



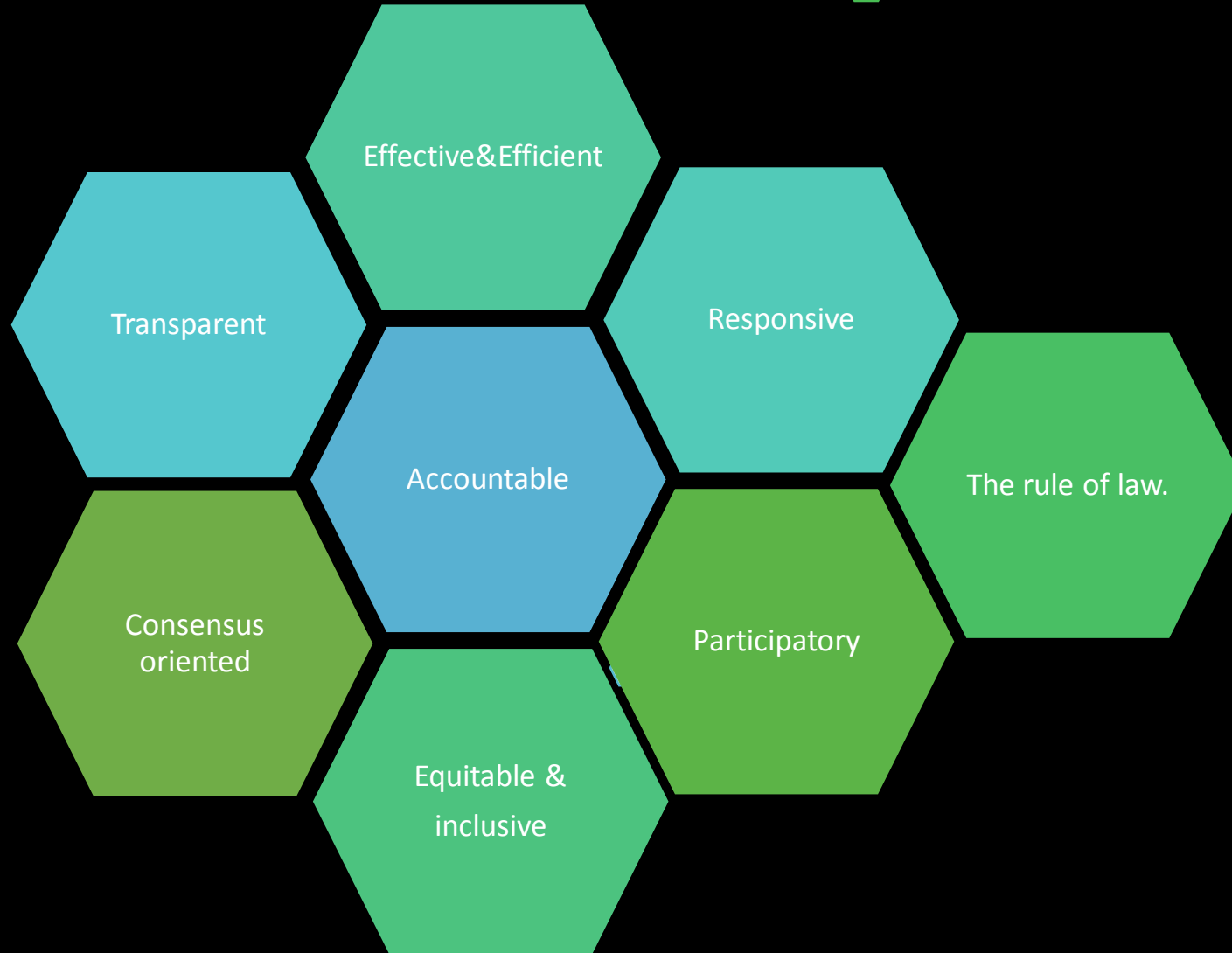
Technology for forest governance in India- Status, prospects and potential

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Governance

- Governance means "the process of decision making and the process by which decisions are implemented or not implemented"
- Continued deprivation and inequality are the result of poor governance in the country

Indicators Of Good Governance



Relevance of Technology in Forest Governance

Unique conditions enabling tech applications in forestry sector

- Last area with less manpower
- Remoteness and inaccessible area
- Remote sensing gives synoptic view
- People interface- i **Hariyali app**- <https://youtu.be/UfoUBDer55M>
- Young population is tech savvy

Technological Applications

- Varying Levels of complexity (from websites to advanced RS&GIS based applications)
- Mobile (Android, IOS), Desktop based, PDAs
- Software- Open Source or Closed Sourced or a combination of both technologies

Important GoI guidelines on Technology adoption

- National e-Governance Plan
- National Policy on Information Technology, 2012
- Policy on Adoption of Open Source Software for Government of India

