

Kenya Forest Service

Japan International Cooperation Agency



Capacity Development Project for Sustainable Forest Management in the Republic of Kenya (REDD+ Readiness Component)

The Document of Design and Using/Operation/Maintenance Manual for Forest Information Platform (FIP)

November 2021

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Introduction

This document is constructed with the design sheet of Forest Information Platform (FIP) and its operation and maintenance manual. The content of each material are following;

Design sheet documents

1 Outline of system development

This document shows the out frame of purpose and functions of FIP. In addition, show the linkage of Kenya Forest Information System (KFIS), Open Foris Collect (forest inventory collection system) and Forest Information Management System (FIMS).

2 Requirement List

This document shows the result of the survey of mandate and expected functions for FIP.

3 Flowchart of Forest inventory collection work

This document shows the chart of data flow and related section / person for forest inventory data collection and process of data store.

4 Flowchart of FIP process

This document shows the chart of work flow and related section / person for operating FIP.

5 Flowchart of Forest Inventory Collection process

This document shows the chart of work flow and related section / person for process of forest inventory collection.

6 Flowchart of FMIS Link process

This document shows the linkage process of FIP and FMIS.

7 FMIS items for linkage to FIP

This document shows the process of data exporting, validating and importing from FMIS to FIP.

8 Components of the hardware

This documents show the hardware for FIP implementation.

9 Components of the software

This documents show the software for FIP implementation.

10 Server structure and installed software

This documents show the server construction and installed software for FIP.

11 Physical layout of hardware

This documents show the layout of physical server and hardware.

12 FIP Contents

This documents show the contents list of FIP.

13 MAP UI Design

This documents shows the basic layout of FIP user interface.

Manuals

1 Server operation of FIP

This manual shows the way of operation and maintenance for server hardware and operating system. Also shows the way of FIP web site administration.

2 How to construct and edit FIP by Portal for ArcGIS

This manual shows the way of create and maintain the FIP contents with Portal for ArcGIS.

3 How to use Survey 123

This manual shows the way of preparing the investigation sheet for survey 123. Also shows the way of working with Survey 123.

- 4 CO2 calculation tool (CO2CalcTool: ArcGIS Pro python tool box) This manual shows the way of installing the tools of CO2 calculation with ArcGIS pro.
- 5 CO2 calculation tool (co2CalcTool: ArcGIS Pro python tool box)

This manual shows the way of using the tools of CO2 calculation with ArcGIS pro.

6 JJ FAST data retrieval tool (JJFastTool: ArcGIS Pro python tool box)

This manual shows the way of installing and using the tools of JJ FAST data retrieval tool with ArcGIS pro.

Design Document

1 Outline of system development



2 Requirement list

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
		L	L	1.FIP		
Work Requirement	1-1-1	Process of work implementati on	To understand framework, process, the flowcharts, Information of input and output and data volume	Person	[FIP Administrator] •Web site Administrator who edits document or sets up map-set [Map Editor] Editor who makes map-data by using the editing function of Arc GIS [Viewer] Citizens who can view FIP information by Internet. Two type viewers ①Internal viewers: Only KFS ②External viewers: General Citizen and related to stakeholder →It is necessary to divide into two type " ②External", general citizen and related stakeholder depending on the contents on FIP	•Is it necessary to introduce not only public site but also Internal share site in KFS.
	1-1-2			Work Flow	∙sheetΓFlowchart of FIP process」	 ∙discuss sheet Flowchart of FIP process J
	1-1-3			Information of input and output	 Public Documents: related Redd+ and forest restoration Map: GIS data 	
	1-1-4			Data volume	 Data volume of public document file : (pending) The number of map for the document:(pending) 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	1-1-5	Work volume including the number of users and survey	To understand the number of users and transactions per unit	The number of people who use FIP	 The number of FIP Administrator : 1(Mr.Mwangi) The number of Map-data Editor : 30-50 (only KFS) The number of Viewer:(pending) 	
	1-1-6			Definition of unit	•per/year	
	1-1-7			The number of transactions per unit	 The number of update documents per year : (pending) The number of update map-data per year : (pending) The number of Viewer per year : (pending) 	
	1-1-8	Season and time	To understand the season of work and busiest season and time	Work season	Every season of the year	
	1-1-9			Busiest season and time	•Busiest season :May,June,J uly (End of Financial year) •Busied time morning and night (9-13,16-17)	
	1-1- 10	Place and device	To understand work place, facility, necessary items	Work place(device)	 FIP Administrator : Office(PC) Map-data Editor : Office(particular PC %) Viewer: Home and so on(PC or mobile device) 	 The PC is necessary to install Arc GIS It is necessary for viewers to view FIP by smartphone.
	1-1- 11	Scope of information system	To understand the scope of systemizatio n and non- systemizatio n for work	Flowchart of process	•sheet [[] Flowchart of FIP process]	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	1-1- 12	Information security policy	To understand the policy of security measures along information importance and restriction information	Information security	•KFS has information security policy. FIP shall follow the policy.	
	1-2-1	Function	To understand process contents, information and method of input and output	Faction list	 Display of document Editing of document Map display Approval of maps 	
	1-2-2			①The function: Display of document	•The Display function of text information and file- link related to work for public	
Functional Requirement	1-2-3			②The function: Editing of document	• The edit function of text information and file-link related to work for public	•This function is not for KFS but also 3-4 stakeholder(not everybody)
	1-2-4			③The function: Map display	•Display of registered map-set for public	The editing function of GIS data is for FIP Administrator
	1-2-5			④The function: Approval of maps	•The function which sets public or nonpublic to registered map-set	∙FIP Administrator can use this function

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	1-2-6	Screen	To understand basically concept of Screen list, summary and screen transaction	Screen list	•Screen for Document •Screen for Map	
	1-2-7			①The screen for Document	The screen for show of text information and file- link related to work for public	
	1-2-8			②The screen for Map	• The screen for the map-set display registered and approved "Portal for ArcGIS"	
	1-2-9	Form	To understand form list, the summary and the output image	Form list	 It is necessary to export some form. 	 •What kind forms do you export? > TBD •How many forms or reports do you export? > TBD
	1-2- 10	Information and data	To understand information data-list, requirement of transaction and data structure	Data list	•Document •Map	
	1-2- 11			①Document	•The text information or file- link related to work for public on FIP	
	1-2- 12			②Map	•Public map for FIP	
	1-2- 13	External Interface	To understand linkage requirement of other system and so on	Linkage to system	Portal for ArcGIS KFIS (Abolishing and migrate into FIP) FMIS(shape-file Linkage to FIP)	
	1-2- 14			information of linkage	∙map-set data ∙GIS data	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	1-2- 15			The timing of linkage	 when map editor registers and issues map when map editor updates GIS data 	•The timing for public is when FIP Administrator approved map or GIS data •Announcement to stakeholders automatically(pendin g)
	1-2- 16			The method of linkage	•To use the function of registration of shape-file from ArcGIS to Portal for ArcGIS	
			2.Fores	st inventory collection	on(FIC)	
Work F	2-1-1	Process of Business implementati on	To understand framework, process the	Person	[Administrator] •Who is the Administrator? •The role : Data Management including checkin/checkout of data Allocation of survey points etc [Field surveyor] •The role : Entry of the survey result by Mobile device	
Requiren	2-1-2		flowcharts, Information	Work Flow	•sheetΓFlowchart of FICJ	
nent	2-1-3		output and output and data volume	Information of input and output	 Information of research point (including location and attribute) Information of survey result Information of Field Surveyor Background image(Landsat image, Administrative boundaries etc.) 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	2-1-4			Data volume	 The number of data : pending data volume/per 1 survey : pending 4phots /per plot (16photo /per cluster) 	
	2-1-5	Volume	To understand the number of users and transactions per unit	The number of people who use FIC	 The number of manager : 4people The number of Field surveyor : →totally 17teams each team has ten members (one person uses the device) 	
	2-1-6			Definition of unit	•твD	Make sure the interval of survey and its timing
	2-1-7			The number of transactions per unit	 The number of survey per year : TBD The number of survey points per one survey : (pending) The number of allocated survey point per survey : (pending) 	average 2plots a day
	2-1-8	Season and time	lo understand work season and busiest season and time	Work season		
	2-1-9			Busiest season and time	Season • January ~ March(dry season) • July~October(dry season)	
	2-1- 10	Place and device	To understand work place, facility, necessary items	Work place(device)	 Administrator : KFS office(PC) Field surveyor : Field (Tough pad) The reason they use tough pad is why its waterproof, memory, easy to use 	 It is necessary for mobile device of Field Surveyor to install an application.

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
					by surveyors, main to be used harsh condition	
	2-1- 11	Scope of information system	To understand the scope of systemizatio n and non- systemizatio n for work	Flowchart of process	•sheet [[] Flowchart of FIC process]	
	2-1- 12	Information security policy	understand the policy of security measures along information importance and restriction information	Information security	FIC shall follow KFS IT policy	
Functional Requirem	2-2-1	Function	To understand process contents, information and method of input and output	Faction list	 Information Management of survey points Entry of survey results Management of survey result information Management of Field Surveyor information Management GIS data of background image , administrative boundaries and so on 	
lent	2-2-2			1. The function: Information Management of survey points [@ArcGIS Online, Portal for ArcGIS]	 List of survey points Detail display of survey points (including positon information) Allocation of survey points to Field Surveyor Check out of 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
					allocated survey point	
	2-2-3			2. The function: Entry of survey results [@Survey123]	 List of survey points Detail display of survey points (including positon information) Result entry of survey points Registration of survey results 	 It is necessary to use the function on off-line
	2-2-4			3. The function: Management of survey result information [@ ArcGIS Online, Portal for ArcGIS]	• List of survey result • Detail display of survey points (including positon information) • Checking of survey result • Exporting survey results as CSV file	
				The function: Data cleansing(Vilificati on of entry data)	 If the data entry violates predefined data rules then the system should give warning or error 	
	2-2-5			⑤The function: Management of Field Surveyor information [@ArcGIS Online, Portal for ArcGIS]	 Insert ,update and delete of Field Surveyor's information Allocation of survey points Checking of survey status 	
	2-2-6			⑥Management of background image and so on [@Portal for ArcGIS]	 Output of data (for off-line) Output of Landsat image, administrative boundaries and so on 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	2-2-7	Screen	To understand basically concept of Screen list, summary and screen transaction	Screen list	 List of survey points[Management] Detail information of survey points[Management] Allocation of survey points[Management] List of survey points[Survey] Detail information of survey points[Survey] Entry of survey result[Survey] List of survey result[Management] Detail survey result[Management] Approval of survey result[Management] 	
	2-2-8			1. List of survey points[Manageme nt] [@ArcGIS Online]	•Display list of registered survey points information	
	2-2-9			2. Detail information of survey points[Manageme nt] [@ArcGIS Online]	• Display of the detail survey points information selected from the list• Location Display from Map•Display from survey point on Map	
	2-2- 10			3. Allocation of survey points[Manageme nt] [@ArcGIS Online, Portal for ArcGIS]	 Allocation of field surveyors from survey points list Lock of Master- data(Checkout) when determining the allocation 	
	2-2- 11			4. List of survey points[Survey] [@Survey123]	 Viewing on the survey points information allocated to Field Surveyor's device List Display of allocated survey points 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	2-2- 12			5. Detail survey result[Managemen t]	• Detail display of the survey points selected the list	
				[@Survey123]	Map display	
	2-2- 13			6. Entry of survey result[Survey] [@Survey123]	 Entry of survey results On offline situation, survey results are saved to the devices temporary →On online situation, the results reflect ArcGIS online 	
	2-2- 14			7. List of survey result[Managemen t] [@ArcGIS Online]	manually • Display of the survey result list entered	
	2-2- 15			8. Detail survey result[Managemen t] [@ArcGIS Online]	 Display of detail survey result information Location Display on Map display Display of survey points on Map 	
	2-2- 16			9. Approval of survey result[Managemen t] [@ArcGIS Online, Portal for ArcGIS]	•Reflection to Master-data of server(check-in) after approving survey result	
	2-2- 17	Form	To understand form list, the summary and the output image	Form list	Pending	
	2-2- 18	Information and data	To understand information data-list, requirement of transaction and data structure	Data list	 Survey points[GIS] Survey result[TEXT] Field Surveyor[TEXT] Background Image (Landsat image、 administrative boundaries) [GIS] 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	2-2- 19			①Survey points	 The GIS-data which show survey points location Summarized information and unique ID as attribute 	
	2-2- 20			②Survey results	•Text information entered as survey results	
	2-2- 21			③Field Surveyor	 Field Surveyor Information including their department and so on 	
	2-2- 22			④Background image	 Background image from ArcGIS Online Landsat images Administrative boundaries and so on 	
	2-2- 23	External Interface	To understand linkage requirement of other system and so on	Linkage to system	•Portal for ArcGIS •ArcGIS Online	
	2-2- 24			information of linkage	 Information of survey points (Location and attribution) Survey result information Field Surveyor information Background data (Landsat image, Administrative boundaries and so on) 	
	2-2- 25			The timing of linkage	 When starting survey : check-out When finishing survey : check-in 	
	2-2- 26			The method of linkage	•Reflection of the administers command on display using the software function	
				3.Linkage to FMIS		

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	3-1-1	Process of Business implementati on	To understand framework, process, the flowcharts, Information of input and output and data volume	Person	[FMIS Administrator] The administrator who update Contents pages' linkage in FMIS: Mr. Mwangi [FMIS data manager] The data manager who updates plantation shape data in KFS [Viewer] •The Viewer who Views public Information through Internet •Viewers are divided into following two type. 1. Internal(only KFS) 2. External viewer	On FIP, FMIS shape file including all attribution shall be opened for KFS. And FMIS shape file including some attribution shall be opened for External viewer.
Vork R	3-1-2			Work Flow	•Sheet Flowchart of FMIS Link process	
tequirement	3-1-3			Information of input and output	Plantation polygon shape file The URL of FMIS contents	
	3-1-4			Data volume	Data volume of plantation polygon shape file : 31MB The number of FMIS contents page : (pending)	
	3-1-5	Volume	To understand the number of users and transactions per unit	The number of people	 The number of FMIS Administrator : 1 (Mr.Mwangi) The number of FMIS data manager : Three people The number of Viewer : Persons who related: (pending) General citizens:(pending) 	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	3-1-6			Definition of unit	•per/year	
	3-1-7			The number of transactions per unit	 The number of shape-file update and linkage to FIP per/week : Maximum once a week The number of FMIS contents update per year:(pending) The number of Viewers per/year:(pending) 	
	3-1-8	Season and time	To understand the season of work and busiest season and time	Work season		
	3-1-9			Busiest season and time		
	3-1- 10	Place and device	To understand work place, facility, necessary items	Work place(device)	 FIP Administrator: KFS Office (PC) FMIS data manager: FMIS (PC) Viewer: Home and so on (PC) 	
	3-1- 11	Scope of information system	To understand the scope of systemizatio n and non- systemizatio n for work	Flowchart of process	 Flowchart of FMIS Link process 	
	3-1- 12	Information security policy	To understand the policy of security measures along information importance and restriction information	Information security	FMIS linkage shall follow KFS IT policy	
Functional Requirement	3-2-1	Function	To understand process contents, information and method	Faction list	+ Validation for plantation shape file •Registration of plantation shape file	

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
			of input and output			
	3-2-2			⊕The function:- Validation for- plantation shape- file	←The validation function of consistency of plantation shape file	_
	3-2-3		_	②The function: Registration of plantation shape file	•The registration function of the plantation shape file	
	3-2-4	Screen	l o understand basically concept of Screen list, summary and screen transaction	Screen list		
	3-2-5	Form	To understand form list, the summary and the output image	Form list	(pending)	
	3-2-6	Information and data	To understand information data-list, requirement of transaction and data structure	Data list	 Plantation shape file Contents linkage page URL of FMIS 	
	3-2-7			①Plantation shape file	•The Plantation shape file which is updated by FMIS data manager	 Holding only latest data on FIP It's unnecessary to hold old data on FIP
	3-2-8			②Contents linkage page URL of FMIS	•The contents page URL of FMIS linked to FIP	
	3-2-9	External Interface	To understand linkage requirement of other system and so on	Linkage to system	∙FMIS(UVIO)	Cold linkage(only shape file)

Groupin g	ltem no	Item	The contents to understand	Check Point	The contents	Note
	3-2- 10			information of linkage	 Plantation shape file Contents linkage page URL of FMIS 	
	3-2- 11			The timing of linkage	•When FMIS data manager updates plantation shape data•When FIP Administrator updates the contents page	
	3-2- 12			The method of linkage	•To link shape data and contents using the function of registration and issue from Arc GIS to Portal for ArcGIS	 It is supported using Software function

3 Flowchart of Forest inventory collection work



4 Flowchart of FIP process



5 Flowchart of Forest Inventory Collection process



6 Flowchart of FMIS Link process



7 FMIS items for linkage to FIP

No	Field Name	Alias	Field type	Field Length	null	The meaning of field and data	note
1	FID	FID	OID	4	I	The serial number to specify each shape data	The number starts from [0]
2	Shape	Shape	Geometry	0	-	Shape type -"Polygon"	
3	OID1	OID1	Integer	9	I	Unknown.	All records are "0"
4	GEO_ID	GEO_ID	String	254	No	Unique number of UVIO system. It matches [SC_ID]	This information is not unique id as each shape data.
5	FMIS_QUANT	FMIS_QUANT	Double	19	I.	Unknown	
6	Station	Station	String	254	No	Large division	
7	Block_Name	Block_Name	String	254	Yes	Middle division	
8	Block_ID	Block_ID	String	254	Yes	Ommited informaiton of [Block_Name]	It doesn't match [Block_Name]
9	Comp	Comp	Double	19	-	The branch number of [Block_ID]	
10	Sub_Comp	Sub_Comp	String	254	Yes	The branch number of [Comp]. The smallest unit of plantation	
11	SC_Code	SC_Code	String	254	Yes	Conbination information of [Comp]+[Sub_Comp]	
12	SC_ID	SC_ID	String	254	Yes	Conbination information of [Block_ID]+[SC_Code], Unique number of UVIO system. It matches [Geo_ID]	It doesn't match each [Block_ID] and [SC_Code] perfectly
13	Geo_Class_	Geo_Class_	String	254	Yes	The information of Indigenous Forest or not	All records are "Indigenous Forest" or "null"
14	GEO_C_CODE	GEO_C_CODE	String	254	Yes	Ommited writing of "Plantation" \rightarrow "PLT"	All records are null or "0"
15	Geo_Group	Geo_Group	String	254	Yes	The information of Conservation or not	All records are "Conservation" or "null"
16	Geo_G_Code	Geo_G_Code	String	254	Yes	Ommited writing of [Geo_Group] "Conservation"→"Con"	It doesn't match [Geo_Group]
17	Species_1	Species_1	String	254	Yes	Species_class1.	How to write is not unified including mixing up Large and small letter of Alphabet or having a space in the first letter of a word
18	Year	Year	Double	19	1	Plantation year related to Species_class1.	Plantation year is displayed as A.D. but some case occures "0","10" "25" or "163".
19	Area_Ha	Area_Ha	Double	19	-	area of Species_class1_per/ha	
20	Land_Cover	Land_Cover	String	254	Yes	The classification of Forest Cover	How to write is not unified including mixing up Large and small letter of Alphabet or having a space in the first letter of a word
21	Land_use	Land_use	Double	19	I.	Land use	All records are "0"
22	Species_2	Species_2	String	254	Yes	Species_class2,	How to write is not unified including mixing up Large and small letter of Alphabet or having a space in the first letter of a word
23	Age	Age	Double	19	-	Stand age.	All records are "0"
24	Volume	Volume	Double	19	I.	Tree volume from Inventory survey	All records are "0"
25	Label	Label	Double	19	-	Unknown.	All records are "0"
26	Year_	Year_	Double	19	-	Plantation year related to Species_class2.	All records are "0" except for 1 record
27	Area_1	Area_1	Double	19	-	area of Species_class2_per/ha	All records are "0"
28	Units	Units	Double	19	-	ha	All records are "0"
29	cat	cat	Double	19	-	Unknown.	All records are "0"

