

Assam Bio Refinery Private Limited



India's first Bio Refinery to produce Ethanol from Bamboo in Assam

EPCM: Engineers India Limited

SITE OFFICE

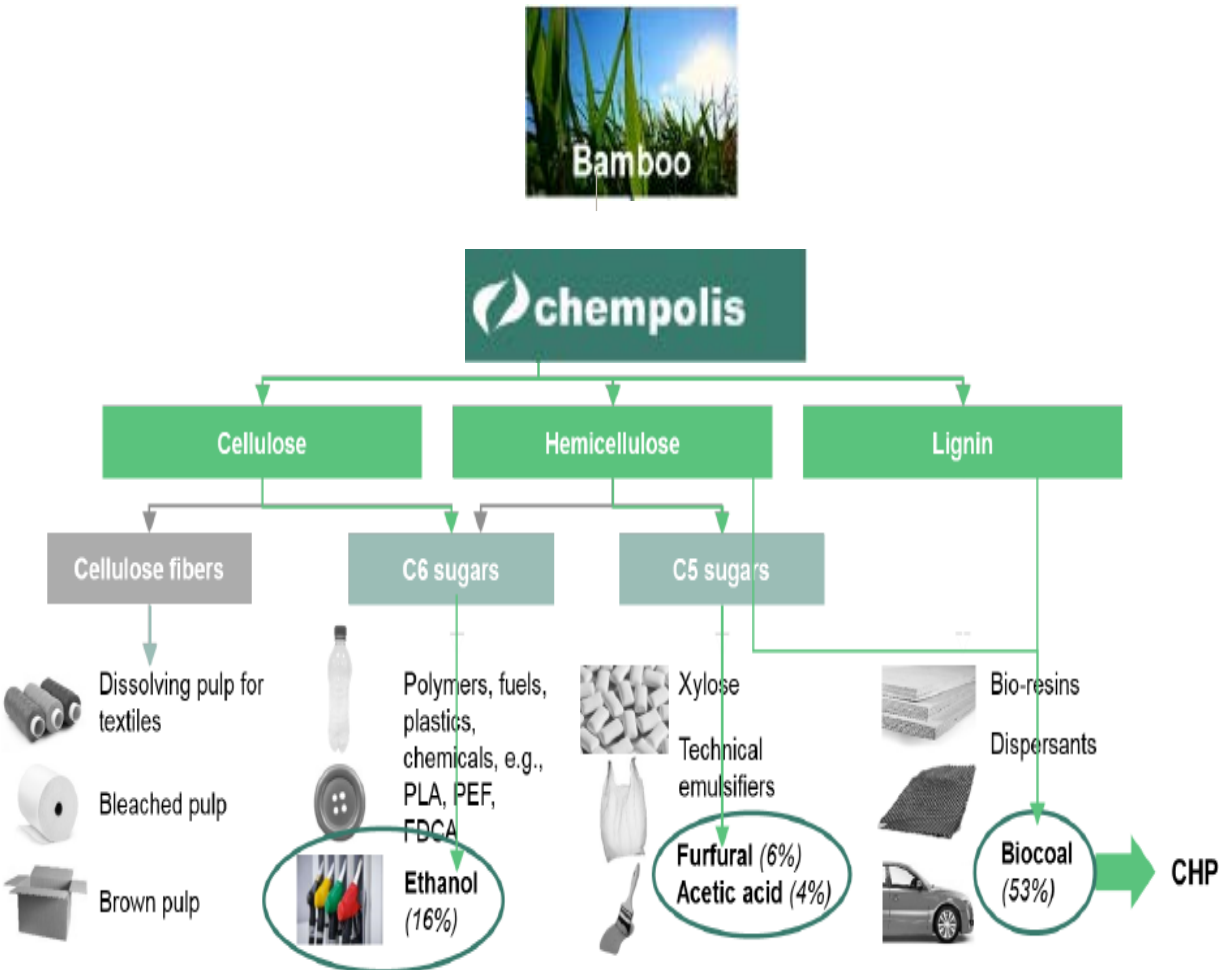
Assam Bio Refinery Pvt. Ltd.
Post Box No. : 003, P.O.: NR Project
Dist.: Golaghat, Assam, India
PIN- 785699

<https://abrpl.co.in>

REGISTERED OFFICE

Assam Bio Refinery Pvt. Ltd.
NRL Building, 122A, G.S. Road
Christianbasti
Guwahati-781005

Assam Bio Refinery: A Bio Refinery based on Fractionation technology with Bamboo as feedstock