Major Types of Technological Applications

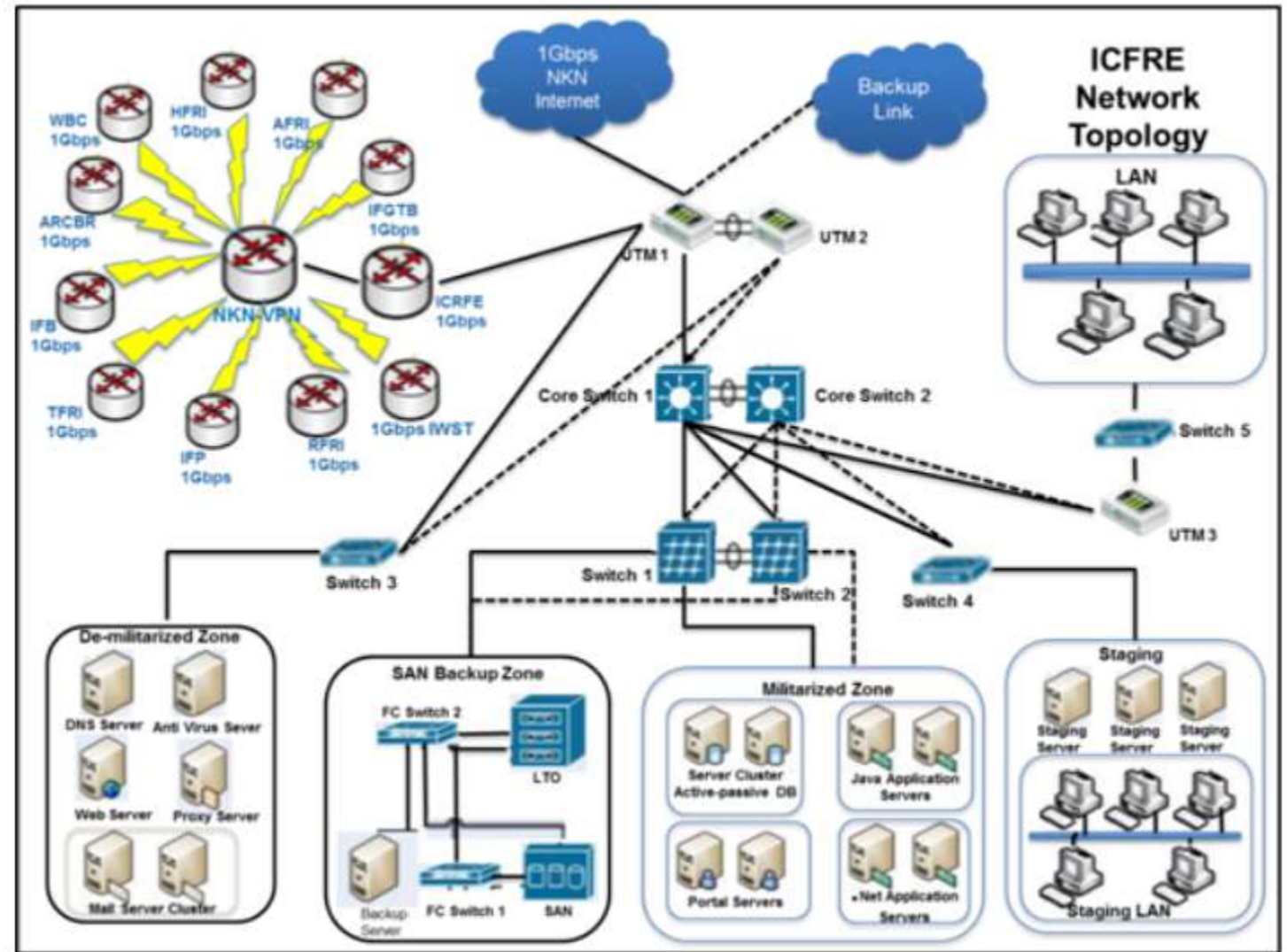
- **Monitoring** -(usually location enabled, use of forms, analysis on the fly...) (Ex. Plantation & works monitoring, Wildlife Census, Forest Fire monitoring and feedback)
- **Planning** -(use of site specific GIS layers, Pre-defined criteria, may include costing etc.) (Ex. Location of SMC structure, site selection)
- **Decision Support Systems** – (Tools to take complex decisions, decision rules defined) (Ex. DSS for FC Act)

Cont....

- **E-commerce** -(online payment methods, product catalogs) (Ex. auction of timber, sale of MFP products, Guest house booking etc)
- **Online Processing** – (Work flow based, well defined user rights) (PARIVESH for Processing of FC cases, e-Office)
- **Dashboards**- (Simplified view of stats, gather info from one or more online systems) (Eg. Plantation programme dashboards, PARIVESH dashboard, FSI FAST 3.0 dashboard)

Technology in Forest Research Governance

- Mail, Internet, Web, Videoconferencing, Antivirus, FTP, Network Security System, Databases, Building Management System (BMS), Virtual Private Network (VPN) services, Push Mail Service, Web casting
- Effective IT infra security system
- > 40 Web applications/websites are hosted on Data Centre
- NKN connectivity at all ICFRE research Institutes

