, in decimal degrees-World Geodetic System 1984 (WGS84));

- 2. Plot size (in hectare) and shape (e.g. square, spherical, etc.);
- 3. The time (year) when the current inventory was performed;
- 4. The cut-off diameter threshold (cm);
- 5. Tree-level attributes: species, DBH, and status (live, dead, etc.)

Optional attributes

- Age- Stand age in years

- The number of endangered or threatened species (both plants and animals). Please see http://www.iucnredlist.org/ for a detailed list. Put the endangered/threatened species names in the notes

- Other plot attributes such as elevation, slope, age, management history, etc.

For <u>remeasurment data from the same plots</u>, enter all the data as if they are from different plots, but keep PlotID the same, and enter the corresponding inventory year.

Please compile your data in the <u>GFB2 template</u> (see a screenshot in the following page). The template in Excel format can be downloaded from the following webpage (the last item under QUICK LINKS):

http://www.gfbinitiative.org/data

Collaboration and Co-authorship:

1. We (the GFB team) invite all the individuals who have contributed over 100 plots to participate in the development of all the GFB papers, and all who have contributed to the development and writing will be entitled to a co-authorship in the corresponding paper. The contribution of other collaborators would be acknowledged in our publications.

2. The above threshold (100 plots) can be relaxed for those with a compelling reason (e.g. regions with low data coverage such as Africa, high risk countries such as Syria, high cost plots such as those tropical plots with over 100 species, etc.).

3. The rank of the data contributor in the coauthor list will depend on the quantity and quality of the data, as well as his/her contribution to the paper.

4. The above threshold (100 plots) can be relaxed for those with a compelling reason (e.g. high risk countries such as Syria, high cost plots such as those tropical plots with over 100 species, etc.).

5. We will adhere to your data policy and data use protocol. Upon the publishing of our papers, all the collaborators are expected to adhere to the publisher's data policy.

Data and Results Deposition:

- For datasets smaller than 5MB, please send them by email to Jingjing Liang (jiliang@mail.wvu.edu).
- For datasets larger than 5MB, please email Jingjing Liang (jiliang@mail.wvu.edu) a notice of your data size and region, and a Dropbox link will be sent to you with instructions for data deposition.

References

Crowther, T., H. Glick, K. Covey, C. Bettigole, D. Maynard, S. Thomas, J. Smith, G. Hintler, M. Duguid, and G. Amatulli, etc. 2015. Mapping tree density at a global scale. *Nature* 525:201-205.

Liang, J., T. W. Crowther, N. Picard, S. Wiser, M. Zhou, G. Alberti, E.-D. Schulze, A. D.
McGuire, F. Bozzato, H. Pretzsch, S. de-Miguel, A. Paquette, B. Hérault, M. Scherer-Lorenzen,
C. B. Barrett, H. B. Glick, G. M. Hengeveld, G.-J. Nabuurs, S. Pfautsch, H. Viana, A. C. Vibrans,
C. Ammer, P. Schall, D. Verbyla, N. Tchebakova, M. Fischer, J. V. Watson, H. Y. H. Chen, X.
Lei, M.-J. Schelhaas, H. Lu, D. Gianelle, E. I. Parfenova, C. Salas, E. Lee, B. Lee, H. S. Kim, H.
Bruelheide, D. A. Coomes, D. Piotto, T. Sunderland, B. Schmid, S. Gourlet-Fleury, B. Sonké, R.
Tavani, J. Zhu, S. Brandl, J. Vayreda, F. Kitahara, E. B. Searle, V. J. Neldner, M. R. Ngugi, C.
Baraloto, L. Frizzera, R. Bałazy, J. Oleksyn, T. Zawiła-Niedźwiecki, O. Bouriaud, F. Bussotti, L.
Finér, B. Jaroszewicz, T. Jucker, F. Valladares, A. M. Jagodzinski, P. L. Peri, C. Gonmadje, W.
Marthy, T. O'Brien, E. H. Martin, A. R. Marshall, F. Rovero, R. Bitariho, P. A. Niklaus, P.
Alvarez-Loayza, N. Chamuya, R. Valencia, F. Mortier, V. Wortel, N. L. Engone-Obiang, L. V.
Ferreira, D. E. Odeke, R. M. Vasquez, S. L. Lewis, and P. B. Reich. 2016. Positive biodiversity-productivity relationship predominant in global forests. *Science* 354.