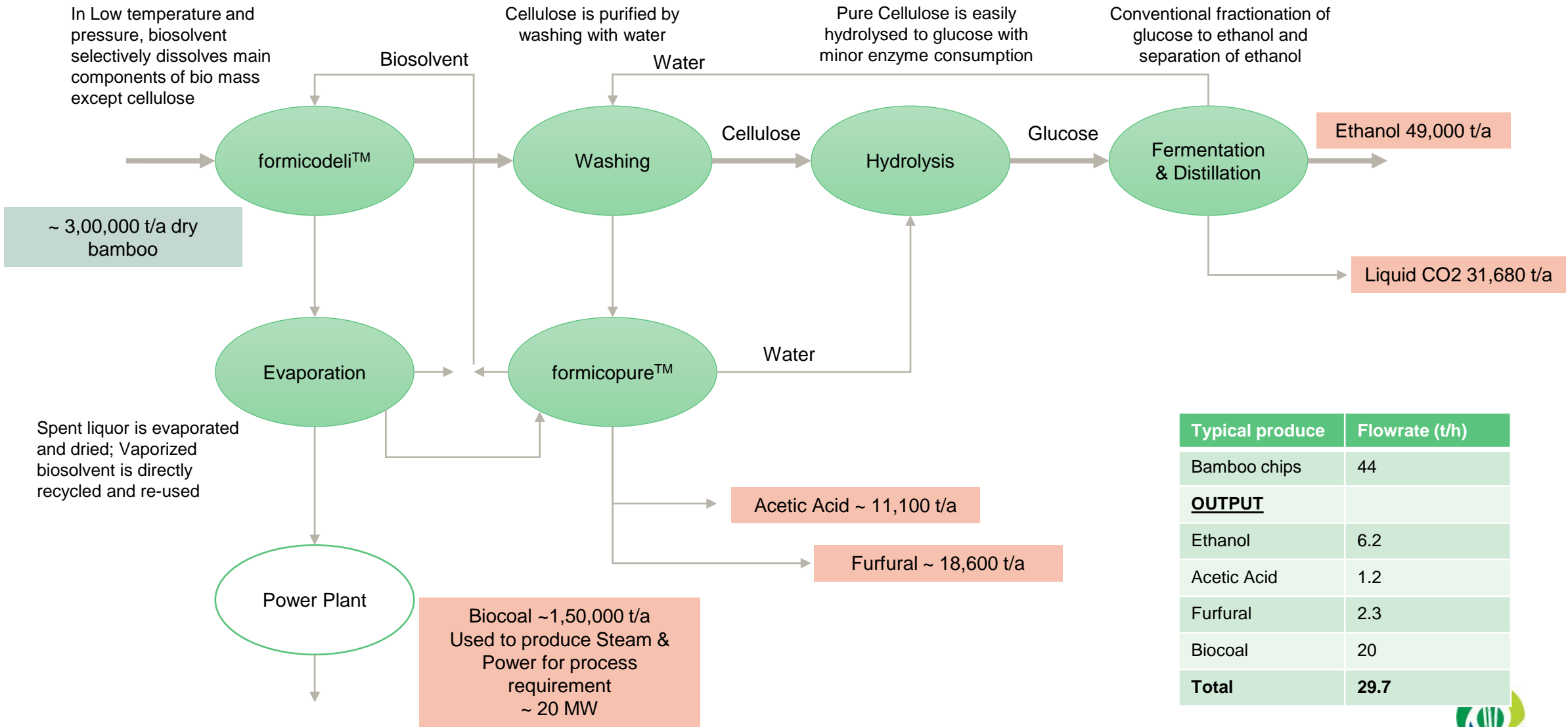
About Project:

- Location: Numaligarh, Assam
- 5,00,000 MT of bamboo to be processed annually using Chempolis' fractionation technology to yield 48,900 MT of Ethanol; 18,600 MT Furfural/Furfural alcohol; 11,600 MT of Acetic Acid, ~31,680 MT of Liquid CO2 and power as well
- More than 55 million tons of bamboo availability in North East India; 66% of total bamboo resource of India
- Estimated completion date – Dec'2022; ~58% overall project progress achieved till 15th Dec'21.
- More than ~85% of Plant & Machinery ordered; All Long Lead items ordered;
- Technology Provider: Chempolis; EPCM: Engineers India Limited (EIL)

End use of Products:

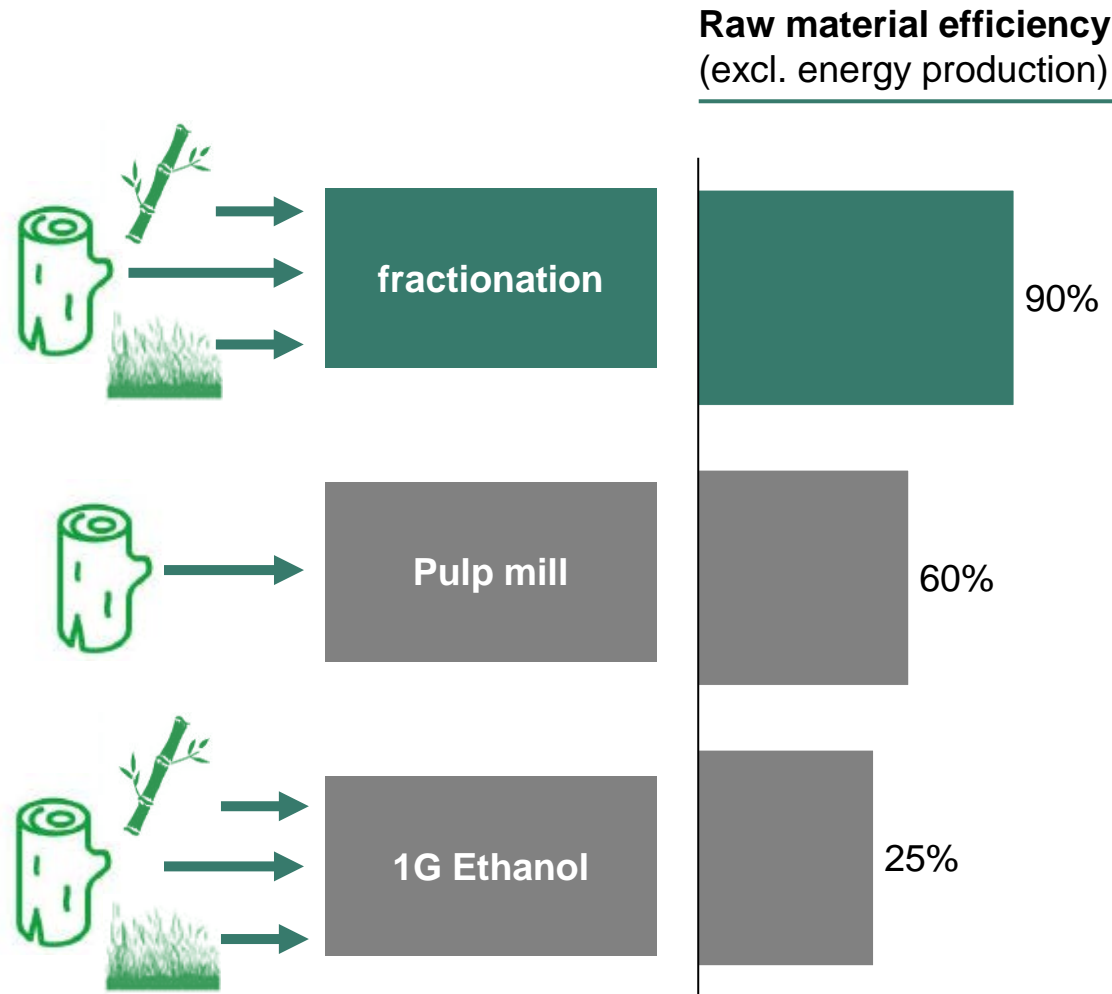
- Ethanol to be used for blending in Motor Spirit (Petrol)
- Furfural/Furfural alcohol used in pharmaceutical, chemical, foundry, refractory and metals, agriculture and fragrance industry
- Acetic Acid, a very versatile chemical, used in adhesives, paints, textiles, agriculture, plastic and pharma industry

Principles of the technology



Typical produce	Flowrate (t/h)
Bamboo chips	44
OUTPUT	
Ethanol	6.2
Acetic Acid	1.2
Furfural	2.3
Biocoal	20
Total	29.7

The process delivers high yield, favorable pricing, small unit size & vast environmental benefits



Technical benefits:

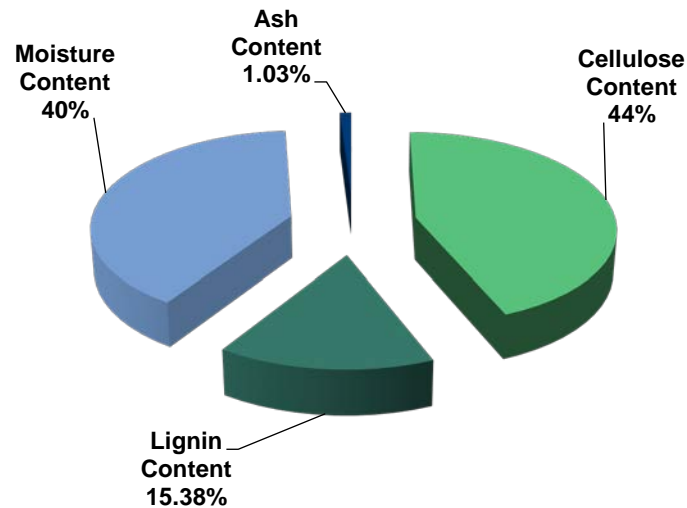
- **Purity of all fractions**, enabling cost-effective production of end-products
- **Optimized properties of all fractions** (vs. conventional pulp mills: only pulp is optimized)
- **Smaller unit size** (e.g., 1/5) with at least the same feasibility as large pulp mills
- **Flexibility in raw material**, e.g., possibility to use **waste** (e.g., straw)
- Ability to **combine best parts of different technologies**