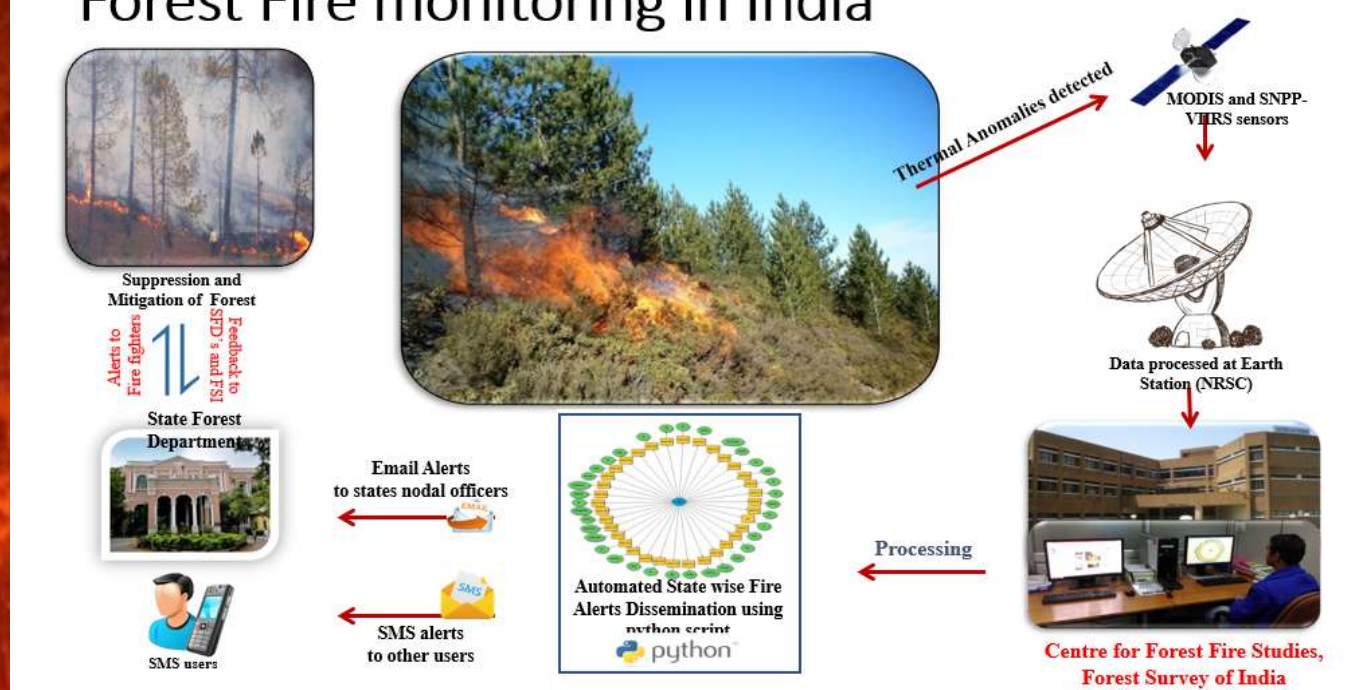


Plantation-

- **Monitoring –landscape level Mgt.in plantations**
- **Location**
- **Feedback**
- **Forced – Social audit**
- **Increased the Accountability and transparency**

Protection

- Patrolling-Wireless – GPS-Drone and e-eye
- Fire
 - Forest fire alert system
 - Automation of processes is crucial



FOREST SURVEY OF INDIA
 Ministry of Environment, Forest & Climate Change
 भारतीय वन सर्वेक्षण

Forest Fire Alerts System 3.0

New User? Sign-up Here

Already Registered? Edit/Update/Un-subscribe

State Admin Login

Fire Alert Dissemination Status for MODIS

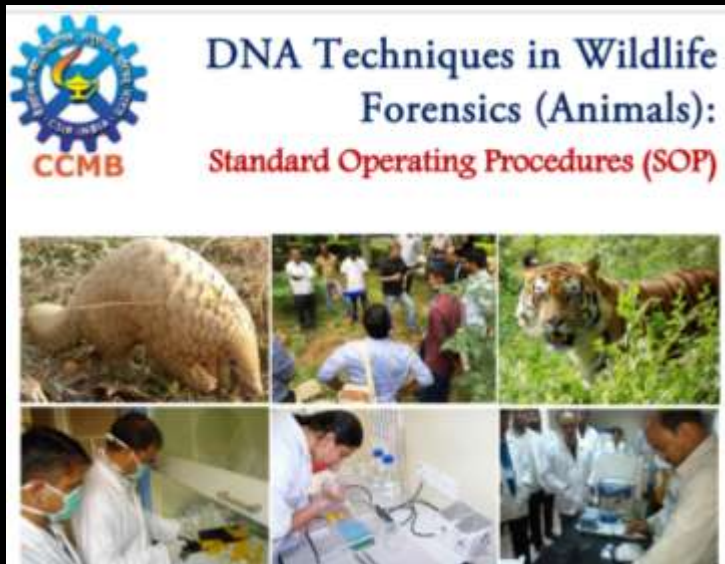
Last Satellite Pass	Last Mail Received from NRSC	Last Mail Sent from FSI	Last SMS Sent
05/05/2020 10:38:53	05/05/2020 11:01:39	05/05/2020 11:03:22	05/05/2020 11:20:21

