

2018

Circular economic service system design for community based flood resilience: Integrating systems design and behavioral science to address a public sector challenge from within

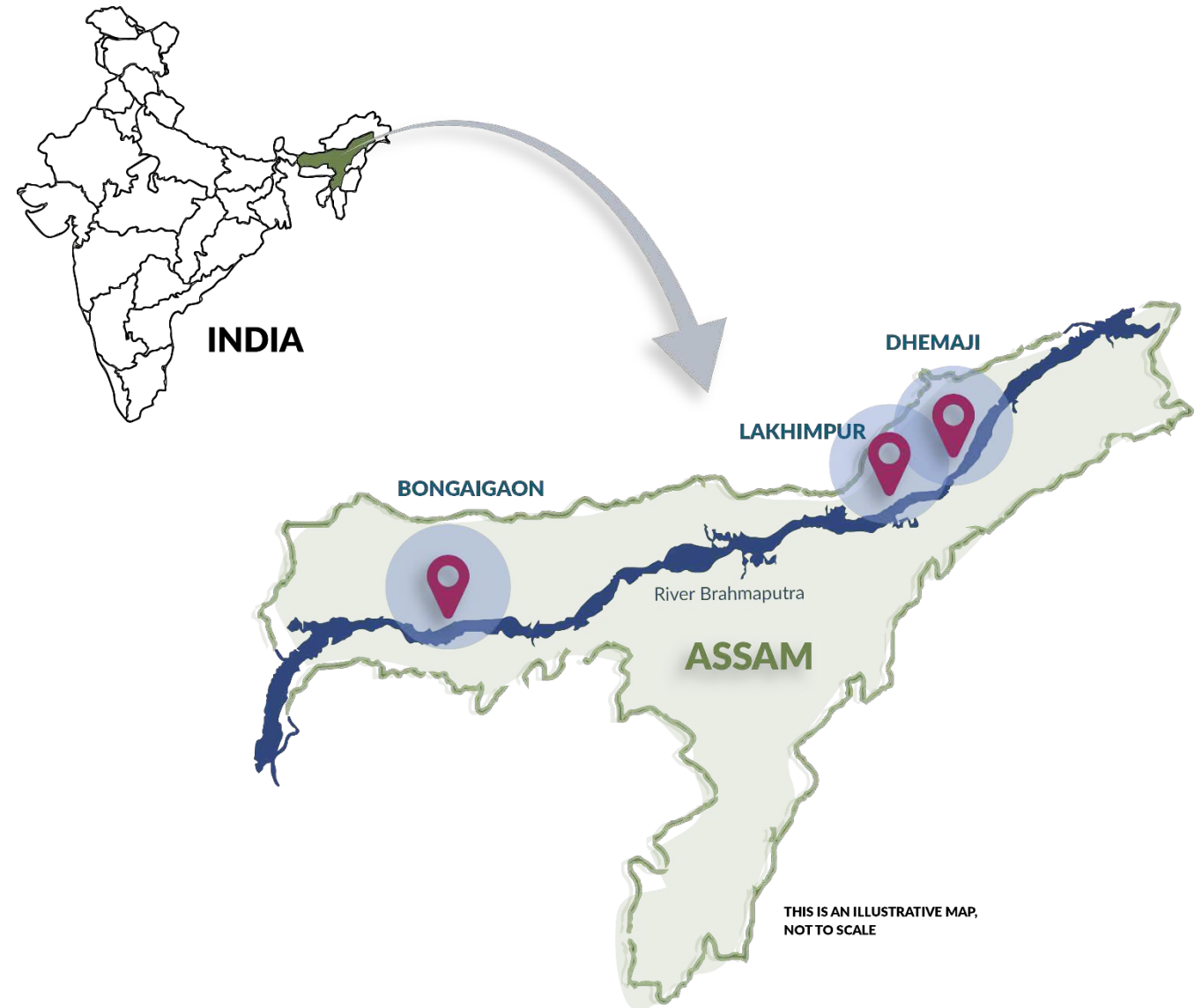
Das, Bhaskarjyoti and Nahar, Praveen

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Das, Bhaskarjyoti and Nahar, Praveen (2018) Circular economic service system design for community based flood resilience: Integrating systems design and behavioral science to address a public sector challenge from within. In: Proceedings of RSD7, Relating Systems Thinking and Design 7, 23-26 Oct 2018, Turin, Italy. Available at <http://openresearch.ocadu.ca/id/eprint/2701/>

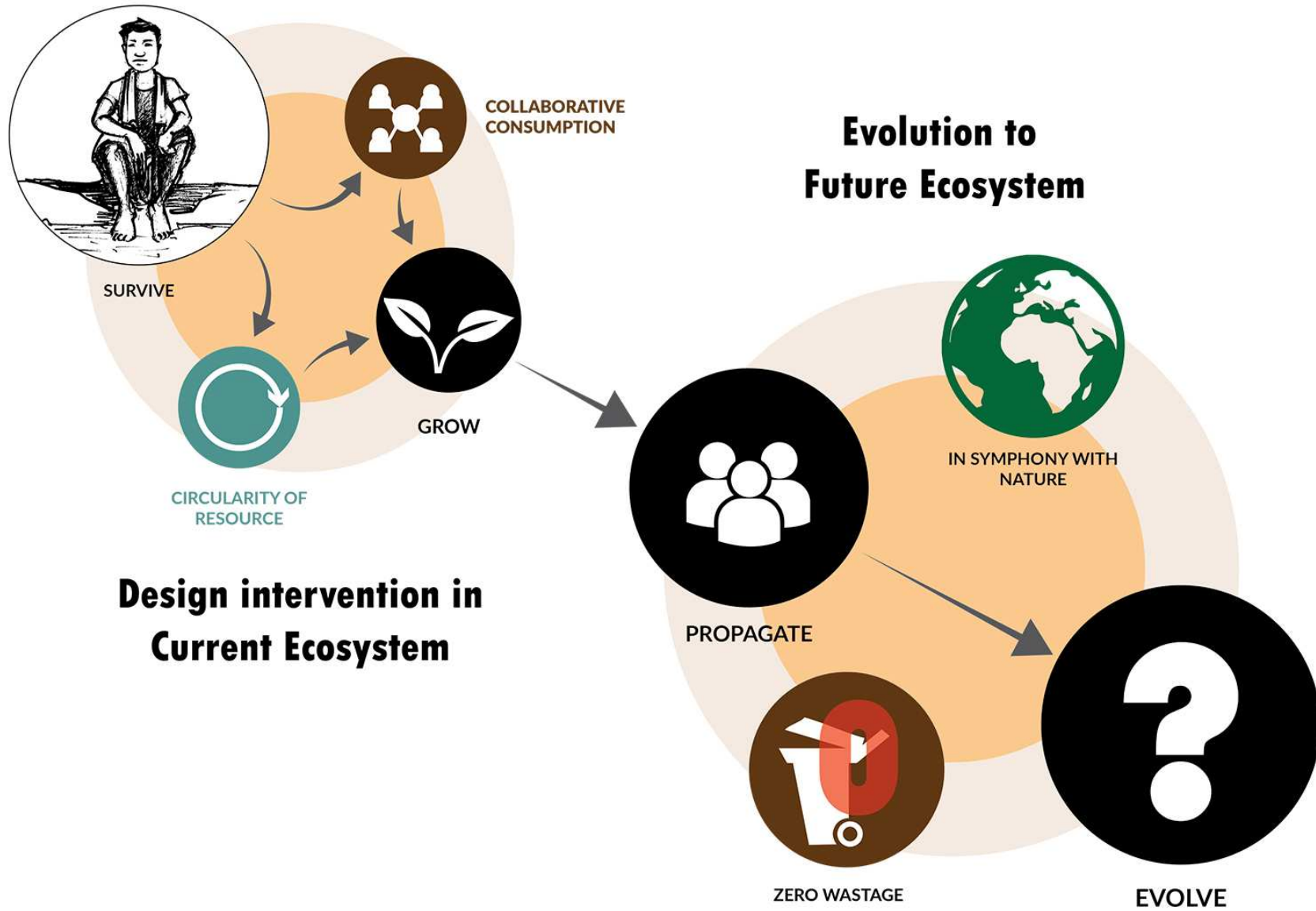
Designing a for the Annually Flood Prone Communities of Assam, India

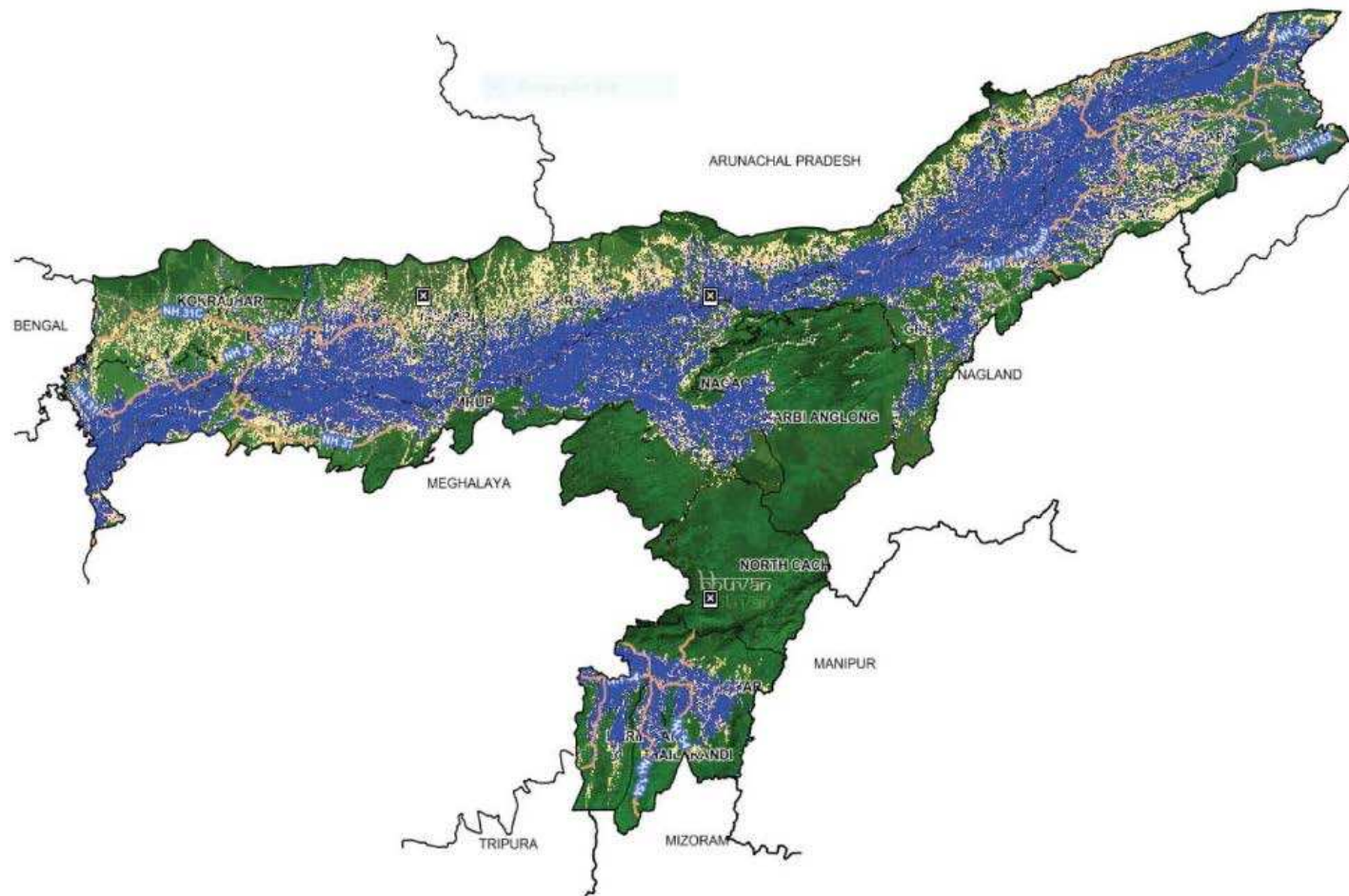
It's an **academic applied design research project** in the context of exploring implementation of circular economy in facilitating a well-being ecosystem among the annually food prone communities of the Brahmaputra Valley in the state of Assam, India.



Acknowledgements:







Aggregated flood inundation map of Assam
Source: Bhuvan, ISRO



Indian Express



Samshul Alam



NDTV



Photo: Reuters/Ankur



News18



Samshul Alam



Times of India



scroll.in



NorthEast Today

The annually occurring floods in the state of Assam, India

The Joint Needs Assessment Report for Assam Floods 2017

In July 2017, more than 1.7 million across 26 districts were affected and 86,000 hectares of crop area in 2450 villages were destroyed.

Food security and livelihood sector has shown that **56% of the affected people have food availability for less than a week** and 34% of the people have reported availability of food for a period of 1-3 weeks, **making over 90% of the affected people without access to food after three weeks.**



Vision

The vision of this project is to facilitate the creation of an adaptable and designed-to-evolve ecosystem which is fertile for innovation, appreciates collaborative growth and preaches overall desire for well-being behaviour among the primary stakeholders and its connected external entities.

Intent

The intent is to understand the current lifestyle scenarios of the flood affected communities, the experienced problems, understand the strengths and the weaknesses to explore and speculate different design intervention opportunities in order to facilitate a desirable well-being living ecosystem, and cultivate or strengthen circular economic behaviour for building resilience to situations of flood.

Directions for Design for Circular Economy (DfCE)



Corollaries of Buddhist economy

Maximizing satisfaction by optimal consumption and appreciating optimized flow of resources by developing usage behavior by emphasising on the shift of focus from materialistic pleasures (tanha) to fulfillment of overall well-being (chanda).



Enriching cognition

Neural simulation is the key to creating innovations and hence the experiencing and creating experiences are inclusive to generating an ecosystem for "care for others". Designing products and services to impart experience can lead to greater awareness dissipation.



Realtime feedback to continuous impact & growth assessment

Calculating growth and overall impact is important to understand the end product, the need it satisfies and the amount of time it requires to achieve the same. Important questions like responsibility, authority and ownership along with socio-cultural and environment impacts needs to be evaluated for a holistic effectiveness.



Incorporating performance economy

The focus of an action should be towards a solution rather than the products involved. Replacing energy consumption through labour generates more employment and judicious usage of energy.



Educate for change

A problem is one when perceived as a problem. One needs to connect to understand and connection building has to be facilitated and educated on. Vague rules and regulations for customers often interfere with the actual problem and solution perception.



Open innovation

Instigating open collaborations make customers create the value of a product or service themselves, thus reducing the chances of product being not used and dumped into the landfills. Open innovation also allows the flexibility for users to decide what they need rather than sticking to the buy and throw behaviour.