Environmental benefits:

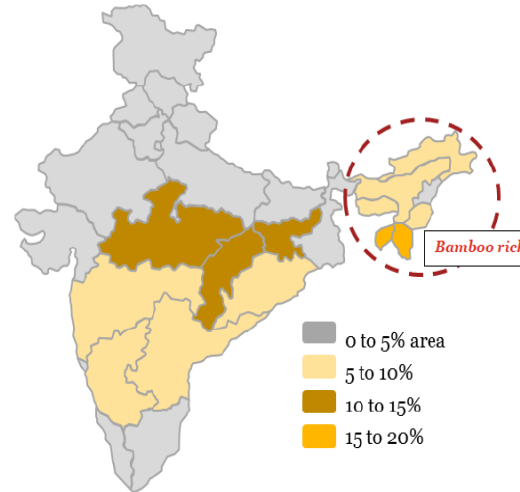
- Possibility to **replace fossil raw materials** in huge variety of products (e.g., viscose & plastics)
- **Lower pollution** (i.e., CO₂) & **reduced water consumption**
- **Reduced land degradation & deforestation**

Bamboo as a feedstock: North East Region accounts for more than 66% of the bamboo available across India

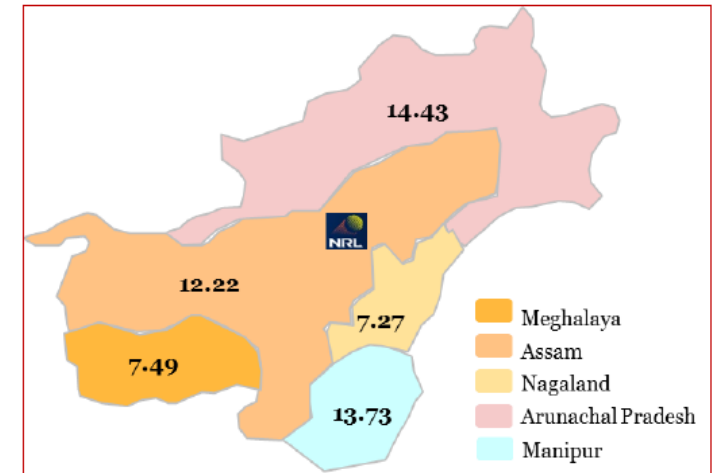
Bamboo has one of the highest cellulosic content amongst all bio masses



Distribution of Bamboo growing Area in India (%)



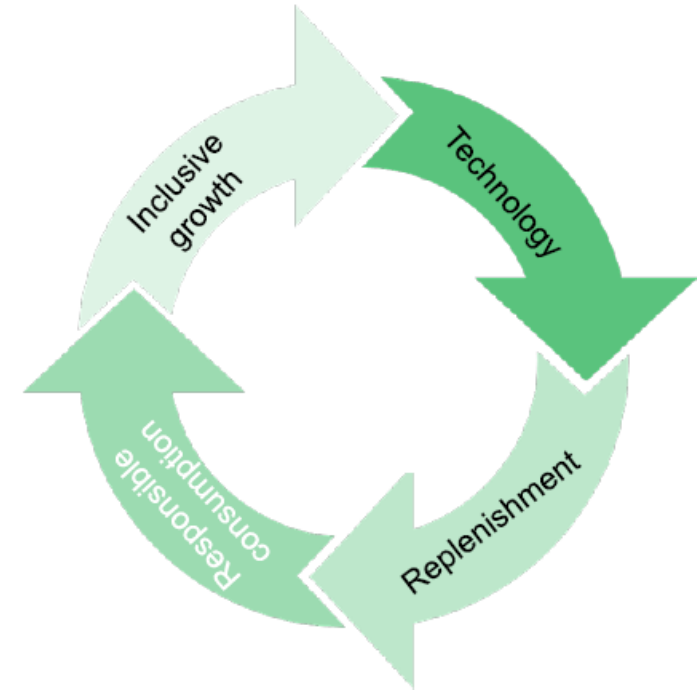
Bamboo Growing Stock in NER (million MT):