For public(including general citizen and related stakesholder) Only KFS The inforfomation for coloring on MAP

8 Components of the hardware

Item	Specification
New server: GIS server	- CPU: Intel® Xeon®E5-2640 v4 2.4GHz for 10 core,
	- Memory: 32 GB
	- HardDisk: 8 x SAS 3.84TB, or more, RAID 6
	- Rack type 2U server
	* Including VMware vSphere Standard
New server: SQL database.	- CPU: Intel® Xeon®E5-2640 v4 2.4GHz for 10 core,
	- Memory: 32 GB
	- HardDisk: 8 x SAS 3.84TB, or more, RAID 6
	- Rack type 2U server
	* Including VMware vSphere Standard
New data storage server	- CPU: 1 x Intel® Xeon® E5-26xx v3 series, 1.9GHz, or more
	- Memory: 32 GB
	- HardDisk: 24 x SAS 2TB or more, RAID 6
	- Rack type 2U server
New Backup device HPE	- Support Tape: LTO-5, LTO-6,LTO-7
Library (AK379A)	- Tape Slot: 24
Liotury (This 7911)	- Capacity: 320TB (Compress)
	- Rack type 2U
New Backup device HPE	- Support Tape: LTO-5, LTO-6,LTO-7
Library (AK379A)	- Tape Slot: 24
	- Capacity: 320TB (Compress)
N. DO LUI C	- Rack type 2U
New PC workstation for	- OS: Windows 10 Pro Edition 64 bit (English)
processing x 6	- CPU: Intel® Xeon® Processer ES-1620, 3.7GHz Turbo or higher, 12M L3,
processing. A o	5.86G1/s or higher
	- Memory: 16 GB or more
	- Hard Disk: at least 2TB totally, SATA (No RAID) or more
	- DVD Super Multi Drive
	- Graphic Card: IG NVIDIA Quadro K600 (IDP and IDVI) (IDP-DVI and
	IDVI-VGA adapter) or higher
	- wireless network USB adopter (support 11n/11a/11g/11b)
	- 29inch wide Monitor $M_{1}^{2} = 0.05 = 201((11 - 10 - 10))$
	- Microsoft Office 2016 (Home & Business)
	- Security software (24 months)
	- System Recovery metha Auto Panging (100V 240V)
	- Auto Kaligilig (100 v - 240 v) - UDS 650 (650VA - 400 Watte) Input 220V / Output 220V
New Lanton PC for Field	- 015 050 (050 VA - 400 waits), input 250 V / Output 250 V
survey: x 2	- OS: WINDOWS 10 PTO Edition 04 oft (English)
	- CI U. IIICIW CUICI/W SCHES FIUCESSEF
	- Internety. 10 OD of more Hard Disk: at least 1TR
New Laptop PC for Field survey: x 2	 Security software (24 months) System Recovery media Auto Ranging (100V- 240V) UPS 650 (650VA - 400 Watts), Input 230V / Output 230V OS: Windows 10 Pro Edition 64 bit (English) CPU: Intel® Core i7® series Processer Memory: 16 GB or more Hard Disk: at least 1TB

9 Components of the software
Item	Specification		
Geo-information database software	ESRI ArcGIS for Server Enterprise Standard,		
with spatial data management	Portal for ArcGIS Level1		
Image server software	ESRI ArcGIS image Extension for Server Enterprise		
GIS Cloud server software	ESRI ArcGIS Online Organization Plan Level 1 + additional 5		
	named user		
GIS software for Desktops for	ESRI ArcGIS for desktop advanced 10.4 with spatial analyst, 3D		
administrators	analyst, geostatistics analyst, publisher		
GIS software for Desktops for the	ESRI ArcGIS for desktop standard 10.4 with spatial analyst, 3D		
operating engineer: x 3	analyst, geostatistics analyst, publisher		
Remote sensing software for desktop	ERDAS IMAGINE 2016 version		
Database Server Software	Microsoft SQL SERVER 2016 or Higher + 5 USER CALS		

Design Document #10

10 Server structure and installed software



Exsisting * *It was procured by "the Forest Preservation Programme"

Design Document #11

11 Physical layout of hardware

42		2000000
41		
40		
39		
38		
37		
36		
35		
34		
33		
32		
31		
30		
29		
28		
27		
26		
25	L3 Switching HUB	
24	DELL PowerEdge R710 *1	
23	(Backup Server)	
22		
21	KWM Canaala KWM Switch	A CONTRACTOR OF THE OWNER OWNER OF THE OWNER OWNE OWNER OWNE
20	LID Pro Light DI 280 Con	NO.
19	[Server1:main]	
17	HP ProLiant DI 380 Gen9	
16	[Server2:backup]	
15	HP ProLiant DL 380 Gen9	
14	[Storage Server]	
13		
12		E .
11		
10	LTO-5 ULTRIUM 3000 *2	
9	[Back-up Device (Single)]	
8		
7	DELL PowerVault TL4000 *1	
6	[Back-up Device (Multi)]	
5		
4	APC Smart-UPS RT 3000	
3		
2	APC Smart-UPS KT 3000	
1	UPSIJ	

*1 Old hardware (moved from old rack)

*2 Old hardware (not working)

New server rack layout

42		
41		
40	L3 Switching HUB	
39		
38		T I DECEMBER OF THE PARTY OF TH
37		T 2
36		3
35		
34		
33		
32		
31		
30		
29		
28	KVM Console, KVM Switch	
27	DELL PowerEdge R710	
26	(ArcGIS Server)	
25	DELL PowerEdge R710 *1	
24	(Web Server)	
23	DELL PowerEdge R710	
22	(Backup Server)	
21	DELL PowerEdge R710	
20	(Database)	D O
19	DELL PowerVault MD3200	
18	(Backup Server)	
17	DELL PowerVault MD3200	
16	(Backup Server)	
15		
14		
13		
12	DELL D V14 TL 4000 *1	
11	DELL Powervault 1L4000 *1	
10	[Back-up Device (Multi)]	
9		and the second s
8		
7		
6	APC Smart-UPS RT 8000	
5		
4		
3	Battery Pack	A Standard and the state
2		
1		
		*1 Moved to new rack

Old server rack layout

Design Document #12

12 FIP Contents

Component	Contents					
	Forest Information Platform					
	What is FRLs?					
	Kenya FRL		APP			
	Kenya FRL Dec. 2019		Document			
	Kenya FRL Aug. 2020		Document			
	Evidence of formulation	Evidence of formulation of FRELs/FRLs				
	Activity data					
FRLs		Land cover / land use change table				
		Land cover / land use change map	Мар			
		Land cover/land use map of the historical reference years	Мар			
	Emission factor		APP			
		Forest inventory survey	Document			
		Biomass conversion information	Document			
	Emission estimate		Document			
	What is MRV?		Description			
	Measurement system					
	Monitoring Activity data					
		Land cover / land use change table	Table			
		Land cover / land use change map	Мар			
		Land cover/land use map of the historical reference years	Мар			
	Emission estimate					
MRV		Forest inventory survey	Document			
		Biomass conversion information	Document			
	Forest carbon stock removal and emissions					
	Reports from Reporting	g system	Document			
	Verification system					
	MRV Training		Document			
	Community Monitoring	of Forest	Мар			
Safeguards Information System	Safeguard information		APP			
Forest cover	JJ-FAST		Мар			
change	NRTFAS		Мар			
monitoring	Field Survey Report		Мар			
National	National REDD+ strate	ду	Document			
REDD+ Strategy and	Legislation and strateg	y related REDD+	Document			
Related	Other information relate	ed REDD+ in Kenya	Document			
mormation	Conventions related cli	mate change ratified	Document			
Forest Sector Administrative	Forest related organiza	ition chart	Document			
Information	Legal jurisdiction of Fo	rest Management	Document			
	Relevant information					

		Information on protected areas including national parks	Мар	
		Demographic information including ethnic communities	Мар	
	Forest and Landscape Restoration			
	EOLAB			
	Other related maps			
	Soil maps			
	Precipitation map			
		Temperature map	Мар	
		Landuse 2010	Мар	
		FMS	Мар	
		Forest Fires	Мар	
	Glossary		Document	
REDD+ & A/R CDM Project Information	REDD+ & A/R CDM Pr	oject Information	Мар	

No	p Contents Type		Content	Identifier
1	Мар		Map application	MAP
2	Image		Image data and/or Link	IMG
3	3 Video		Video data and/or Link	MOV
4	4 Web page		Web pages	(WEB)
	4-1	APP	Web application (implemented and managed in Portal)	APP
	4-2 Description		Description for contents	DES
4-3 Document		Document	Document data (managed in portal)	DOC
	4-4	Table	Table data	ТАВ
4-5 Link		Link	Outside link	LNK

Design Document #13

13 MAP UI Design

Porest Information Platform x +	ortal.kenyaforestservice.org/portal/apps/Map	Series/index.html?appid=bf97262a5148	34b0eb4dcddf18c4e570b#	Q fa 🛛	3 ₫	Ð -	□ × •••
Forest Information Platform			When sub compo	nent has mul	tiple cor	ntent	s.
Home	Activity data		they are shown as	tabbed inte	rface		
	Land cover/Land use change area	Land cover/Land use change Map	Land cover/Land use Map				
FRLs	レイヤー リスト ロ レイヤー Q 示 ・V LCLU Change Legend ・・・・	+	Vert	S N MENDEBO MOUN	TAINS MOD Shee	and a	
What is FRL2 Kenya FRL Evidence of formulation of FRELs/FRLs - Activity data - Emission factor - Emission estimate	LCLU Change Legend Forest (no change) Forest (edgreddeton) Forest (edgreddeton) Cropland to forest Grassland to forest Wetland and other land to forest. Forest to original	Each col	ntents will be displa	ayed here	The second secon	and the second	SOM A
Main 8 components and sub components are shown here as TOC (Table of Contents)	Forest to grassland Forest to welland and other land ULUCChangeLayer Change_2002_2006sf Change_2009_2010sf	KirkANDA Coma (Kiga) Birkaru	da Veder Abre States Mananza Mananza		_o Kism.	aayo	
Safeguard information system	Y change_2010_2014.tf Y change_2014_2018.tf	Bujumbura	Arusha	lombas a			
Forest Cover Change Monitoring		Lukage Ugske	TANZANIA Dodoma	Dar es Salaam P Esr, HERE	Garmin, FAO, NC	DAA, USGS	esri

Technical Manual

Technical Manual

Technical Manual #1

1 Server operation of FIP

1.1 Sever structure of FIP

1.1.1 Rack Layout

The rack layout of FIP is as follows.

42		42		-
41		41		La
40		40		
39		39		0 1
38		38	attle	D
37		37	11 Martin	
36		36		
35		35		
34		34		1
33		33		
32		32		
31		31		D
30		30		
29		29		
28		28		
27		27		
26		26	-	
25	L3 Switching HUB	25		
24	DELL PowerEdge R710	24		
23	(Backup Server)	23		
22		22		A DESCRIPTION OF TRADE OF TRADE OF TRADE
21		21		
20	KVM Console , KVM Switch	20	le lo-	8028
19	HP ProLiant DL380 Gen9	19		
18	[Server1;main]	18		
17	HP ProLiant DL380 Gen9	17		
16	[Server2;backup]	16	and a second	
15	HP ProLiant DL380 Gen9	15		
14	[Strage Server]	14		
13		13		
12		12		
11		11		
10	LTO-5 ULTRIUM 3000	10		
9	[Back-up Device (Single)]	9		
8	_ #	8		
7	DELL PowerVault TL4000	7		
6	[Back-up Device (Multi)]	6		
5	~	5		
4	APC Smart-UPS RT 3000	4		:
3	[UPS1]	3		PARTI
2	APC Smart-UPS RT 3000	2		
1	[UPS1]	1		
1	[[[[[[[[[[[[[[[[[[[[J	

1.1.2 SW/HW Design of FIP

The SW/HW Design of FIP contains the contents below.



UPS connection design of FIP

UPS connection of FIP server entails the following;

necesarry power volu	me (W)	Output Power (W)	
		above ; Actual volume	
Sever1 (main)	800	below ; Max volume	
Sever2 (backup)	800		
Storage Sever	800	1,725	UPS1
Switching Hub	250	2,100	
	250		
Back up tape (single)	34	1,885	
KVM Console	36	2,100	UF32
KVM Console Switch	20		
Backup Server	870		
Back up tape (multi)	350		
	※ Red letter r	neans estimated volume	

1.2 How to operate server and access FIP

1.2.1 How to operate physical server

- 1 Enter the server room and open FIP server rack.
- ② Pull KVM console and open the display (The power of display is on automatically)





3 To change the monitor of each Server, push the <code>[prt sc]</code> button of the Keyboard

of KVM console.



④ When the display of selected server is shown, push [the arrow] buttons and select the server you want to display.

Note: Server name and Port Number enable easy identification of the server.



1.2.2 How to access FIP site on physical server

- FIP is running on Virtual Servers of Server1.To connect virtual servers, KFS can operate virtual servers by Virtual Machine management server, Storage Server = Server03.
- ② Based on the method of "2-1 How to operate physical server", select Server03(port:03).

	HPE &	Mai	n	<u>?</u> ×	Ī
	A Name	EID	Port	1	
	520916-04A4FA		04	0.0	
	520916-04A4FF	46.000/10/1	03	O A	
	520916-04450A 520916-044516		02 01	O A O A	
and the second					
	1000 1 (((((((((((((((((
	-				
	Clear	1	Setup	1	
	Disconnect		Connand	IS D	
Ctrl+Alt+Delete to unlock	100		K	Star Ford	<u>h</u>

③ After the display of Server03 (Storage Server) ,push the [Ctrl+Alt+Delete] button at the same time and log-in the following account,

User ID :	Administrator
Password :	(ask system administrator)

④ After the display of Server03 (Storage Server) ,which is for operation of VM machine, double click [VM01] short-cut icon on Desktop.



Note :VM02 is for Image server.

⑤ In case of the alert of certification, push the [Yes] button.



6 After accessing the Virtual server, open the internet browser including [Firefox] and click the [Forest Information Platform] in [Favorite].
 Or use following URL.

https://kfs2018svr01:7443/portal/apps/MapSeries/index.html?appid=3322eda6af 894573aea4a3811a4a09c7 ⑦ You can see following display of FIP site.



- 1.2.3 How to access FIP contents management display
- Portal for ArcGIS manages FIP site. If you want to access Portal for ArcGIS, open the internet browser including [Firefox] and click the [Portal for ArcGIS] in [Favorite].
- ② Or use following URL. https://kfs2018svr01/portal/home/
- ③ After accessing, sign in specified USER ID and password.



1.2.4 How to access FIP site or FIP contents management display on your PC by remote desktop

Through "remote desktop" application, you can access FIP site or FIP contents management display without entering in server room. How to Access account of Virtual server is following.

Click "remote desktop" icon and input following information



User name : KFS2018SVR01¥Administrator Password : (ask system administrator)

1.3 Sustainable server operation

1.3.1 How to copy server1 to server2

Server2 is introduced for the cold standby environment in case of crash of Server1. For example, if the version of the software of Server1 is updated, it's necessary for KFS to copy server1 environment to Server2.

The procedure of how to copy server1 to sever2 is described below:

Note: All datasets are stored is Server3 (Data storage server). So copying from server 1 to server 2 is for the sustainable operation of system. The operation of data back-up is related server3 and backup device including backup tape and server. It's necessary to KFS to decide how to operate back-up.

- HPE Main ? X D Name EID 21 Port 520916-04A4FA 04 0 0484F1 03 OR 520916-046508 02 OA 520916-046516 01 0 A = Clear Setup Disconnect Connand Ctrl+Alt+Delete
- ② If Virtual server1 and Virtual server2 of "Server1" are power on, it's necessary to power off.

Input the URL," https://192.168.17.132" and input User name and Password of [Server1].

 Based on the method of "2-1 How to operate physical server", select Server03(port:03).



③ If Virtual Server1 is power on, select Virtual Server1(KFS2018SVR01) and push [Power off] button.



④ Next, if Virtual Server2 is power on, select1 Virtual Server2(KFS2018SVR02) and push [Power off] button.



(5) If the copy of Virtual server1 and Virtual server2 of "Server2" exist, it's necessary to delete both environments because of the limit of server2 storage volume.

Input the URL," <u>https://192.168.17.133</u>" and Input User name and Password of [Server2].



On VMware ESXi display, select "Virtual machines" and "KFS2018SVR01".
 And push [Action] button and select [Delete].

