From Big Data to Big Evidence to Big Impact at Landscape Scale

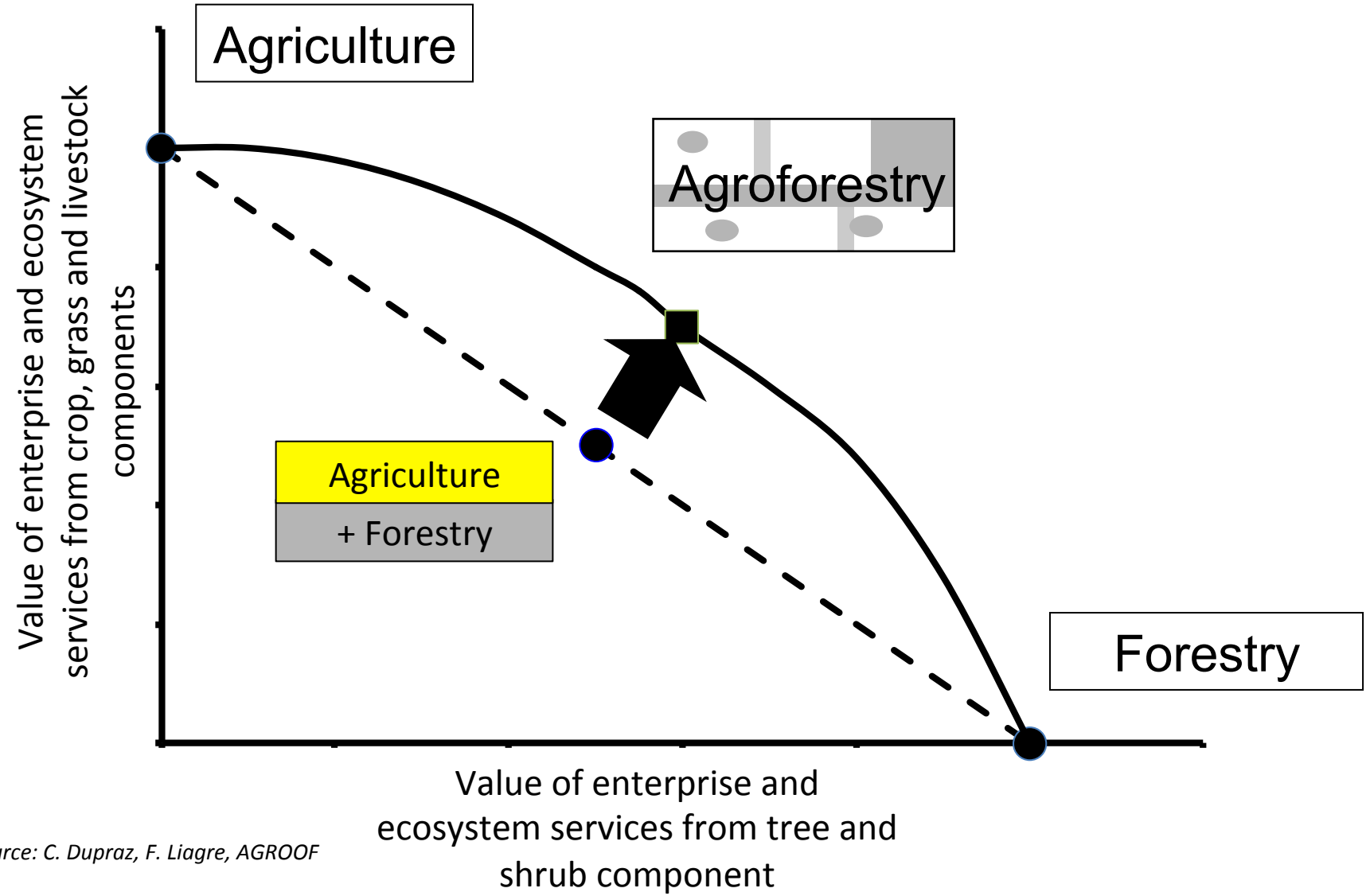
Tony Simons, World Agroforestry Centre (ICRAF)

IGNITE Session, FC14, Washington, Nov 2015

Big Data, Evidence and Impact

1. Cocoa Landscapes (PPP)
2. Greening India (Policy)
3. Data to Decisions (Land Use)

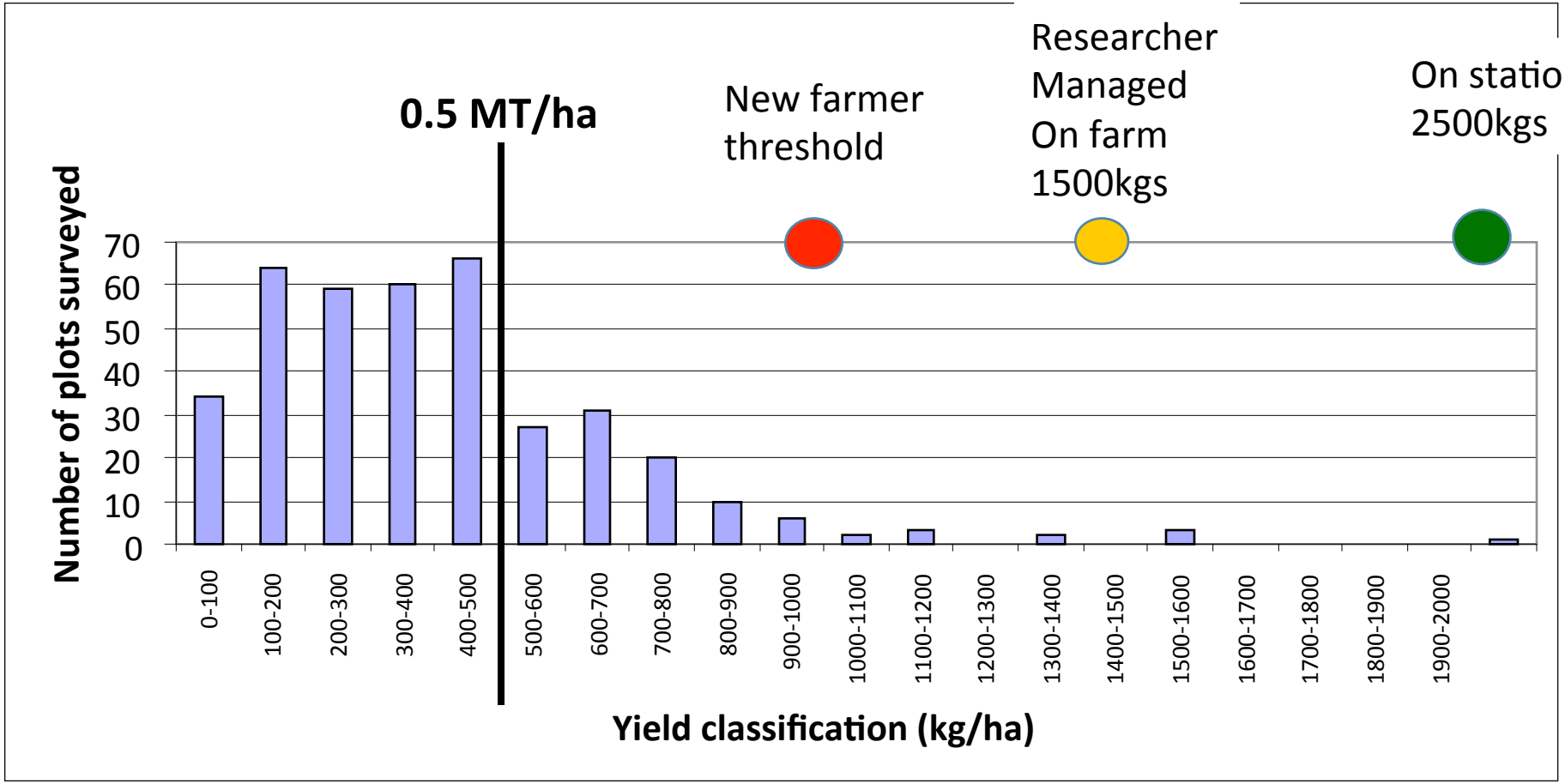
Land Equivalent Ratios (LERs)