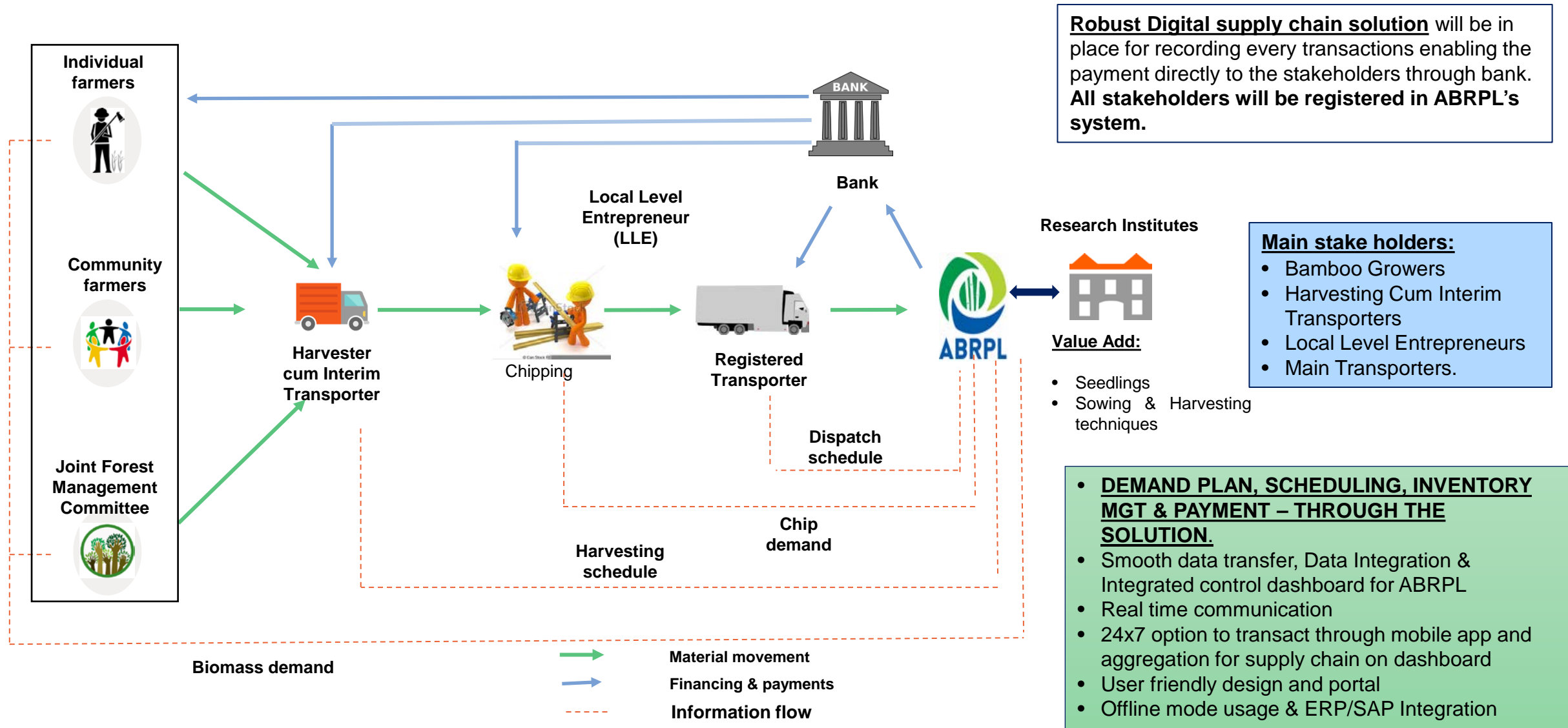
- India is the second richest country in the world after China in terms of Bamboo genetic resources
- Bamboo cover represents 16.7 % of total forest area of the country and 3.4% of the total geographical area of India; NER contributes 28% in terms of Area and 66% in terms of availability.
- Despite having largest area under bamboo in the world, India contributes to only 4% share of the global market; Japan, China, Malaysia contributes 80% of the World's bamboo market