KFS2018VM01 - VMware ESXi ×	📕 KFS2018VM02 - VMware	ESXi × 192.168	8.17.133/host/v	ms X	+		- o ×
← → ♂ ଢ	🛈 🎤 🔒 https://192.16	8.17.133/ui/#/hos	t/vms		•••	♥ ☆	± II\ □ ≡
vm ware [®] ESXi [™]				root@1	192.168.17.13	33 - Helj	p 🗸 I 🝳 Search 🔷
Navigator	🔂 KFS2018VM02 - Virtu	al Machines					
✓ ☐ Host Manage Monitor	쭴 Create / Register \	M 📝 Console	Power	on 📕 Powerd	off 📕 Susp	end CR	tefresh Actions
🗸 🚰 Virtual Machines 🛛 🛛 2	Virtual machine	▲ ~ si	t v Used s	space ~ Guest	os ~	Host name	🚯 Power 🕨 🕨
▼ 🚰 KFS2018SVR01	🗹 🗗 KFS2018SVF	R01	9.02 T	B Micros	soft Wind	Unknown	👼 Guest OS
Monitor	🗌 🗿 KFS2018SVF	R02	9 ТВ	Micros	soft Wind	Unknown	Snapshots
More VMs	Quick filters		•				Console
Server 02 Storage							👸 Autostart
Monitor		-	KF\$2018\$V	/R01			🙀 Upgrade VM Compatibility
More storage			Guest OS Compatibility	ESXi 6.7 and	s Server 2012 later (VM versi	(64-bit) 0	Capet Export
> 🧕 Networking 📃 1			VMware Tools	No			🤯 Edit settings
			Memory	4 23 GB			Sermissions
							🧊 Edit notes
	Recent tasks						📷 Rename
	Task ~	Target ~	Initiator ~	Queued ~	Started	~ Result	😰 Answer question
	Power On VM	B KFS2018SVR01	root	10/03/2018 1	10/03/2018 1	📀 Comp	💮 Unregister
	Power On VM	KFS2018SVR01	root	10/03/2018 1	10/03/2018 1	Failed	🙀 Delete
	Power Off VM	FS2018SVR01	root	10/03/2018 1	10/03/2018 1	🚫 Comp	H Delete this virtual machine
	Power On VM	KFS2018SVR01 	root	10/03/2018 1	10/03/2018 1	🚫 Comp	
	Update License	None	root	10/03/2018 1	10/03/2018 1	💟 Comp	Upen in a new window
	Lecode License	None	root	10/03/2018 1	10/03/2018 1	💟 Comp	iered successfully 10/03/2018 1 V

⑦ After delete of Virtual Server1(KFS2018SVR01) of Server2, delete Virtual Server2(KFS2018SVR02) of Server2

📕 KFS2018VM02 - VMware ESXi 🛛 🗙 📑	+	
← → ♂ ☆	① 🔒 https://192.168.17.133/ui/#/host/vms	
VM ware ESXi		
Navigator	G KFS2018VM02 - Virtual Machines	
✓ ☐ Host Manage	🐒 Create / Register VM 📝 Console 🕨 Power on 🝵 Power off 🔢 Suspend 🧲 Refresh 🙀 Actions	
Monitor	□ Virtual machine ▲	JSVR02
Virtual Machines 2	Guest C Guest C	S >
Monitor More VMs • Storage 1 • Server 02 Storage Monitor More storage • Networking 1	Cuick filters KFS2018SVR02 Guest 05 Compability VNvare Tools CPUs Memory B GB KF Sconsolation Fermises Fermises Compatibility Compatibility<td>ots</td>	ots
	🖉 Recent tasks	a new window
	Task v Target v Initiator v Qué	

⑧ At the next step, you copy from Virtual server1&2 of Server1 to Server2.At first, double click [VMware vCenter Converter Standalone client].

0			Host Name: IE Version: IB Addrose:	KFS2018SVR03 11.1884.14393.0
Recycle Bin	57246B6C.key		IF AUUICSS.	(none) (none) (none)
			Logon Domain:	KFS2018SVR03
	2		Logon Server:	KFS2018SVR03
			MAC Address:	EC-EB-B8-9A-7E
Firefox	VMware-co	backup		EC-EB-B8-9A-7E
				EC-EB-B8-9A-7E
a				EC-EB-B8-9A-7E
			Machine Domain:	WORKGROUP
			Memory:	32639 MB
			Network Card:	HPE Ethernet 1G
leamViewer	VMware VCenter Launch Converter Client			HPE Ethernet 1G
15	Converter			HPE Ethernet 1G
	Standalone			HPE Ethernet 1G
	Client		Network Speed:	1 Gb/s
55				0 b/s
VM01				0 b/s
				0 b/s
			Network Type:	Ethernet
				Ethernet
				Ethernet
0				Ethernet
VM2			OS Version:	Windows Server
			Service Pack:	No service pack

9 On $\ensuremath{\left[VMware vCenter Converter Standalone] display, click <math display="inline">\ensuremath{\left[Convert machine] \right]}$.

🚦 VMware	Nware vCenter Converter Standalone						
<u>File V</u> iew	<u>Ele View Task Administration Help</u>						
🚱 Conver	rt <u>m</u> acl	hine 🛛 🌆 Confi <u>a</u> ur	e machine				
Vie <u>w</u> by:	Vie <u>w</u> by: ▼ Tasks <u>S</u> how: ▼ All tasks <u>n</u> ▼ Recent tasks						
Task ID		Job ID	Source	Destination	Status	Start time	End time
🚰 1		1	192.168.17.132/KFS20	192.168.17.13	 Completed 	10/2/2018 3:21:46 PM	10/2/2018 10:03:04 PM
🚰 2		2	192.168.17.132/KFS20	192.168.17.13	 Completed 	10/2/2018 3:38:38 PM	10/2/2018 7:39:04 PM

① On 「Conversion」display, set following image. The source system of copying is server1.

🔁 Conversion		— 🗆 X
Source System Select the source sys	stem you want to convert	
Source System Source Machine Destination System Options Summary	Source: none Destination: no Select source type: Powered on Powered off VMware Infrastructure virtual machine Convert a virtual machine from VMware vCenter Server ESX/ESX. Specify server connection information Server: 192.168.17.132 User name: root Password: **********	r or VMware
Help Export diag	nostic logs < <u>B</u> ack	<u>N</u> ext > Cancel

① In case of following display, push the [Ignore] button.



It's necessary to copy both [Virtual server1](KFS2018SVR01) and [Virtual server2](KFS2018SVR02) a of Server1 to Server2.

On source Machine, at first select [KFS2018SVR01].

🔁 Conversion					\times
Source Machine Select the virtual mach	ine you want to convert				
Source System	Source: 🗗 192.168.17.132 (VMware E	ESXi 6.7.0) Destination: none			
Destination System	Inventory for: 192.168.17.132	Search for name with:			<u>C</u> lear
Summary	VM name / Power state				
	KFS2018SVR02 Powered off				
	Refrech		View sr	urce det	taile
	Kencan		view st	arce <u>d</u> et	
Help Export diagno	stic logs	< <u>B</u> ack Next >)	Cano	cel

 $\ensuremath{\textcircled{3}}$ $\ensuremath{\textcircled{3}}$ On Destination System, input the information of Server2.

🔁 Conversion	- D X
Destination System	
Select a host for the ne	w virtual machine
Source System Source Machine Destination System Destination Location Options Summary	Source: Style="background-color: blue;">Source: KFS2018SVR01 on 192.168.17.132 (VMware ESXI 6.7.0) Destination: none Select destination type: VMware Infrastructure virtual machine Creates a new virtual machine for use on a VMware Infrastructure product. VMware Infrastructure server details Server: 192.168.17.133 User name: root Password: ***********
Help Export diagnos	tic logs < <u>Back</u> <u>Next</u> > Cancel

[⊥] Input "Name" as [KFS2018SVR01].

Note: If you select [KFS2018SVR02] above display, Input "Name" as [KFS2018SVR02].

🚦 Conversion		_		×
Destination Virtual Machi Select the destination V	ne M name and folder			
Source System Source Machine Destination System	Source: 🗗 KFS2018SVR01 on 192.168.17.132 Destination: 🚱 KFS2018SVR01 N <u>a</u> me: KFS2018SVR01	on 192.	168.17.1	133
Destination Virtual Machi Destination Location	Inventory for: 192.168.17.133 Search for name with:			<u>C</u> lear
Summary	VM name / Power state KFS2018SVR01 Running KFS2018SVR02 Powered off			
<u>ا</u>	Refresh			
Help Export diagnos	tic logs < <u>B</u> ack <u>N</u> ext >		Can	cel

1 On Destination Location, push <code>[next]</code> button.

🔁 Conversion		— 🗆 X
Destination Location Select the location for t	he new virtual machine	
Source System Source Machine Destination System Destination Virtual Machine Destination Location Options Summary	Source: KFS2018SVR01 on 192.168.17.132 D Inventory for: 192.168.17.133 KFS2018VM02	estination: SKFS2018SVR01B on 192.168.17.133 Total source disks size: 9,216 GB Datastore Server 02 Storage C Capacity: 18,627.75 GB Free: 193.45 GB Type: VMFS6 Block size: 1 MB Virtual machine version Version 14 C
Holp Export discuss	tic looc	c Rock Next > Concol
	uc ivys	

6 On Options, push <code>[next]</code> button.

🚦 Conversion					— 🗆	×
Options Set up the parameters f	for the conversion task					
Source System Source Machine Destination System	Source: KFS2018SVR0 Click on an option below to	1 on 192.168.1 edit it.	7.132 D	estination:	KFS2018SVR01B on KFS2018V	M02 (
Destination Virtual Machine Destination Location Options	Current settings: Current settings: Copy type: Disk-based	Data copy ty	pe: Copy al (VMX) file lo	ll disks and m	naintain layout 💌 rer 02 Storage (193.45 GB)	×
Summary	VirtualDisk1: 9,216 GB Devices Edit vCPUs: 4 (4 sockets	Disk VirtualDisk1	Size 9,216 GB	Type Thick 💌	Destination datastore Server 02 Storage (193.45 GB)	
	 Disk controller: Pres Memory: 23GB Networks Edit NIC1: VM Network Services Edit Total: 224 service(s) Advanced op Edit Power on destinatio Install VMware Tools Customize Guest OS Remove Restore Ch Reconfigure: Yes Throttling Edit CPU: None Network bandwidth: 		-7£10 db	printe	J CONTER OF DECOMPLETE (230-73 GB)	
Help Export diagnos	tic logs			< <u>B</u> ack	Next > Ca	ncel

⑦ On Summary, after checking the information, push [Finish] button.

The copy starts.

🔁 Conversion		— C	X C
Summary Review the conversion par	ameters		
Source System Source Machine	Source: 🗗 KFS2018SVR01 on 192.168.17	7.132 Destination: 쪩 KFS2018SVR01B on KFS201	8VM02 (
Destination System	Source system information		
Destination Virtual Machine Destination Location Options Summary	Source type: Source VM: Host/Server: Connected as: No throttling information	VMware Infrastructure virtual machine KFS2018SVR01 192.168.17.132 root	
	Destination system information Virtual machine name: Hardware version: Host/Server: Connected as: VM folder: Host system: Resource pool: Power on after conversion: Number of vCPUs: Physical memory: Network: NIC1 Storage: Number of disks: Create disk 0 as:	KFS2018SVR01B Version 14 192.168.17.133 root None KFS2018VM02 Default No 4 (4 sockets * 1 cores) 23GB Preserve NIC count Connected VM Network Disk-based cloning 1 Thin provisioned disk [Server 02 Storage]	
	Configuration files datastore:	Server 02 Storage	•
Help Export diagnostic	logs	< <u>B</u> ack <u>Finish</u>	Cancel

(18) You can copy Virtual server2 at the same time to Virtual server1. Implement above procedure 2^{10} for Virtual Server2.

★Remark-Operation of Server2★

Since you are using cold standby, you can leave server2 powered off.

You can turn on server2 in the following scenarios:

-in case of server1 crashes

-when there is a major update(on VM1 and/or VM2 on server1) and you want to copy server1 to server2.

-at least once every month to check if server2 and the virtual machines are working.

Technical Manual #2

2 How to construct and edit FIP by Portal for ArcGIS

Please refer Portal for ArcGIS help site as follows if you want to know how to use in detail. <u>https://enterprise.arcgis.com/en/portal/</u> (Other document of ArcGIS: <u>https://doc.arcgis.com/en/</u>)

2.1 Basic policy of constructing FIP

•FIP shall be constructed by basic function of Portal for ArcGIS including existing template.

 \rightarrow You can deal with FIP by operation maintenance or updated version up of software, instead of customizing by programing.

•Main components of sitemap shall be made by "Story Map Series*" of existing template.

*Note:***The* [*Story Map Series*] *template enables FIP to manage display of multiple maps or web pages. In addition, nest structures of "Story Map Series" enables to display layered structures as follows.*



You can see Current FIP situation as sitemap accessing following URL.

https://kfs2018svr01:7443/arcgis/apps/MapSeries/index.html?appid=3322eda6af 894573aea4a3811a4a09c7



2.2 Accessing to Portal for ArcGIS

Before accessing Portal for ArcGIS, acquire your account from System Administrator.

(1) URL to access Portal for ArcGIS

https://kfs2018svr01/portal/home/

(2) Sign In to Portal for ArcGIS

Sign In to Portal for ArcGIS, using the user account with editing right




2.3 How to import data on Portal for ArcGIS from your PC

(1) How to import shape file

Select "Add Item" list from "Content" page and "From my computer".



Select zipped your shape file

Note: If you import shape data into Portal for ArcGIS directly, the data related to shape file is necessary to unify to one zip file.

Carbon_Map2014.cpg	2018/01/10 22:36
Carbon_Map2014.dbf	2018/01/10 22:36
Carbon_Map2014.prj	2018/01/10 19:58
Carbon_Map2014.sbn	2018/01/10 19:58
Carbon_Map2014.sbx	2018/01/10 19:58
Carbon_Map2014.shp	2018/01/10 22:36
🔮 Carbon_Map2014.shp.xml	2018/01/10 19:58
Carbon_Map2014.shx	2018/01/10 22:36
🚹 Carbon_Map2014.zip	2018/01/10 22:45

Select "Contents" and input "Title" and "Tags". Finally push "Add Item" button.

Note: "Title" and "Tags is necessary to set easy name because this information is relation to easy search on Portal for ArcGIS.

Content × +					
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(2) Setting to symbol of Map on Portal for ArcGIS

Select "Open in Map Viewer".

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After display of Map viewer, select change style.

"Change Style" enables to change symbol based on attribution and so on. After changing symbol style, push "DONE" button and select Save As.



On Save Map display, register "Title" and "Tags" for researching the data in portal for ArcGIS and push the "SAVE MAP" button.

Title:	Carbon Map2014
Tags:	CarbonMap X Add tag(s)
Summary:	Description of the map.
Save in folder:	portaladmin

(3) Setting to label of MAP on Portal for ArcGIS

On a display of Map viewer, select "More Options" and "Create Labels".



Editing left box, you can set label.



Note: Using "Custom" from "Text", you can realize advance setting of label.



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(4) Setting to Pop-up of MAP on Portal for ArcGIS

On a display of Map viewer, select "More Options" and "Configure Pop-up".



Editing left box, you can set label.



Note: Using "ADD" button, you can realize advance setting of Pop-up.





(5) How to share your data

This setting is important for the data to publish on FIP site. On a display of Map viewer, push "Share" button.



On Share display, select the scope of sharing the data and "DONE" button.

Note: If the data is necessary to import into FIP site, select Everyone.

On the other hand, if you don't want to share, you don't have to any check.

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On Content display, you can change the setting of sharing. Select "View item details".

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On Overview display, push "Share" button.

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* Add to Favorites		Create Web App 🗸
Description	🖌 Edit	Share
Add an in-depth description	of the item.	Details

On Share display, you can change the setting of sharing.



(6) How to import other data

Select "Add Item" list from "Content" page and "From my computer".



Select the data you want to upload including PDF, xlsx ,doc file and so on.

And register "Title" and "Tags" for researching the data in portal for ArcGIS and push the "Add Items" button.

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If you want to share this data, with same method, "(5) How to share your data", you can change the setting.

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2.4 The order of constructing FIP

This chapter shows how the framework of FIP is constructed. With understanding this chapter, you can edit or update FIP.

(1) Making contents

Select "Create" list from "Content" page and "App Using a Template".



(2) Selection of template

From templates, select "Story Map Series" and push "CREATE WEB APP" button.





(3) Setting App including Title and so on.

Register title to make everyone understand and bush "Done" button.

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(4) Setting App's layout

Select app layout from "Tabbed", "Side accordion" and "Bulleted". After that, push the "Start" button.

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Note: It is easy to change layout after this setting.

(5) Addition of contents

Designate contents name and contents type to add. Contents type to add is as follows.

- ① Map : Maps registered into contents
- ② Image : Image data including photo or picture , the service Google+ and web page of Image
- ③ Video : Web page including You Tube
- ④ Web page : Web page Linkage or Embedding code

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	ADD CANCEL	

The contents type "Web page" enables to display other App contents, setting the URL of other contents. This setting enables to display many type information using access rights of Portal for ArcGIS.

Note: URL setting of "Story Map Series" enables to display layer structure of contents.

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	ADD CANCEL	

(6) Setting contents including layout

Designating setting of contents including layout and pushing "ADD" button, contents are added.

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	Content Map default Custom configuration •		
	Pop-up Map default Custom configuration		
	Extras 🗌 Legend 😡		
		ADD CANCEL	

After registering contents, it enables to register explanation or image of contents.



(7) Constructing multiple contents

Pushing "ADD" button and repeat (5)(6), it enables to display multiple contents in an App.





If you want to update or edit content, push "EDIT" button or "ORGANIZE" button"



<EDIT TAB>



<ORGANIZE>



(8) Other setting

"SETTING" enables to set logotype of Header, display/hidden to share and theme of contents and so on.

Note: As below, "Story Map Series B" is better not to set header display.





Registered contents enable to manage the display order, delete and so on from "Order:整理" icon.

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(9) Sharing the template

Using sharing button, you can share this template (Story map Series).



(10) Saving

After setting, push the "SAVE" button.



(11) How to edit component

This method is review of above method.

"Component" is main 8 subject of FIP information as below.



The following explanation shows how to edit component page including adding components or changing component name and so on.

From "Content", search "Forest Information Platform" and click the contents name.

	Forest Information Platform ×	Content X 🛞 Oth	er related Map × +		- 0	×
¢	→ C' û	Image: kfs2018svr01/portal/home/content.html?s	tart=1&view=grid&sortOrder=desc&so	ortField=modified#organiz 🛛 🐨 😒 🏠	III\ 🗊	Ξ
\$ M	ost Visited ArcGIS - Sign In 🛛 G God	ogle 🔘 ArcGIS Enterprise - Sig				
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	✔ Item Type	Q Forest Information Platfo	rm		■ :: ::	
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	> Date Modified	Forest Information Platf	World Forests 30m Bas	USA Wildfire Activity		
_		by portaladmin	by esri_livingatlas	🖾 by esri_livingatlas		
	> Date Created	Last Updated: Oct 5, 2018 Created: Jul 11, 2018	Last Updated: Oct 13, 2017 Created: Oct 13, 2017	Last Updated: Oct 13, 2017 Created: Oct 13, 2017		
	> Shared	★★★★★ (0) № 263	***** (0) 20	***** (0) 20		
		@ * …	4 * ···	4 × ···		

Push "View Application" button.





Using these function of red frame, you can edit component display.



(12) How to edit TOP display

This method is review of above method.

From "Content", search "TOP".

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ome Gallery Map Scene	Groups Content Organization	, v Q
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✓ Item Type	Q, TOP	
Maps	1 - 16 of 99	Sort by: Date Modified ✔ ↓
Layers		
Scenes	☐ Title Modified ♥ Own	.er Views
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Files	🔄 🙆 2017 USA Traffic Counts 🐻 Premium Content 👍 ★ 🚥 Oct 13, 2017 esri_	livingatlas 0
> Date Modified	🗆 📕 Linz. Austria Terrain 3D 🗰 🛨 🚥 Oct 13, 2017 esri 1	livingatlas 0
> Date Created	🔲 🖺 World Light Gray Base 🛛 🏛 ★ 🚥 Oct 13, 2017 esri_l	ivingatlas 0
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	🔲 🙆 USA Wilderness 💼 ★ 🚥 Oct 13, 2017 esri_l	livingatlas 0
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	🔲 📓 Dark Gray Canvas (WGS84) 🌐 🗮 🛨 🚥 Oct 13, 2017 esri_l	livingatlas 0

Push "Update" button.