Reuse over recycling

Recycling is resource and energy intensive and creates substantial air, water and soil pollution. Products designed with an intention for re-use will reduce the excess energy spent on the product life cycle due to recycling. Durable products can subsequently enter the performance model of business



Design to evolve

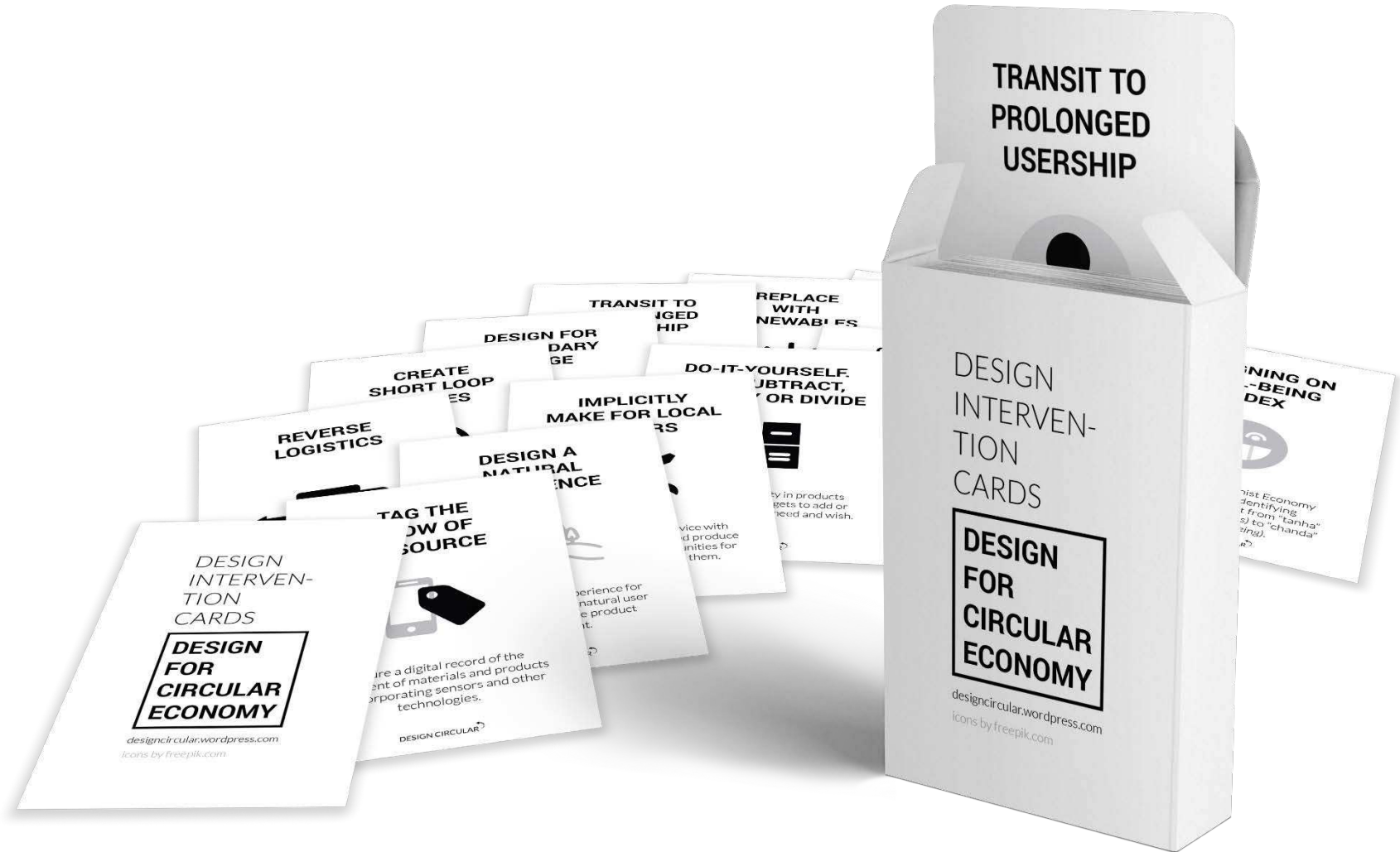
Flexible products and services which can evolve as per the user's needs, will lead to development of social capital allowing users to creatively participate and choose the way they would like to use the product. This will lead to prolonged usage and ownership of goods and products.



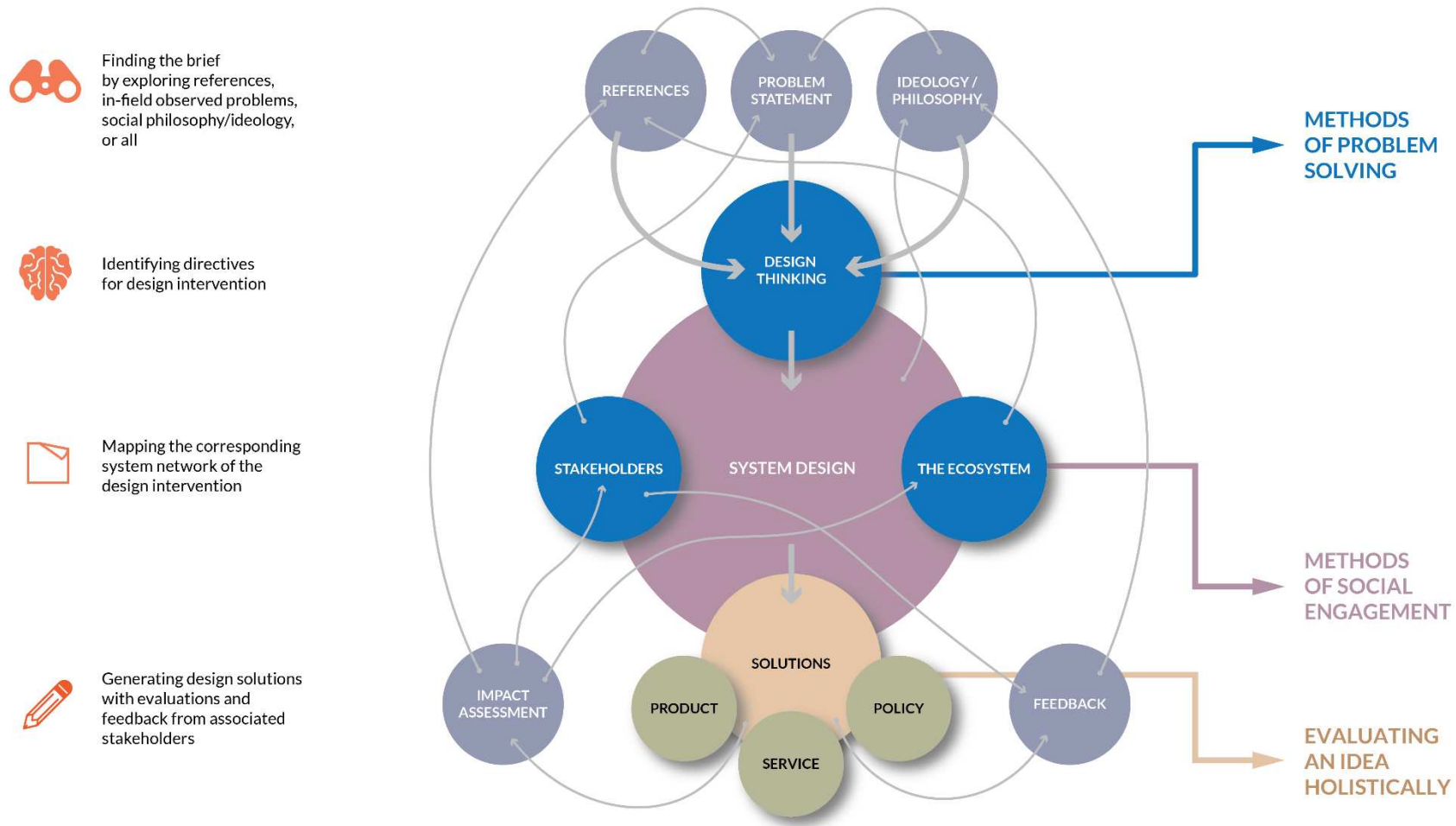
Developing customer desirability along with CE design intervention

The usage behaviour of customers is dependent on the desires that one has from it. Increasing opportunities for co-creation will lead to greater acceptability of a solution and hence prolonged ownership or usership of the create product or service.

Directions for Design for Circular Economy (DfCE)



A design student's approach towards holistic thinking



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Ten Questions To Design Ideation

Evaluating a design concept through ten sets of trigger questions – a checklist for ideation and concept generation.

Print this on an A3 sheet and use sticky notes to ideate and stick on relevant boxes.



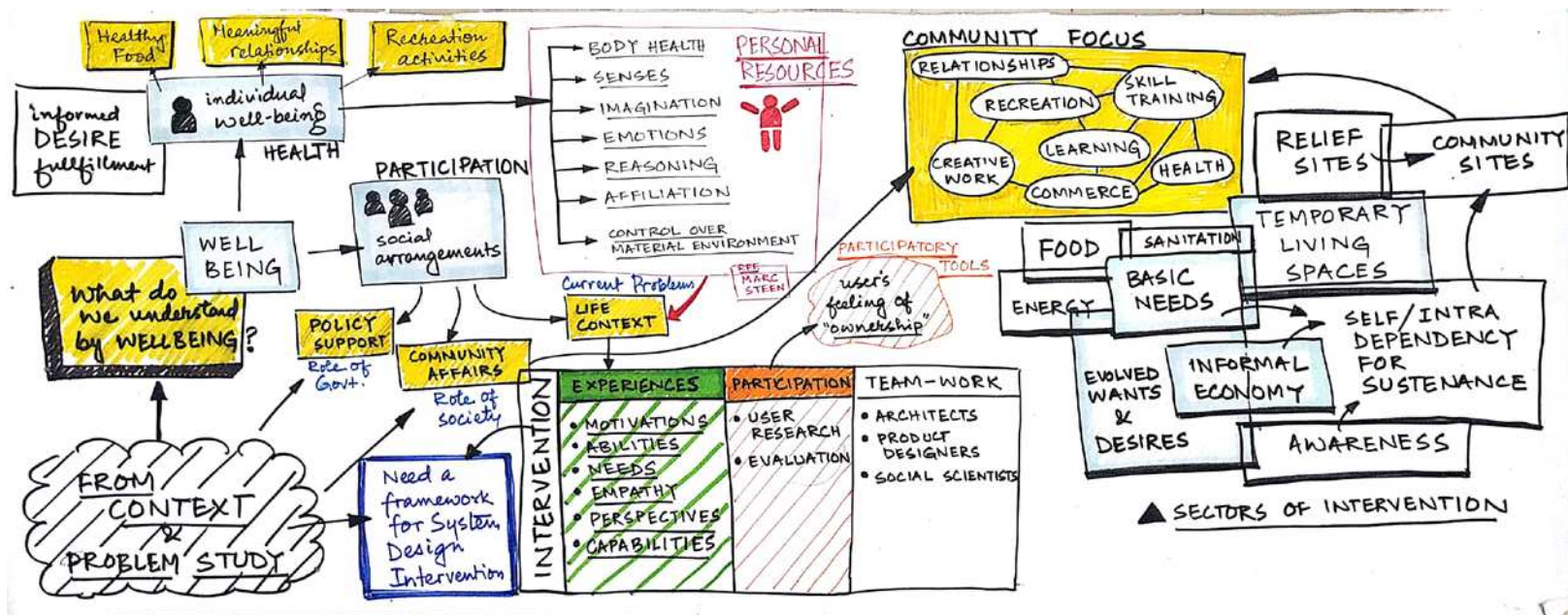
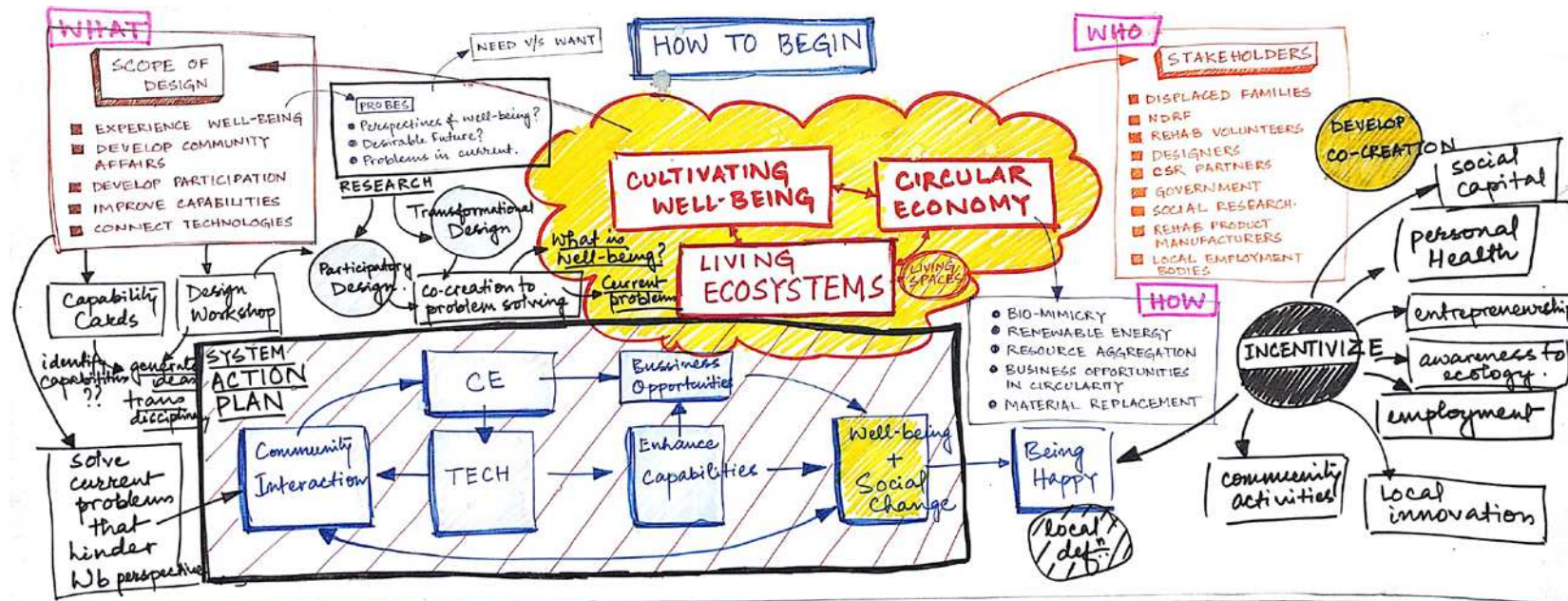
Created for academic purposes.



<http://designcircular.wordpress.com>

Developed as a part of the graduation project - Cultivating well-being through circular economy.