Source: C. Dupraz, F. Liagre, AGROOF

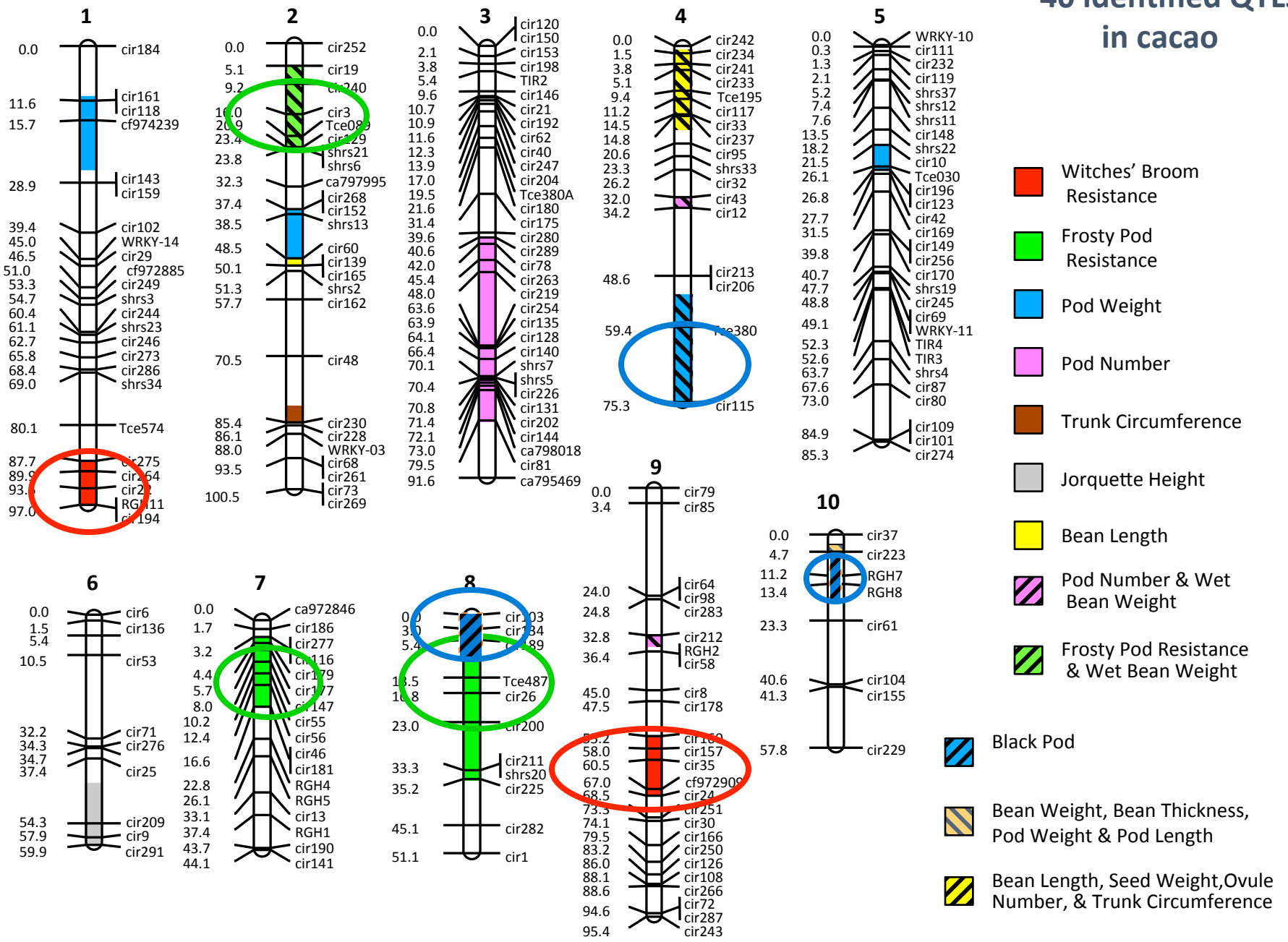

1. Cocoa Landscapes

Cocoa Yields are too low

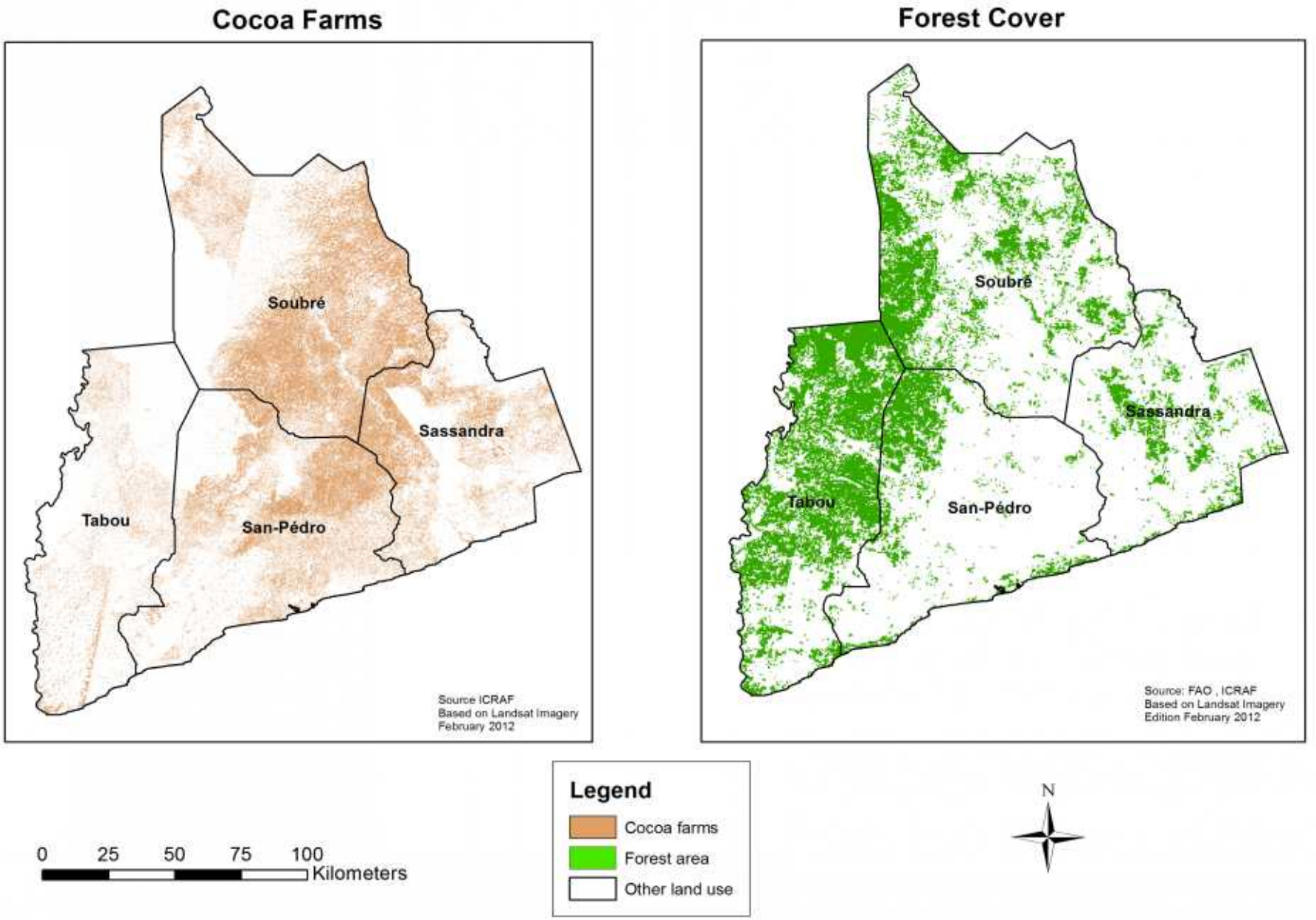


Source: *Etude sur les revenus et les investissements des producteurs de café et de cacao en Côte d'Ivoire,* Agrisystems Consortium, 2008

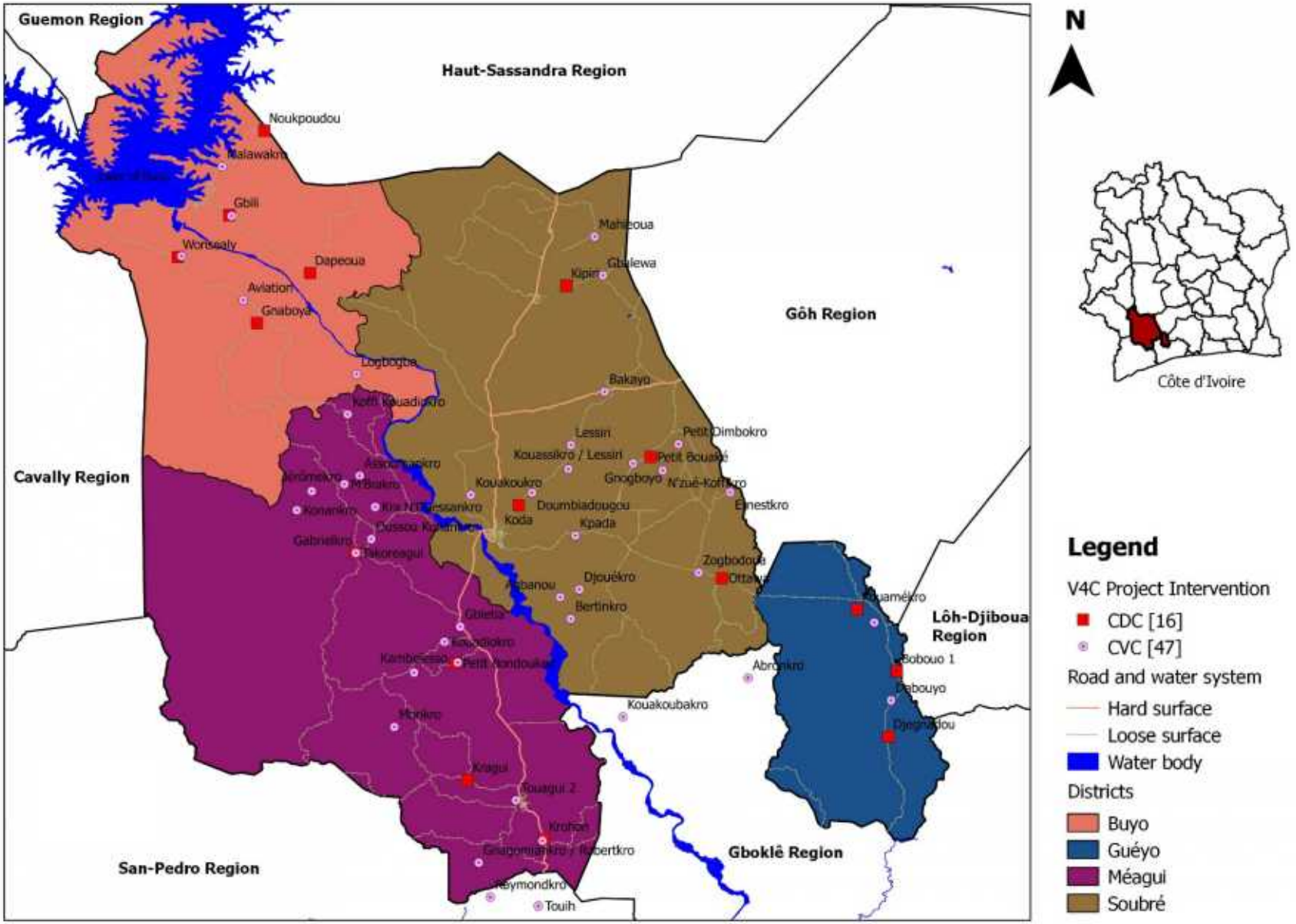

MARS-ICRAF-CDI Government
Public Private Partnership
MARS
Vision for Change (V4C) project