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🔅 Most Visited 🎯 ArcGIS - Sign In 🔇	Google 🔀 ArcGIS Enterprise - Sig			
Home Gallery Map Scen	ne Groups Content Organization	🛛 pasco 🗸 🔍		
top 🖌 Edit Overview Settings				
Edit Thumbnail Ford and	Add a brief: by portaladr Last Modifier Image Update Item Keplace 'top.png' with an updated version from your computer. The file name you upload must be the same as the original file name.	Download Update Share		
★ Add to Favorites Description Add an in-depth description	Item: Browse No file selected. Update tem Cancel	Details	vs: 230 ublic)	
Access and Use Co	onstraints			
Add any special restrictions	, disclaimers, terms and conditions, or limitations on using the item's content.	Owner =	Change Owner	

Select updated "top" file.

Note: To update image, it's necessary to maintain same file name and file extension "png".

🍯 File Upload		×
← → × ↑ 🔲 > This PC > Desktop	ٽ ~	Search Desktop 🔎
Organise 🔻 New folder		▼ ■ ?
 Quick access Desktop Documents Documents Pictures CollectorforArcGIS For SytemAdministi Music temp OneDrive This PC USB Drive (E) O1_CarbonMap CollectorforArcGIS Survey123Connectf Survey123Connec		
File name: top	~	All Files V Open Cancel

top	× 🛞 Forest Information Platform X +		- 0	×
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top 🖌 Edit Overview Settings				
Edit Thumbnail Fore	Add a brief: by portaladr Last Modifie Image Update Item Keplace 'top.png' with an updated version from your computer. The file name you upload must be the same as the original file name.	Download Update Share]
★ Add to Favorites Description Add an in-depth description	Item: Browse top.png In of the item.	Details ★★★★★ (0) & view Created: July 11, 2018 Size: 720 KB Shared with: Everyone (pt	s: 230 ıblic)	
Access and Use Co	onstraints , disclaimers, terms and conditions, or limitations on using the item's content.	Owner A portaladmin Folder portaladmin		

Confirm the change, using following URL

https://kfs2018svr01:7443/arcgis/apps/MapSeries/index.html?appid=3322eda6af 894573aea4a3811a4a09c7



2.5 How to migrate data from ArcGIS Online to Portal for ArcGIS

Input following URL.

https://ago-assistant.esri.com

On the following display, select "Log in to ArcGIS Online".

Note: If you want to migrate your date from Portal for ArcGIS to ArcGIS Online, select "Log in to Portal for ArcGIS".



Select "I want to…" and "Copy Content"

	ArcGIS Online Assistant	Search My Content	۹ -	I want to +		Shintaro Ishizuka (pascoadmin77) -
KenyaForestService - https://kenyaf Current User: Shintario ishizuka (pascoadmin77)	orest.maps.arcgis.com/	Refresh	3	Copy ont	lent am's ISON a URLs of Services in a Web Map	9
Root		16		Update the	URLs of Registered Apps and Services tats	
Survey-Inventory sample-17/10/2018		3		K Start Over		
Survey-sample1		3				
Survey-sample2		3				
Survey-Survey 5		2				
Survey-Test_inventory		5				
Survey-Test_survey1		3				
Survey-test_survey12		3				
Survey-Test_survey1_1		3				
Survey-Test_Survey_ 4		3				

Select "Another account".

rch Mv. Content Q + Lwant to +	
Copy content	×
Select the account you want to copy into.	
My account	
Another account	
Cance	Log in

Select "Portal for ArcGIS".



Input URL to your portal as following https://kfs2018svr01/portal/home/

And select "Direct Login tab" and input Username and Password of portal for ArcGIS.

Copy cor	itent				Х
Log in to the ac folder on the rig	count that you want ht.	t to copy items into. T	hen simply (drag an item ir	nto a
Select the desti	nation: Portal for ArcG	BIS			
Enter the URL t	o your Portal 8svr01/portal/				•
Direct Login	OAuth Login	PKI or IWA Login			
Username	portaladmin				
Password	•••••				
More info					
				Cancel	Log in

Note: In case of following error, input following URL into web browser and try again. <u>https://kfs2018svr01/portal/home/</u>

Copy content ×	
Log in to the account that you want to copy items into. Then simply drag an item into a folder on the right.	
Select the destination:	
ArcGIS Online Portal for ArcGIS	
Enter the URL to your Portal	$\leftarrow \rightarrow \mathbb{C}$ (https://kfs2018svr01/portal/home/ \rightarrow
https://kfs2018svr01/portal/	
Uh oh! There's a problem with the url. X Make sure you've entered the url to your portal's web adaptor. example: https://mydomain.com/portal	
Direct Login OAuth Login PKI or IWA Login	
Username pascoadmin	
Password	
More info 🚯	
Cancel Log in	

With drag&drop, copy the contents form ArcGIS online to Portal for ArcGIS. https://kfs2018svr01/portal/home/

Arc05 Enterprise X +				
A https://ago-assistant.esricom		1338 😇 ☆		
🙃 Google 🕲 Arctill Enterprise - Sig				
ArcGIS Online Assistant Sear	rch My Content Q	I want to + Shinfaro Ishizuka (pascoedmin77) +		
KenyaForestService - https://kenyaforest.maps.arcgis.com/ Current User: Stinitaro Ishicaka (pascoadmin77)	Copy informat	tion		
Root	Copy Type Smpte Full			
Survey-Inventory sample-17/10/2018	Simple copy creates a reference to the original service in the destination account. In the destination account. Full copy (EXPERIMENTAL) replicates the original service in the destination account.			
Inventory sample-17/10/2018 Type: Forn Liters ID: Utolds	and harvests all of its associated data.			
		Canool Copy		
Inventory sample-17/10/2018 Type: Peture Server (Herted) Sens ID: 10016		Type: Web Mapping Application (Item ID: 5435a)		
Survey-sample1		Type: Web Mapping Application of FRELS/FRLs		
		Type: Web Mapping Application (Item 10: e24/3)		
Survey-sample2		APP-2120, Emersion factor Min Manne Application (Item The Application)		
Survey-Survey 5	0	TO APP-3000 MRV Type: Wes Magong Application (Item RD: 51505		
Survey-Test_inventory	0	APP-5000_Forest Removal/Emissions Monitoring Type: Wei Mageing Application (Item ID: Sticke)		
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Summutaet europart?		APP-5110_Monitoring-Activity data Type: Web Magning-Application (New ID: 40895		
		APP-5120_Monitoring-Emission factor Type: Vie Maging Application (Item ID: 1)/2001		
Survey-Test_survey1_1	0	APP-6000_Nstional REDO+ Strategy and related information Type: Web Mapping Application Item ID: e0772		
Survay-Test_Survay_4	0	APP-7000_Forest Administrative Information Type: Wes Mapping Application (Item 87: 1992)		
		III APP-8000_Other Relevant Data Type: Wei Mageig Application (Item 82: 37/dai		
		APP-8100_Relevant information Type: Web Mapping Aptication Item ID: 61e97		
		APP.8200 Other related mans		
2.6 Create the Web Map with ArcGIS Pro

2.6.1 Connect to the portal from ArcGIS Pro.

[Step 1] Start ArcGIS Pro and Create or open the project.

	ArcGIS Pro	? – 🗆 ×
ArcGIS Pro		Not signed in https://portal.kenyaforestservice.org/portal/ Sign in
Open a recent project		Create a new project Select a project template
MyProject		Global_Scenuptx
Operational project		Local_Scene.aptx
		Select another project template
About ArcGIS Pro		

[Step 2] Click the "Project" tab.

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Project Jome Insert	Analysis View Imagery Share			👸 Not signed in 🕤 🗘
Map * Connections * Toolbox Map * Connections * Project	er & Add - der & New - by Import Styles Favorites			
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4 🙆 Portal	El Locators		This item cannot have metadata.	D Locators
(A) My Content				
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All Portal				
Living Atlas				
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	¢	ArcGIS Pro - NewProject2 - Catalog	?	-	×
<	New Open Save Save As Portals Options	Portals			
	Python Add-In Manager				
	Help About	Add Portal Learn more about managing portal connections			
	Exit				

[Step 3] Click "Portals" and open the portal menu.

[Step 4] Click the "Add Portal" button and load the "Add Portal" dialog.

(c)		ArcGIS Pro - NewProject2 - Catalog	?	-	×
New Open Save Save As	Portals				
Portals Licensing Options Python Add-In Manager Heip About Ext	Add Portal Learn more about managin	Add Portal Enter the URL of your portal [Examples: ArcGIS Enterprise - https://webadaptorhost.domain.com/webadaptorname ArcGIS Online - https://www.arcgis.com or https://yourorg.maps.arcgis.com	>		
		OK	cel		

[Step 5] Input the following portal address to the dialog; http://portal.kenyaforestservice.org/portal



[Step 6] Right click the portal name and select "Sign in".

E	ArcGIS Pro - NewProject2 - Catalog	?	-	×
Image: Constraint of the second se	Accids Pro - NewProject - Catalog Portals Sign in Set As Active Portal Edit Portal Connection Test Availability Add Portal Learn more about managing portal connections	2	-	×
Ext				

[Step 7] Type in the user name and password for the portal and click the "SIGN IN". Make sure that the user should have the administrator's permission.

ArcGIS Sign In	х
ArcGIS Pro wants to access your Kenya Forest Service Portal account information	
Sign in to Kenya Forest Service Portal	
Username	
portaladmini	
Password	
•••••	
SIGN IN CANCEL	
Forgot password?	
☑ Sign me in automatically	

[Step 8] Click "Left arrow" and back to main page.

\bigcirc	ArcGIS Pro - NewProject2 - Catalog ? - 🗆 🗙
New Open Save Save Ac	Portals https://portal.kenyaforestervice.org/portal/ Available: Signed in as pascoadmin
Portals Licensing Options	Available : Signed in as pascoadmin
Python Add-In Manager Help	Add Portal
About Exit	Learn more about managing portal connections

Check the connection status and make sure to connect to the portal successfully.

2.6.2 Add the data to the map and symbolize it.

[Step 1] At the "Insert" tab, click "New Map" for add the map.



8 8 8 5.	÷	ArcGIS Pro - NewProject2 - Map1		? – 🗆 X
Project Man	Insert Analysis View Edit Jegagery	Share	A Shinta	ro (Kenya Forest Service Portal) - 🛆 🔺
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	Folders			
	🔺 🙆 Portal			
	A My Content			
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	1:217,005,933 * 1 🖽 🎎 1	132.0394523°E 79.3881610°S 🖗 S	Selected Features: 0 11 Catalog A	ttributes Symbology Chart Properties

[Step 2] At the "Map" tab, click "Add Data" to open the

[Step 3] Change the layer symbols as you wish.



2.6.3 Upload to the portal server as Web Map.

[Step 1] At "Share" tab, click "Web Map".



[Step 2] Right click "Map 1" (or map name you defined) and open "Properties".

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Project Map Mobile Layer Geopro Map Package	cessing Web Web Web Locator Map Layer* Style* * Share As	Web Tool + Status Manage	Project Map Layer Task mplate File Save As Prince	p Map nt Export		
Contents	🗸 🕂 X 🔂 Catalog	tap1 ×		- Neos	Chart Properties •	ųΧ
Search		和任	Gen		Select a chart in the contents pane	
Orawing Order	Map Properties: Map	1			×	
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✓ Topographic		Color model	RGB	•		
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					2K Cancel	
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	1:6,688,666 *	477,822.5	i1E 9,505,128.60N m 🔰 👰 Se	elected Features: 0 💵 😂	Catalog Attributes Symbology Chart Proper	rties

[Step 3] Select "Coordinate System" and choose "WGS1984 Web Mercator Auxiliary Sphere" for "Current XY".

General	Select the Coordinate System to view the available options.
Likterit.	Current XY Details Current Z
Vietadata Coordinate Systems	WGS 1984 Web Mercator Auxiliary <pre></pre>
Transformation	sphere
llumination	XV Coordinate Systems Available Search P - T-
abels	
	Arc 1960 UTM Zone 37S
	Carbos_Map2011
	😡 🚳 WGS 1984 Web Mercator Auxiliary Sphere 🕺 🕺
	Topographic
	Geographic coordinate system
	Enable wrapping around the date line

[Step 4] At the "Share As Web Map" tab, give the suitable name for publish. Input the "Summary" and "Tags". Choose "Copy all data: Visualization" in "Select a Configuration". Also Select "Everyone" for "Share with". Then click "Analyze"



[Step 5] When you got error or warning with "Analyze", following the error/warning message and fix them. If "Analyze" did not find any errors/warnings, hit "Share" button.



[Step 6] When success message is shown on the lower right corner, upload finished successfully. Gratz! On the other case, please contact to the administrator,



2.6.4 Check the result of upload from portal

[Step 1] Connect to the portal site as administrator permission and move to "Content" menu. Click the web map name which you gave and check the status.

🕘 🛞 🎯 http://portal.kenyaforestser	vice.org/portal/home/item.html?id=d74b05ce228d46bdb303bac82b039d5e	×		- D 合合印
Home Gallery Map Scene	a Groups Content Organization	1	Shintaro 🗸 🔍	
Map1 redit				
Edit Thumbnail Add to Favorites	Web Map test. Upload from ArcGIS Pro. Web Map by pascoadmin Created: Jul 12, 2019 Updated: Jul 12, 2019 View Count: 0	🖍 Edit	Open in Map Open in ArcGIS Create Prese Create Web /	Viewer Desktop Intation
Description		🖋 Edit	Share	
Add an in-depth description	of the item.		Item Information	Q Learn more
Layers			Low	High
Map1_WTL1			🖻 Top Improvement: Ad	d a longer summary
Topographic			Details	
Topographic Tables			Size: 1 KB Shared with: Everyone (put ★ ★ ★ ★	blic)
100100			Owner	🛔 Change Owner
Terms of Use		💉 Edit	pascoadmin	
Add any special restrictions,	disclaimers, terms and conditions, or limitations on using the item's content.			

When you could not find the web map, contact to the administrator.

Technical Manual #3

3 How to use Survey 123

Introduction

Survey123 is one of ArcGIS online service for Field Survey.

Compare to Collector for ArcGIS, which is one of the Field Survey tool, Survey123 has following characteristic.

Characteristic	Collector for ArcGIS	Survey123
Easy setting of research form	0	Ø
Friendly GUI	0	Ø
Setting survey point or area in advance	0	×
Editing feature data on PDA	0	×
Using background data	Ø	0

The flow of field survey through Survey123 is following.



This document shows how to make the survey form as following image.

When you want to register Plot information (1-1,...,1-4) and each tree information, using the function of "repeat function", you can make survey form by "Web Designer" or "Survey123 connect for ArcGIS"*.

* Web designer is easy to make form. On the other hand, complex form like repeating function is possible for "Survey123 connect for ArcGIS".



If you want to know how to use Survey123 for ArcGIS in detail, refer to following URL. https://doc.arcgis.com/en/survey123/desktop/create-surveys/createsurveys.htm

A: Making field Survey form and setting of sharing A-1: Making field Survey form by web designer

1.Input following URL for accessing ArcGIS Online https://kenyaforest.maps.arcgis.com/home/organization.html

2.Sign-in by designed User ID and Password

3. After sign-in, push "Application" button and select "Survey123".

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2		ОК		
KenyaForestServio	入	Dev	2	
	AppStudio	Developers	Living Atlas	
Esri.com ArcGIS Marketplace ヘルプ				
	Marketplace	Operations Dashboard	Story Maps	
		F		
	Survey123	Workforce		
1 Push "Making new survey"				
4. I USII IVIAKIIIG IIEW SULVEY				



5. To make survey form, you can select Web designer or Survey123 Connect. In this lesson, select web designer because it's easier to make survey form than Survey123 Connect.





6. At first, make the form for inputting the information of each Plot, as following red line instead of the information of each tree.

Referring to the document, "HOW TO: Create a survey in Survey123", from 2 to 8 page, create survey form. After making the form, save and publish it.



Test_inven	tory
	Test_inventory
	Inventory Survey
1	Date *
2	Plot Dimentions
3	Subplot Dimentions

Test_inven	tory
4	Plot ID *
5	Orientation
6	Inventory Leader
7	Assistant
8	Botanist
9	County★ - 選択してください -
11	SurveyPoint Note: Geo-point (Survey point) is necessary to set in the form.
10	Ownership - 選択してください - V
11	SurveyPoint 場所の設定



Note:Refering to the code-list, set the code if necessary.

A-2: Making field Survey form by Survey123 connect for ArcGIS

1. At the next step, you have to make the form for the information of each tree linked to each Plot ID as following red scopes. To realize the form for registering the information of each tree, function of "repeating" is necessary. However, because of not having the function in "Web Designer", you have to use " Survey123 Connect for ArcGIS"

Note: You can set various style form by Survey123 Connect for ArcGIS instead of Web Designer.



2. If you don't download " Survey123 Connect for ArcGIS" , at first download it. Go back to Create a New Survey

Note: If you have already downloaded " Survey123 Connect for ArcGIS", skip following 3 and go on to 4.



3. Select using "Survey123 Connect " and on next display, download it on your PC.





4. After downloading, launch "Survey123 Connect for ArcGIS".



5. Push "sign in" button.



6. Sign in by ArcGIS Online account.

©1 दे↓ <mark>Q 検索</mark>	-		💄 Shintaro
€			
新規調査	sample2 💣	sample1 💣	Test_inventory
フォーム 4 🛛 📃	フォーム 2 🛛 📃	フォーム 1 🛛 📃	

7. Download and open the form you made.

8. On Survey123 connect display, you can see same display to WebDesign.

Edit this form for registering the information of each tree.

Push "" button.

m.	Test_inventory	
	Date* 日付	
-^} ⊕	Plot Dimentions	
	Subplot Dimentions	_
	Plot ID *	
	Orientation	
	Inventory Leader	
_	Assistant	Ŧ

9. Excel sheet is opened. Add the information for each tree survey.

At first, delete second row, type "note" ,name "generated_note_surveyDescription"

🔣 🛃 🔊 • (° - =		form.xlsx - Mic	rosoft Excel	
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B20 •	fx fx			× *
A		В	C	D
1 type		name	label	hint
2 note	generated_note_surveyDe	scription		Inventory Survey
3 date	field_1		Date	
4 text	field_2		Plot Dimentions	
6 text	field 5		Plot ID	\rightarrow
7 text	field 6		Orientation	Delete this
8 text	field 7		Inventory Leader	
9 text	field 8		Assistant	
10 text	field_9		Botanist	row
11 select_one list_8	field_12		County	
12 select_one list_9	field_13		Ownership	
13 geopoint	field_14		SurveyPoint	
14 image	field_15		Photo1	
15 image	field_16		Photo2	
16				
17				
10				
20				
21		Detaile as field at	—— •	
22		This will be the field name	e in the	
K + > > survey choices	settings / types / 🎦 /	resulting database. Eq: fi	rst_name,	
		survey_date. This field m	nust contain	

10. On excel sheet, add the information of following red frame, for each tree survey.

Important thing is that the information of each tree is between "type" of "begin repeat" and "end repeat".