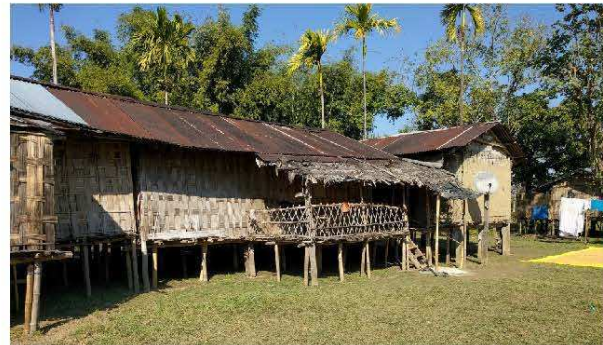
Bhaskarjyoti Das, National Institute of Design, Ahmedabad



Action plan for design research

<p>INITIAL DESIGN RESEARCH BRIEF</p>	<p>To understand the lives and ecosystem of the temporarily displaced individuals and families; and identify opportunities to generate circular economic design solutions directed towards overall wellbeing.</p> <p>CONTEXT: Temporarily displaced families in the districts of Dhemaji and Bongaigaon in Assam, India; facing temporary displacement due to floods and soil erosion.</p> <p>KEYWORDS: System Design, Design for Circular Economy, Social Design, Design for Experiencing Well-Being</p>				
<p>ACTION</p>	<p>Ethnographic Inquiry (EI)</p>	<p>Local Ecosystem Inquiry (LEI)</p>	<p>Well-being Inquiry (Wbi)</p>	<p>Design for Circular Economy Inquiry (DfCEI)</p>	<p>Generative Design Inquiry (GDI)</p>
<p>KEY QUEST</p>	<p>Scenario building of the primarily affected stakeholders</p> <p>Mapping and categorizing the layers of currently faced problems</p> <p>Understanding the needs and wants of the primary stakeholders towards body health and cognition</p>	<p>Understanding the breadth and depth of available local knowledge</p> <p>Exploring opportunities for contextual system resilience [4]</p> <p>Exploring the cultural, social and economical impacts of existing lifestyle in the ecosystem</p>	<p>Perspective of well-being and the speculative desirable future</p> <p>Exploring and deciding metrics/ indicators for well-being evaluation and design inspiration</p>	<p>Exploring locally available resources and material usage loops and lifecycles</p> <p>Exploring contextual incentives to transit to circular economic model</p> <p>Exploring and evaluating opportunities for product or service development and related business/economy generation avenues.</p>	<p>To further explore and gather information for design intervention as directed by design research post EI, LEI, Wbi and DfCEI</p> <p><i>(if required)</i></p>
<p>METHODOLOGY FOR REFERENCE</p>	<p>Empathy Mapping [1][2] through focussed group interviews [6]</p> <p>Design Video Documentary [3]</p> <p>Generative research [10]</p> <p>Human Centered Design [12]</p>	<p>Identifying the connected biophysical metrics and indicators [5]</p> <p>Tripple Value Method [11]</p>	<p>Identifying biophysical metrics and indicators [5]</p> <p>Individual and focussed-group interviews [6]</p> <p>Capability approach [7]</p> <p>Generative research [10]</p>	<p>Circular Design Guide [8]</p> <p>Design for Circular Economy : Design Intervention Cards [9]</p> <p>Participatory Design [10][13]</p> <p>Circular Design Checklist [14]</p>	<p>Generative research [10]</p> <p>Participatory Design [10][13]</p>
<p>STAKEHOLDERS IN FOCUS</p>	<p>Primarily affected individuals, families or communities</p>	<p>NGOs, Local business associates, Social researchers, Journalists, Ecosystem researchers</p>	<p>Primary affected families, On-field working NGOs, Social researchers</p>	<p>Primary affected families, Local businesses, Local markets, Self-help groups, NGOs.</p>	<p>To be decided during the primary research phase.</p>

The contextual living ecosystem through photographs



Community preparedness and resilience to floods



Housing on stilts

is a traditional practice of housing of the Mishing community of Assam, gradually being incorporated by other tribes and communities due to its effectiveness of flood resilience. These are mostly constructed by locally available materials.



Community drinking water stations

have high raised hand pumps that are mass constructed near roads and areas of mass gatherings with auxiliary sand-water-filters to meet the need of safe drinking water during floods and otherwise. These are constructed by NGOs under CSR funds.

Community shelter homes are constructed by NGOs on 660 sq. m. high-raised-platforms which intends to provide relief and rehabilitation to around 70 - 100 households in the vicinity. These are often used for local gatherings during normal times.



Individual grain storage

are small huts made of bamboo walls on stilts that provide minute protection from flood currents. Grains are kept with husk in bunches to prevent moisture attacks but leads to rat and other pest infestation during several seasons of the year.



Relief and rehabilitation post floods

A number of local, national and international NGOs have been found working for all-round development of the flood prone communities along with the district officials.

NGOs aid in development of flood resilient social infrastructure, awareness on improved farming practices, healthy behaviour building, local disaster task force building and training, medical support and preventive vaccinations, education of children and adults and also monetary and generic resource support to entrepreneurial activities.

Post floods, NGOs along with Assam State Disaster Management Authority and the army facilitate distribution of food grains, shelters, kitchen utensils, blankets, lights and other needs that is assessed for a given area with respect to the severity of devastation.



Visit to the Subhanshri Relief Camp, Chirang District

After the onset of flash floods (August 2016), an entire village shifted to this relief camp, out of which, several still stay here due to unavailability of land and income. Some of the families could breakdown their houses and carry important materials in a span of 2 hours to a higher ground, however stored grains are lost and they have been completely dependent on relief aid for food ever since.

Many of the families have been provided with compensation from the government to buy lands for farming, and the building and housing materials are provided by the NGOs, operating here, which includes steel roofs, solar lamps, blankets etc. Availability of cooking fuel, food grains and proper sanitation still remain the most severe problems, residents face here.



Raised concerns during flood mock drill

Collaborative flood mock drills are organized by the respective district administrations every year and one such drill was attended at Kajalgaon in June 2017. The drill was a collaborative effort of the district commissioner's office, police, NGOs, fire fighters, local school teachers and village heads of the district Chirang in western Assam. With reference to the training manual for collaborative action among different stakeholders, been formed and distributed by Assam State Disaster Management Association (ASDMA) to all concerned activity in charges, this mock drill was a review forum to discuss the problems and fine tune the opportunities anticipated in this season concerning field action in case of onset of floods in the region.

Summarizing some of the main points raised and discussed during this mock drill, here is a compilation of the problems faced in flood preparedness, relief distribution and rehabilitation, as reported in the forum:

- Point-to-point alert system through field mobilizers is slow and uncertain. Mass alert system channels are required for timely dissipation of information at all remote locations in the flood prone area.
- Delays in relief distribution occur as there is no faster process to locate the distressed families other than visiting every house in the flood effected zone. The forum reiterated the need for more mass assembly points that can be clubbed with local emergency relief centers.
- Unavailability of adequate local grain storage facilities makes it difficult to store grains as backup for relief distribution. Fresh stock supply from centralized locations takes considerable amount of time to reach the relief sites.
- The forum also assessed the need for more remote data collection and the usage of IOT enabled product services for user feedback, information collection and wide dissipation.

the annual scenarios



Apr - May

Flood preparedness begins among local residents – physically and cognitively



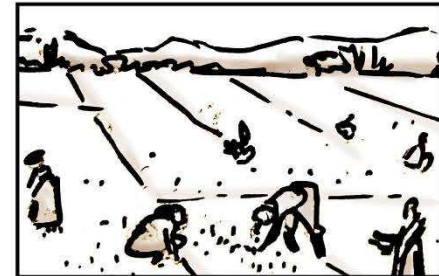
June - July - August

Heavy rain and flood period: families dislocate to safer places to stay temporarily



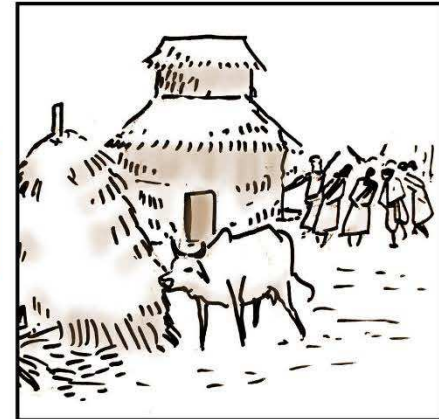
Sep - Oct

Post-flood trauma period: reconstruction and rehabilitation



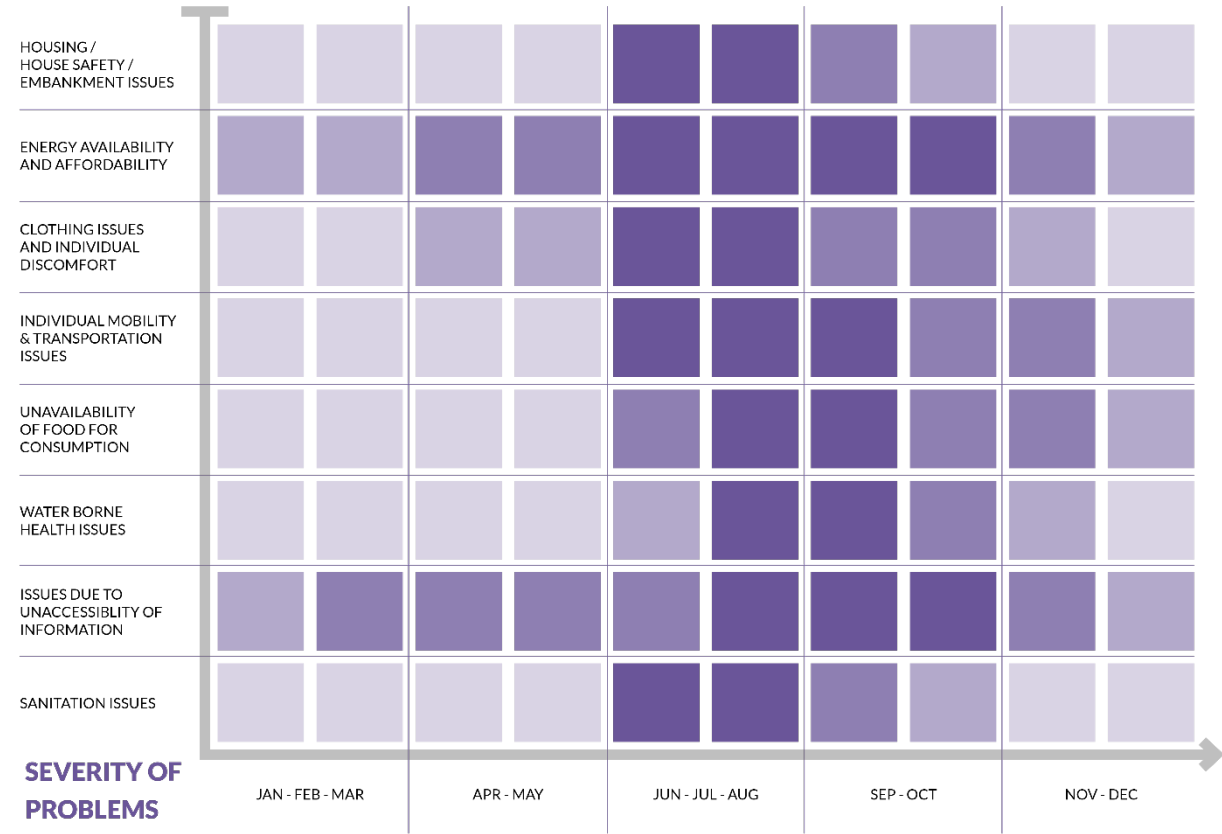
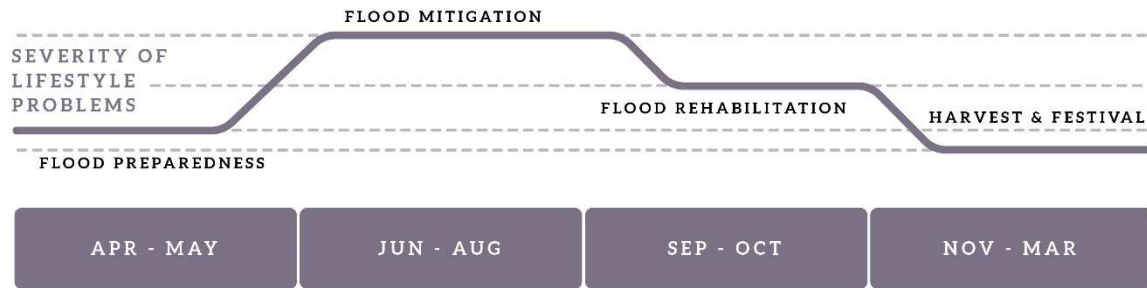
Nov - Dec

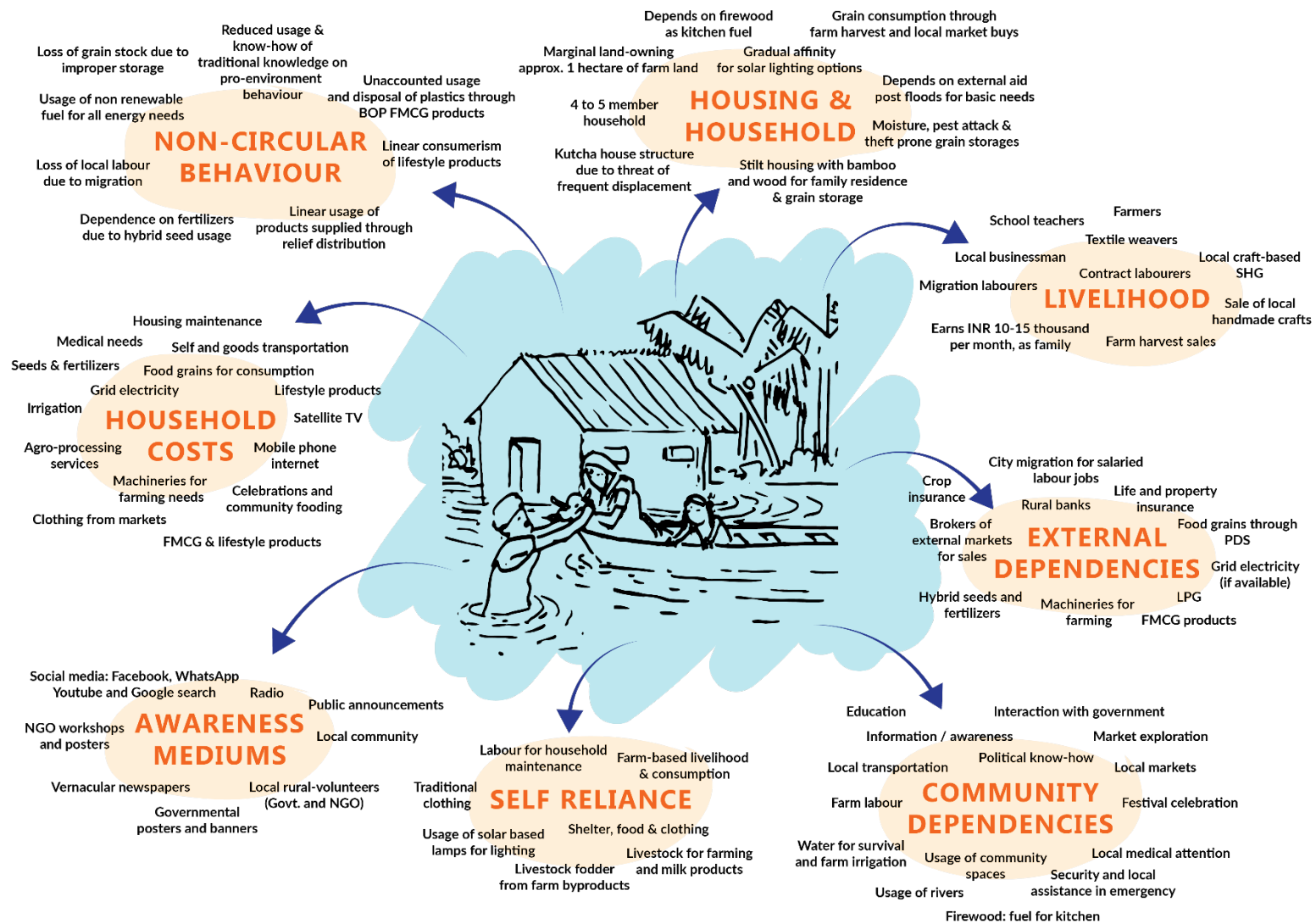
Lean period: Basic life continues, locals focus on earning livelihood



Jan - Feb - Mar

Festive period: celebration of agricultural harvest - Magh Bihu celebrations





Think and feel

Wants access to services for improved safe storage of harvested grain stock.

Desires to have a stronger-role/participation in new project ideation and implementation.