~40 identified QTLs in cacao
1
0.0 cir184
11.6 cir161
cir118
15.7 cf974239
28.9 cir143
cir159
39.4 cir102
45.0 WRKY-14
46.5 cir29
51.0 cf972885
53.3 cir249
54.7 shrs3
60.4 cir244
61.1 shrs23
62.7 cir246
65.8 cir273
68.4 cir286
69.0 shrs34
80.1 Tce574
87.7
89.9
93.5
97.0
2
0.0 cir252
5.1 cir19
9.2
23.4
23.8 shrs6
32.3 ca797995
37.4 cir268
cir152
38.5 shrs13
48.5 cir60
50.1 cir139
cir165
51.3 shrs2
57.7 cir162
70.5 cir48
85.4 cir230
86.1 cir228
88.0 WRKY-03
93.5 cir68
cir261
100.5 cir73
cir269
3
0.0 cir120
2.1 cir150
3.8 cir153
5.4 cir198
9.6 TIR2
10.7 cir146
10.9 cir21
11.6 cir192
12.3 cir62
13.9 cir40
17.0 cir247
19.5 cir204
21.6 Tce380A
31.4 cir180
39.6 cir175
40.6 cir280
42.0 cir289
45.4 cir78
48.0 cir263
63.6 cir219
63.9 cir254
64.1 cir135
66.4 cir128
70.1 cir140
70.4 shrs7
70.8 shrs5
71.4 cir226
72.1 cir131
73.0 cir202
79.5 cir144
91.6 ca798018
cir81
ca795469
4
0.0 cir242
1.5 cir234
3.8 cir241
5.1 cir233
9.4 Tce195
11.2 cir117
14.5 cir33
14.8 cir237
20.6 cir95
23.3 shrs33
26.2 cir32
32.0 cir43
34.2 cir12
48.6 cir213
cir206
59.4
75.3 cir115
5
0.0 WRKY-10
0.3 cir111
1.3 cir232
2.1 cir119
5.2 shrs37
7.4 shrs12
7.6 shrs11
13.5 cir148
18.2 shrs22
21.5 cir10
26.1 Tce030
26.8 cir196
cir123
27.7 cir42
31.5 cir169
39.8 cir149
cir256
40.7 cir170
47.7 shrs19
48.8 cir245
49.1 cir69
52.3 WRKY-11
52.6 TIR4
63.7 TIR3
67.6 shrs4
73.0 cir87
cir80
84.9 cir109
85.3 cir101
cir274
6
0.0 cir6
1.5 cir136
5.4
10.5 cir53
32.2 cir71
34.3 cir276
34.7
37.4 cir25
54.3 cir209
57.9 cir9
59.9 cir291
7
0.0 ca972846
1.7 cir186
3.2 cir277
4.4
5.7
8.0
10.2 cir55
12.4 cir56
16.6 cir46
cir181
22.8 RGH4
26.1 RGH5
33.1 cir13
37.4 RGH1
43.7 cir190
44.1 cir141
8
cir203
cir234
cir289
Tce487
cir26
cir200
cir211
shrs20
cir225
cir282
cir1
9
0.0 cir79
3.4 cir85
24.0 cir64
24.8 cir98
cir283
32.8 cir212
36.4 RGH2
cir58
45.0 cir8
47.5 cir178
58.0 cir157
60.5 cir35
67.0
68.5 cir24
74.1 cir30
79.5 cir166
83.2 cir250
86.0 cir126
88.1 cir108
88.6 cir266
94.6 cir72
cir287
95.4 cir243
10
0.0 cir37
4.7 cir223
11.2 RGH7
13.4 RGH8
23.3 cir61
40.6 cir104
41.3 cir155
57.8 cir229
Witches' Broom Resistance
Frosty Pod Resistance
Pod Weight
Pod Number
Trunk Circumference
Jorquette Height
Bean Length
Pod Number & Wet Bean Weight
Frosty Pod Resistance & Wet Bean Weight
Black Pod
Bean Weight, Bean Thickness, Pod Weight & Pod Length
Bean Length, Seed Weight,Ovule Number, & Trunk Circumference

Robust Evidence for targeting in cocoa landscapes



V4C project implementation area with the 16 Cocoa Development Centres and 47 Cocoa Village Centres



Use of clones and hybrid seeds

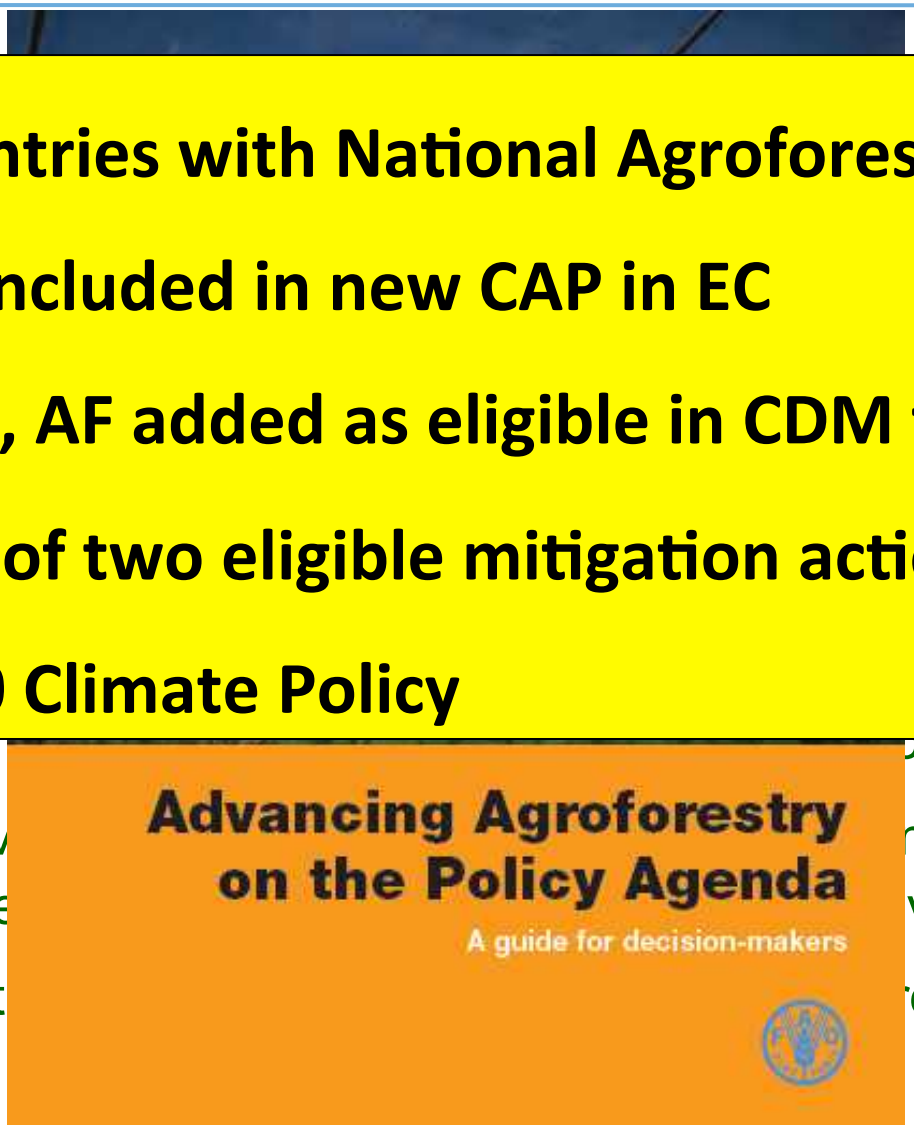
Seedlings of improved cocoa varieties produced in V4C nursery at Soubre

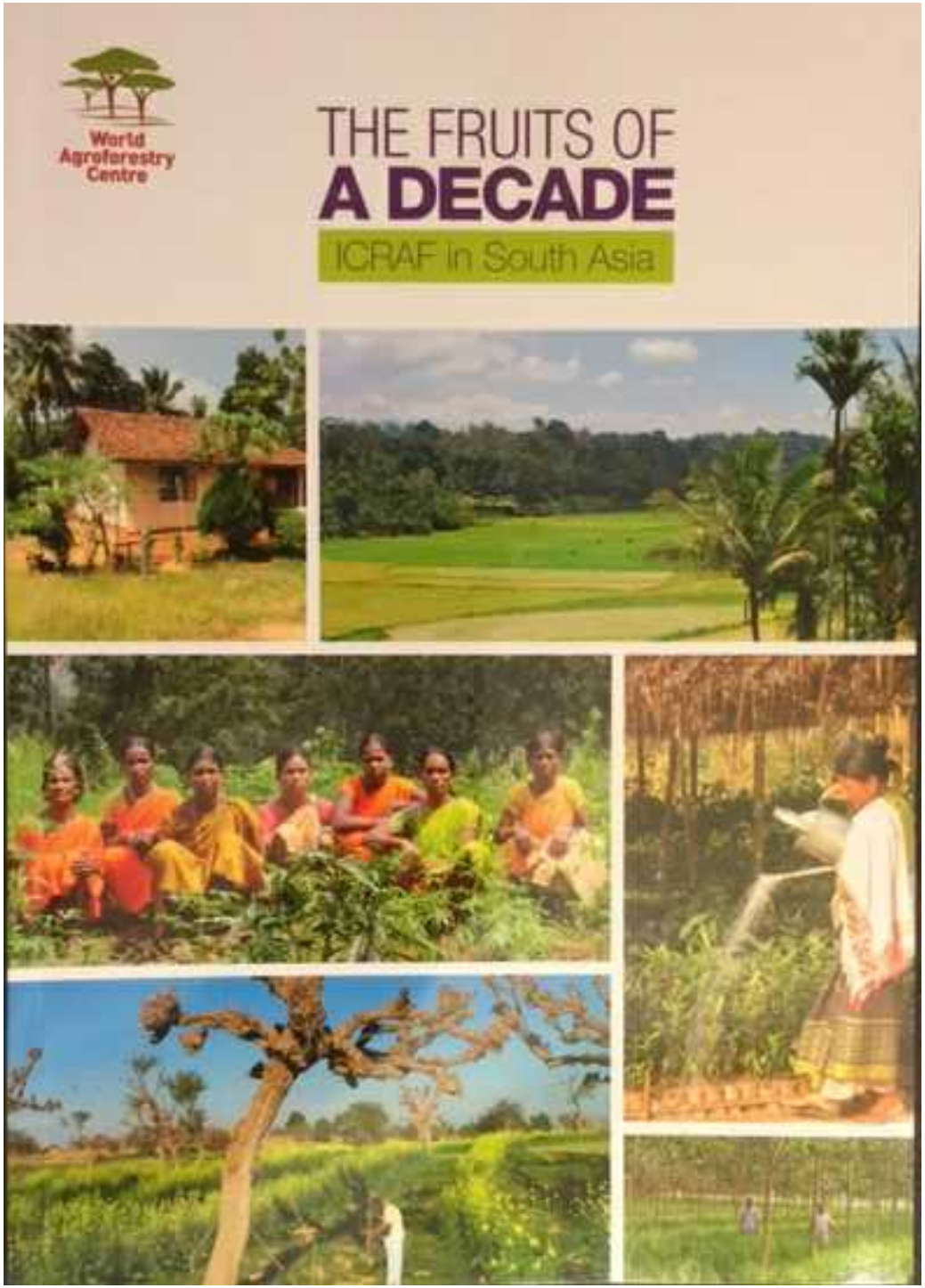
Newly grafted seedlings for the establishment of clonal gardens