After above setting, push "save" button.

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1 type		name		label	
11 select_one list_8	field_12		County		
12 select_one list_9	field_13		Ownership	Tre	ee l
13 geopoint	tield_14		SurveyPoint		
14 image	field_15		Photo1	inform	ation
16 havin variant	field 10 F-I-I 17		Photo2	tion .	
10 Degin repeat	field 19		l ree Intorma SubplatNO		
19 text	field 19				
	field 19		Speices		
20 end repeat	field 56		Opercea		
21					
22				Label	
23				The label will act	
24				as the question in your survey (e.g.,	
25				What is your	
26				namer).	
H + + H survey choices settings	/types / 📁 /			•	
1<25				130% - +	

Note: Don't use " "(space) or "-" (hyphen) letter in "name" column(field). This cause error when making form or registering data. Instead of " "(space), it's better use "_"(underbar) and so on.

	■) • (°= • -		form.xlsx	- Microsoft E	xcel		_	
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1	type		nam	е			label	
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12	select_one list_9	field_13				Ownership	o l	
13	geopoint	field_14				SurveyPoi	int	_
14	image	field_15				Photo1		=
15	image	field_16				Photo2		
16	begin repeat	field_17				Tree Infor	mation	
17	text	field_18				SubplotNC)	
18	text	field_19				Tree num	ber	
19	text	field_19				Speices		
20	end repeat	field_56						

11. On the survey123 connect display, confirm addition of "Tree information".

Tree information is made by the function of repeating "begin repeat" and "end repeat". "On the survey, pushing "plus" button, you can register tree information infinity.

Tree Information		
SubplotID		
Tree Number		
Speices		
Ū	6/6	0
2		

12. After making form, push "publish button for updating ArcGIS online.

	Test_inventory	
	Photo2	
(
	▼ Tree Information	
	SubplotID	
	Tree Number	
	Speices	
2		

A-3: Various setting by Survey123 connect for ArcGIS

Survey123 connect enables to make various type setting.

a. type : select_one [list name]

1	type	name	label
2	date	field_1	Date
3	3 text field_2 Plot Dimention		Plot Dimentions
4	text	field_4	Subplot Dimentions
5	text	field_5	Plot ID
6	text	field_6	Orientation
7	text	field_7	Inventory Leader
8	text	field_8	Assistant
9	text	field_9	Botanist
10	select_one list 8	field_12	County
11	select_one list_9	field_13	Ownership
12	geopoint	field_14	SurveyPoint
13	image	field_15	Photo1
14	image	field_16	Photo?
15	begin repeat	field_17	- Database Field Name
16	text	field_18	resulting database. Eq: first name
17	text	field_19	survey date. This field must contain
18	text	field_20	9
19	end repeat	field 21	- unique values
20			 no spaces or non-ascii characters no reserved konwords or special
21			symbols (these are listed on the
22			type worksheet).
14 4	▶ M survey / choices /	settings / types / 📁 /	
-77	-8		Man

Note: On "choices" sheet, don't use " "(space) in information of "name" column..

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1 list_	_name	name	label	image	label::language1						
2 list_8		choiceU choice1	Kwale Laikinia								
4 list_8		choice2	Bungoma								
5 list_8		choice3	ElgeiyoMarakwet								
6 list_8		choice4	WestPokot Control Covernment								
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10											=
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	○ West	Pokot	J								

b. combination of type : select one [list name] and relevant

For example, when county and a location of county are related, you can realize the setting of two phase select list.



Note: Setting "appearance" column as "minimal", you can set drop-down list.

ases field 2 Ref Dimension ased field 2 Ref Dimension ased field 3 Subtract Dimension ased field 3 Ref	type		label	required_message	appearance	default	readon
est Feld est Feld feld Settor	date	field 1	Date	This information is required.			
est Feld Subpt Dimension est Feld Subpt Dimension feld Orientation required feld Orientation required feld Massion feld feld Protein feld feld Feld feld feld	text	field 2	Plot Dimentions				
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set feid3 Overtation set feid3 Assistant set feid3 Assistant set feid3 Sates County * Kase	text	field 5	Plot ID	This information is required			
set 5613 Assistant bise-input for Arctis county * Kwale County * County * Kwale County * Kwale County * Kwale County * Kwale County * County * Kwale County * County * County * Kwale County * County * C	text	field 6	Orientation				
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at dot one (81,8) (81,4)	text	field_0	Deterriet				
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elector for Nade Nade Location of Nade response field 1 Subclob response field 1 Subclob exit field 20 Species response field 20 Species Species field 20 Species Species field 20 Species Species fi	select_one list_8	field_12	County	This information is required.	minimal	-	
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Treese field,11 Proto2 Respondence field,12 Field Proto2 Field Proto2 Respondence field Proto2 Field Proto2 Field Proto2 Field Proto2 Field Proto2	image	field_15	Photo1			field. This will pre-populate	
regin reseat field 12 The Information regin reseat field 12 The Information regin reseat field 12 Field and the research of	image	field_16	Photo2			the survey with the default value. This can either be us	ed
ext Field 18 Solution of Held 21	begin repeat	field_17	Tree Information			to save time by supplying a	
ext Fel13 Tree Number fel23 Socies fel23 Socies fel23 Socies fel23 Socies fel23 Socies fel23 Socies fel23 Conect for ArcGIS Test_inventory Assistant County * Kwale Location of Kwale * Chengoni Kinango Mwavumbo SurveyPoint Modential Mo	text	field_18	SubplotID			commonly used answer or showing what type of answ	er
ext Feld 20 Speces Feld 20 Speces Feld 21 Feld 21 Feld 21 Feld 21 Feld 21 Feld 21 Feld 20 Fe	text	field 19	Tree Number			choice is expected.	
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c. type : select_multiple [list name]

m

1	type	name	label	appearance	default	readonly	
2	date	field_1	Date				
3	text	field_2	Plot Dimentions				
4	text	field_4	Subplot Dimentions				
5	text	field_5	Plot ID				
6	text	field_6	Orientation				
7	text	field_7	Inventory Leader				
8	text	field_8	Assistant		This setting		
9	text	field_9	Botanist		i ms setting		
10	select_one list_8	field_12	County	minimal			-
11	select_one Kwale	Kwale	Location of Kwale	minimal	enables to display		\$(field
12	geopoint	field_14	SurveyPoint	hide-input			
13	image	field_15	Photo1		friendly.		
14	image	field_16	Photo2				
15	begin repeat	field_17	Tree Information				
16	text	field_18	SubplotID		\sim	Default	
17	text	field_19	Tree Number			Set the default value for this	
18	text	field_20	Speices			tield. This will pre-populate the survey with the default	
19	select multiple FLAG1	FLAG1	Tree Codes	minimal		value. This can either be used to save time by supplying a	
20	e <u>nd rep</u> eat	field_21				commonly used answer or by showing what type of answer	-
H + F	N survey choices / settings / types /	/ 💱 /		1	1 4 m	choice is expected.	+

inst i nine	name	label image label::language1
Kwale 🖊	kasameni	kasameni
FLAG1	а	a=Alive normal, should be used by itself unless a tree is a recruit
FLAG1	b	b= Alive,broken/snapped.Write in comments what height the stem is broken
FLAG1	с	c=Alive, leaning by > 10%. DO NOT use leaning code with the fallen code 'd'
FLAG1	d	d= Alive,fallen (e.g on the ground)
FLAG1	е	e=Alive,tree fluted or fenestrated
FLAG1	f	f=Alive,hollow
FLAG1	g	g= Alive, rotten
FLAG1	h	h=Multiple stemmed ndividual.Each stem >10cm gets a number.Should be used with other code e.g. if a tree is broken and with multiple stems use 'bh'
FLAG1	i	i= Alive,no leaves,few leaves
FLAG1	j	j=Alive, burnt
FLAG1	k	k= Alive,snapped<1.3m (therefore the diameter at 1.3 is 0 mm)
FLAG1	1	I=Alive, has liana>10 cm diameter on stem or in canopy
FLAG1	m	m= Covered by lianas.Use where canopy is atleast 50% covered by lianas,even if no individual liana reaches 10cm diameter
FLAG1	n	n= New recruit.Always use with another code-e.g. if a tree is normal and new then use the code 'an', if the tree is broken and a new recruit the code is 'bn'
FLAG1	0	o= Lighting Damage
FLAG1	p	p= Cut
FLAG1	q	q= Peeling bark (bark loose/flaking)
FLAG1	r	r= Pests present. In comments write % of crown affected by pests
FLAG1	s	s=Has a strangler
51.4.6.4	7	z= Alive, declining productivity (nearing death)

Test_inventory

Т	ree Codes
a	a=Alive normal,should be used by itself unless a tree is a recruit,c=Alive,leaning by > 10%.DO NOT use leaning code with the fallen code 'd',g= Alive, rotten,i= Alive,no leaves,few leaves
	\bigcirc a=Alive normal, should be used by itself unless a tree is a recruit
	\Box b= Alive,broken/snapped.Write in comments what height the stem is broken
	\mathbf{C} c=Alive,leaning by > 10%.DO NOT use leaning code with the fallen code 'd'
	\Box d= Alive,fallen (e.g on the ground)
	□e=Alive,tree fluted or fenestrated
	□ f=Alive,hollow
	⊡g= Alive, rotten
	h=Multiple stemmed ndividual.Each stem >10cm gets a number.Should be used with other code e.g. if a tree is broken and with multiple stems use 'bh'
	☑ i= Alive,no leaves,few leaves
	□j=Alive, burnt
	\Box k= Alive,snapped<1.3m (therefore the diameter at 1.3 is 0 mm)
	□I=Alive, has liana>10 cm diameter on stem or in canopy
	m= Covered by lianas.Use where canopy is atleast 50% covered by lianas,even if no individual liana reaches 10cm diameter
	n= New recruit.Always use with another code-e.g. if a tree is normal and new then use the code

d. type : integer

It is not allowed to input text letter or decimal value, only integer.

	А	В	С	I	J	ĸ
4	text	field_4	Subplot Dimentions			
5	text	field_5	Plot ID			
6	text	field_6	Orientation			
7	text	field_7	Inventory Leader			
8	text	field_8	Assistant			
9	text	field_9	Botanist			
10	select_one list_8	field_12	County	minimal		
11	select_one Kwale	Kwale	Location of Kwale	minimal		\${field
12	geopoint	field_14	SurveyPoint	hide-input		
13	image	field_15	Photo1			
14	image	field_16	Photo2			
15	begin repeat	field_17	Tree Information			
16	text	field_18	SubplotID			
17	text	field_19	Tree Number			
18	text	field_20	Speices			
19	integer	DBH_mm	DBH_mm			
20	select_multiple FLAG1	FLAG1	Tree Codes Label	minimal		
21	end repeat	field_21	as the question in			
22			What is your			
23			name?).	7		
iiî î ⊧	N survey / choices / settings / types	///			14	•

		Test_inventory	
	 Tree Inform 	hation	
	SubplotID		
⊕	Tree Numbe	r	
	Speices		
	DBH_mm		
	25	Output	
	Tree Codes		
		✓	
	-	0	
	W	1/1 🕀	

e. type : decimal

It is allowed to not only integer value but also decimal value.

	А	В	С	I	J	K	^
10	select_one list_8	field_12	County	minimal			
11	select_one Kwale	Kwale	Location of Kwale	minimal			\$[field
12	geopoint	field_14	SurveyPoint	hide-input			
13	image	field_15	Photo1				
14	image	field_16	Photo2				
15	begin repeat	field_17	Tree Information				
16	text	field_18	SubplotID				
17	text	field_19	Tree Number				
18	text	field_20	Speices				
19	integer	DBH_mm	DBH_mm				
20	decimal	Height_m	Height_m				
21	select_multiple FLAG1	FLAG1	Tree Codes	minimal			
22	end repeat	field_21					-
23							
24			Database Field Name				
25			This will be the field name in the resulting database. Fo: first_name.				
26			survey_date. This field must contain				
27			- unique values				
28			no reserved keywords or special				
29			type worksheet).				
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Survey123 Connect for ArcGIS		x
<	フォームのプレビュー(スキーマプレビュー)(設定)	
	Test_inventory	
Tree Number		-
Speices		
DBH_mm		
Height_m [16.7]	8	
Tree Codes	~	
	1/1	
	✔ 入力の整合テェッ	・

f. combination of type : decimal or integer and constraint

	А	В	С	D	E	
1			label	hint	constra	
1	select <u>one Kwale</u>	Kwale	Location of Kwale			
2	geopo Please select an XLS Form Typ	e form 1_14	SurveyPoint			$\mathbf{\cap}$
3	image if using a select_one or select_	multiple 1_15	Photo1		$\langle \rangle$	
4	image	L_16	Photo2			\mathbf{U}
15	begin	17	Tree Information			
6	text	field_18	SubplotID			
17	text	field_19	Tree Number			
8	text	field_20	Speices			
9	integer	DBH_mm	DBH_mm		.>0	
20	decimal	Height_m	Height_m		.>0	
21	select_multiple FLAG1	FLAG1	Tree Codes			
22	end repeat	field_21				
22						



g. The setting of "required" column.

The setting of "yes" in "required" column enables to set essential information to register. And the setting of some massage in "required_message" column enables to display the massage in case of empty information.

1	type	name	label	required	required_message
2	date	field_1	Date	yes	This information is required.
3	text	field_2	Plot Dimentions		
4	text	field_4	Subplot Dimentions		
5	text	field_5	Plot ID	yes	This information is required.
6	text	field_6	Orientation		
7	text	field_7	Inventory Leader		
8	text	field_8	Assistant		
9	text	field_9	Botanist		
10	select_one list_8	field_12	County	yes	This information is required.
11	select_one Kwale	Kwale	Location of Kwale	yes	This information is required.
12	geopoint	field_14	SurveyPoint		v
13	image	field_15	Photo1	Required	1
14	image	field_16	Photo2	Select 'yes' to	
15	begin repeat	field_17	Tree Information	this field before	
16	text	field_18	SubplotID	completing the	
17	text	field_19	Tree Number	survey.]
18	text	field_20	Speices		
19	integer	DBH_mm	DBH_mm		
20	decimal	Height_m	Height_m		
21	select_multiple FLAG1	FLAG1	Tree Codes		
22	end repeat	field_21			
23					
24					
25					
26	survey choices settings	; /types / 💱			

	Test_inventory
	Date*
 ⊕	Plot Dimentions
	Subplot Dimentions Survey123 Connect for Plot ID * OK
	Orientation
	Inventory Leader

h. The setting of "default" column.

type		label	default	
date	field_1	Date		
text	field_2	Plot Dimentions		
text	field_4	Subplot Dimentions		
text	field_5	Plot ID		
text	field_6	Orientation		
text	field_7	Inventory Leader		
text	field_8	Assistant		You can set the value or
text	field_9	Botanist		
select_one list_8	field_12	County		10 .1
select_one Kwale	Kwale	Location of Kwale		text used frequently
geopoint	field_14	SurveyPoint		
image	field_15	Photo1		
image	field_16	Photo2		
begin repeat	field_17	Tree Information		
text	field_18	SubplotID		
text	field_19	Tree Number		
text	field_20	Speices		
integer	DBH_mm	DBH_mm		
integer	POM cm	POMicm	130	
decimal	Height_n	n Height_m		
select_multiple FLAG1	FLAG1	Tree Codes		
end repeat	field 21			
Tree Info	rmatio	n		
SubplotiD				
	L			
Iree Num	ber			
Spains				
speices				
_				
DBH mm				
			V	
POM cm				
130				○
Height m				
neight_m				

As advanced lesson, set the select list of other "location of county", "Speices" and so on , with using choice list.

< other "location of county">

1	typ	е	name		label	required	required_message	appearance	relevan	ht
2	date	field_1		Date	yes	This information is required.				
3	text field_2		Plot Dimentions							
4	text		field_4		Subplot Dimentions					
5	text		field_5		Plot ID	yes	This information is required.			
6	text		field_6		Orientation					
- 7	text		field_7		Inventory Leader					
8	text		field_8		Assistant					
9	text		field 9		Botanist					
10	select_one li	st_8	field_12		County	yes	This information is required.	minimal		
11	select_one k	wale	Kwale		Location of Kwale	yes	This information is required.	minimal	\${field_12=chc	bice01
12	select_one L	.aikipia	Laikipia		Location of Laikipia	yes	This information is required.	minimal	\${field_12=chc	bice11
13	select_one T	"rans_Nzoia	Trans_Nzoia		Location of Trans_Nzo	yes	This information is required.	minimal	\${field_12=chc	bice2'
14	select_one E	Bungoma	Bungoma		Location of Bungoma	yes	This information is required.	minimal	\${field_12=chc	bice3′
15	select_one E	ElgeiyoMara	ElgeiyoMaral	kwet	Location of ElgeiyoMar	yes	This information is required.	minimal	\${field_12=chc	bice4′
16	select_one V	VestPokot	WestPokot		Location of WestPokot	yes	This information is required.	minimal	\${field_12=chc	bice51
17	geopoint	Λ	field_14		SurveyPoint			hide-input	7	
18	image		field_15		Photo1					
19	image		field_16		Photo2				-	
20	begin repeat		field_17		Tree Information					
21	text		field_18		SubplotID					
22	text		field_19		Tree Number					
23	text		field_20		Speices					
24	integer		DBH mm		DBH mm					

1	list_na/ne	name	label image
2	list_8	choice0	Kwale
3	list_8	choice1	Laikipia
4	list_8	choice2	Trans_Nzoia
5	list_8	choice3	Bungoma
6	list_8	choice4	ElgeiyoMarakwet
7	list_8	choice5	WestPokot
8	list_9	choice0	Central Government Forest
9	list_9	choice1	Community Forest
10	list_9	choice2	Private Forest
11	Kwale	Chengoni	Chengoni
12	Kwale	Kasemeni	Kasemeni
13	Kwale	Kinango	Kinango
14	Kwale	Mtaaa	Mtaaa
15	Kwale	Mwa∨umbo	Mwavumbo
16	Kwale	Ndavaya	Ndavaya
17	Kwale	Puma	Puma
18	Kwale	Samburu	Samburu
19	Kwale	Taru	Taru
20	Kwale	gandini	gandini
21	Kwale	Lukore	Lukore
22	Kwale	Majimboni	Majimboni
23	Kwale	Mkongani	Mkongani
24	Kwale	Mwaluphamba	Mwaluphamba
25	Kwale	Shimba_hills	Shimba_hills
26	N survey choices	settings /types /	mwaluwanga

Л

	County *	
	Bungoma	\sim
	Location of Bungoma *	
	Ochepkube	
	○ chesikak	
	Sasur	
	Obumula	
Ĕ	Omusikoma	