Fails to trust local office management (public, private & collaboratives) due to corruption and poor record keeping of deals and transactions.

Extreme love for ancestral land and ethnic society even after annual flood threat to the same land.

Dependent on NGOs and external relief services for food, lifestyle products and community spaces. Expects more facilitation for self sufficiency rather than products.

Hear

Collects new information from local peers and NGO field mobilizers.

Consults local school teachers for investments.

Hears news through radio, social media and TV.

Flood alerts arrive through peer to peer mouth talk and WhatsApp messages.

Gets influenced by local politicians in terms of affinity towards a party or group in lieu of benefits and overall affinity or negativity towards newer projects.

Gets influenced by leaders of religious houses and ethnic societal rules towards lifestyle behaviour.

Advertisements on TV and Facebook play a great role in deciding affinity for an activity.

Growing affinity towards urban lifestyles, considers it to be developed and superior in nature.

Absence of feedback channels makes it difficult for users to review and suggest changes to governmental projects for infrastructure development.

Feels to migrate to urban areas due to decreasing livelihood opportunities and local markets for traditional skills.

Feels to invest first on flood resilient basic need services like water, food, sanitation, and energy.

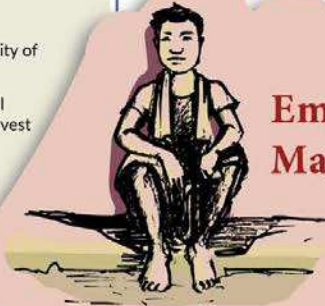
Pains

Floods cause inaccessibility or unavailability of food grains, kitchen fuel, and electricity

Irregular prices of grain facilitated by local brokers cause less revenue from farm harvest

Absence of adequate community based flood resilient infrastructure. No collaborative pre-planning to cope with flood situations.

No ownership attitude towards existing community based infrastructure. Non-maintenance leads to its ineffectiveness during emergency situations.



Empathy Map

See

Understands climate change effects through irregular onset of seasons and rainfall.

Observant towards depleting natural resources and increasing plastic waste in the locality.

Farming yield can be increased with foreign varieties of crop seeds, e.g. Boro paddy

Solar energy is affordable, accessible and can reduce household expenditure on kerosene and grid power.

Strong affinity for ethnic cultures rarely allow people to accept newer solutions.

NGO initiatives die down after they handover projects to the community. There is no visible incentive of any individual in maintaining community based projects.

Gains

Shift to newer farming practices - flood resilient cropping, with the help of KVK experts and NGOs have created greater farm harvest.

Accessibility to internet facilities through affordable 4G cellular services have boosted overall awareness and on-demand information access.

Government subsidies along with peer to peer promotion has increased the usage of solar power for lighting needs.

Stronger community behaviour with increasing community based infrastructure and its usage in the locality.

Growth in household income through women entrepreneurship and promotion of local textile crafts through governmental initiatives and NGO workshops.

Say and do

Prime goal is to ensure and grow household income, doesn't mind shifting to newer sources of income by learning new skills.

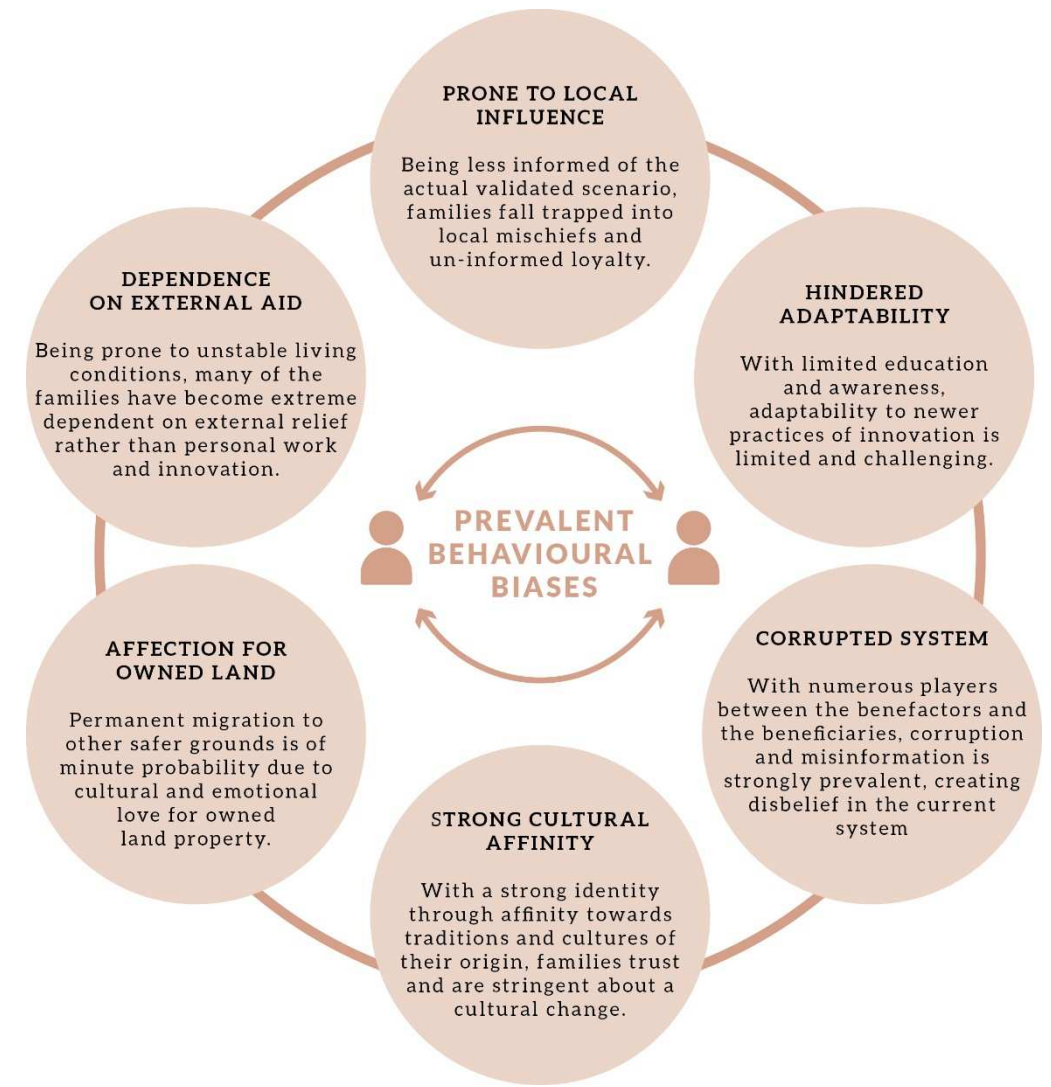
Aspires a greater role in formulating projects meant for local development.

Desire for pleasure is primal and doesn't mind dependency on external aid for the same.

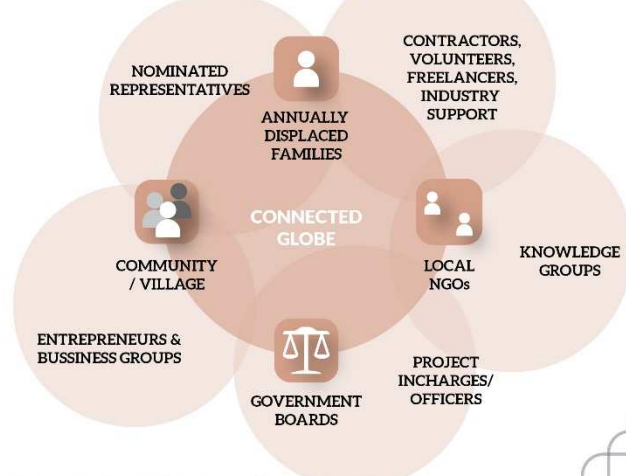
Looks for training opportunities in new business and skills for being market relevant.

Takes help from governmental schemes for product and market development.

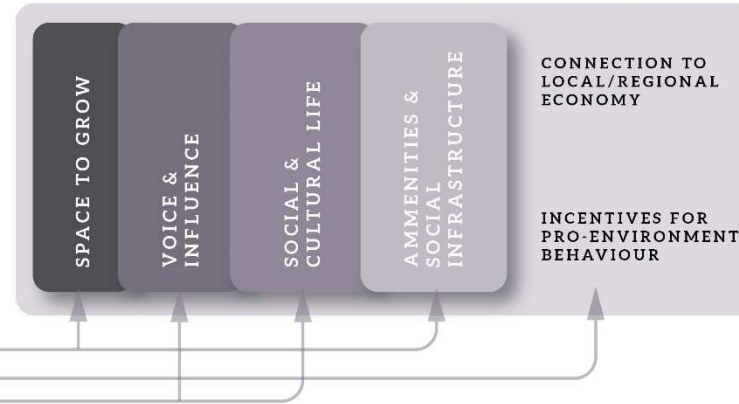
Looks forward to forming smaller partnerships and societal groups to facilitate resilience towards floods by improving collaborative income and individual household investment.



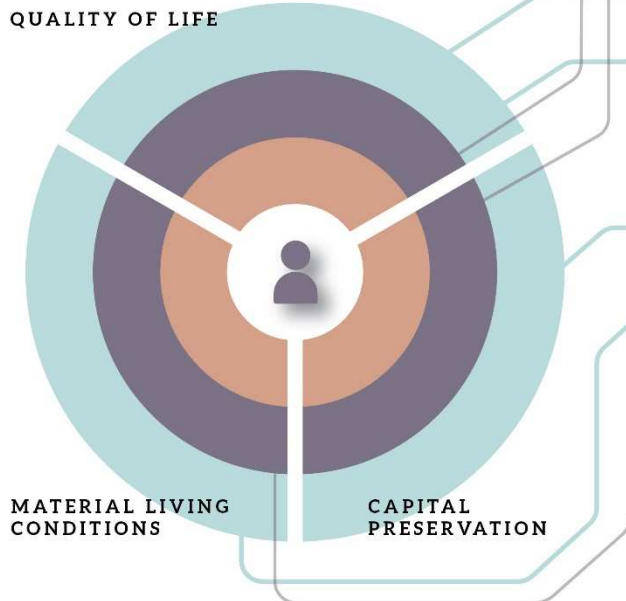
FIRST STAKEHOLDERS [REF: FIELD STUDY]



FRAMEWORK & FACTORS FOR SOCIAL SUSTAINABILITY [REF: YOUNG FOUNDATION, 2011]



FRAMEWORK FOR OVERALL WELL-BEING [REF: OECD, HOW'S LIFE?]



IDENTIFIED DESIGN DIRECTIVES WITH PRINCIPLES OF CIRCULAR ECONOMY



The following map highlights and focusses on connections between the primary stakeholders, factors for well-being generation and social sustainability, and the identification of directives for incorporating circular economic principles.

These directives further helps in identifying opportunities within the current scenarios and speculate future scenarios for design intervention.



LIVELIHOOD AND ECONOMY

LOCAL ECONOMY OPTIONS : Looking for opportunities for local employment of youth and prevent work-migration.

PROMOTION OF LOCAL MARKETS : Enhancing reach and facilitation of local produce to urban markets.

LOCAL INNOVATION HUBS : Local co-creation and co-innovation labs for market development.



INFORMATION AND LOGISTICS ISSUES

GENERIC AWARENESS AND CONSULTING : Awareness regarding government laws and emergency rehabilitation practices through digitization.

ENHANCE NGO REACH : Make people aware of the initiatives and activities of NGOs for training, rehabilitation and relief support.

FOR WELL-BEING LIVING

LIFESTYLE AND BEHAVIOR



KITCHEN FUEL : Building sustainable energy solution for cooking purposes.

ELECTRICITY AVAILABILITY AND AFFORDABILITY : Building sustainable locally managed electrical grid system.

LIGHTS : Emergency scenarios and throughout the year.

HYGENIC SANITATION : Cultivating practices for floods and dry scenarios.

GRAINS STORAGE : Developing community grain storage and insurance schemes.

FLOOD MITIGATION/ REHABILITATION PROBLEMS



MINI EMBANKMENTS : To prevent water flow current and soil erosion during floods.

SAFE HOUSE : For temporary shifting during minimum 2ft high floods.

WATER RESISTANT/WARM CLOTHES : For general wear during the floods / temporary shifting of residence.

BOATS AND MULTI-TERRAIN LOCOMOTION SUPPORT : For emergency mobility during floods.



NATURAL CAPITAL PRESERVATION



FLOOD RESILIENT CROPPING : Need to develop as a common kitchen gardening practice.

PREVENT PLASTIC PENETRATION : Need to reduce the plastic usage and disposal waste released to the natural environment.

PROMOTE USAGE OF FLOOD BYPRODUCTS : Need to see the flood leftovers as possible sources of resources.

POLICY INTERVENTIONS

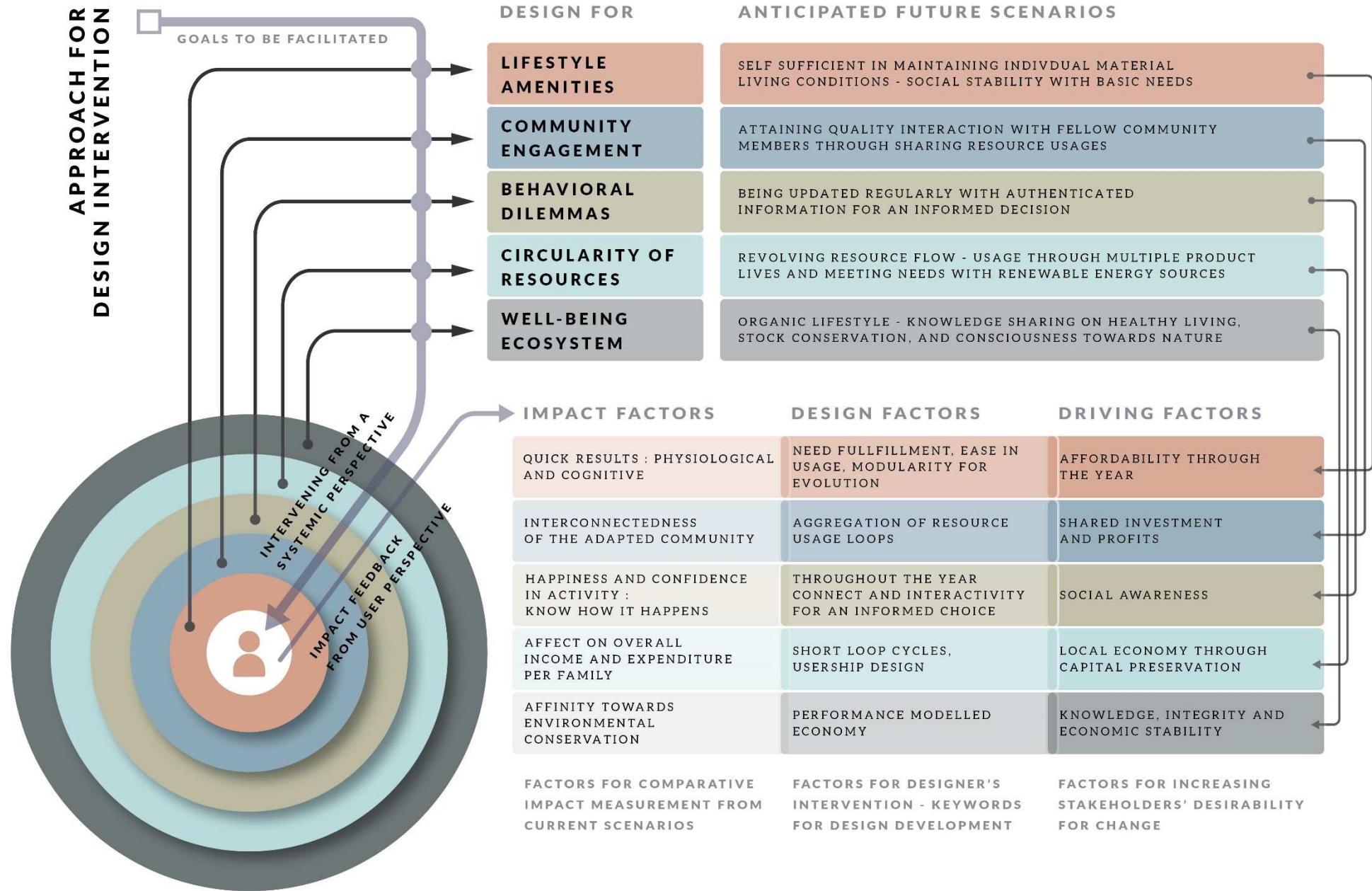


FAMILY LOCATOR: Identifying and locating families effectively for relief supply and intervention.