Fire Alert Dissemination Status for SNPP

Last Satellite Pass	Last Mail Received from NRSC	Last Mail Sent from FSI	Last SMS Sent
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Protection

- Offence management system
- Forensic



(A)



(B)

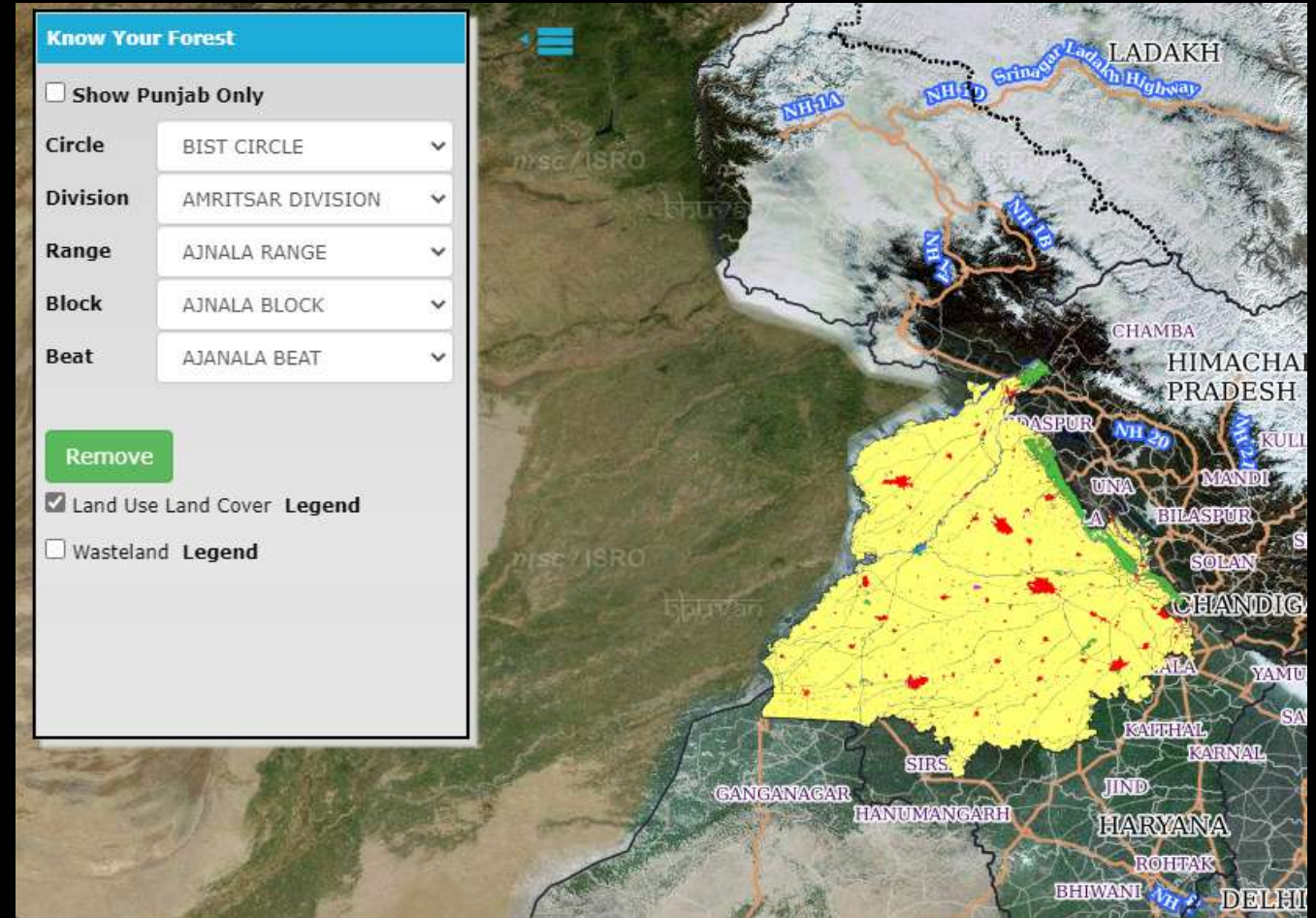


(C)

Figure 2. Blood stained (A) sickle

Protection

- Linkages through internet with NGOs and international bodies
- Encroachment mapping by satellite – forest boundary survey



FRA-

- FRA- use of PDA in surveying land and maintaining data base
- Keeping record digitally
- Use of timeline data in Google Maps to find encroachments.