	73	U		u u			1
1	type	name	label	required	rec	uired_message	appearance
2	date	field_1	Date yes		This info	rmation is required.	
3	text	field_2	Plot Dimentions				
4	text	field_4	Subplot Dimentions				
5	text	field_5	Plot ID	yes	This info	rmation is required.	
6	text	field_6	Orientation				
- 7	text	field_7	Inventory Leader				
8	text	field_8	Assistant				
9	text	field_9	Botanist				
10	select_one list_8	field_12	County	yes	This info	rmation is required.	minimal
11	select_one Kwale	Kwale	Location of Kwale	yes	This info	rmation is required.	minimal
12	select_one Laikipia	Laikipia	Location of Laikipia	yes	This information is required.		minimal
13	select_one Trans_Nzoia	Trans_Nzoia	Location of Trans_Nzoia	yes	This information is required.		minimal
14	select_one Bungoma	Bungoma	Location of Bungoma	yes	This information is required.		minimal
15	select_one ElgeiyoMaral	ElgeiyoMarakwet	Location of ElgeiyoMarakwet	yes	This info	rmation is required.	minimal
16	select_one WestPokot	WestPokot	Location of WestPokot	yes	This info	rmation is required.	minimal
17	geopoint	field_14	SurveyPoint				hide-input
18	image	field_15	Photo1				
19	image	field_16	Photo2		¥		
20	begin repeat	field_17	Tree Information	Requ	ired		
21	text	field_18	SubplotID	Selec	t 'yes' to		
22	text	field_19	Tree Number	this f	ield before		
23	select_one A-7	First_letter_of_Speices	First letter of Speices	ves comp	leting the	mation is required.	minimal
24	integer	DBH_mm	DBH_mm	Surve	.y.		
25	integer	POM_cm	POM_cm				
26	Horizon		Hoight m			i 4	
		<u>a - 2 a </u>					

<From first letter of speices to speices name , using 2 phase dropdown-list>

1	list_name		name	label
9	rating		3	3 Stars
0	rating		4	4 Stars
1	rating		5	5 Stars
2	A-Z	A		A
73	A-Z	В		В
4	A-Z	С		C
15	A-Z	D		D
76	A-Z	E		E
11	A-Z	F		F
18	A-Z	G		G
9	A-Z	H		H
0	A-Z	1		1
21	A-2	J		J
23	A-2 A 7	n.		
J A	A 7	M		M
+ 5	A-7	N		N
16	A-7	0		0
7	A-7	P		P
8	A-7	0		0
9	A-7	R		R
0	A-7	S		s
91	A-Z	Ť		T
92	A-Z	Ū.		U
93	A-Z	v		v
94	A-Z	Ŵ		Ŵ
95	A-Z	X		X
96	A-Z	Y		Y
97	A-Z	Z		Z
98	A	A1		1. Abutilon longicuspe
99	A	A2		2. Acacia brevispica
00	Α	A3		3. Acacia drepanolobium
4 4	I ▶ ▶ survev	choices	/settings /types	/Sheet1 / 📁 /
				Test_inver
			Tree Information	-
		⊕	SubplotID	
			Tree Number	
			First letter of Speice	*S *
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			OF	
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			01	
			Lo.	
			-	
		č	DBH_mm	
		_		

	A	В	С	G	Н	I	L
22	text	field_19	Tree Number				
23	select_one A-Z	First_letter_of_Species	Eirst letter of Species	ves	This information is required.	minimal 🔪	
24	select_one A	A_Species	A_Species	yes	This information is required.	minimal 🦯	\${First_letter_of_Species}='A'
25	select_one B	B_Species	B_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='B'
26	select_one C	C_Species	C_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='C'
27	select_one D	D_Species	D_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='D'
28	select_one E	E_Species	E_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='E'
29	select_one F	F_Species	F_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='F'
30	select_one G	G_Species	G_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='G'
31	select_one H	H_Species	H_Species	yes	This information is required.	minimal	\$(First_letter_of_Species)='H'
32	select_one I	I Species	I_Species	yes	This information is required.	minimal	\$[First_letter_of_Species]='I'
33	select_one J	J_Species	J_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='J'
34	select_one K	K_Species	K_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='K'
35	select_one L	L_Species	L_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='L'
36	select_one M	M_Species	M_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='M'
37	select_one N	N_Species	N_Species	yes	This information is required.	minimal	\$(First_letter_of_Species)='N'
38	select_one 0	0_Species	O_Species	yes	This information is required.	minimal	\$(First_letter_of_Species)='O'
39	select_one P	P_Species	P_Species	yes	This information is required.	minimal	\$(First_letter_of_Species)='P'
40	select_one Q	Q_Species	Q_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='Q'
41	select_one R	R_Species	R_Species	yes	This information is required.	minimal	\${First_letter_of_Species}='R'
42	select_one S	S_Species	E Secolog	yes	This information is required.	minimal	\$(First_letter_of_Species)='S'
43	select_one T	T_Species	The label will act	yes	This information is required.	minimal	\$(First_letter_of_Species)=T
44	select_one U	U_Species	as the question in	yes	This information is required.	minimal	\$(First_letter_of_Species) ='U'
45	select one V	V_Species	What is your	yes	This information is required.	minimal	Second Species
H 4	H survey choices / settings	/types/💱/	namer).		[] 4 [III		
	/						

	list name	namo	label image
1		name	label lindge
58	A-2	X	X
39	A-2	Y	7 Y
00	A-22	2	
01	A	AI	1. Abutilon longicuspe
02	A	AZ AD	2. Acacia previspica
00	A	AJ AJ	3. Acacia drepanolobium
04	A	A4	4. Acacla elation
00	A	AU	J. Acacia gerrardii
00	A .	A0	 Acacla nockii Acacla label
107	A	A/	7. Acacia ianai
00	~	A0	0. Acacla melanoxylon
170	A .	A9	9. Acacia meninera
70	A	A10	10. Acacia nilotica
71	A	ATT	10 Acacia nubica
72	A .	A12	12. Acadia reliciens
70	A	A10 A14	14 Acadia seyar
74	~	A14	15 Acadia stepenaria
70	A .	A10	16 Accesia venthanklass
70	A .	A17	17. Acadia xantriophioea
70	A .	A17	12 Acelypha Inuticosa
70	^	A10	10. Achyrranarmum achimneri
00	A .	A19 A20	20 Acekenthem ennesitifelie
21	A	A20	20. Acokanthera oppositiona
01	^	A00	21. Acokantilera schimpen
02	<u>_</u>	A00	22. Adopogornug monnii
24	<u>_</u>	A24	24 Aeschynomene abyroinios
04	r i	m2 H	24. Aeschynomene abyssinica

649	v	V3	379. Vangueria volkensii		
650	V	V4 380. Vernonia adoensis			
651	V	∨5	381. Vernonia auriculifera		
652	V	V6	382. Vernonia brachycalyx		
653	V	∨7	383. Vernonia lasiopus		
654	V	V8	384. Vernonia urticifolia		
655	V	V9	385. Vitex doniana		
656	V	V10	386. Vitex keniensis		
657	V.	V11	0. Other species		
658	W	W1	Warburgia ugandensis		
659	W	W2	Withania somnifera		
660	W	W3	Other species		
661	Х	×1	387. Xylocarpus granatum		
662	Х	X2	388. Xylocarpus moluccensis		
663	Х	×3	389. Xymalos monospora		
664	X	X4	390. Xylopia Parvifolia		
665	Х	×5	0. Other species		
666	Y	Y1	0. Other species		
667	Z	Z1	391. Zantho×ylum gillettii		
668	Z	Z2	392. Zantho×ylum usambarense		
669	Z	Z3	393. Ziziphus mucronata		
670	z	Z4	0. Other species		
14 4	E BI	cup ov choiced (entrings /tyrees / 🐑	1		

	Test_inventory	
		•
	▼ Tree Information	
⊕	SubplotID	
	Tree Number	
	First letter of Species *	
	H	
	H_Species *	_
	0186. Hypericum revolutum	
	0187. Haplocoelum foliolosum	
2	0188. Hymenodictyom parvitolium	
		Ŧ
<FLAG2:MODE OD DEATH, if FLAG1 is "dead 0" >

1	type	name	label	appearance	relevant
35	select_one L	L_Species	L_Species	minimal	\${First_letter_of_Species}='L'
36	select_one M	M_Species	M_Species	minimal	\${First_letter_of_Species}='M'
37	select_one N	N_Species	N_Species	minimal	\${First_letter_of_Species}='N'
38	select_one O	0_Species	O_Species	minimal	\${First_letter_of_Species}='O'
39	select_one P	P_Species	P_Species	minimal	\${First_letter_of_Species}='P'
40	select_one Q	Q_Species	Q_Species	minimal	\${First_letter_of_Species}='Q'
41	select_one R	R_Species	R_Species	minimal	\${First_letter_of_Species}='R'
42	select_one S	S_Species	S_Species	minimal	\${First_letter_of_Species}='S'
43	select_one T	T_Species	T_Species	minimal	\${First_letter_of_Species}='T'
44	select_one U	U_Species	U_Species	minimal	\${First_letter_of_Species}='U'
45	select_one V	V_Species	V_Species	minimal	\${First_letter_of_Species}='V'
46	select_one W	W_Species	W_Species	minimal	\${First_letter_of_Species}='W'
47	select_one X	X_Species	X_Species	minimal	\${First_letter_of_Species}='X'
48	select_one Y	Y_Species	Y_Species	minimal	\${First_letter_of_Species}='Y'
49	select_one Z	Z_Species	Z_Species	minimal	\${First_letter_of_Species}='Z'
50	integer	DBH_mm	DBH_mm		
51	integer	POM_cm	POM_cm		
52	decimal	Height_m	Height_m		-
53	select_multiple_FLAG1	FLAG1	Tree Codes	minimal	
54	select_multiple FLAG2	FLAG2	MODE OF DEATH	minimal	\${FLAG1}='0'
55	text	Note	Note		
56	end repeat	field_21			-
57					
H 4	I survey choices settings	: / types / 🔁 /			[] 4
	1				

1	list_name	name	label	image	label::language1			
669	Z	Z3	393. Ziziphus mucron	ata				
670	Z	Z4	0 Other species					
671	FLAG1	0	0=Dead					
672	FLAG1	a	a=Alive normal,should	be used by	itself unless a tree is	a recruit		
673	FLAG1	Ь	b= Alive,broken/snap	ped.Write in	comments what height	t the stern is	: broken	
674	FLAG1	с	c=Alive,leaning by ≻	10%.DO NOT	use leaning code with	the fallen c	ode 'd'	
675	FLAG1	d	d= Alive,fallen (e.g. or	the ground)				
676	FLAG1	e	e=Alive,tree fluted or	fenestrated				
677	FLAG1	f	f=Alive,hollow					
678	FLAG1	g	g= Alive, rotten					
679	FLAG1	h	h=Multiple stemmed i	ndividual.Eac	h stem ≻10cm gets a	number.Shou	ild be used wit	th other code e.g. if a
680	FLAG1	i	i= Alive,no leaves,few	leaves				
681	FLAG1	j	j=Alive, burnt					
682	FLAG1	k	k= Alive,snapped<1.3	m (therefore	the diameter at 1.3 is	0 mm)		
683	FLAG1	1	l=Alive, has liana≻10	cm diameter	on stem or in canopy			
684	FLAG1	m	m= Covered by lianas	Use where	canopy is atleast 50%	covered by	lianas,even if r	no individual liana rea
685	FLAG1	n	n= New recruit.Alway	s use with a	nother code-e.g. if a tr	ee is norma	I and new ther	n use the code 'an',if
686	FLAG1	0	o= Lighting Damage					
687	FLAG1	р	p= Cut					
688	FLAG1	q	q= Peeling bark (bark	loose/flakir	ng)			
689	FLAG1	r	r= Pests presentIn c	omments wri	te % of crown affected	by pests		
690	FLAG1	s	s=Has a strangler					
691	FLAG	z	z= Alive,declining pro	<u>ductivity (n</u> e	aring death)			
692	FLAG2	a	a = Standing					
693	FLAG2	Ь	b = Broken (snapped	trunk)				
694	FLAG2	m	m = Unknown					
695	FLAG2	р	p = Died alone					
696	FLAG2	q	q = One of multiple d	eaths				
697	FLAG2	r	r = Unknown					
698	FLAG2	j	j = Anthropogenic					
699	FLAG2	k	k = Pests					
700	FLAG2	n	n = Burnt					
701	FLAG2	0	o = Lightning					
702	FLAG2	u	u = Killed,no more inf	ormation				
703	FLAG2	z	z = Killed by Strangle	r				
704	FLAG2	2	3 = Killed by liana					
705								
706								
707								
14 4	🕨 🕅 survey	choices settings	/types/ 🔁 /					

Tree Codes	
0=Dead	
MODE OF DEATH	
a = Standing	
□ b = Broken (snapped trunk)	
🗆 m = Unknown	
$\Box p = Died alone$	
$\Box q = One of multiple deaths$	
□r = Unknown	
□j = Anthropogenic	
\Box k = Pests	
n = Burnt	
□ o = Lightning	
□ u = Killed,no more information	
$\Box z = Killed$ by Strangler	
\Box 3 =Killed by liana	

A-4: Sharing field Survey form on ArcGIS online.

1.Input following URL for accessing ArcGIS Online https://kenyaforest.maps.arcgis.com/home/organization.html

2.Sign-in by designed User ID and Password

3. After sign-in, push "Application" button and select "Survey123".



4.Push the "Collaborate" button of the updated form.

Note: If you use the function including repeating, which don't have in Web designer, you can't open the form in web designer.



5.Select "Submitter" and choose "Who can submit data to this survey:".

And select how to open the form.

Finally push "Save button".

Choose who can submit dat - Everyone (Public) Members of my organization (KenyaForestService)	Without ArcGIS online accou (Possibly not secure)
Following Groups: Training of forest survey Details	Saus
Survey link: https://arcg.is/KmPve0 Open the survey in browser directly Ask the user how to open the survey, in browser or in the Su	urvey123 field app
	Survey link: https://arcg.is/KmPve0 Open the survey in browser directly Ask the user how to open the survey, in browser or in the S Open the survey in the Survey123 field app directly. (Lear

6. With this URL or QR-code, you can share the form to register date.

÷	
lest_inventory	Overview Design Collaborate Analyze Data Settings 🔨
	Choose who can submit data to this survey
Submitter	
Viewer	Everyone (Public) Scan the QR code to open the survey on your device
Group Sottings	 Members of my organization (Ker
Group settings	Following Groups:
	✓ Training of forest survey [
	55566
	Save
	https://arcg.is/KmPve0
	Open the survey in browser directly
	Ask the user how to open the survey, in browser or in the Survey123 field app
	Open the survey in the Survey123 field and directly. (Learn more about this option)

7.Select "Viewer" and Choose "Who can submit data to this survey:".

And select "What data can viewers see?"

Finally push "Save button".

Survey123 for ArcGIS -	My Surveys Help Overview Design (C	Checking "Everyone" enable to display registered data
Submitter Viewer Group Settings	Who can view data of this.ex veryone (Public) Members of my organization (KenyaForestService) Following Groups: Training of forest survey Details What data can viewers see? All records in this survey Only their own submitted records	Without ArcGIS online account (Possibly not secure)
Copyright © 2015 - 2018 Esri. Al	I rights reserved. Privacy Terms of Use	@esri

B: Registering survey information and sending to ArcGIS online by PDA

1. Download "Survey123 for ArcGIS" application into your PDA by iOS or Android.

Note: This application enables to download in your PC.

- 2. Launch "Survey123 for ArcGIS" in application.
- 3. To download a survey form, select "Sign in".



C: Registering survey information and sending to ArcGIS online by PDA

4. Sign in by ArcGIS online account.

Survey123 for ArcGIS	– 🗆 X
< Sign in to Onl	o ArcGIS 🔅
Survey123 for ArcGIS want Online account	s to access your ArcGIS
Sign In	() esri
Username	
Password	
SIGN	IN
Forgot password? Forgot user	name?

5. Select "Download Surveys".



6. Select "the form you made" and the download starts.



7. On "My Surveys display", select the form you downloaded.



8. Select "Collect".



9. Based on the form, register field data.



10. When you register geo-point, click on the map.



11. You can move this map by Searching or clicking on the map or \bigcirc button.



12. And also clicking latitude and longitude below, you can see same information above display. Changing this information, including referring exact GPS information, you can set exact geo-point.



13. If you want to change background map, from "Map Types", select other map.

Using useful background data, you can set exact geo-point, regardless of off-line situation, too.



14. After setting geo-point, push 🖸 button.



15. As following form, if repeating function is used, for registering the information of each tree, pushing 💿 button, you can continue to register the information of another tree.

Survey 125 for Arcols		×					
K Test_inventory		Ξ					
Tree Information		<u>^</u>					
SubplotID							
12	0						
Tree Number							
2	8						
First letter of Species *							
A	\sim						
A Species*							
2. Acacia brevispica	\sim						
DBH_mm 113	8						
POM_cm							
Height_m							
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16. After inputting necessary data, push 🕑 button.

Survey123 for ArcGIS	-		×
× Test_inventory			\equiv
DBH_mm			
POM_cm [130		0	
Height_m			
Tree Codes		~	
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1 3 of 3		0	
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17. You can select the survey is sent now or later. On online situation, selecting "Send Now", the data is updated into ArcGIS Online. This time, select "Send Now".



18. If you want to edit sent survey, select "Sent".

Survey123 for ArcGIS	-	×
Test_inventory		
Test		
Collect Start collecting data		>
Sent Review sent survey data		>

19. You can see sent data from "List" tab and sent geo-point from "Map" tab.



20. From "List" tab, select sent data. If you want to edit sent data again, select "Edit and resend survey".



21. After editing sent data, pushing 🗹 button, you can resend survey to ArcGIS Online .



22. If you want to proceed another survey, select "Collect".



C: Confirmation of field survey result

1.Input following URL for accessing ArcGIS Online https://kenyaforest.maps.arcgis.com/home/organization.html

2.Sign-in by designed User ID and Password

3.After sign-in, select "Content".



4.From "My Organization" tab, select your feature layer.

	Content ×	😰 Test_invento	ory - Collaborate 🛛 🗙	+						- 0	×
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	Date Created		sample2_fiel	dworker	0	*		Oct 13, 2018	pascoadmin77	0	~

5.Select "Open in Map Viewer".



6.From "Details", select "show table" from "layer name".



7.You can see the table of the layer below.Editing the information directly, you can edit registerd data.



8.If you want to see the information of "the table" ,the information of each tree, select "show table" from "the table". Editing the information directly, you can edit registerd data.