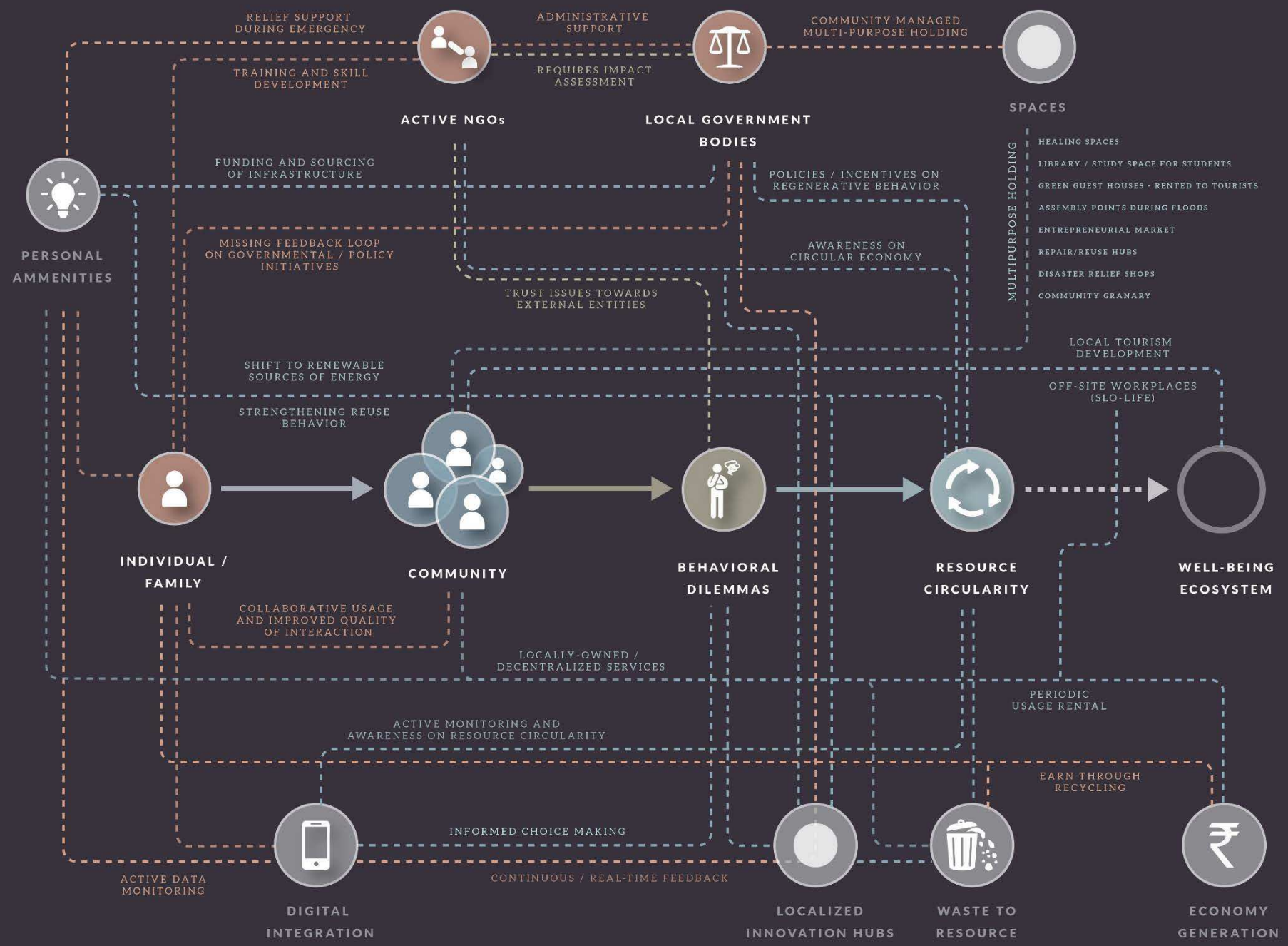
SKILL DEVELOPMENT FAIRS : Training and facilitation for development of local livelihood opportunities.

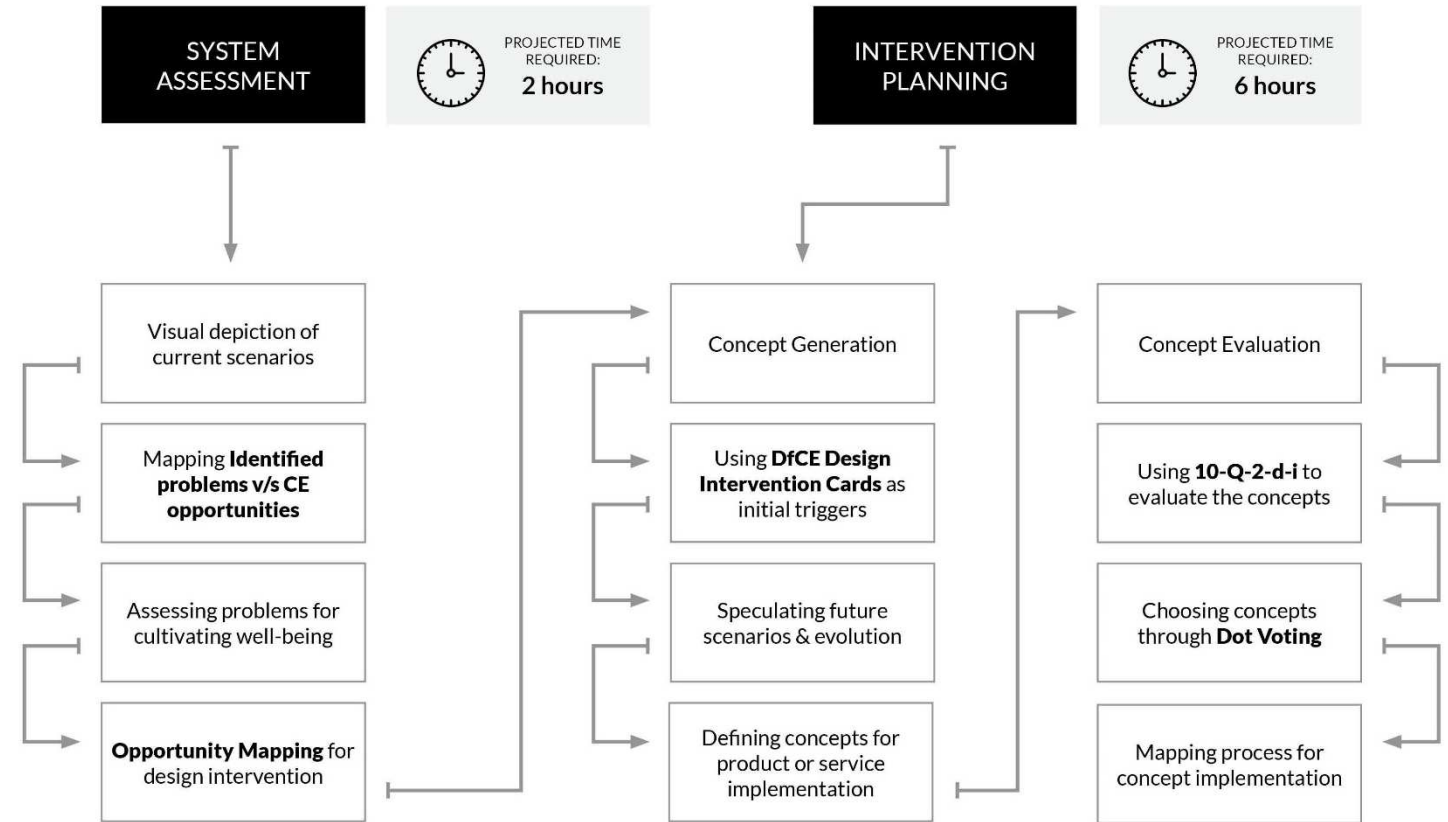
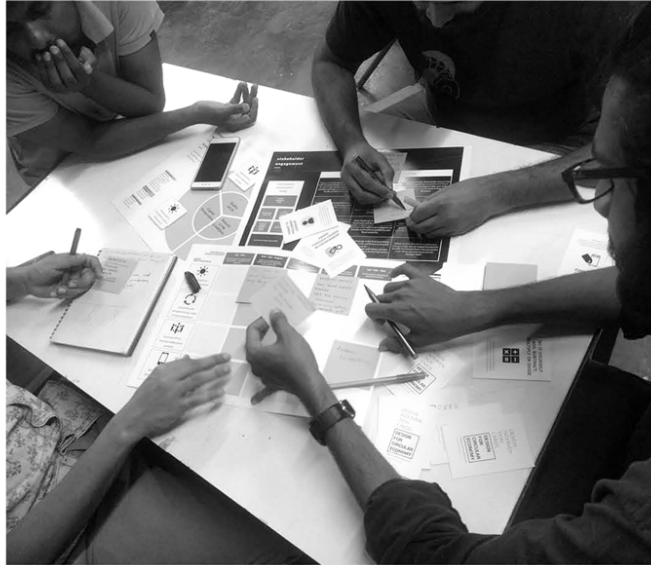
FEEDBACK MECHANISM : Looking for facilities for effective feedback collection post rehabilitation and infrastructure development initiatives.

TRAINING ON USAGE : Usage processes needs to be taught to the fellow users and assessed regularly for improvement opportunities.