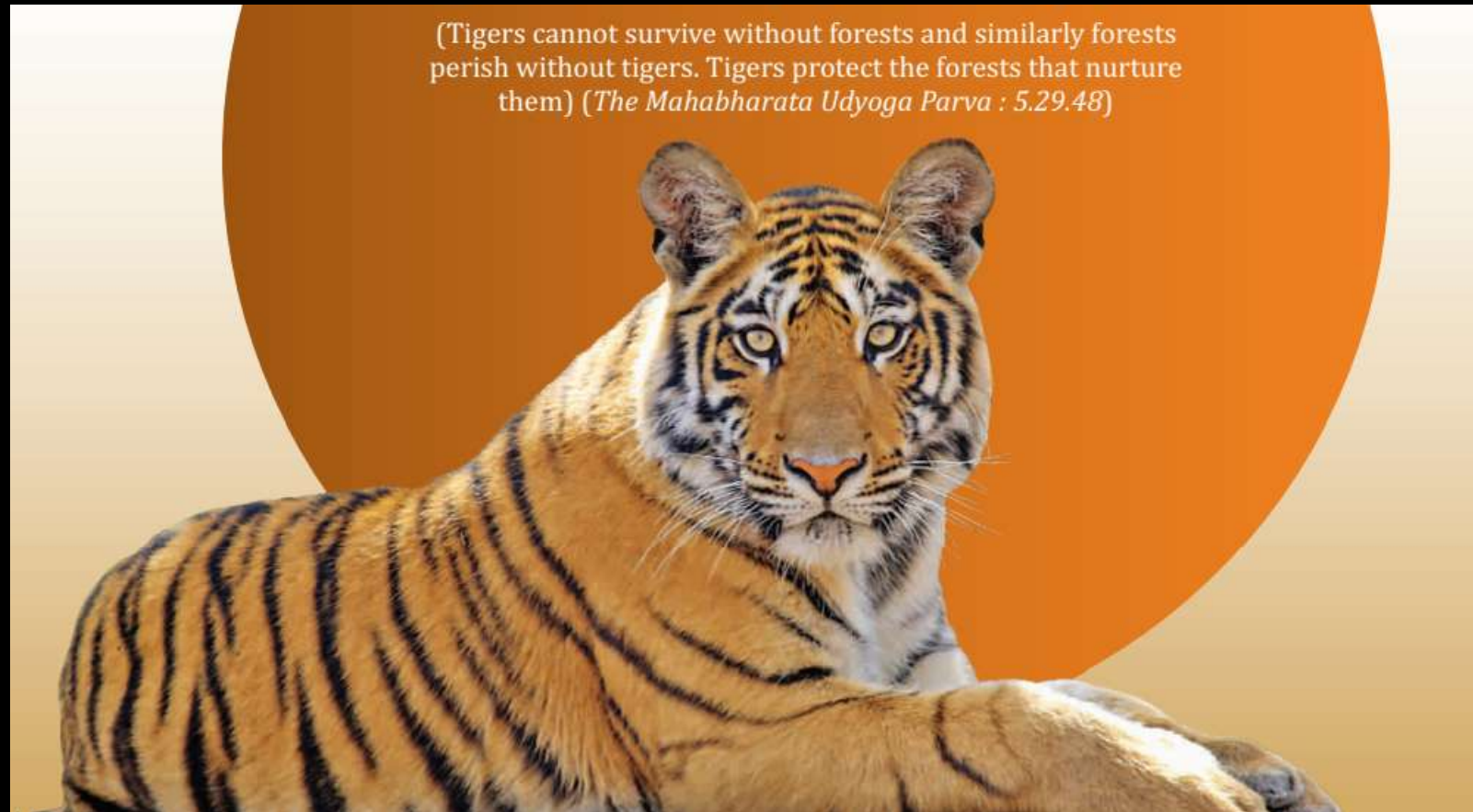
Wild Life Management

- Patrol- Antenna-Radio collar- RFID
- GPS Monitoring,
- Landscape management, satellite tracking of animals.
- Help track tigers, Prey predator relation ship.
- Identify Poached tiger and Track the origin with National Tiger Database.