22 months after side grafting, from 4-5 pods to 20-30 pods per tree

2. Why an Agroforestry Policy Initiative?

- **9 EU Countries with National Agroforestry Policy**
- **2013 AF included in new CAP in EC**
- **Nov 2014, AF added as eligible in CDM for LULUCF**
- **AF is one of two eligible mitigation actions in EC 2020 Climate Policy**





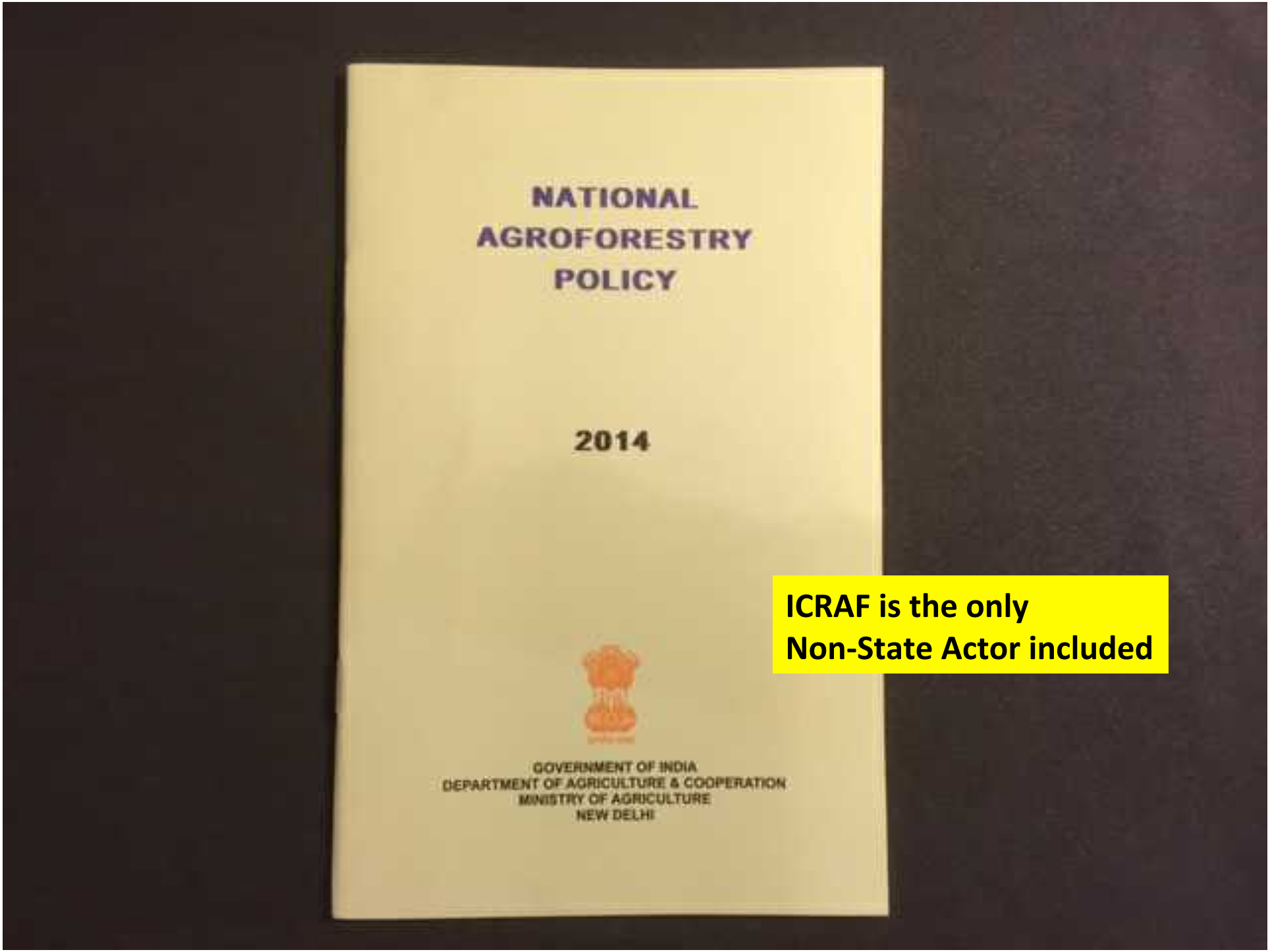
Privileged to be invited by India to work with them on an Agroforestry Policy

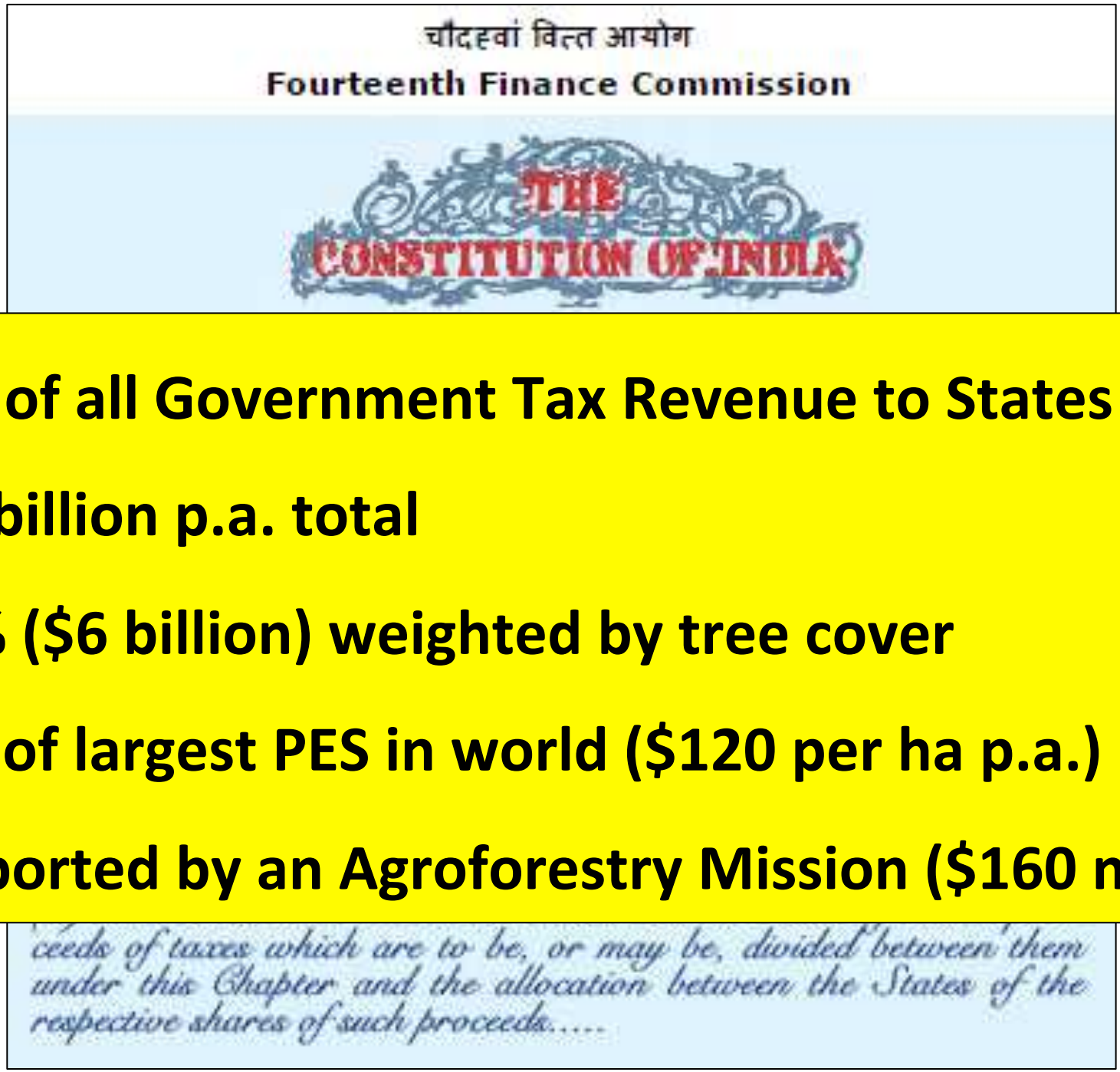
Related to several other GOI processes

Table 1: Forest and Tree cover of India in 2013		
Class	**Area (km^2)**	**% of Geographical Area**
Forest Cover		
Very Dense Forest	83,502	2.54
Moderate Dense Forest	318,745	9.70
Open Forest	295,651	8.99
Total Forest Cover*	**697,898**	**21.23**
Tree Cover	**91, 266**	**2.78**
Total Forest and Tree Cover	**789,164**	**24.01**
Scrub	41,383	1.26
Non Forest	2,547,982	77.51
Total Geographical Area	**3,287,263**	**100.00**

India set a goal of moving from 24% tree cover to 33% tree cover by 2030

Now part of India INDC


NATIONAL
AGROFORESTRY
POLICY
2014
GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURE & COOPERATION
MINISTRY OF AGRICULTURE
NEW DELHI
ICRAF is the only
Non-State Actor included



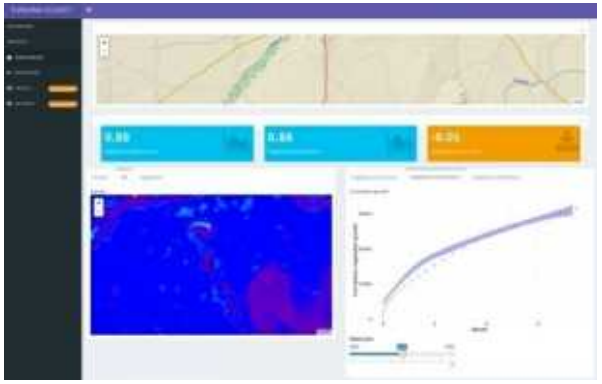
42% of all Government Tax Revenue to States