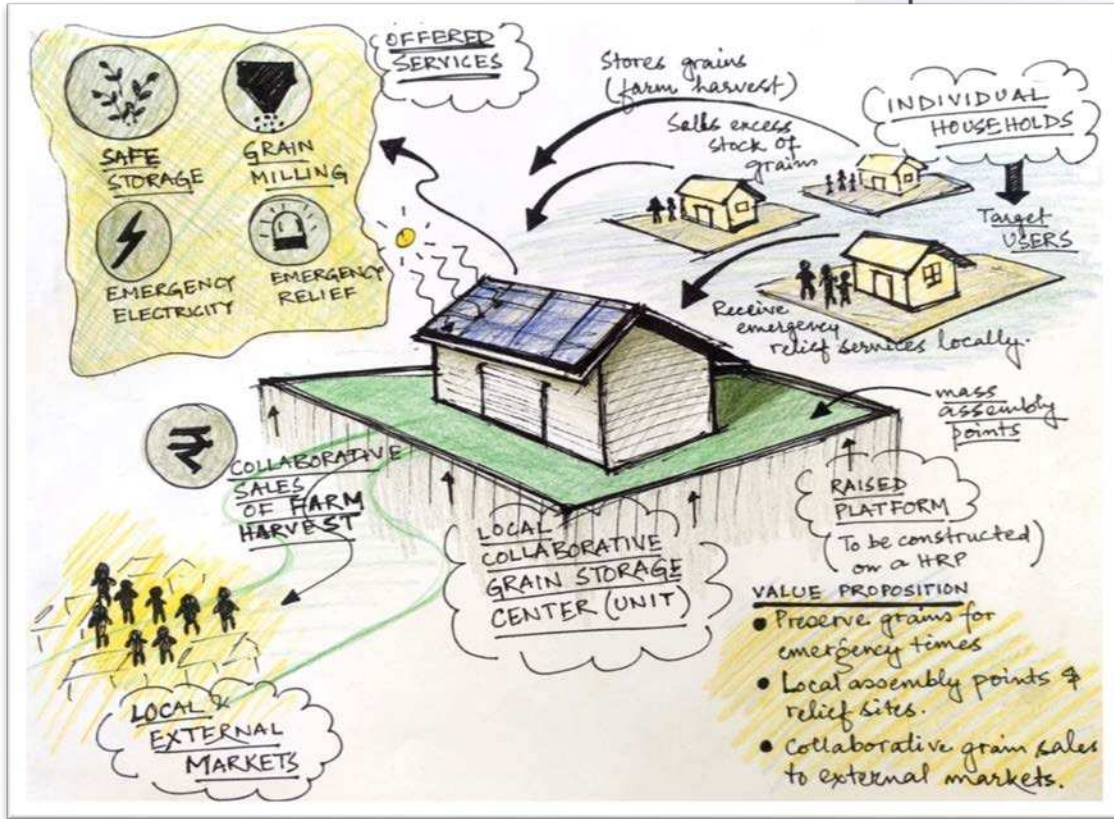


**LEVERAGE POINTS
IN THE SYSTEM**





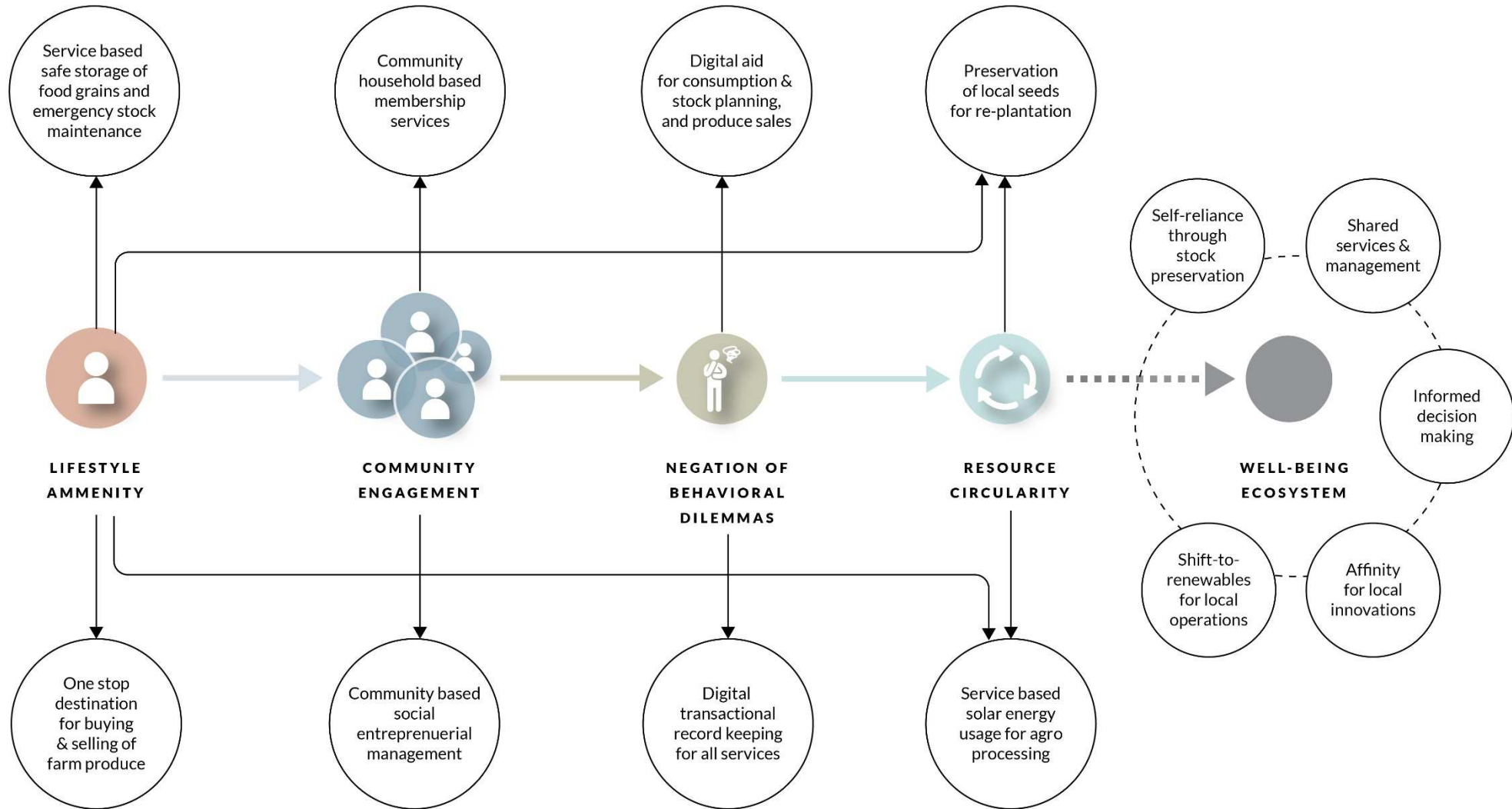
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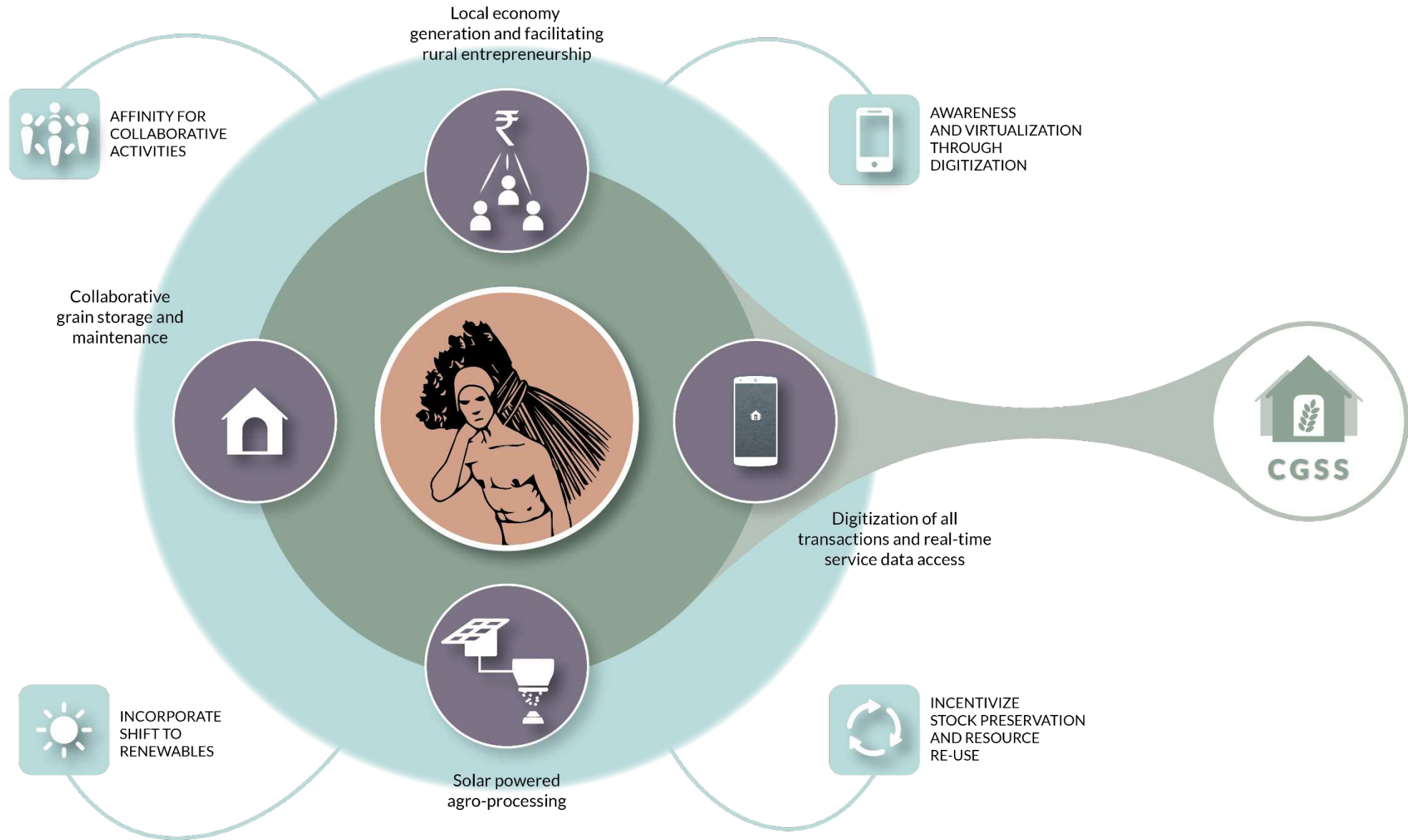


project - Cultivating well being through circular economy.
 Bhaskarjyoti Das, National Institute of Design, Ahmedabad

Stakeholders	Ideology or Philosophy	Projected future scenario	Anticipated impact
<ul style="list-style-type: none"> Flood prone families of Assam Local panchayat Farmer's Club NGOs Disaster Management Authority District administration 	<ul style="list-style-type: none"> To create self-reliance for food and energy at all times To ensure a socially sustainable lifestyle through circular economy. 	<ul style="list-style-type: none"> Flood resilience through user's local behaviour Effective and regenerative farming practices. Higher household livelihood/income 	<ul style="list-style-type: none"> Higher livelihood and resources through effective planning. Higher community collaboration Shift-to-renewable social sustainability
Need	Collaborative Grain Storage and relief services System		Feel
<ul style="list-style-type: none"> Counter loss of stored grains due to poor storage Reduce dependence on external aid through self-reliance for food and energy Effective sales of harvest devoid of loss 			<ul style="list-style-type: none"> Self-reliance Sense of personal security Inspiration for local innovation Higher know-how and information on demand.
Circularity	Production	Evolution	Narrative
<ul style="list-style-type: none"> Preservation of capital stocks — food grains & farm harvest Collaborative sales & resource usage Shift to renewables and digitization of transactions 	<ul style="list-style-type: none"> Local employment for construction and business Strengthening local markets' connections to external markets 	<ul style="list-style-type: none"> Network of self-managed relief sites. Network of CGSS sale points Replicability of model with population rise 	<p>Farm harvest can be stored safely and can be easily accessed during times of flood. It's users local center for harvest storage, sales and processing</p>

Collaborative Grain Storage and Service System





The future speculations in consideration

Aligning the design intent and brief to the current context scenarios, here are some of the basic considerations and future speculations which are identified and on the basis of social, economical and technological factors observed in the field.

Speculation 1

Majority of the population in the field use smartphones or have the highest affinity to use one.

Supporting factors: Growth in affordable 4G cellular services, usage of and familiarity with multilingual social networking applications, Indian Government's Digital India initiative.

Speculation 2

Workshops by NGOs and rural development initiatives by the Indian Government have been instrumental in awareness generation and promotion of local innovation.

Supporting factors: Growth in entrepreneurial activities (SHGs and women entrepreneurship) and promotion of indigenous crafts and innovations through governmental trade fairs and exhibitions.

Speculation 3

Flood resilient cropping, and soil based innovative cropping is gaining momentum and being heavily practiced and facilitated by agricultural research institutes along with NGOs. However this is increasing the need for improved irrigation during the winter seasons.

Supporting factors: The affinity for Boro Dhan (summer paddy) over Ahu Dhan (autumn paddy) is growing for its higher productivity. Bao dhan (deep water paddy) is also finding preference due to its deep water cultivation methods surpassing the threat of early floods and cultural cropping affinity.

Speculation 4

Flood resilient infrastructure development including toilets, water stations, shelter homes and high-raised-platforms are being built with appropriate funding from the government, CSR activities through NGOs and rural banks.

Supporting factors: High raised platforms and shelter homes along with drinking water stations and public toilets are constructed by IGSSS in several villages of Lakhimpur district. The Assam State Disaster Management Association has also called for open collaboration to transform the flood prone villages of Assam to flood resilient villages.

Speculation 5

The young population in the flood plains enjoy easy mobility and connectedness to urban centers and have increasing awareness on local/state affairs and access to knowledge, innovations and new markets through the internet.

Supporting factors: Gradual return of migrated men to explore entrepreneurial activities in the local vicinity, sudden increase in cellular network based internet subscribers and increase in e-facilities and e-services by government through its Digital India initiative, development of local web-based music and film-making industry.

Grain preservation for times of flood, best market sale of excess harvest, shift to solar energy for agro processing



সামবায়িক শস্য সংগ্রহশালা
Collaborative Grain Storage System



Mobile application assistance to plan post-harvest consumption pattern, and offered service know-how, ready digital access to all transactional and service information

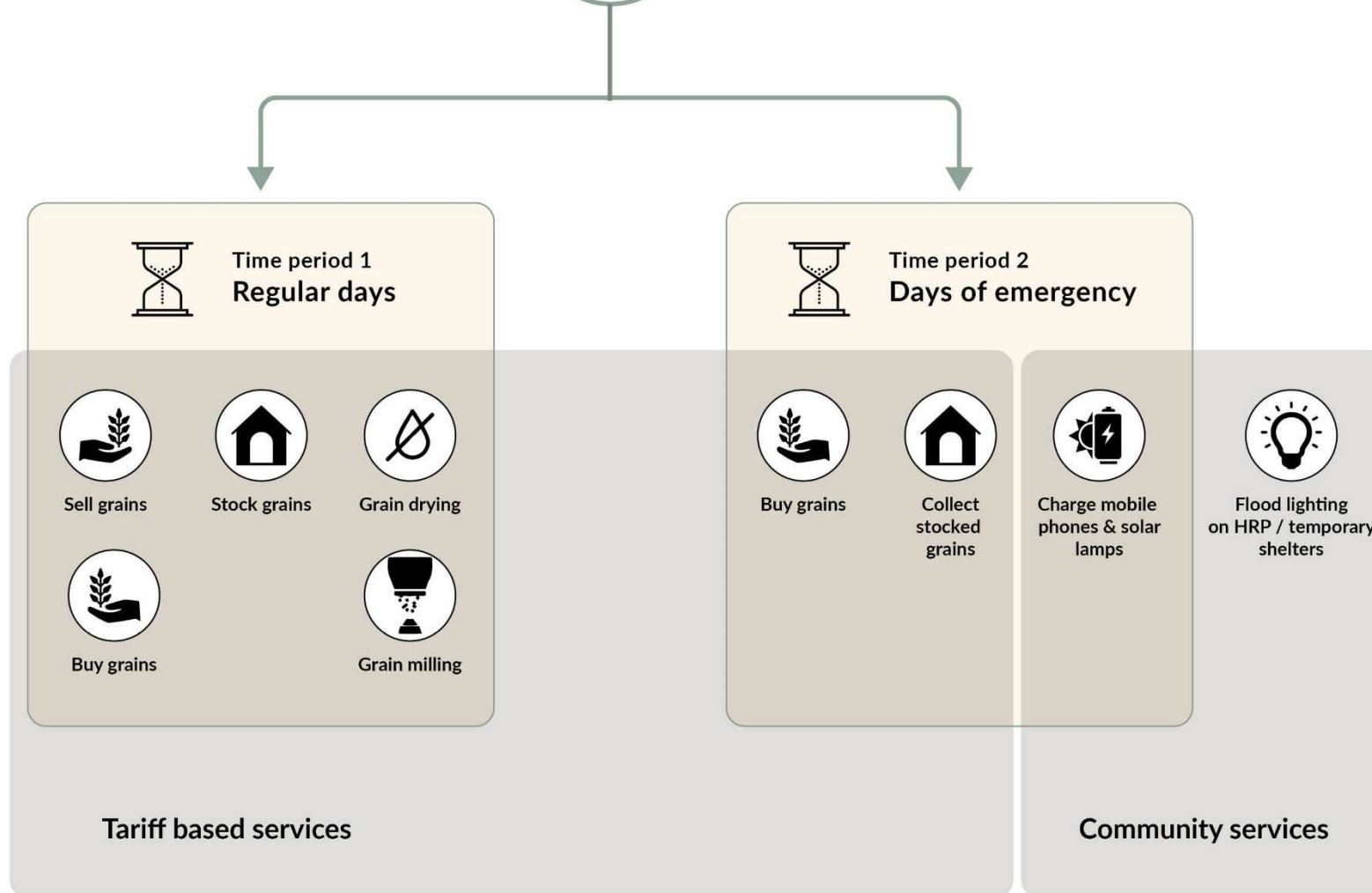


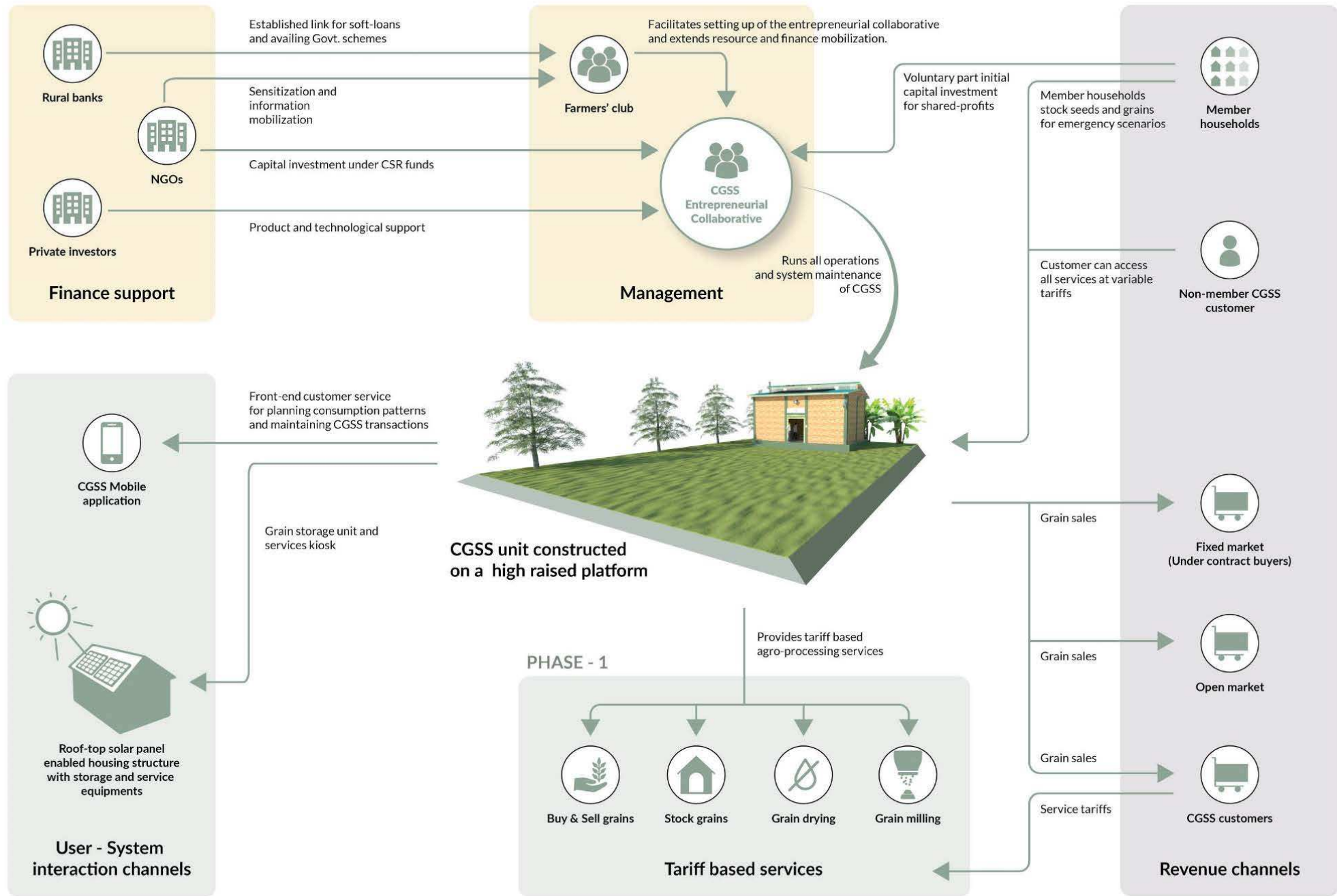
Local units/centers for collaborative grain storage, sale and buy point for grains and agro-processing of produced harvest