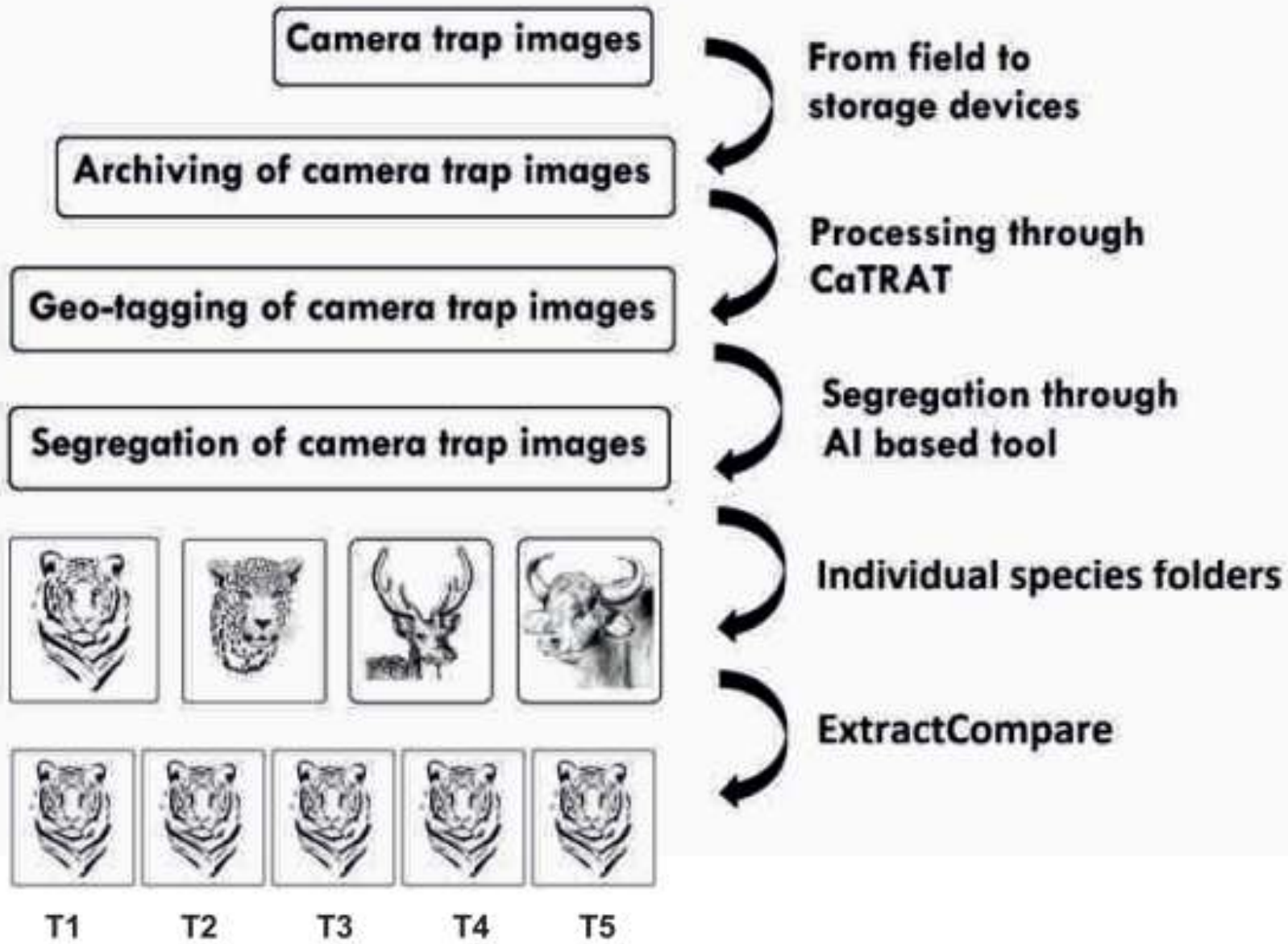
Tiger Census

- M-Stripes
- Use of AI in Image analysis



Camera Trap with Motion Detection and IR Camera







a) *Placing seeds on prominent body parts
(mid shoulder, tail, hip)*



a) *3-D model fitting which takes into account the angle
at which the photo is taken*