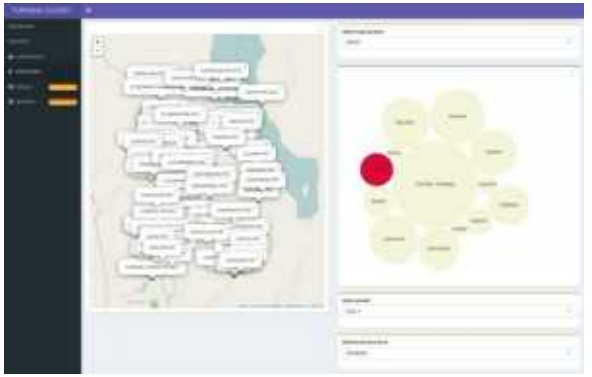
$85 billion p.a. total

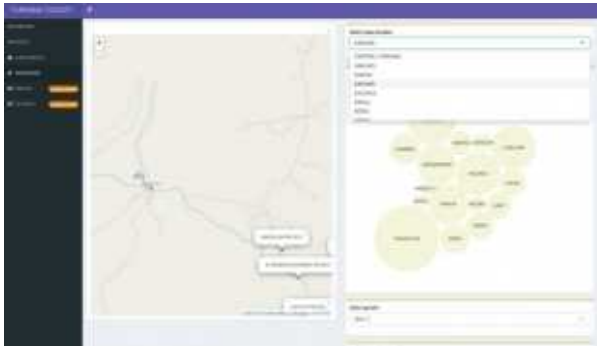
7.5% ($6 billion) weighted by tree cover

One of largest PES in world ($120 per ha p.a.)

Supported by an Agroforestry Mission ($160 m)







3. From Data to Decision Support Systems


Dave Carpenter
"My job is to make decisions. Your job is to make them good decisions."

Review of the Evidence on Indicators, Metrics and Monitoring Systems

Commissioned by the UK Department for International Development (DFID)

Conducted by the CGIAR Program on Water, Land & Ecosystems

Coordinated by the World Agroforestry Centre (ICRAF)

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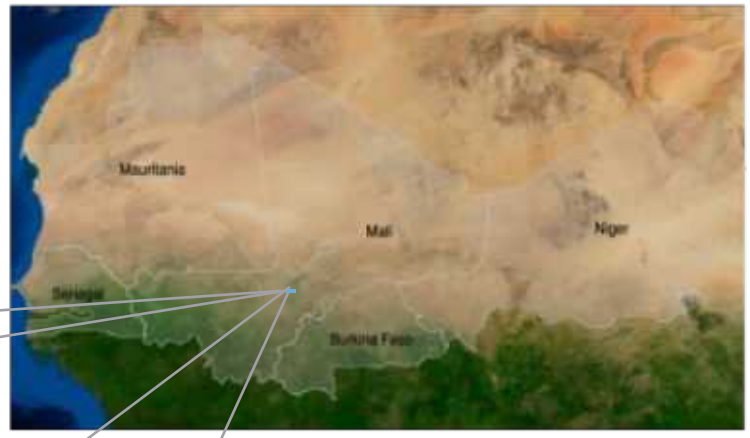
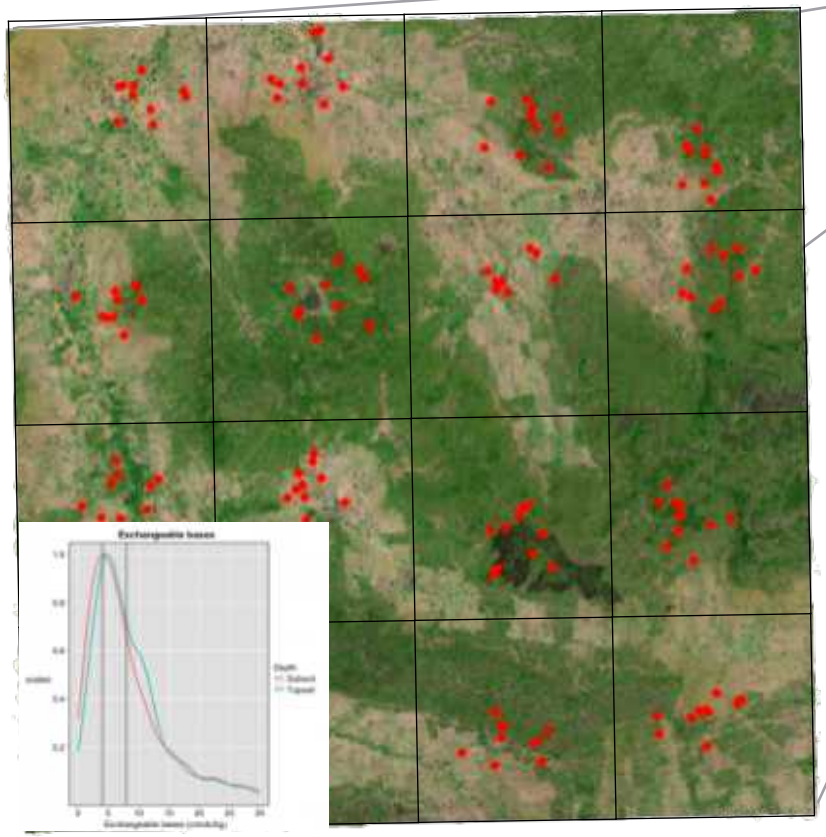
[4] Bioversity International

CGIAR Research Program on Water, Land and Ecosystems

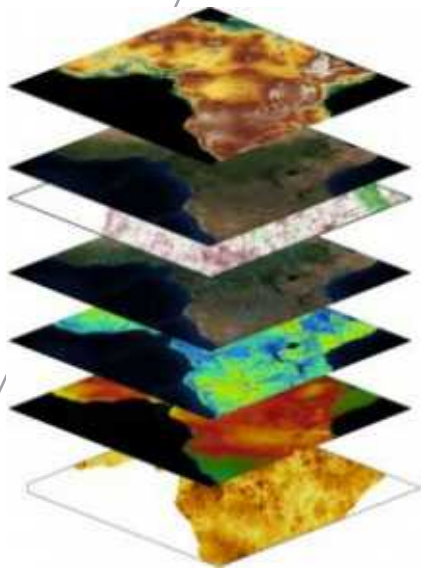
World Agroforestry Centre

Surveillance science
Land health metrics





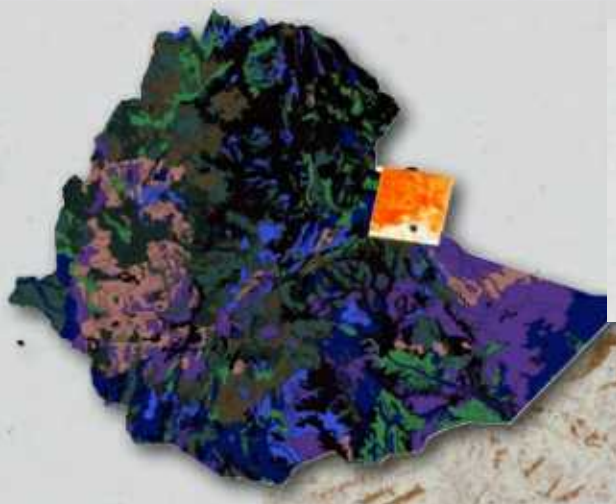
Prevalence, Risk factors, Digital mapping



Coupling with remote sensing

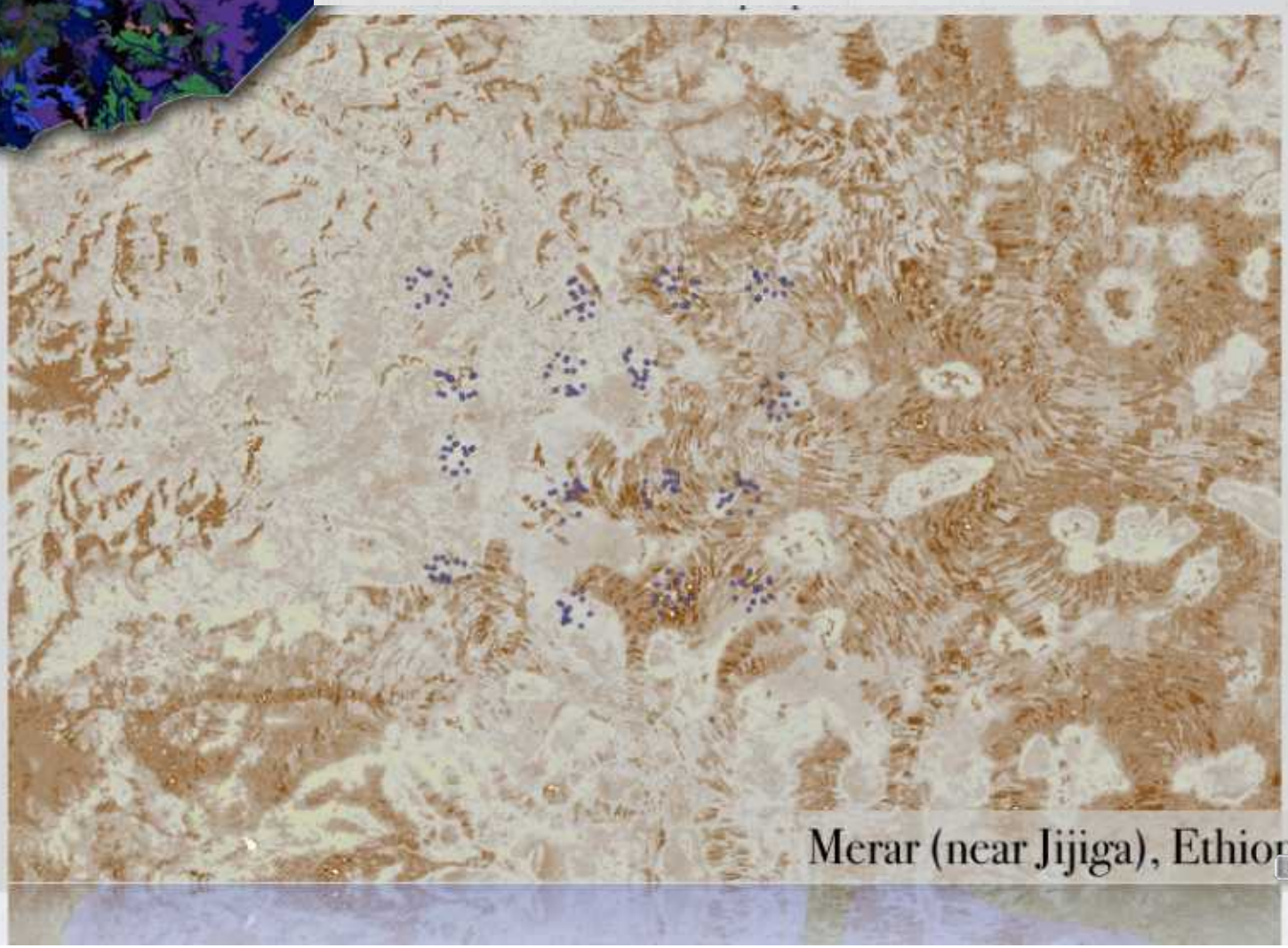
Consistent field protocol

Soil spectroscopy



Soil Carbon (30m x 30m)

Can guide better decisions



Welcome to the Landscapes Portal!