9. Push "Save" button and select "Save" .									
Test_inventory	× 🗈	Test_inventory - Collaborate	× +						
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A (E) ==	4	Arctic	Save						
	1	+	Save As						

10. Input "Title" and "Tags". Finally push "SAVE MAP" button.

Note: "Title" and "Tags is necessary to set easy name because this information is relation to easy search on ArcGIS Online

Save Map		
Title:	Test_inventory	
Tags:	inventory × Add tags	
Summary:	Description of the map.	
Save in folder:	pascoadmin77	-

11. Saving map as MapViewer enables to display easily from Content next time.

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Content				
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✓ Categories	Q Search My Organization			■ ∷ ∷
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12. If you want to export the survey information.Select Feature Layer from contents.

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Tools] 🗎 Sample_Inventory		*		Oct 13, 2018	pascoadmin77	0

13. If you want to export layer information, push "Export TO" button and select Export to Excel from Layers.

Overview Data Visualization Usage Settings		
Edit Thumbnail Add a brief summary about the item	/ Edit	Open in Map Viewer 🗸 🗸 🗸 🗸
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Created: Oct 13, 2018 Updated: Oct 13, 2018 View Count: 2		Open in ArcGIS Desktop
★ Add to Favorites		Publish 🗸
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ables Export to KM		M Top Improvement: Add a summary
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erms of Us Export to GeoJSUN	🖍 Edit	Test_inventory_stakeholder, Feature Layer
Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.		Data Last Updated: Oct 15, 2018, 12:45:43 PM

14. If you want to export table data, push "Export TO" button and select Export toExcel from Tables.

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Leave a comment. Export to GeoJSON Export to Feature Collection Leave a comment.		forest survey			

Technical Manual #4

4 CO2 calculation tool (CO2CalcTool: ArcGIS Pro python tool box) Install "R" and setup the environment manual

This manual instructs to install the "R" in your PC and set up the environment of Windows and ArcGIS Pro.

[Step 1] Required environment ESRI ArcGIS Pro 2.7 or higher

[Step2] Download and install the "R" package

1. Access to <u>https://cran.r-project.org/</u> and click the "Download R for Windows" in the "Download and Install R".



2. Click "base" then click "Download R 4.1.1 for Windows (86 megabytes, 32/64 bit)"(The version number will be changed).

The Comprehensive R Archive No ×	+				-		×
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		R for Windows					
	Subdirectories:						
	<u>base</u>	Binaries for base distribution. This is what you want to install R for the first time	2.				
CRAN Mirrors	contrib	Binaries of contributed CRAN packages (for R >= 2.13.x; managed by Uwe Ligges information on <u>third party software</u> available for CRAN Windows services and corre environment and make variables.	s). The espond	re is also ling)		
What's new? Task Views	old contrib	Binaries of contributed CRAN packages for outdated versions of R (for R < $2.13.x$; Ligges).	mana	ged by U	Jwe		
Search About R	Rtools	Tools to build R and R packages. This is what you want to build your own package to build R itself.	s on W	'indows,	or		
<u>R Homepage</u> <u>The R Journal</u>	Please do not submit related to Windows bi	binaries to CRAN. Package developers might want to contact Uwe Ligges directly in c naries.	ase of	questior	ıs / suç	gestic	ons
Software R Sources	You may also want to	read the <u>R_FAQ</u> and <u>R for Windows FAQ</u> .					
R Binaries Packages Other	Note: CRAN does som executables.	${\sf n}$ checks on these binaries for viruses, but cannot give guarantees. Use the normal ${\sf g}$	precaut	ions wit	h down	lloade	d
Documentation Manuals							
EAQs Contributed							



3. Install the "R" package with downloaded installer (ex. R-4.1.1-win.exe).

[Step 3] Install the libraries for "R"

1. Start "R" (choose x64 version when installed version i386 & x64)



2. Click "Package" > "Install Package" then select the mirror site (closest site will be fine) and click "OK".



3. Find and select "lmfor" (l is small "L") and click "OK" for install. When you meet the error in this section, it means the lacking of other libraries. Check the error message and find the lacking libraries and install them first.

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[Step 4] Set the environment variables in Windows

Add the following values to the Windows's environment variable.

Create "R_HOME" and give the "C:¥Program Files¥R¥R-4.0.5" to the value on "USER environment variable" (Value will not be same. It depends on the installed folder and version.).
 Add "C:¥Program Files¥R¥R-4.0.5" and "C:¥Program Files¥R¥R-3.3.2¥bin¥x64" to the "Path" in "System environment variable" (Value will not be same. It depends on the installed folder and version.).

[Step 5] Install the "pyper"

"pyper" is the library for using "R" in the python script.

1. Start the python command prompt as an administrator. It will be found in "Start" > "ArcGIS".

2. In the command prompt, type "pip install pyper". Then "pyper" will be installed.



[Step 6] Replace the pyper.py

The pyper.py is designed for python2. However, ArcGIS Pro uses the python3 and the difference of version will cause the problem.

Replace the pyper.py. Usually it will be found in following folder (AppData is a hide folder. Make sure set the explore setting as "show hide folders/files");

 $C: \label{eq:c:sers} E < username > \ensuremath{\sc s} AppData \ensuremath{\sc s} Roaming \ensuremath{\sc s} Python \ens$

[Step 7] Use "R" from ArcGIS Pro

1. Start ArcGIS Pro and click the "Project" tab.



2. Click the "Options" in the left menu and open the "Options" dialog.

Options		×
Project Current Settings	Change settings for the current project.	
Units	Name	
Tasks	Untitled	
Application	Location	
General	C:¥Users¥005760¥AppData¥Local¥Temp¥ArcGISProTemp11492¥7158f173-691c-4883-b68f-dc6f5805c10c3	
Map and Scene	Home folder	
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Selection		- 1
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Device Location	Default toolbox	
Share and Download	C:¥Users¥005760¥AppData¥Local¥Temp¥ArcGISProTemp11492¥7158f173-691c-4883-b68f-dc6f5805c10c¥	2
Raster and Imagery		
Full Motion Video		
Display		
Layout		
Text and Graphics		
Color Management		
BIM	Learn more about changing a project's settings	
CAD T		
	OK Canc	el

3. Click "Geoprocessing" in the left menu and find the "R-ArcGIS Support".

Options		×
Project Current Settings Units Tasks Application General Map and Scene Navigation Selection	Remove layers that reference data overwritten by geoprocessing tools Add output datasets to an open map Display disabled parameters Enable Undo toggled on by default Display data paths as shortened names Analyze script and model tools for ArcGIS Pro compatibility Script Editor	▲
Editing Geoprocessing Device Location Share and Download Raster and Imagery Full Motion Video Display	Cogging Write geoprocessing operations to Geoprocessing History Write geoprocessing operations to XML log file Write geoprocessing operations to dataset metadata ModelBuilder Options Do not show warning when overwriting model from previous version R-ArcGIS Support	
Layout Text and Graphics Color Management BIM	Detected R home directories [R-4.1.0] C#Program Files#R#R-4.1.0 Installed 'arcgisbinding' package version: [1.0.1.244] 😇 🔻 Learn more about geoprocessing options OK	Cancel

4. When ArcGIS Pro requires the installation of "R", follow the installation dialog and install the required libraries.

[Step 8] Finish Now ArcGIS Pro is ready to use the CO2CalcTool.

Technical Manual #5

5 CO2 calculation tool (co2CalcTool: ArcGIS Pro python tool box) Install co2CalcTool and operation manual

Install the co2CalcTool

[Step 1] Copy the tool

1. Copy the "calc" folder to C:¥work¥kenya¥calc. When copy to another folder, modify the parameter of "cst_pram6 = 'c:¥¥work¥¥kenya¥calc'" in the "co2CalcTool.pyt". This folder contains the calculation program. Tables below shows the list of formula and its program.

Volume Estimation		Called from: sel_calcvolm.R (by ID)		
ID	Туре	Formula (m3)	Python Code	
1	Common for natural forests and plantations	$\pi * (\text{DBH}_\text{cm}/200)^2 * \text{H} * 0.5$	calc_Volm1.R	
2	Rhizophora sp. in mangroves	$\pi * (DBH_cm/200)^2 * H * 0.5$	calc_Volm2.R	
3	Bamboo in montane forests	DBH_cm ² -(DBH_cm*0.7) ² /4* π *H*0.8	calc_Volm3.R	
4	Climbers in natural forests	-	calc_Volm4.R	

Biomass (Above Ground, AGB)		Called from: sel_calctype.R (by ID)			
ID	Туре	Formula (kg)	Python Code		
1	Common for natural forests and plantations	$0.0673 * (0.598 * DBH_cm^{2*}H)^{0.976}$	calc_akb_kg1.R		
2	Rhizophora sp. in mangroves	0.128 * DBH_cm ^{2.60}	calc_akb_kg2.R		
3	Bamboo in montane forests	$\begin{split} 1.04 + 0.06 * DBH_cm * GW_{bmb} \\ GW_{bmb} = 1.11 + 0.36 * DBH_cm^2 \ (bamboo \ diameter > 3 \ cm) \\ GW_{bmb} = 1.11 + 0.36 * 3.1^2 \ (bamboo \ diameter \le 3 \ cm) \end{split}$	calc_akb_kg3.R		
4	Climbers in natural forests	e ^{(-1.484+2.657*ln(DBH))}	calc_akb_kg4.R		

Biomass (Bellow Ground, BGB) Called from: sel_calcbkg.R (by ID)			
ID	Туре	Formula (kg)	Python Code
1	Montane	AGB * 0.37	calc_bkb_kg1.R
2	Dryland	AGB * 0.20	calc_bkb_kg2.R
3	Coastal and Mangrove	AGB * 0.28	calc_bkb_kg3.R
4	Plantation	AGB * 0.27	calc_bkb_kg4.R

2. Copy the "Toolbox" folder to any place. This folder contains the Python tool box for ArcGIS.

Using the co2CalcTool with ArcGIS Pro

[Step 1] Load the co2CalcTool

1. In the ArcGIS Pro, open the "Catalog" window. Usually it will be shown in the right side.



2. Right click the "Toolbox" and select "Add Toolbox".



3. Select and open the "co2CalcTool.pyt"

Add Toolbox ×							
(ⓒ) ⑦ (□ → Computer → OS (C:) → work → ToolBox → v) ↓= Search ToolBox				earch ToolBox	- ٩		
Organize New Item							
🔺 🚔 Project		Name	Туре	Date	Size		
🛜 Databases		📑 co2CalcTool.pyt	Python Toolbox	2021/07/14 19:24:26	9 KE		
Folders		📑 JJFastTool.pyt	Python Toolbox	2021/08/06 17:20:26	13 KE		
🔺 [Computer							
🚞 Desktop							
Documents							
Downloads							
GS (C:)							
(D:)							
Name co	o2CalcTool.pyt			Toolboxes (A	ll Types) 🔹		
					OK Cancel		

4. "co2CalcTool" will be added to the catalog.

Catalo	g	≁⊥×
Project	Portal Favorites	≡
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Þ 😿	Styles	
Þ 📊	Folders	
▶ 🙀	Locators	
Catalog	Manage Templates	

[Step 2] Load & use the tool

1. Click the "co2CalcTool" > "Tool" and start the tool.

Catalog 🗸 🕂 X		Geoprocessing		* ů ×
Project Portal Favorites		\odot	Tool	\oplus
E Search Project		Parameters Envir	onments	?
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		calc		
				🕞 Run 🔻
Catalog Manage Templates Geoprocessing		Catalog Manage Ter	mplates Geoprocessin	ig

2. Set the parameters to the tool window.

Geoprocessing		* † ×
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Parameters Enviro	nments	?
* Select Strata	1)	
* Select ImportFolder	1)	
* Select ExportFolder	2)	
[DBH] FieldName DBH_CM	3) 4)	
[Height] FieldName Height1_M	5)	
[PlotGroup] FieldNa group	me 6)	
Select CalcSourceFo calc	lder 7)	
Catalog Manage Tem	plates Geoprocessi	🕞 Run 🔹

- 1) Choose the "Strata Type"
- 2) Select the import folder name where contains the survey data as CSV file
- 3) Select the export folder. Analyzed data will be stored in this folder with same name of input CSV file.
- 4) Input the DBH column name of input file. This tool will handle the DBH unit as millimeter (mm). When input data's DBH has another unit (like centimeter), please convert the unit to millimeter before using this tool.
- 5) Input the height column name of input file. This tool will handle the height unit as meter (m).
- 6) Input the column name of sub-plot.
- 7) Select the calc source folder which contains the calculation formulas as python codes (Same as [Step 1] folder. When it has been installed in default folder, no need to change here).

3. Click "Run" for analysis. Calculated values are added to export CSV file.

[Extra Step] CSV Preparation

For running this tool, following items should be included in the CSV File.
1. Field Name line

Field name line should be allocated in the top of CSV file.

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2	91	4 Plantation	Open	3	15	214	133	67	37	37	0	0.07069	6.52246	92.2739	5.07152	71.7474		
3	91	4 Plantation	Open	3	15	214	133	72.1	NA	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	91	4 Plantation	Open	3	15	214	133	78.7	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	91	4 Plantation	Open	3	15	214	133	88.9	NA	24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3
6	92	8 Plantation	Open	1	15	78	133	30	NA	14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	92	8 Plantation	Open	1	15	78	133	45.6	NA	15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	92	8 Plantation	Open	1	15	78	133	33.1	18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	92	8 Plantation	Open	1	15	78	133	42.5	NA	15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	92	8 Plantation	Open	1	15	78	133	46.5	NA	15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	92	8 Plantation	Open	1	15	78	133	40.3	NA	15.238	1	0.07069	0.97185	13.7489	0.79099	11.1902		
12	92	8 Plantation	Open	1	15	78	133	30.9	NA	14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.6855	7
13	92	9 Plantation	Open	1	15	78	133	57.5	NA	16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742		
14	92	9 Plantation	Open	1	15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
15	92	9 Plantation	Open	1	15	78	133	29	14.2	14.2	0	0.07069	0.46897	6.63456	0.38843	5.49512		
16	92	9 Plantation	Open	1	15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
17	92	9 Plantation	Open	1	15	78	133	37.7	NA	15.5686	1	0.07069	0.86894	12.2931	0.70914	10.0322		
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2. Cluster field and value

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1	A	В	C	D	E	F	G	H	I	J	K	L	M	N	0	P	Q	-
1	cluster	orest typ	Canopy c	c plot_info	_plot_rad	species	veg_type	d(cm)	h(m)	est_h(m)	est_h_typ	plot_expts	vol	m3ha	abovegrou	above_bic	mass_ton	ha
2	914	lantation	Open		3 15	214	133	67	37	37	0	0.07069	6.52246	92.2739	5.07152	71.7474		
3	914	lantation	Open		3 15	214	133	72.1	NA	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	914	lantation	Open		3 15	214	133	78.7	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	914	lantation	Open		3 15	214	133	88.9	NA	24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3 3
e	928	lantation	Open		1 15	78	133	30	NA	14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	928	lantation	Open		1 15	78	133	45.6	NA	15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	928	lantation	Open		1 15	78	133	33.1	18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
g	928	lantation	Open		1 15	78	133	42.5	NA	15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
1	928	lantation	Open		1 15	78	133	46.5	NA	15.6068	1	0.07069	1.3252	18,7477	1.07058	15,1456		
1	928	lantation	Open		1 15	78	133	40.3	NA	15.238	1	0.07069	0.97185	13.7489	0.79099	11,1902		
1	928	lantation	Open		1 15	78	133	30.9	NA	14 4359	1	0 07069	0.54128	7 65754	0 44678	6 32063	91 6855	5 7
	929	lantation	Open		1 15	78	133	57.5	NA	16 6192	1	0 07069	2 15777	30 5262	1 72291	24 3742		
1	929	lantation	Open		1 15	78	133	21	NA	13 4384	1	0.07069	0 23273	3 29242	0 19603	2 77321		
1	929	lantation	Open		1 15	78	133	29	14.2	14.2		0.07069	0 46897	6 63456	0.38843	5 49512		
	929	lantation	Open		1 15	78	133	21	NA	13 4384	1	0.07069	0.23273	3 29242	0 19603	2 77321		
	929	lantation	Open		1 15	78	133	37.7	NΔ	15 5686	1	0.07069	0.86894	12 2031	0 70914	10 0322		
	020		0000		1 10	70	100	00.5		10.0000		0.07000	0.00004	7 4 4 5 4 6	0.10014	F 00770		
		3 CD C	M CO DD	DM Ma	MaO Mol	D MoM Mo	O PO	÷										Þ
準備7	67 11														=	I II	+	14096

3. Plot field and value

Θ	13 5 -	¢- ∓						JICA	Tree data.xisx	- Excel						6	b — .	o x	
ファイ			レイアウト 数式	データ 校開	表示 開発												MBO Akinobu	只共有	
617	· · ·	: x	6																
517			/*																
	A	B	C		E	F	G	H	I	J	K	L	M	N	0	P	Q		î
1	cluster	Forest t	yp Canopy	c plot_info_p	ot_rad	species	veg_type	d(cm)	h(m)	est_h(m)	est_h_type	plot_expts	VOI	m3ha	abovegrou	above_bic	mass_to	nha	
2	9	14 Plantatio	on Open	3	15	214	133	67	37	37	0	0.07069	6.52246	92.2739	5.07152	71.7474			
3	9	14 Plantatio	on Open	3	15	214	133	72.1	NA	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995			
4	9	14 Plantatio	on Open	3	15	214	133	78.7	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778			
5	9	14 Plantatio	on Open	3	15	214	133	88.9	NA	24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.00	08 3	
6	9	28 Plantatio	on Open	1	15	78	133	30	NA	14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618			
7	9	28 Plantatio	on Open	1	15	78	133	45.6	NA	15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535			
8	9	28 Plantatio	on Open	1	15	78	133	33.1	18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589			
9	9	28 Plantatio	on Open	1	15	78	133	42.5	NA	15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264			
10	9	28 Plantatio	on Open	1	15	78	133	46.5	NA	15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456			
11	9	28 Plantatio	on Open	1	15	78	133	40.3	NA	15.238	1	0.07069	0.97185	13.7489	0.79099	11,1902			
12	9	28 Plantatio	on Open	1	15	78	133	30.9	NA	14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.68	55 7.	
13	9	29 Plantatio	on Open	1	15	78	133	57.5	NA	16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742			
14	9	9 Plantatio	n Open	1	15	78	133	21	NA	13 4384	1	0 07069	0 23273	3 29242	0 19603	2 77321			
15	9	29 Plantatio	on Open	1	15	78	133	29	14.2	14.2	0	0.07069	0 46897	6 63456	0 38843	5 49512			
16	9	29 Plantatio	n Open	1	15	78	133	21	NA	13 4384	1	0.07069	0 23273	3 29242	0 19603	2 77321			
17	0	20 Plantatio	n Onen	1	15	78	133	37.7	NΔ	15 5686	1	0.07069	0.86894	12 2031	0 70914	10 0322			
17					15	70	100	00 5		10.0000		0.07008	0.00034	7 4 45 40	0.10014	F 00770			*
4	· · · · · ·	Sheet3 CD	CM CO C	DM MaM	MaO MoD	MoM Mo	O PO	+			1							•	
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4. Forest type (strata) filed and value