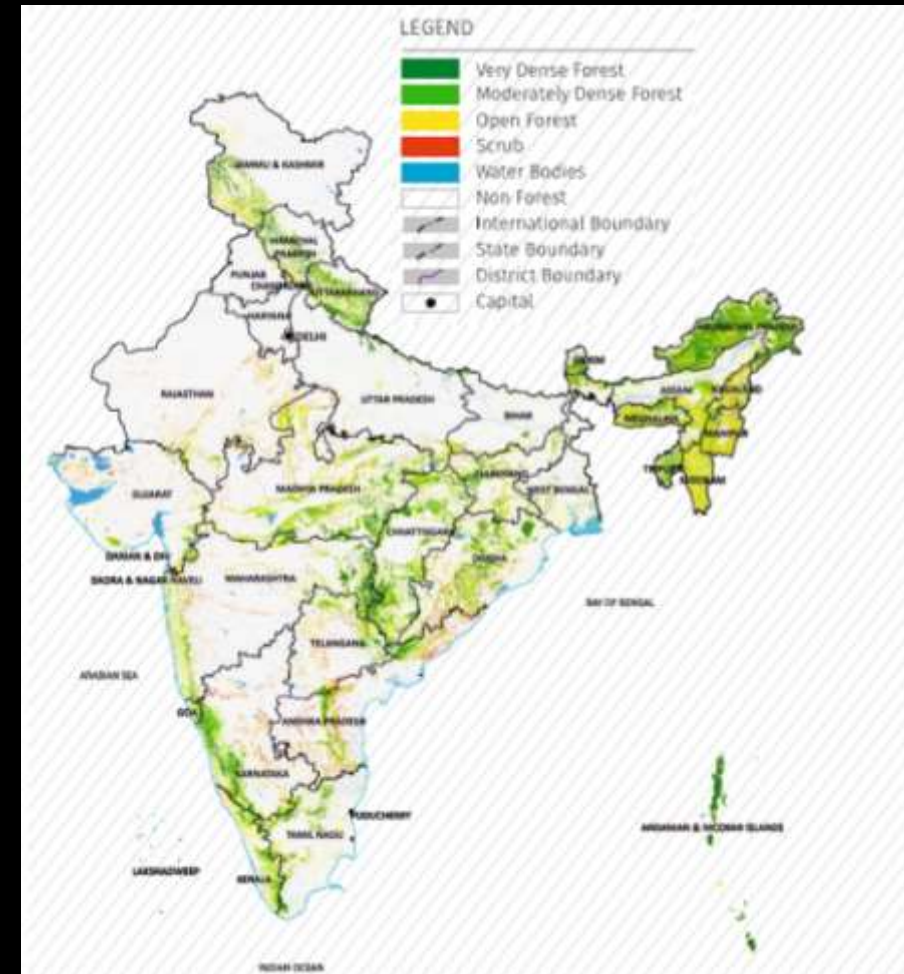
c) Pattern extracted



d) *Visual compare to match tiger images after the computer program has provided a few options from several thousand images*

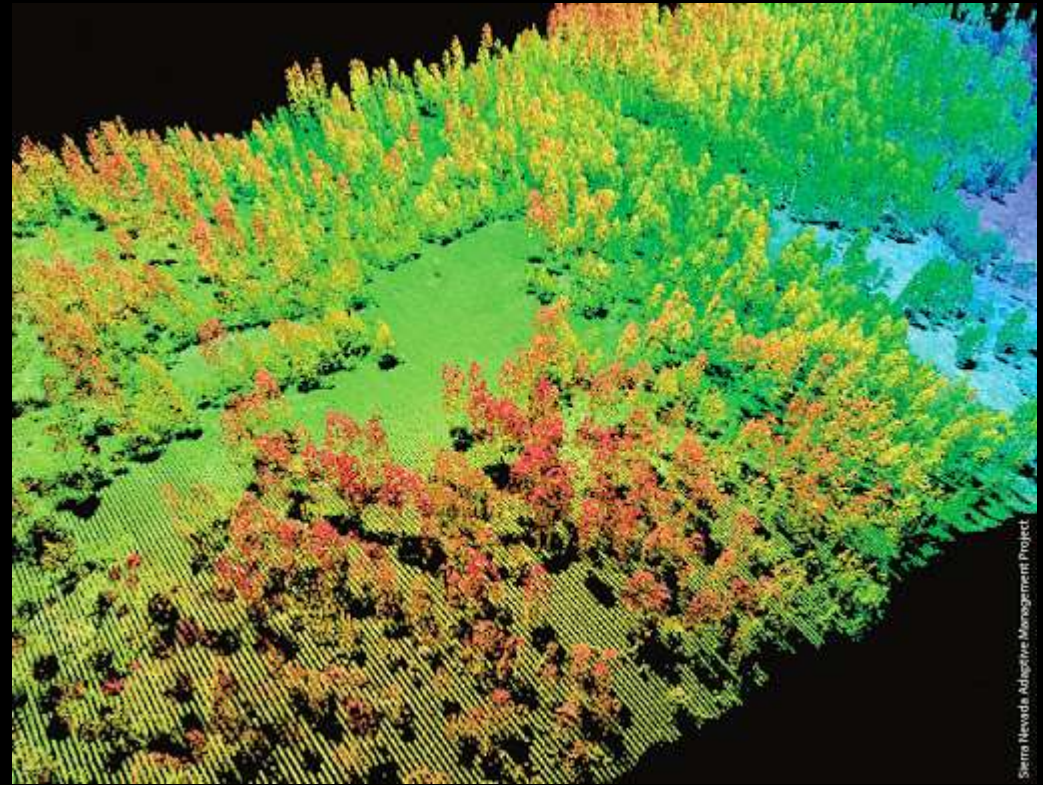
Sustainable management

- Resource survey- ISFR –satellite data, forest types mapping
- Growth models – (for future)
- PDA based field data collection by FSI
- Web GIS Platform for National Forest Inventory (NFI) , Geo-spatial & Statistical Data Processing