Our mission is to further the application of GeoScience in assessing coupled social-ecological processes in landscapes.

The Landscapes Portal provides users with a platform for visualizing and sharing spatial data and maps, as well as map stories.

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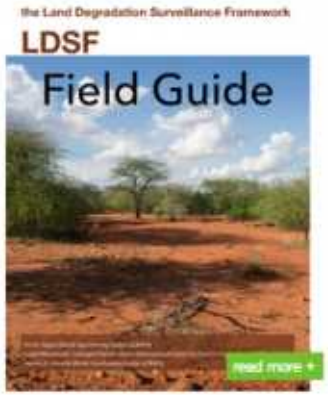
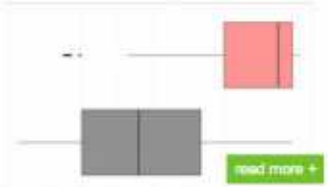


The Land Degradation Surveillance Framework



Mapping the source of soil erosion

Conventional soil erosion models are generally based on the Universal Soil Loss Equation (USLE), or a revised (RUSLE) or modified (Williams and Berndt (1977)) version of the USLE. Betre et al (2011) used the Soil and Water Assessment Tool (SWAT), ...

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Want to know what we are up to?

In the GeoScience Lab we are constantly pushing the envelope on what we do with models and maps. This presentation gives you an idea of what we are up to at the moment:

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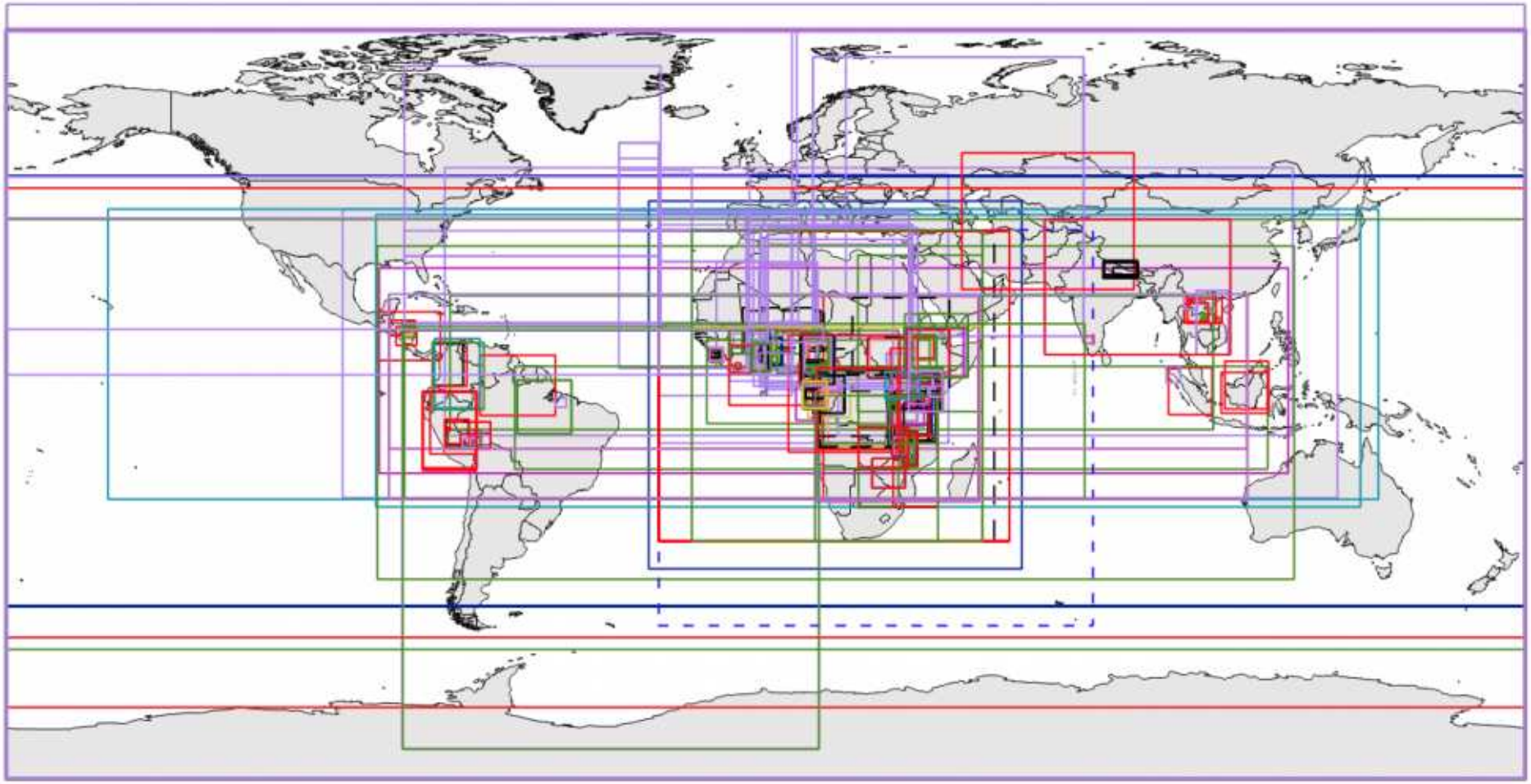
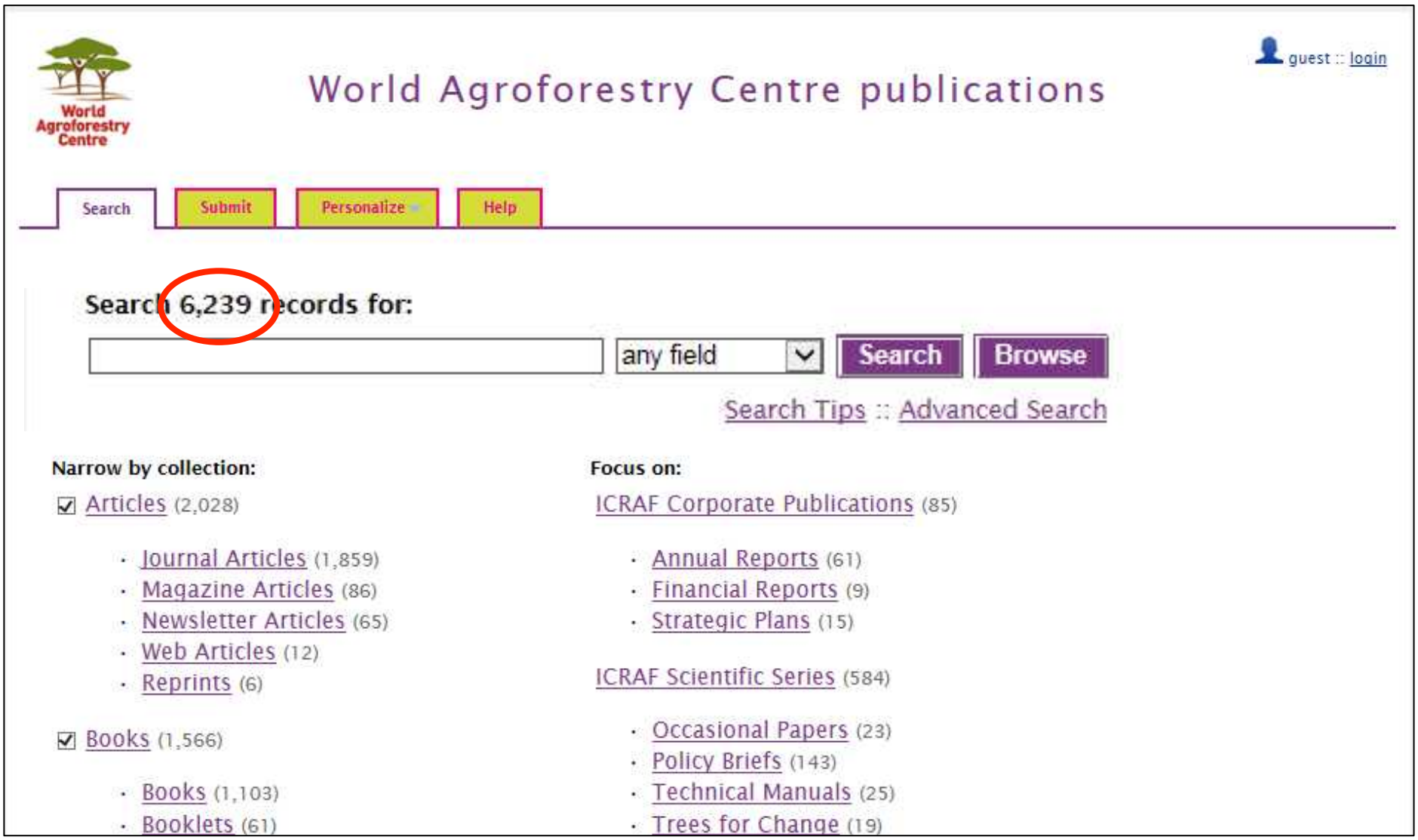
Mapping soil functional properties using multilevel models

In this document we present examples of R functions and scripts that may be used to generate local maps of soil functional properties based on for example remote sensing data, climate surfaces and/or digital elevation models and their derivatives ...