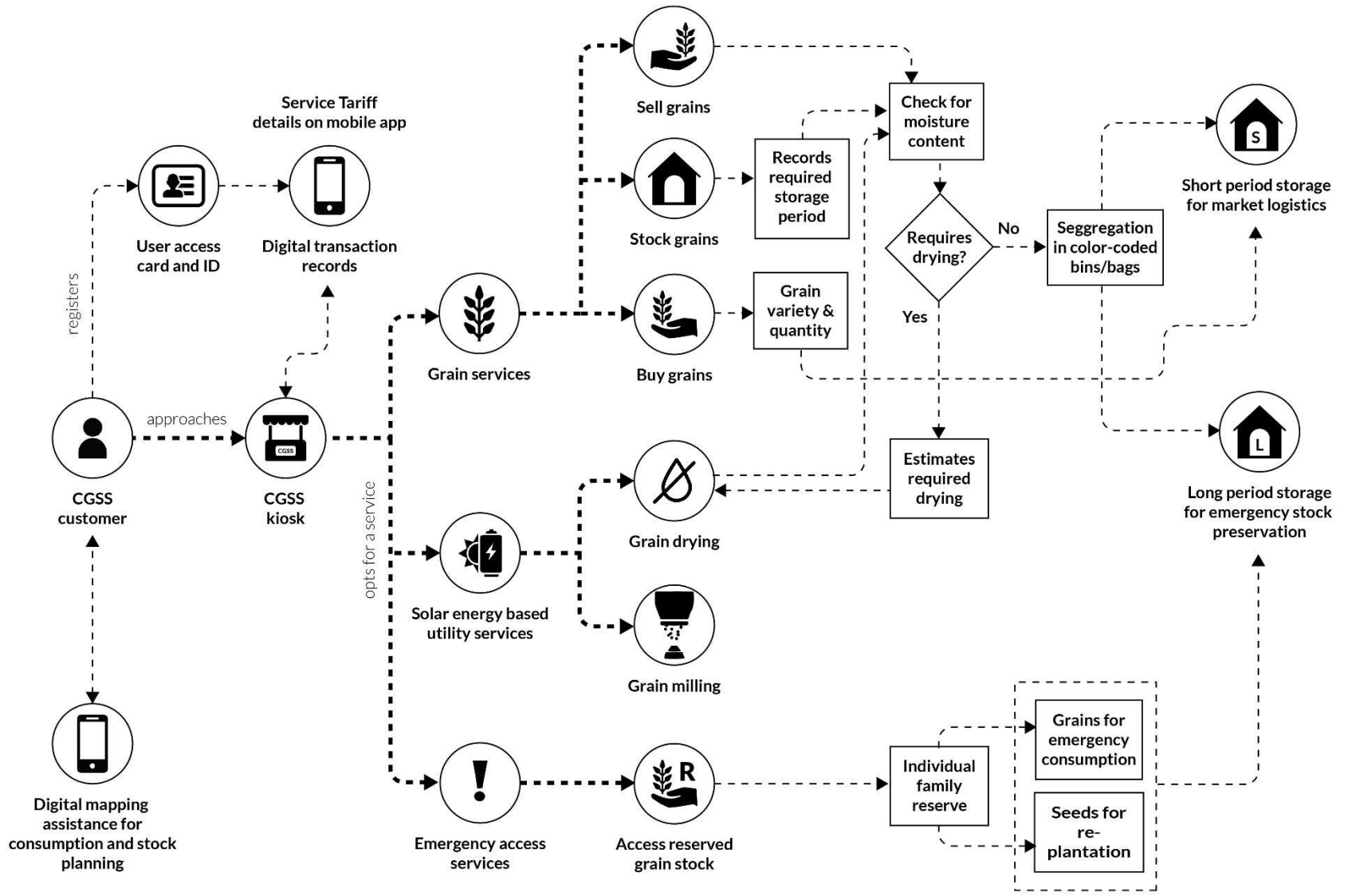


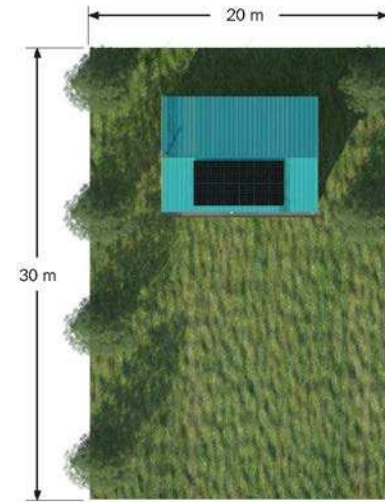
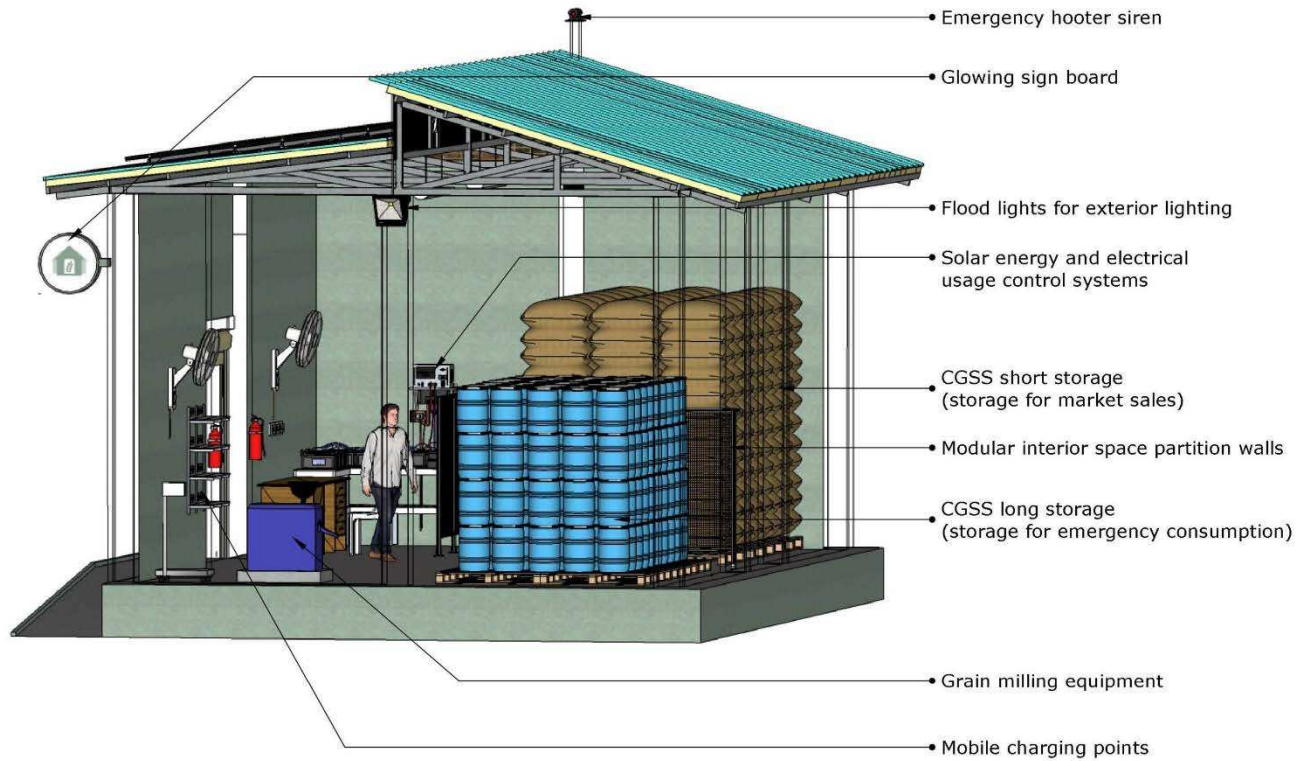


CGSS Services

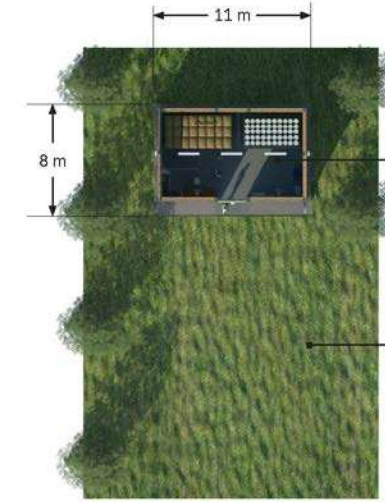








Top view of CGSS unit on a HRP



Top view of CGSS unit on a HRP displaying its interior space without roofing

CGSS storage and service unit

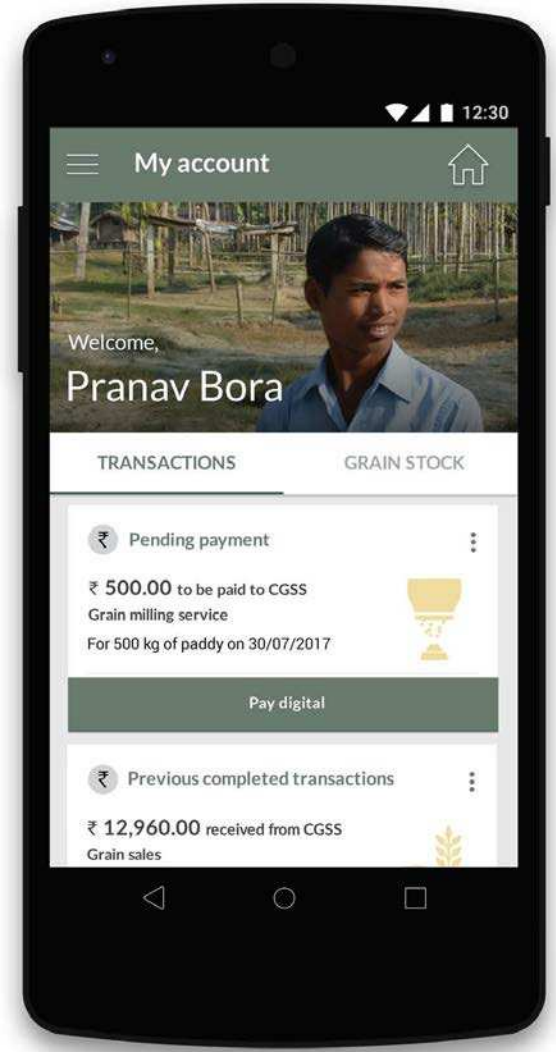
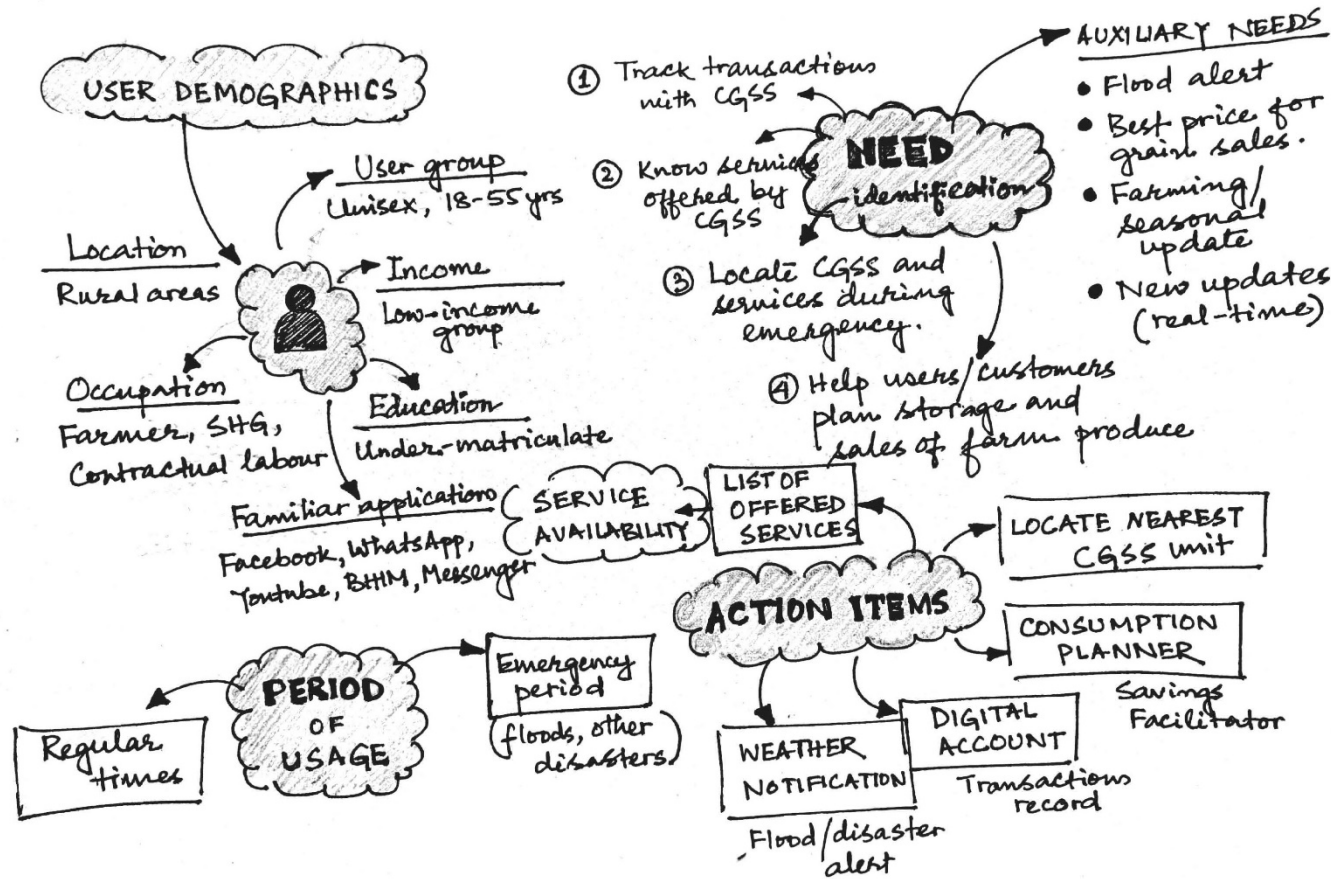
Assembly site and open space for temporary relief shelter construction

Solar based grain drying area during regular days

Multipurpose space utilization for community infrastructure: emergency shelter homes, public toilets.