Sustainability is at the core of ABRPL's Biomass sourcing strategy

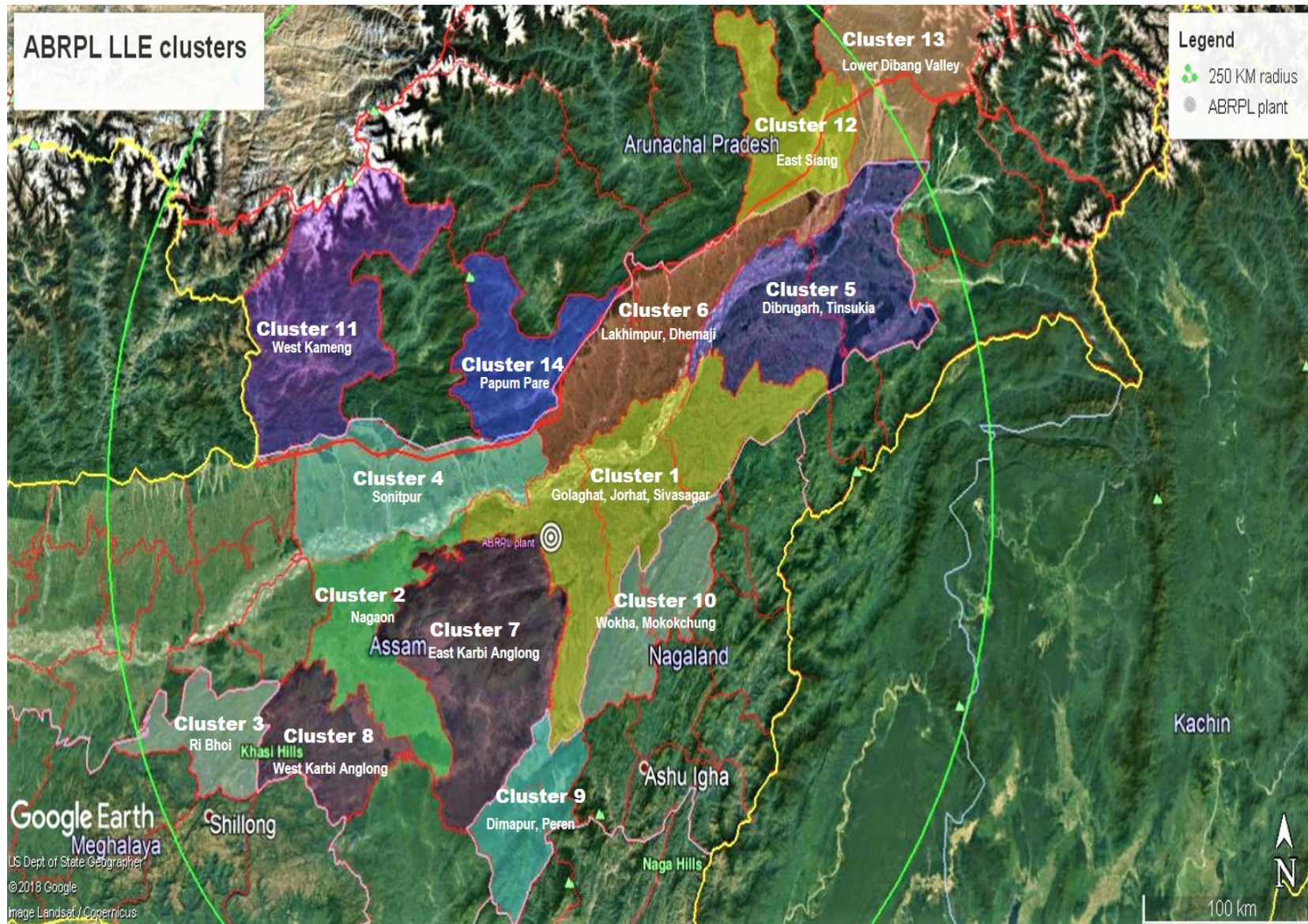
- **Responsible Consumption/Sourcing**
 - Less than 2% of available bamboo resource required
 - Transparent sourcing – direct from the source (Individual/Community/JFMC/FPO/FPC)
- **Inclusive growth**
 - Potential to provide livelihood to more than 50,000 people in the region.
 - 40 to 50 Local Level Entrepreneurs to be developed for cluster level chipping units
 - Direct engagement with Harvesters and Transporters to collect and transport bamboo
- **Technology**
 - Digital supply chain solution being developed for seamless integration of all stakeholders in the bamboo supply chain.
 - Geo-tagging of the bamboo resource.
- **Replenishment**
 - Sapling distribution and plantation drive in the catchment area
 - Tie-up with high yielding tissue culture labs to provide large amount of bamboo saplings
 - Association with agricultural universities and other government/private institutions for capacity development, sustainable harvesting techniques and training.