GFB2 Guideline, updated October, 2016

X	🛃 🗐 • (° - 🥯 -							12	GFB2_Te	mplate_Jan2017 -	Microsoft	Excel			-				- 6	×
F	ile Home Inse	ert Pa	ge Layout Fo	rmulas	Data Rev	iew	View	Develope	r										۵ 🕜	- @ X
100	💐 🔏 Cut	Calibri	- 10	- A A	= = [- 8/		Wrap Text	3	General	*				+	🖈 🛗	Σ AutoSum -	A7 A		
Pas	Copy -		TT	A			- 53			¢ 0/ -	÷.0 .00	Condition	nal Format	Cell	Incert	Delete Format	💽 Fill 👻	Sort & Find 8	4 21	
Tas	💞 Format Painter	B 1	<u>u</u> • •		= = 3	I 1F		Merge & 0	Center *	\$*%,	.000	Formattin	g * as Table *	Styles *	Ŧ	* *	🖉 Clear 👻	Filter * Select		
	Clipboard 5a		Font	15	i	Alig	gnment	ient 🖓		Number 🗔		Styles				Cells	Editi	ng		passa
_	A1 .	. (0	fx PlotID																	*
- sale	A B	С	D	E	F	G	н	I.	J	K		L	M	N	Ê.	0	Р	Q	R	S 📕
1	PlotID Latitude (°) Lo	ongitude (°) Plot area (ha)	Year Cuto	off DBH (cm)	TreeID	DBH (cm)	Species	Status	Plot Elevation (m)	Plot Ma	nagement	Plot Age (yr)	Plot Ow	nership	Site index (m)	Tree Height (m)	Note		
2	terran and a second second for																			
5																				
6																				
7	Notes:																			
8	GFBI will keep all th	e data st	rictly confiden	tial unless	approved	by the d	ata own	er												
9	Mandatory attribute	es are ma	arked in yellow	, and no co	olor if an at	tribute i	is option	al but p	refered	:										
10	For remeasurment of	lata from	the same plot	ts, enter al	I the data a	s if they	are fror	n differe	ent plot	s, but keep Plot	ID the sa	me, and	enter the co	rrespond	ling inv	entory year.				
11																				
12	- PlotID is a unique	e ID code	assigned to e	ach plot, p	lots that ha	ve been	remeas	ured sho	ould ha	ve the same Plo	tID for a	ll invento	ries;							
13	- Georeference (c	oordinat	es: lat, lon, in o	decimal de	grees-Wor	ld Geod	letic Syst	tem 1984	4 (WGS	84); please also	provide	indication	n of precisio	n in Note	e);					
14	- Plot area (size, ir	Plot area (size, in hectare);																		
15	- Year refers to the	Year refers to the year when the current inventory was performed;																		
16	- Cutoff DBH: three	Cutoff DBH: threshold diameter-at-breast-height (DBH, in centimeters), which defines trees from saplings. All woody plants of which DBH greater than or equal to such value would be measured, whereas those v																		
17	- TreeID is a uniqu	TreeID is a unique ID code assigned to each tree. Trees that have been remeasured should have the same TreeID for all inventories;																		
18	- DBH (cm): diame	DBH (cm): diameter-at-breast-height (DBH, in centimeters);																		
19	- Species: provide	Species: provide scientific name (binomial) for the tree species. Please verify that the scientific names are binomial (clear of items such as authority, etc.) before the entry;																		
20	- Status: status coo	Status: status code of each tallied tree- 0: live, 1: dead, 2: cut. Please specify in text for all other status;																		
21	- Elevation (m): pl	ot altitud	de from the se	a level (in	meters);															
22	- Management: br	iefly des	scribe if the plo	ot was harv	ested or pl	anted in	the pas	st, and cu	irrent n	nanagement (if	applicab	le). Pleas	e specify ho	w much	timber	was harveste	d in each size cl	ass. Attach a	a docume	ntation i
23	- Age- Stand age in	n years (i	f applicable);																	
24	- Ownership: defin	ne land o	wnership (priv	ate, state	/provincial,	nationa	al, etc.);			1.25 0.2253 5.257	1 20 12	2 002	3.8 3.97			2 222				
25	- Site index: the a	verage h	eight (in mete	rs) of domi	inate and/o	r codon	ninate tr	ees of a	even-a	ged, undisturbe	d site of	intoleran	it trees at a	base age;	The de	etault base ag	e is 50 years. If	the actual b	ase age d	tters, pl
26	- Height (m): OPTI	ONAL. TO	otal tree heigh	t in meters	;															
27	- Note: Optional n	otes.			2															•
14 4	GFB DataTem	plate	Sample Datashe	et / 🔁 /								<u>I</u>	4	-						
Rea	idy 🔛																	프 100% (-		(+)

Figure 1<u>A Screenshot of GFB2 template</u> (see a screenshot in the following page). The template in Excel format can be downloaded from the following webpage (under Data Contribution): <u>http://www.gfbinitiative.org/data</u>