Over 1800 Datasets

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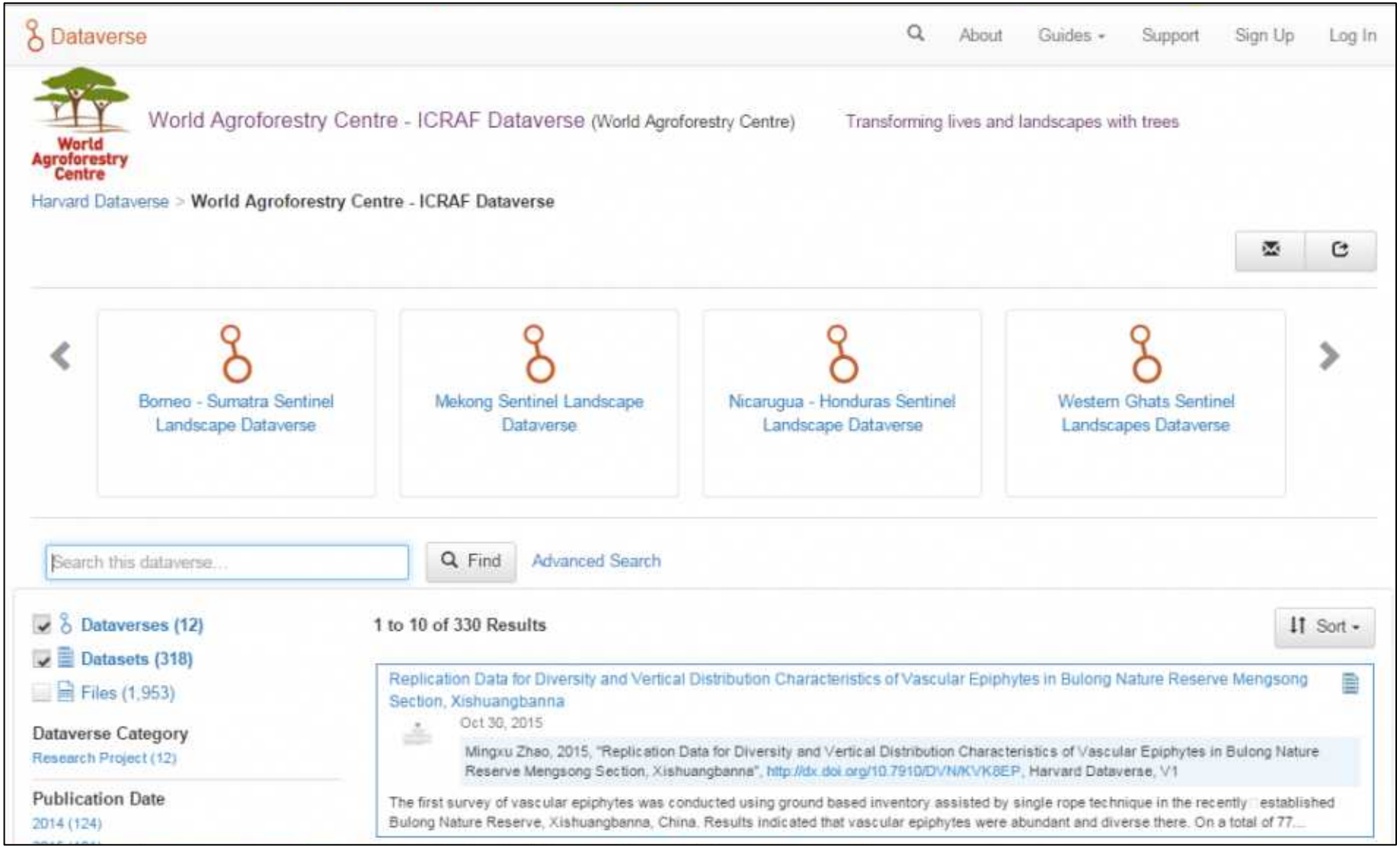
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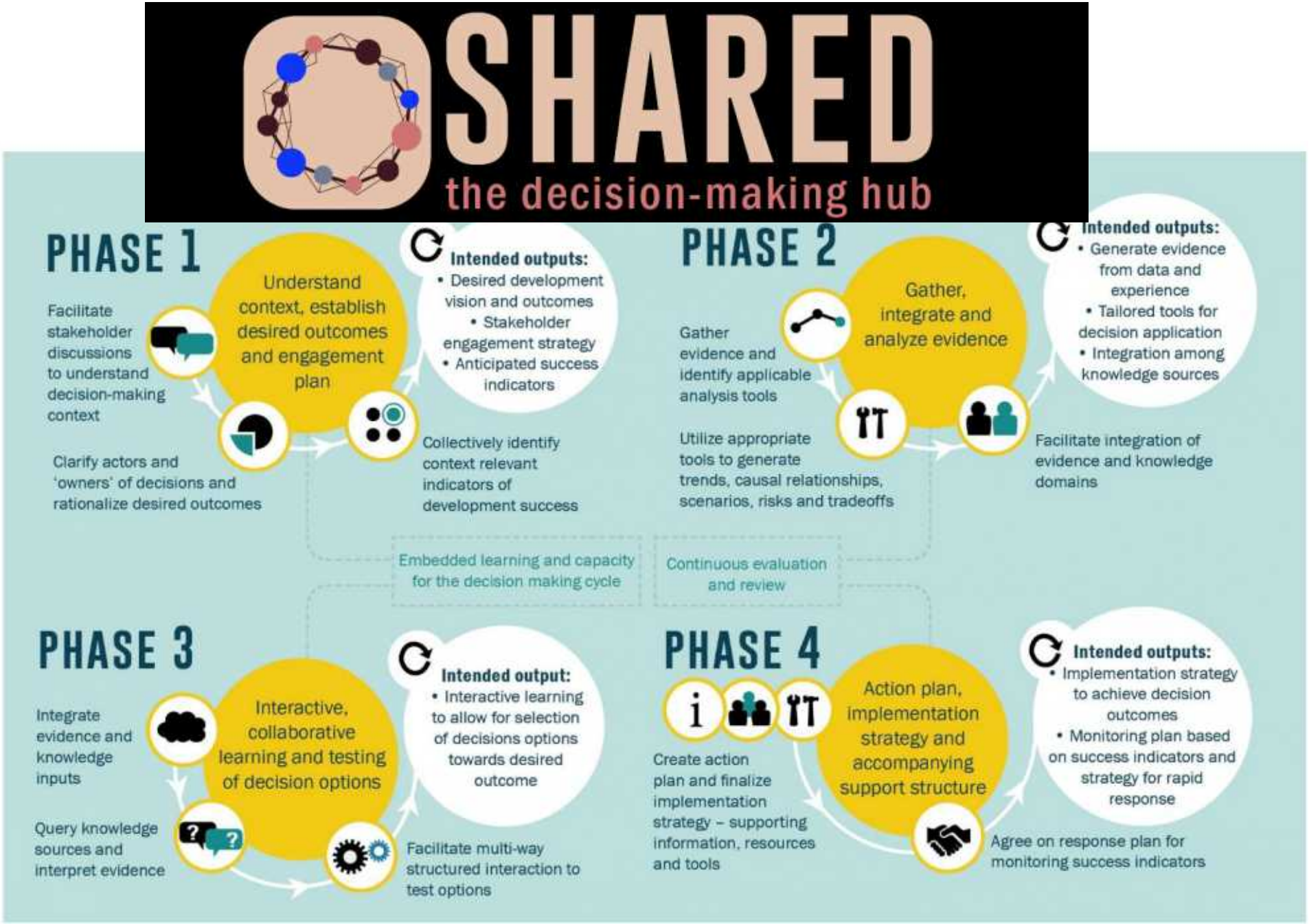
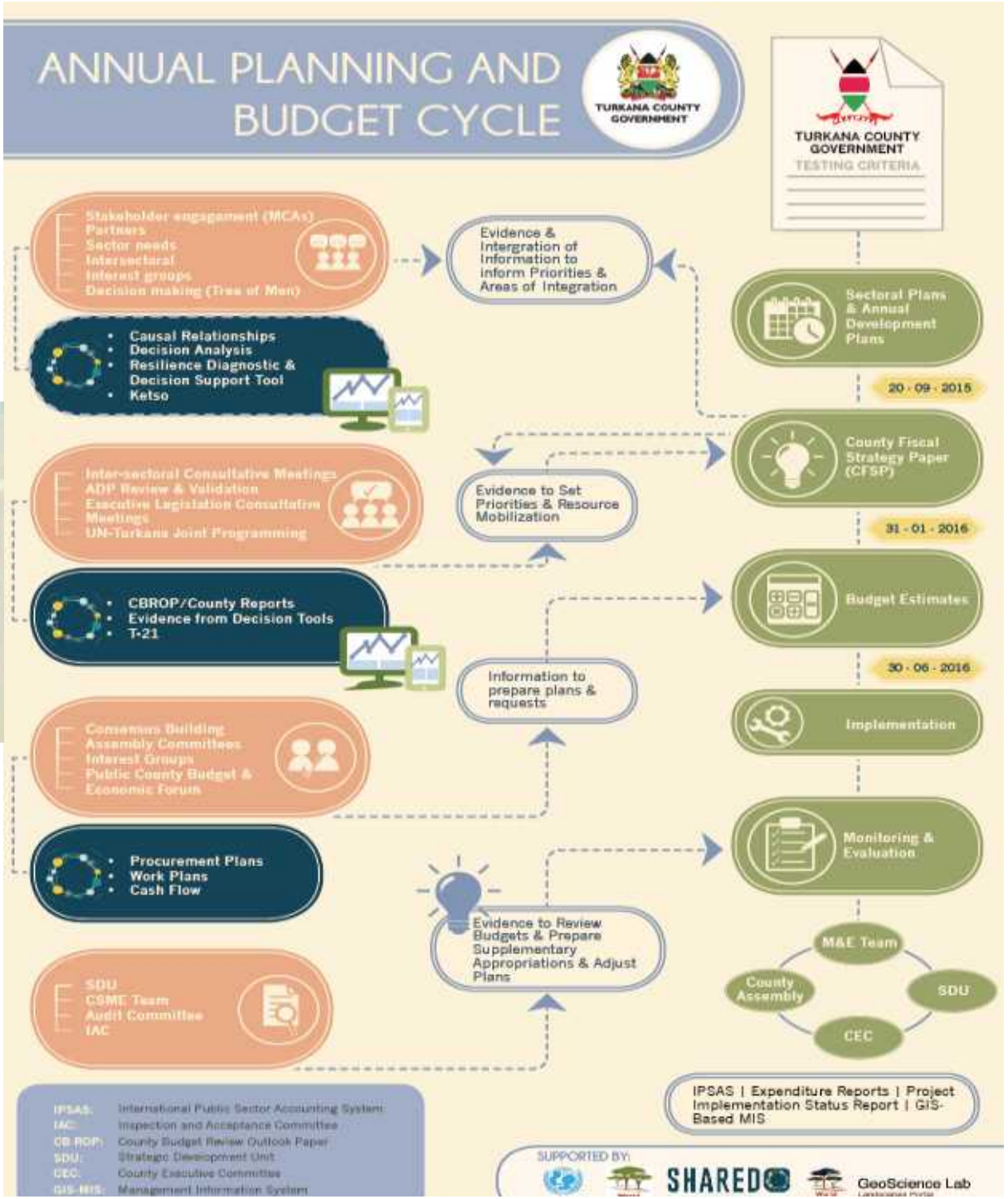
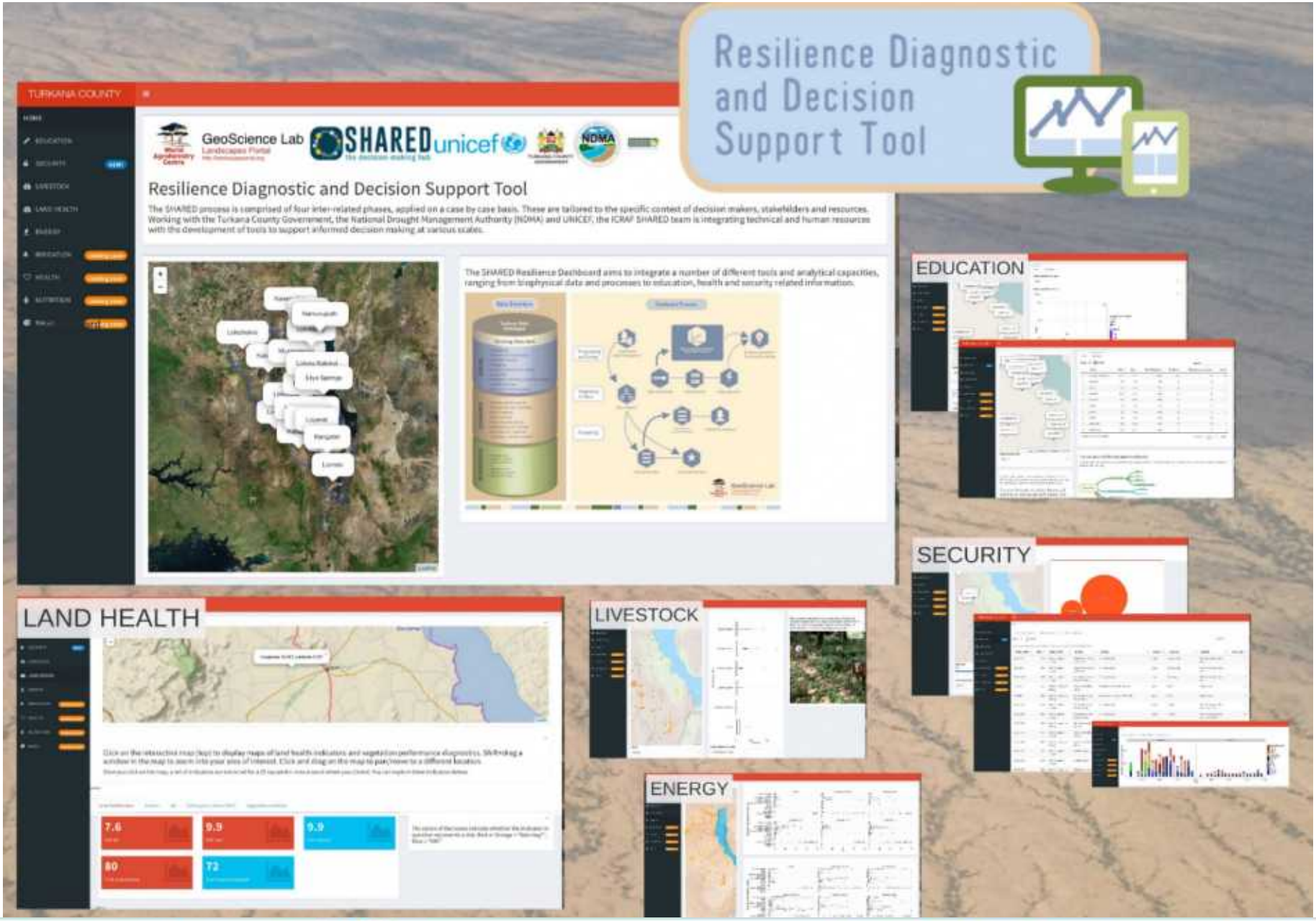
Replication Data for Diversity and Vertical Distribution Characteristics of Vascular Epiphytes in Bulong Nature Reserve Mengsong Section, Xishuangbanna
Oct 30, 2015
Mingxu Zhao, 2015, "Replication Data for Diversity and Vertical Distribution Characteristics of Vascular Epiphytes in Bulong Nature Reserve Mengsong Section, Xishuangbanna", http://dx.doi.org/10.7910/DVN/KVK8EP, Harvard Dataverse, V1
The first survey of vascular epiphytes was conducted using ground based inventory assisted by single rope technique in the recently established Bulong Nature Reserve, Xishuangbanna, China. Results indicated that vascular epiphytes were abundant and diverse there. On a total of 77...