Overview of proposed Bamboo Supply Chain

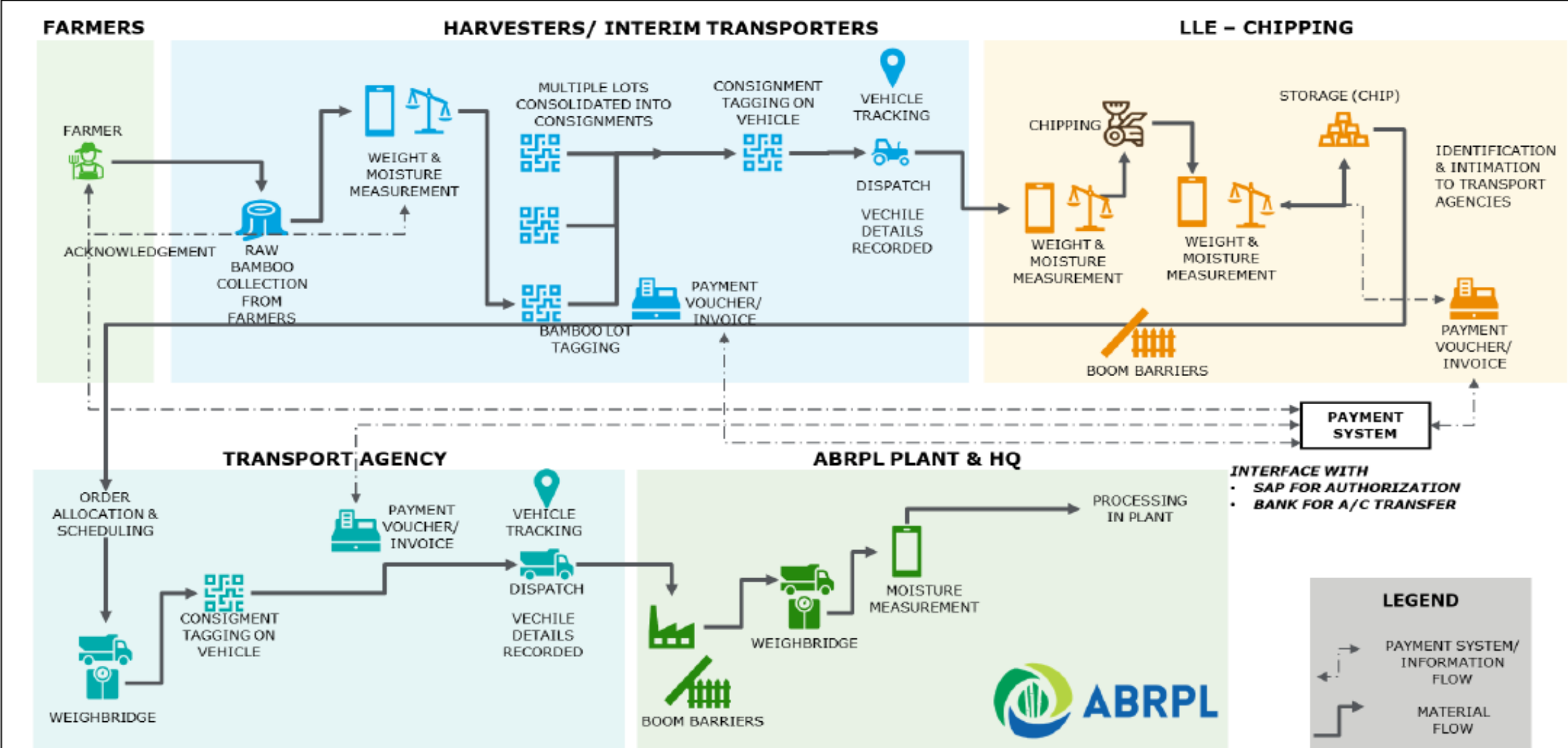


Sourcing Areas of ABRPL and Cluster Formation

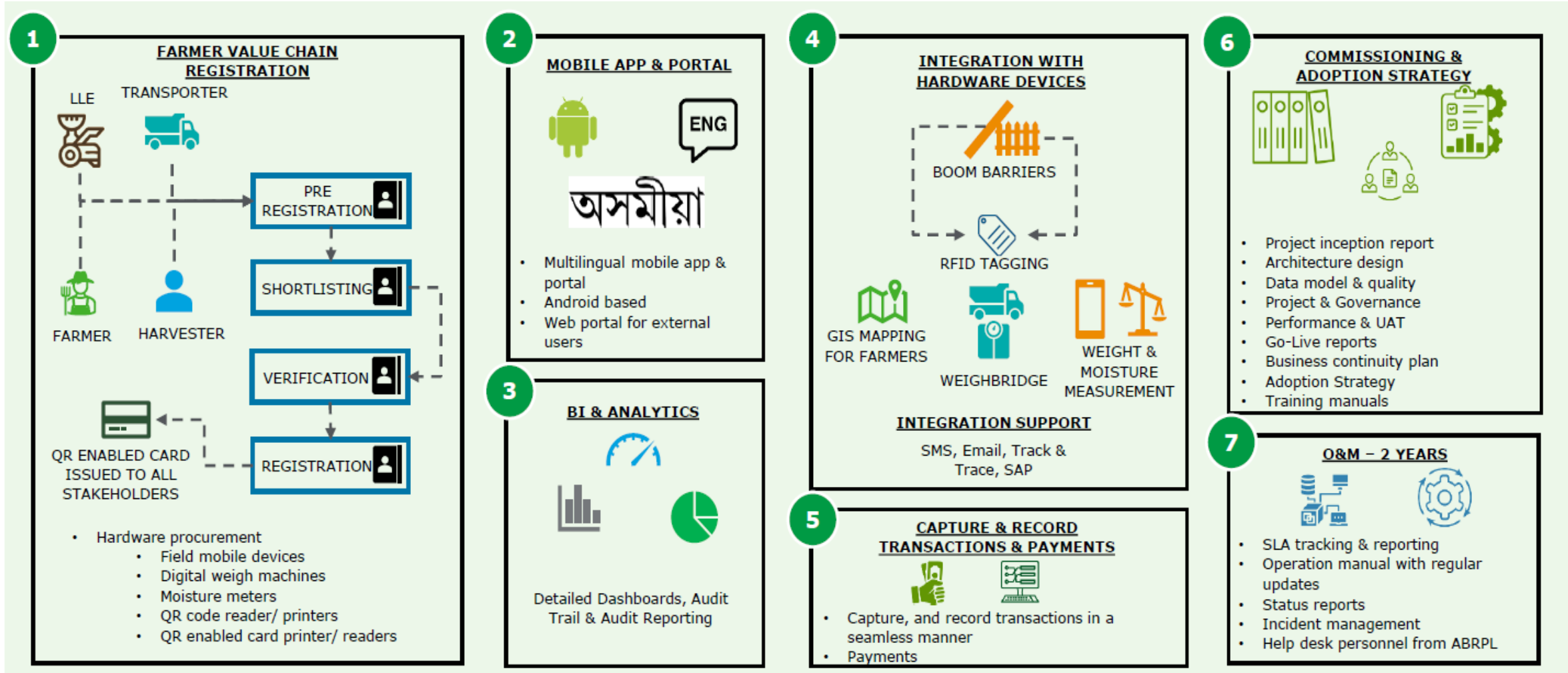


States	Districts Name	Nos. of Districts
Assam	Biswanath, Charaideo, Darrang, Dhemaji, Dibrugarh, Golaghat, Hojai, Jorhat, Kamrup Metro, Karbi Anglong, Morigaon, Nagaon, North Lakhimpur, Sivsagar, Sonitpur, Tinsukia, Udalguri, West Karbi Anglong	18
Arunachal Pradesh	East Siang, Lower Dibang Valley, Papumpare & West Kameng	4
Nagaland	Mokokchung, Wokha, Dimapur, Peren & Niuland	5
Meghalaya	Ri Bhoi	1

Extensive use of technology to integrate Bamboo supply chain and seamless connectivity



ICT enabled In-bound Supply Chain: Key Modules



MoUs signed with various agencies to enable sustainable development and sourcing

NECBDC – North East Cane and Bamboo Development Council
Plan for more than 500 hectares of bamboo farming every year.



PNB – Punjab National Bank

To provide loans and other agri based credit facilities for growing bamboo in the region



ASRLM – Assam State Rural Livelihood Mission Mobilising small bamboo growers by forming Farmer Producer Companies/Organisations



NAFED – National Agricultural Cooperative Marketing Federation of India Ltd.

Form and support Farmer Producer Organisations (FPO) to become self-sustainable through NAFED's Cluster Based Business Organizations (CBBO)

Key Takeaways



Economic Growth



Responsible
Consumption &
Production



Poverty



Sustainable community



Climate Action



Clean Energy



Industry, Innovation & Infrastructure

Saving nations energy imports around **60 million USD** annually.

Creating market linkage for **5,00,000 tonnes** of bamboo annually for Farmers, Industries, institutes/labs etc.

Generation of business opportunities in bamboo sourcing of more than **200 crores annually**.

Potential of creating sustainable livelihood for more than **30,000 rural households**.

Creation of **50 Local Level Entrepreneurs and employment generation of 3500** approx. in its value supply chain.

CO2 emission reduction of **65,000 tonnes** approx. per annum.

Generation of **25 MW** of Bio Power.

Thank You