6	<u>ه</u> ا	e - =						JIG	A Tree data.xlsx	- Excel						œ	- D	×
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	A	В	С	D	Е	F	G	н	1	J	К	L	м	N	0	P	Q	
1	cluster	Forest ty	p Canopy c	cplot_info_p	plot_rad	species	veg_type	d(cm)	h(m)	est_h(m)	est_h_type	plot_expfs	vol	m3ha	abovegrou	above_bio	mass_tonh	a
2	9	14 Plantatio	n Open	3	15	214	133	67	37	37	0	0.07069	6.52246	92.2739	5.07152	71.7474		
З	9	14 Plantatio	n Open	3	15	214	133	72.1	NA	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	9	14 Plantatio	n Open	3	15	214	133	78.7	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	9	14 Plantatio	n Open	3	15	214	133	88.9	NA	24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3
6	9	28 Plantatio	n Open	1	15	78	133	30	NA	14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	9	28 Plantatio	n Open	1	15	78	133	45.6	NA	15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	9	28 Plantatio	n Open	1	15	78	133	33.1	18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	9	28 Plantatio	n Open	1	15	78	133	42.5	NA	15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	9	28 Plantatio	n Open	1	15	78	133	46.5	NA	15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	9	28 Plantatio	n Open	1	15	78	133	40.3	NA	15.238	1	0.07069	0.97185	13.7489	0.79099	11.1902		
12	9	28 Plantatio	n Open	1	15	78	133	30.9	NA	14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.6855	7.
13	9	29 Plantatio	n Open	1	15	78	133	57.5	NA	16.6192	: 1	0.07069	2.15777	30.5262	1.72291	24.3742		
14	9	29 Plantatio	n Open	1	15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
15	9	29 Plantatio	n Open	1	15	78	133	29	14.2	14.2	2 0	0.07069	0.46897	6.63456	0.38843	5.49512		
16	9	29 Plantatio	n Open	1	15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
17	9	29 Plantatio	n Open	1	15	78	133	37.7	NA	15.5686	i 1	0.07069	0.86894	12.2931	0.70914	10.0322		
		Sheet3 CD		D DM MaM	MaQ MoD	MoM M	0 00 000	(+) ~ ~ ~		11 7707		0.07000	0 50500		0.4470	F 00770		
港盘	87 80			a lotte l'india	1100 1100	1.000									Ħ	m m	4	140%

5. Canopy cover filed and value

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	1BO Akinobu													表示 開発	データ 校開	イアウト 数式	挿入 ページレ		ファイル
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<u>^</u>	Q	P	0	N	M	L	K	J	Ι		Н	G	F	E	D		В	A	
onha	mass_to	above_bior	abovegrou	m3ha	vol	plot_expfs	est_h_type	est_h(m)	n)	h(n	d(cm)	veg_type	species	plot_rad	plot_info_r	Canopy of	Forest ty	cluster	1
		71.7474	5.07152	92.2739	6.52246	0.07069	0	37	37	67		133	214	15	3	Open	Plantatio	914	2
		53.7995	3.80286	68.7032	4.85634	0.07069	1	23.7891	۱	2.1 NA	7	133	214	15	3	Open	Plantatio	914	3
		122.778	8.67865	160.004	11.31	0.07069	0	46.5	46.5	8.7	7	133	214	15	3	Open	Plantatio	914	4
08 3	429.00	83.6796	5.91496	108.028	7.63603	0.07069	1	24.6039	۱	8.9 NA	8	133	214	15	3	Open	Plantatio	914	5
		5.92618	0.4189	7.16829	0.5067	0.07069	1	14.3366	۱	30 NA		133	78	15	1	Open	Plantatio	928	6
		14.535	1.02742	17.9737	1.27048	0.07069	1	15.5589	۱	5.6 NA	4	133	78	15	1	Open	Plantatio	928	7
		8.96589	0.63376	10.9561	0.77444	0.07069	0	18	18	3.1	3	133	78	15	1	Open	Plantatio	928	8
		12.5264	0.88544	15.4333	1.09092	0.07069	1	15.3799	۱	2.5 NA	4	133	78	15	1	Open	Plantatio	928	9
		15.1456	1.07058	18.7477	1.3252	0.07069	1	15.6068	۱	6.5 NA	4	133	78	15	1	Open	Plantatio	928	10
		11.1902	0.79099	13.7489	0.97185	0.07069	1	15.238	۱	0.3 NA	4	133	78	15	1	Open	Plantatio	928	11
55 [°] 7	91.685	6.32063	0.44678	7.65754	0.54128	0.07069	1	14.4359	۱	0.9 NA	3	133	78	15	1	Open	Plantatio	928	12
		24.3742	1.72291	30.5262	2.15777	0.07069	1	16.6192	۱	7.5 NA	5	133	78	15	1	Open	Plantatio	929	13
		2.77321	0.19603	3.29242	0.23273	0.07069	1	13.4384	۱	21 NA		133	78	15	1	Open	Plantatio	929	14
		5.49512	0.38843	6.63456	0.46897	0.07069	0	14.2	14.2	29		133	78	15	1	Open	Plantatio	929	15
		2.77321	0.19603	3.29242	0.23273	0.07069	1	13.4384	۱	21 NA		133	78	15	1	Open	Plantatio	929	16
		10.0322	0.70914	12.2931	0.86894	0.07069	1	15.5686	۱	7.7 NA	3	133	78	15	1	Open	Plantatio	929	17
		F 00770	0 4470		0 50500	0.07000		44 7705		~ ~ ~ ~ ~	(+) ^	0 00 000	MoM Mc	MaQ MaD	DM MaM		et3 CD	b Shi	
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0	91.6	71.7474 53.7995 122.778 83.6796 5.92618 14.535 8.96589 12.5264 15.1456 11.1902 6.32063 24.3742 2.77321 5.49512 2.77321 10.0322	5.07152 3.80286 8.67865 5.91496 0.4189 1.02742 0.63376 0.88544 1.07058 0.79099 0.44678 1.72291 0.19603 0.38843 0.19603 0.70914	92.2739 68.7032 160.004 108.028 7.16829 17.9737 10.9561 15.4333 18.7477 13.7489 7.65754 30.5262 3.29242 6.63456 3.29242	6.52246 4.85634 11.31 7.63603 0.5067 1.27048 0.77444 1.09092 1.3252 0.97185 0.54128 2.15777 0.23273 0.46897 0.23273	0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069 0.07069	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	37 23,7891 46,5 24,6039 14,3366 15,5589 18,15,5589 15,3789 15,6068 15,238 14,4359 15,6068 14,4359 16,6192 13,4384 14,2 13,4384 15,5686	37 46.5 18 18	67 2.1 NA 8.7 8.9 NA 30 NA 5.6 NA 3.1 2.5 NA 6.5 NA 0.3 NA 0.9 NA 21 NA 29 21 NA 7.7 NA	77 77 77 78 88 44 43 44 44 44 44 44 55 6 6	133 133 133 133 133 133 133 133 133 133	214 214 214 78 78 78 78 78 78 78 78 78 78 78 78 78	15 15 15 15 15 15 15 15 15 15 15 15 15 1	3 3 3 3 3 3 3 3 3 1 1 1 1 1 1 1 1 1 1 1	Open Open	Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio Plantatio	914 914 914 928 928 928 928 928 928 928 929 929 929	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 - - - - - - - - -

6. Radius field and value

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	•	D	0	D		_		0	LL	I		1	L K	1	h.d.	N	0	D	0	
1	cluster	Forest typ	Canopy	ccplot in	nfo plot ra	ad speci	es v	ea type	d(cm)	h(m)		est h(m)	est h type	plot expfs	vol	m3ha	abovegrou	above bio	mass ton	ha
2	91	4 Plantation	Open		1 -	15	214	133	67	. /	37	37	0	0.07069	6.52246	92.2739	5.07152	71.7474	_	
3	91	4 Plantation	Open			15	214	133	72.1	NA		23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	91	4 Plantation	Open			15	214	133	78.7	4	16.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	91	4 Plantation	Open			15	214	133	88.9	NA		24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3 3
6	92	8 Plantation	Open			15	78	133	30	NA		14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	92	8 Plantation	Open			15	78	133	45.6	NA		15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	92	8 Plantation	Open			15	78	133	33.1		18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	92	8 Plantation	Open			15	78	133	42.5	NA		15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	92	8 Plantation	Open			15	78	133	46.5	NA		15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	92	8 Plantation	Open			15	78	133	40.3	NA		15.238	1	0.07069	0.97185	13.7489	0.79099	11.1902		
12	92	8 Plantation	Open			15	78	133	30.9	NA		14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.6855	5 7·
13	92	9 Plantation	Open			15	78	133	57.5	NA		16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742		
14	92	9 Plantation	Open			15	78	133	21	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
15	92	9 Plantation	Open			15	78	133	29	1	4.2	14.2	0	0.07069	0.46897	6.63456	0.38843	5.49512		
16	92	9 Plantation	Open			15	78	133	21	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
17	92	9 Plantation	Open			15	78	133	37.7	NA		15.5686	1	0.07069	0.86894	12.2931	0.70914	10.0322		
4) S	heet3 CD C	M CO D	D DM	MaN MaO	Mol MoN	1 MoO	PO (Ð			44 7705	1	0.07000	0 50500		0.4470	- 00770	_	•
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7. Species field and value

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			D	0	L D		c	E	0	U	I		1	IZ IZ	1	M	N	0	P	0		-
1	clust	⊣ er	Forest typ	Canopy c	c plot in	fo rplot	rad	species	veg type	d(cm)	h(m)		est h(m)	est h type	plot expfs	vol	m3ha	abovegrou	above bi	omass to	onha	70
2		914	Plantation	Open		3	15	214	133	67	` ´	37	37	0	0.07069	6.52246	92.2739	5.07152	71.747	1 -		
3		914	Plantation	Open		3	15	214	133	72.1	NA		23.7891	1	0.07069	4.85634	68.7032	3.80286	53.799	5		
4		914	Plantation	Open		3	15	214	133	78.7	40	6.5	46.5	0	0.07069	11.31	160.004	8.67865	122.77	3		
5		914	Plantation	Open		3	15	214	133	88.9	NA		24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	6 429.0	08	3
6		928	Plantation	Open		1	15	78	133	30	NA		14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618	3		
7		928	Plantation	Open		1	15	78	133	45.6	NA		15.5589	1	0.07069	1.27048	17.9737	1.02742	14.53	5		
8		928	Plantation	Open		1	15	78	133	33.1		18	18	0	0.07069	0.77444	10.9561	0.63376	8.9658	9		
9		928	Plantation	Open		1	15	78	133	42.5	NA		15.3799	1	0.07069	1.09092	15.4333	0.88544	12.526	4		
10		928	Plantation	Open		1	15	78	133	46.5	NA		15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456	3		
11		928	Plantation	Open		1	15	78	133	40.3	NA		15.238	1	0.07069	0.97185	13.7489	0.79099	11.190	2		
12		928	Plantation	Open		1	15	78	133	30.9	NA		14.4359	1	0.07069	0.54128	7.65754	0.44678	6.3206	3 91.68	55	7
13		929	Plantation	Open		1	15	78	133	57.5	NA		16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742	2		
14		929	Plantation	Open		1	15	78	133	21	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.7732	1		
15		929	Plantation	Open		1	15	78	133	29	14	4.2	14.2	0	0.07069	0.46897	6.63456	0.38843	5.49512	2		
16		929	Plantation	Open		1	15	78	133	21	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.7732	1		
17		929	Plantation	Open		1	15	78	133	37.7	NA		15.5686	1	0.07069	0.86894	12.2931	0.70914	10.032	2		
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8. DBH field and surveyed value

Current version of this tool handle the DBH unit as millimeter (mm). When this value is stored as other unit in original file, need to convert the value as millimeter scale.

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3	914	4 Plantation	Open		3 15	214	133	72.1	NA	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	914	4 Plantation	Open		3 15	214	133	78.7	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	914	4 Plantation	Open		3 15	214	133	88.9	NA	24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	8 3
6	92	B Plantation	Open		1 15	78	133	30	NA	14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	92	8 Plantation	Open		1 15	78	133	45.6	NA	15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	92	B Plantation	Open		1 15	78	133	33.1	18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	92	8 Plantation	Open		1 15	78	133	42.5	NA	15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	92	8 Plantation	Open		1 15	78	133	46.5	NA	15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	92	8 Plantation	Open		1 15	78	133	40.3	NA	15.238	1	0.07069	0.97185	13.7489	0.79099	11.1902		
12	92	8 Plantation	Open		1 15	78	133	30.9	NA	14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.685	5 7
13	92	9 Plantation	Open		1 15	78	133	57.5	NA	16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742		
14	92	9 Plantation	Open		1 15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
15	92	9 Plantation	Open		1 15	78	133	29	14.2	14.2	0	0.07069	0.46897	6.63456	0.38843	5.49512		
16	92	9 Plantation	Open		1 15	78	133	21	NA	13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
17	92	9 Plantation	Open		1 15	78	133	37.7	NA	15.5686	1	0.07069	0.86894	12.2931	0.70914	10.0322		
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9. Height filed and surveyed value

Keep this field blank (or not figure value or -1) for not surveyed trees.

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4	914	Plantation	Open	3	15	214	133	78.	r	46.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	914	Plantation	Open	3	15	214	133	88.) NA		24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3
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7	928	Plantation	Open	1	15	78	133	45.	NA 🛛		15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	928	Plantation	Open	1	15	78	133	33.		18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	928	Plantation	Open	1	15	78	133	42.	NA		15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	928	Plantation	Open	1	15	78	133	46.	NA		15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	928	Plantation	Open	1	15	78	133	40.	NA		15.238	1	0.07069	0.97185	13,7489	0.79099	11,1902		
12	928	Plantation	Open	1	15	78	133	30.	NA		14.4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.6855	7.
13	929	Plantation	Open	1	15	78	133	57.	NA		16.6192	1	0.07069	2.15777	30.5262	1.72291	24.3742		
14	929	Plantation	Open	1	15	78	133	2	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
15	929	Plantation	Open	1	15	78	133	2		14.2	14.2	0	0.07069	0.46897	6.63456	0.38843	5.49512		
16	929	Plantation	Open	1	15	78	133	2	NA		13.4384	1	0.07069	0.23273	3.29242	0.19603	2.77321		
17	929	Plantation	Open	1	15	78	133	37.	'NA		15.5686	1	0.07069	0.86894	12.2931	0.70914	10.0322		
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10. Estimation height column

Estimated height value will be stored in this column.

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3	5	914 PI	lantation	Open		3	1	o 214	4 133	72.1	NA	_	23.7891	1	0.07069	4.85634	68.7032	3.80286	53.7995		
4	<u></u>	914 PI	lantation	Open		3	1	5 214	4 133	78.7	46	5.5	46.5	0	0.07069	11.31	160.004	8.67865	122.778		
5	9	914 PI	lantation	Open		3	1	5 214	4 133	88.9	NA		24.6039	1	0.07069	7.63603	108.028	5.91496	83.6796	429.008	3
6	9	928 PI	lantation	Open		1	1	5 78	B 133	30	NA		14.3366	1	0.07069	0.5067	7.16829	0.4189	5.92618		
7	9	928 PI	lantation	Open		1	1	5 78	8 133	45.6	NA		15.5589	1	0.07069	1.27048	17.9737	1.02742	14.535		
8	9	28 PI	lantation	Open		1	1	5 78	B 133	33.1		18	18	0	0.07069	0.77444	10.9561	0.63376	8.96589		
9	9	28 PI	lantation	Open		1	1	5 78	B 133	42.5	NA		15.3799	1	0.07069	1.09092	15.4333	0.88544	12.5264		
10	9	28 PI	lantation	Open		1	1	5 78	8 133	46.5	NA		15.6068	1	0.07069	1.3252	18.7477	1.07058	15.1456		
11	9	28 PI	lantation	Open		1	1	5 78	8 133	40.3	NA		15.238	1	0.07069	0.97185	13,7489	0.79099	11,1902		
12	9	28 PI	lantation	Open		1	1	5 78	8 133	30.9	NA		14,4359	1	0.07069	0.54128	7.65754	0.44678	6.32063	91.6855	7.
13	9	29 P	lantation	Open		1	1	5 78	8 133	57.5	NA		16 6192	1	0 07069	2 15777	30 5262	1 72291	24 3742		
1.4	9	29 P	lantation	Open		1	1	5 78	8 133	21	NA		13 4384	1	0.07069	0 23273	3 29242	0 19603	2 77321		
15	9	29 P	lantation	Open		1	1	5 78	8 133	29	14	12	14.2	0	0.07069	0 46897	6 63456	0.38843	5 49512		
10		20 0	lantation	Open		1	1	5 75	B 133	20	NA	1.2	13 / 39/	1	0.07060	0.30007	3 20242	0.10603	2 77321		
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[Extra Step] Formula modification

When need to modify the formula of calculation, please change the python code directory. The list written in [Step 1] shows the relationship of formula and python code (*.R).

Technical Manual #6

6 JJ FAST data retrieval tool (JJFastTool: ArcGIS Pro python tool box)

Install and operation manual

Install the JJFastTool

[Step 1] Copy the tool and base data

1. Copy the "Toolbox" folder to any place. This folder contains the Python tool box for ArcGIS.

2. Copy the "EmptyShape" folfrt to anyplace. This folder includes the base shape file (jjfastkenya.*) for appending the JJ FAST data.

3. Start ArcGIS and copy the base shape (jjfastkenya.shp) to data collection folder. Import the shape file as GeoDatabase (instead of shape file) is also fine.

Using the JJFastTool with ArcGIS Pro

[Step 1] Load the co2CalcTool

1. In the ArcGIS Pro, open the "Catalog" window. Usually it will be shown in the right side.



2. Right click the "Toolbox" and select "Add Toolbox".



3. Select and open the "JJFastTool.pyt"

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4. "JJFastTool" will be added to the catalog.



[Step 2] Add the "jjfastkenya.shp" (or the file/geodatabase which are copied in [Step 1] 3.) to the map.



[Step 3] Load & use the tool

1. Click the "co2CalcTool" > "Tool" and start the tool.

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2. Set the parameters to the tool window.

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	2) Input the map layer name of target shape which are added
	in [Step 2].
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3) Select the download folder. All data stored in JJ FAST web site will be download here as ZIP and expanded file.

(#

3. Click "Run" for download. All JJ FAST data will be downloaded to under the [Step 3] 2. 3) folder. In addition, all data will be append to the shape file which are defined in [Step 3] 2. 2).



* It will takes a time for first execution. Because tools try to download the all files stored in JJ Fast web site.

4. The information of start and end date (for deforestation analysis) are added to the dataset. Users can find the latest area of deforestation from these information.

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			2019/03/26	2019/05/07	
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	Ver.3.0	Area1	2020/11/17	2020/12/29	
	Ver.3.0	Area1	2020/11/17	2020/12/29	
	Ver.3.0	Area1	2020/11/17	2020/12/29	
	Ver.3.0	Area1	2020/11/17	2020/12/29	
	Ver.3.0	Area1	2020/11/17	2020/12/29	
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