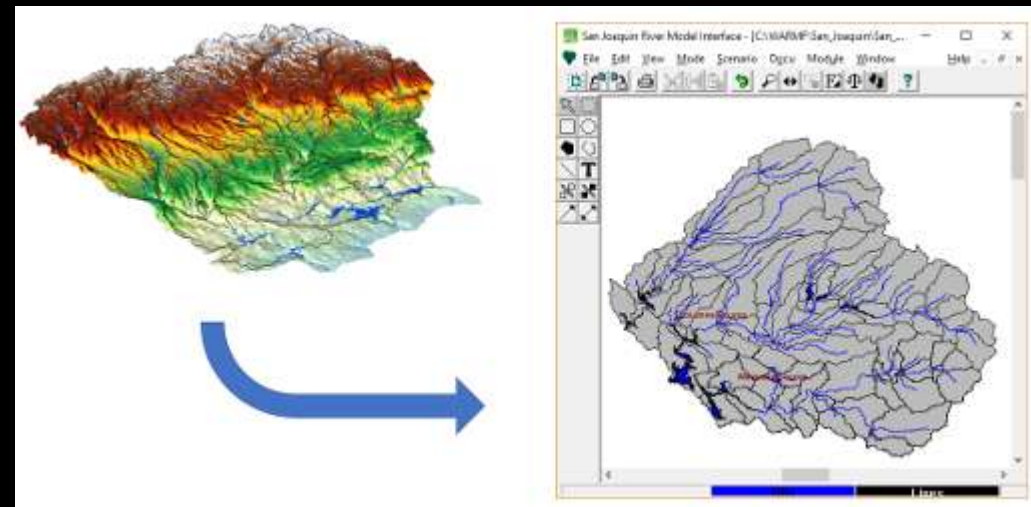
Carbon sequestration

- Not much presently but in future –LIDAR survey for growing stock
- With Better accuracy of both Ground Bio Mass and Tree volumes.



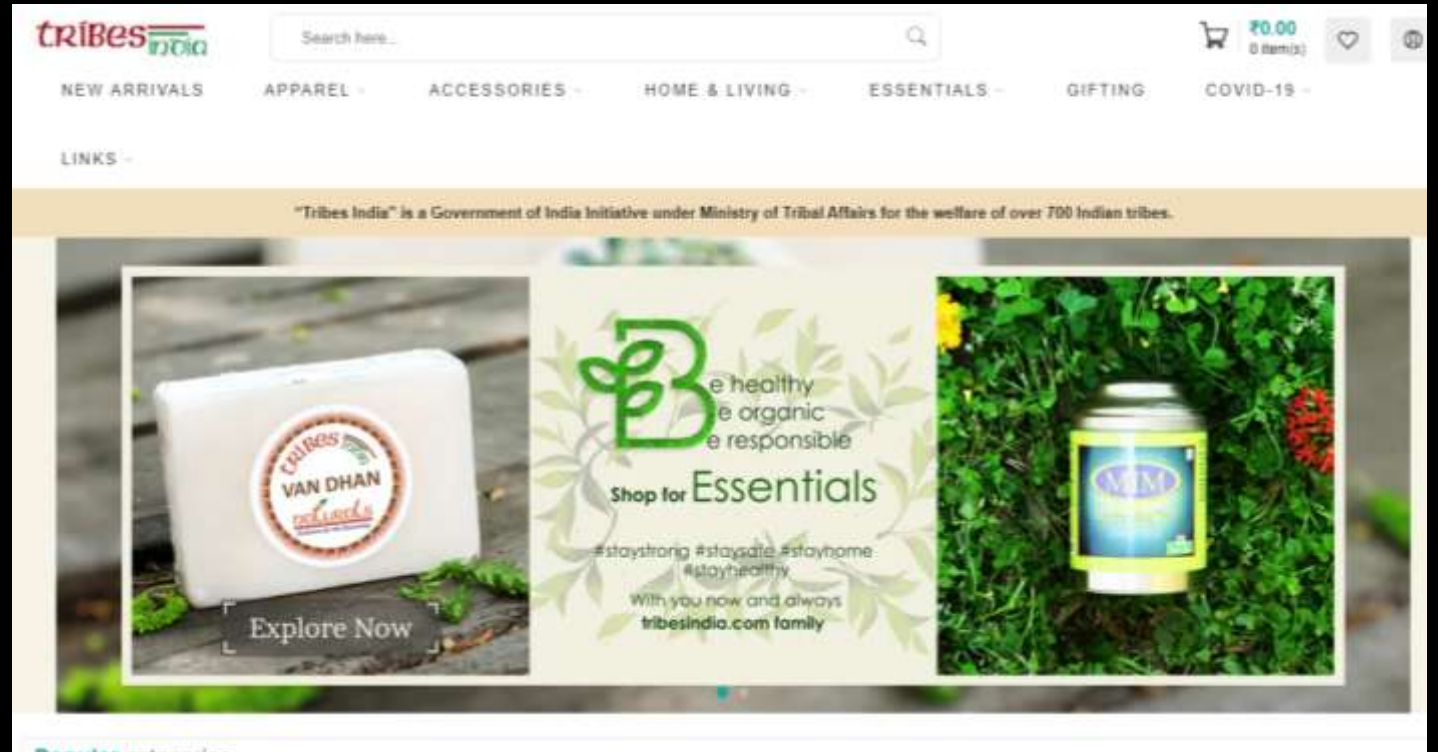
Watershed Planning

- Delineation using satellite data – better planning
- Help create Water harvesting Structures in a scientific manner.



Rural Livelihood

- MFP
- Timber
- Online sale- better Marketing and better price
- Large consumer base and help Backward Forward Linkages



Important aspect to consider..

- Sound design (effective SRS, future proofing)
- Security (CERT certification, security audits)
- Effective Network administration
- Maximize use of Open source software (GoI guidelines)

Future Prospects

- Better Use of resources and Better protection.
- Better Harvest of forest products and Rural livelihood.
- A Way towards Sustainable Future.
- High resolution satellite data forestry Planning & Monitoring
- Need Proper Training ,capacity dev, Mindset.