Stakeholder Approach to Risk Informed and Evidence Base Decision Making

Turkana County
Revised Decision Cycle





TURKANA COUNTY GOVERNMENT

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SHARED — the decision-making hub

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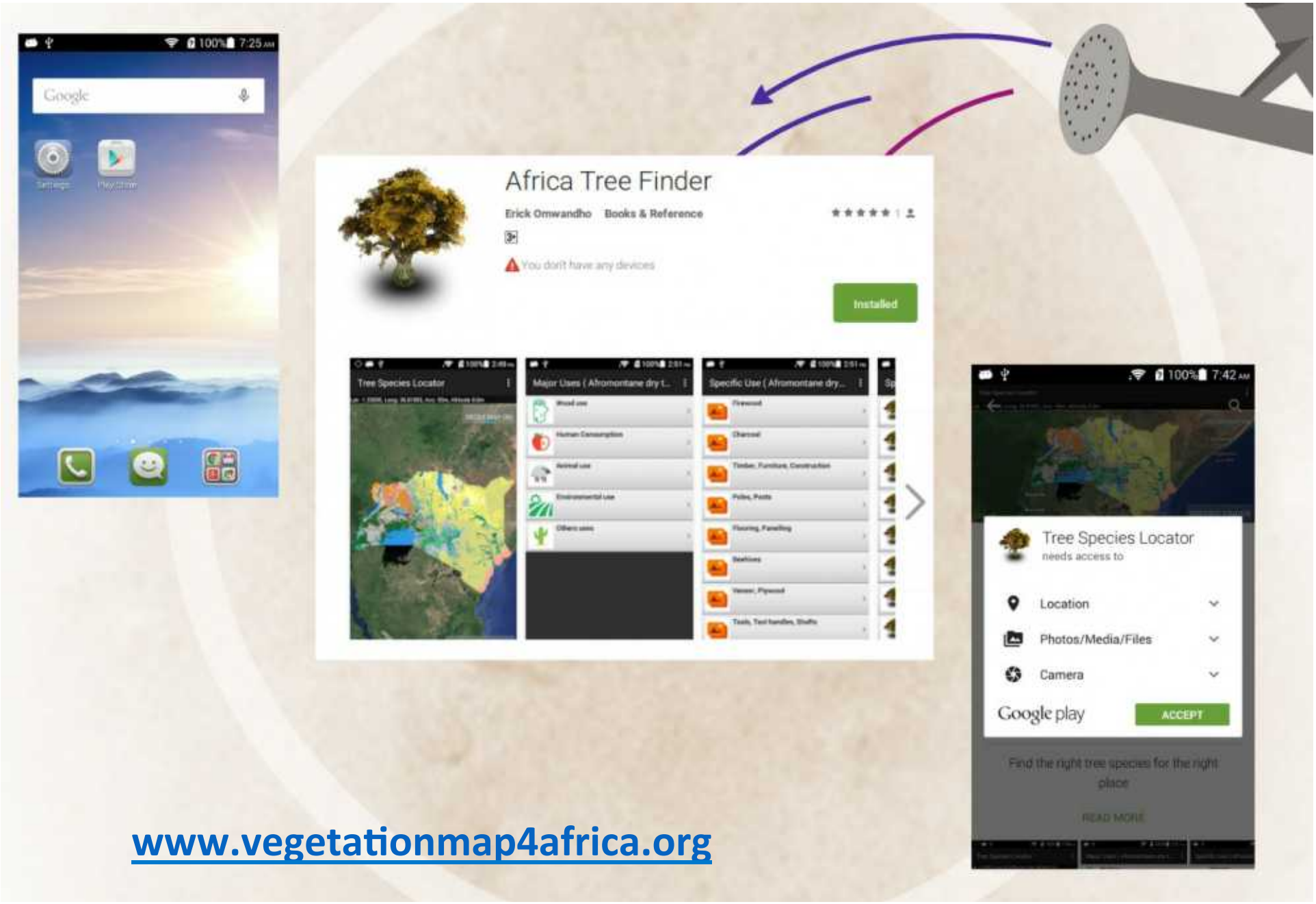

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The political Process versus Science

With COP21 and SDGs roll out up we have high aspirations, but it is a political process.
Whilst we look up to our politicians …. who do they look up to?

The CGIAR