CGSS Customer Portal



My account

Customers with a Customer ID and Password issued by CGSS can access their transactional details through the My account interface. This service requires pre-registration of the application user as a customer of CGSS. The user registers himself the first time he/she visits a CGSS unit and performs a transaction.

CGSS services

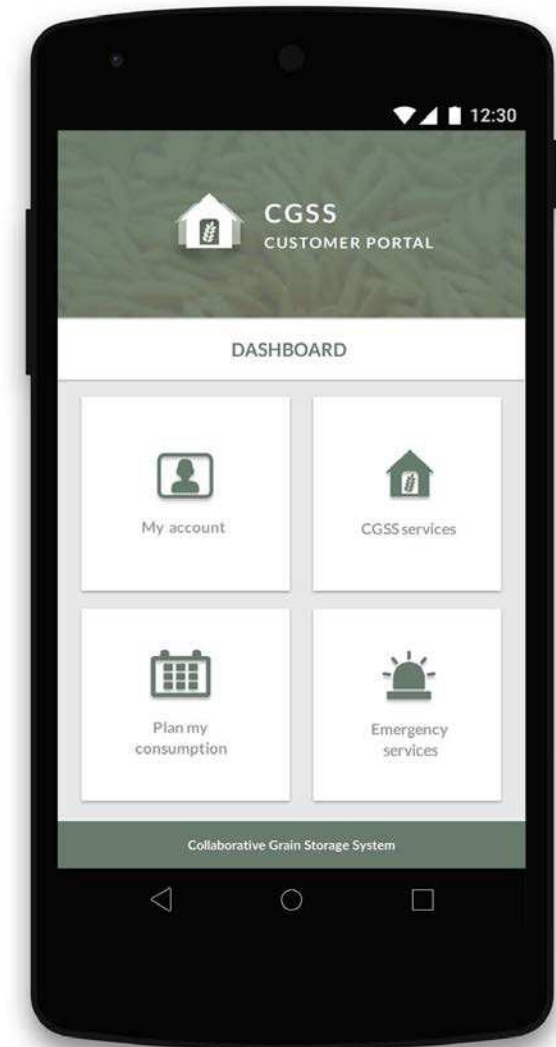
CGSS services can be accessed without Customer login. This task interface allows user to search and know the services offered by CGSS, unit wise in real-time. The units can be either searched by unit name or unit ID or located in the vicinity through the drop down menu.

Plan my consumption

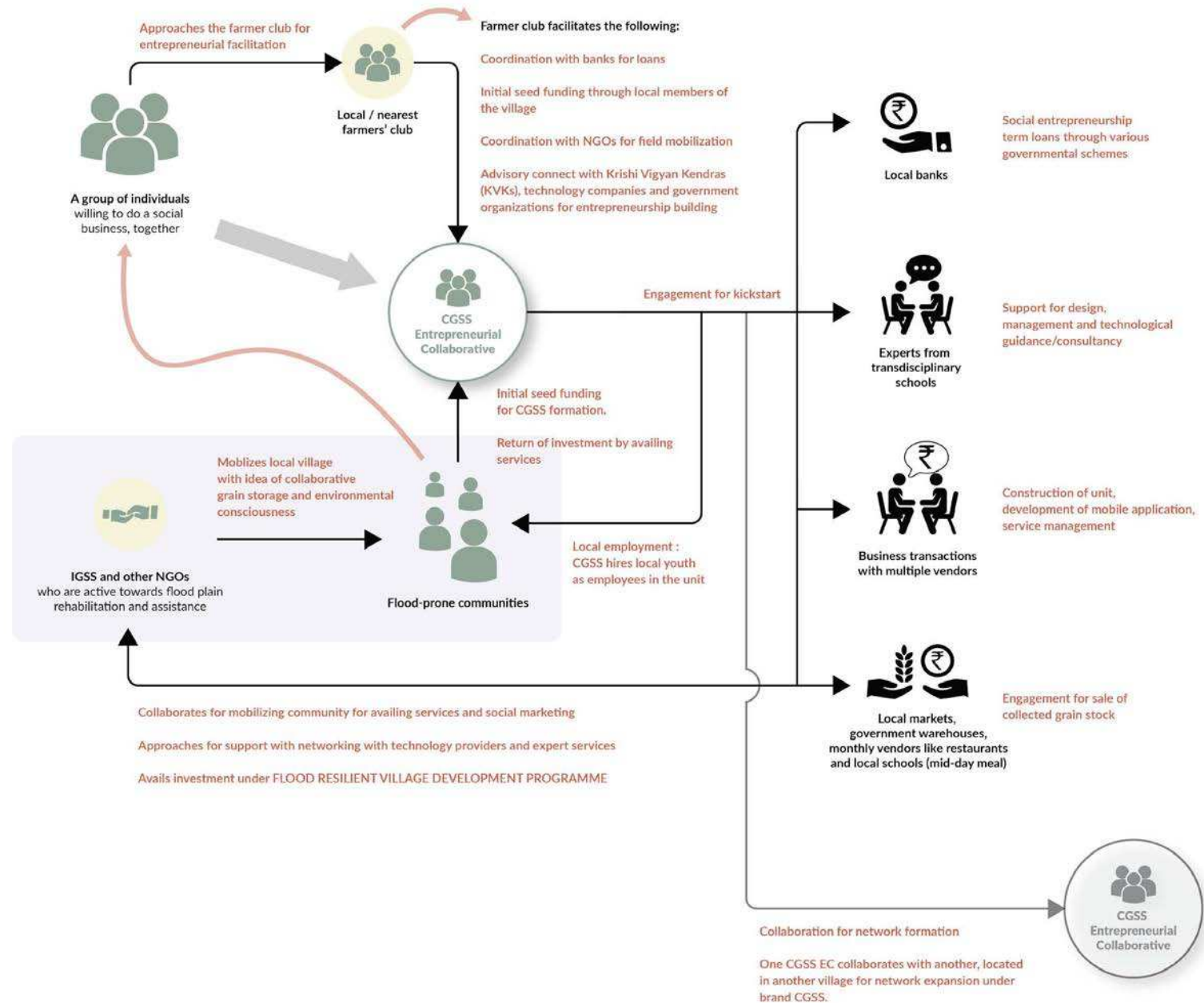
An user can plan his consumption of produced grains through this service. The user answers a few questions to generate his/her personalized plan for CGSS grain storage, amount of grains saleable to the market and the prospective revenue that can be generated through the plan. The user can further share this plan through multiple mediums.

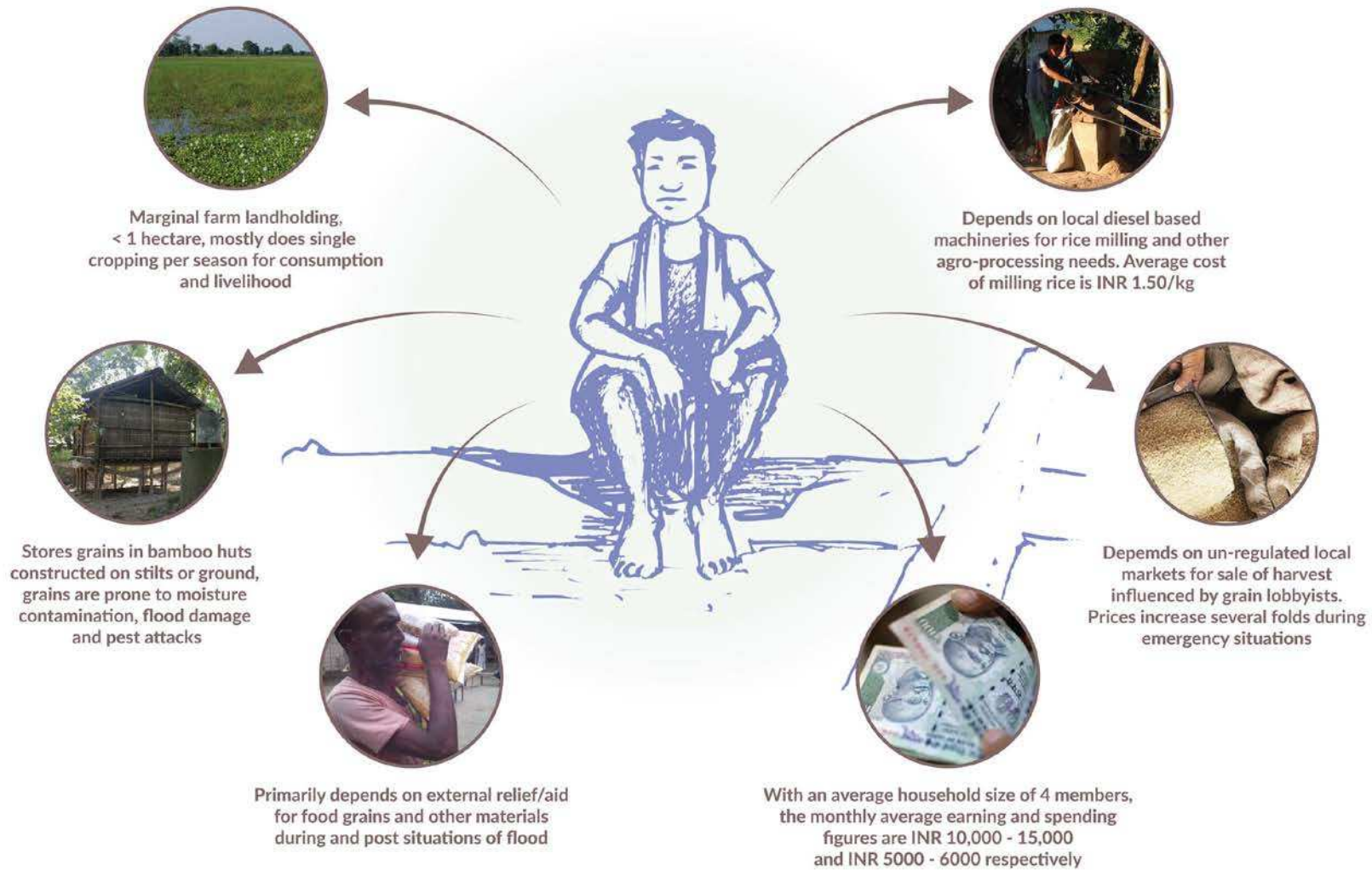
Emergency services

Emergency services are activated in times of emergency like floods and other disasters when availability of food, energy and other relief materials is of priority. Assisting the user to the nearest CGSS unit through location mapping, this interface aids in knowing the services, availability, tariffs and other information available at the selected unit, dedicated to the emergency period.



On-field Implementation Plan







Insured safe storage of produce for emergency needs

"I can rest assure that I have saved food stock for my family for any crisis"



Transparent and best price selling and buying of grains

"I can sell my produce at the best possible market rates and need not fall into the manipulation of the grain market brokers"



Affordable and environment safe agro-processing

"I can dry and mill my paddy at lower tariffs, I know that solar power is saving a lot of diesel and causing less pollution"



Charge mobile phones during emergency

"I can easily charge my cellphone at CGSS units during floods and stay connected with relatives"



Non-dependence on external aid

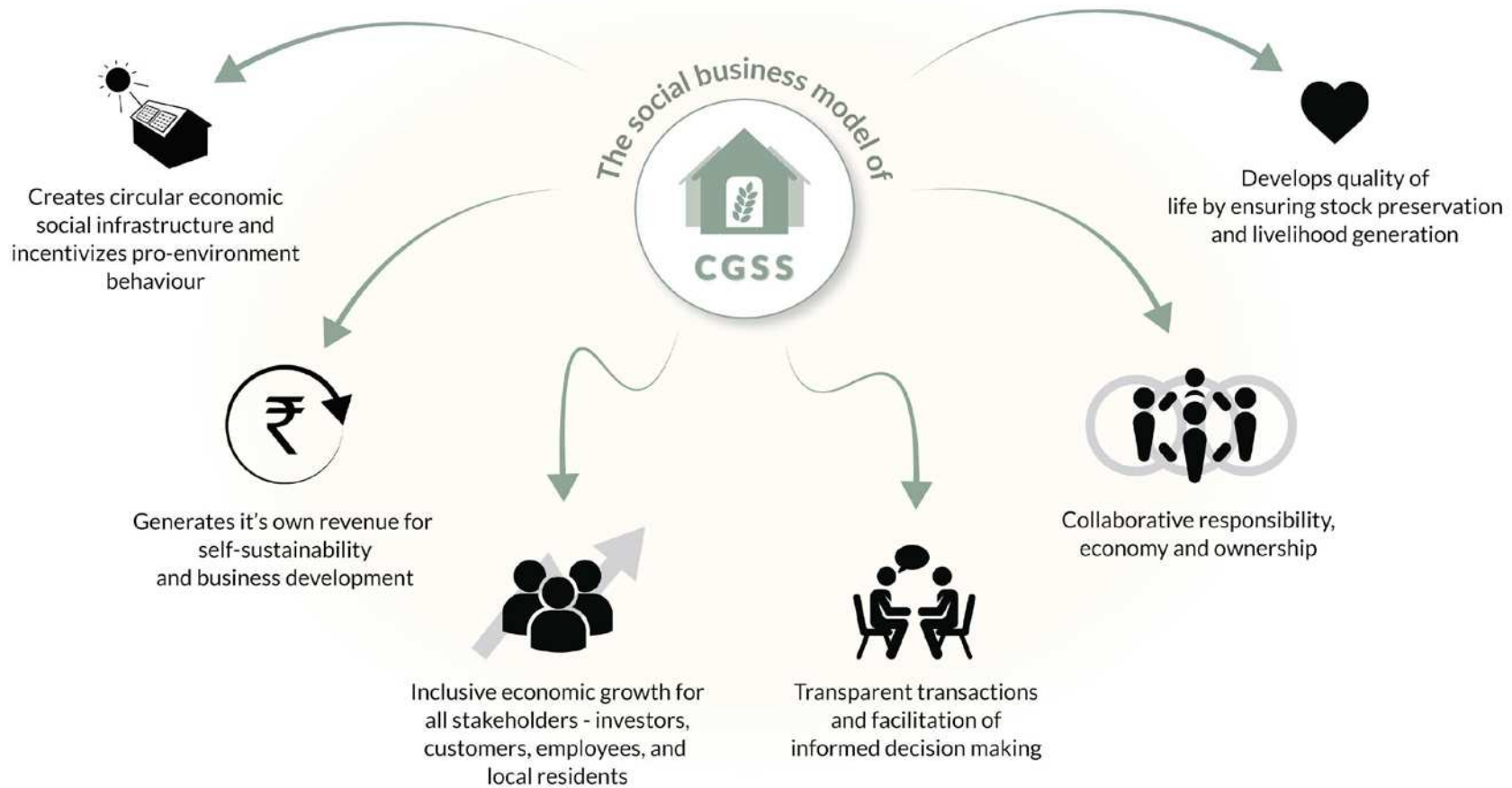
"I no longer have to depend on NGOs and government for relief during floods and can take care of my food and energy needs"



সামবায়িক শস্য সংগ্রহশালা

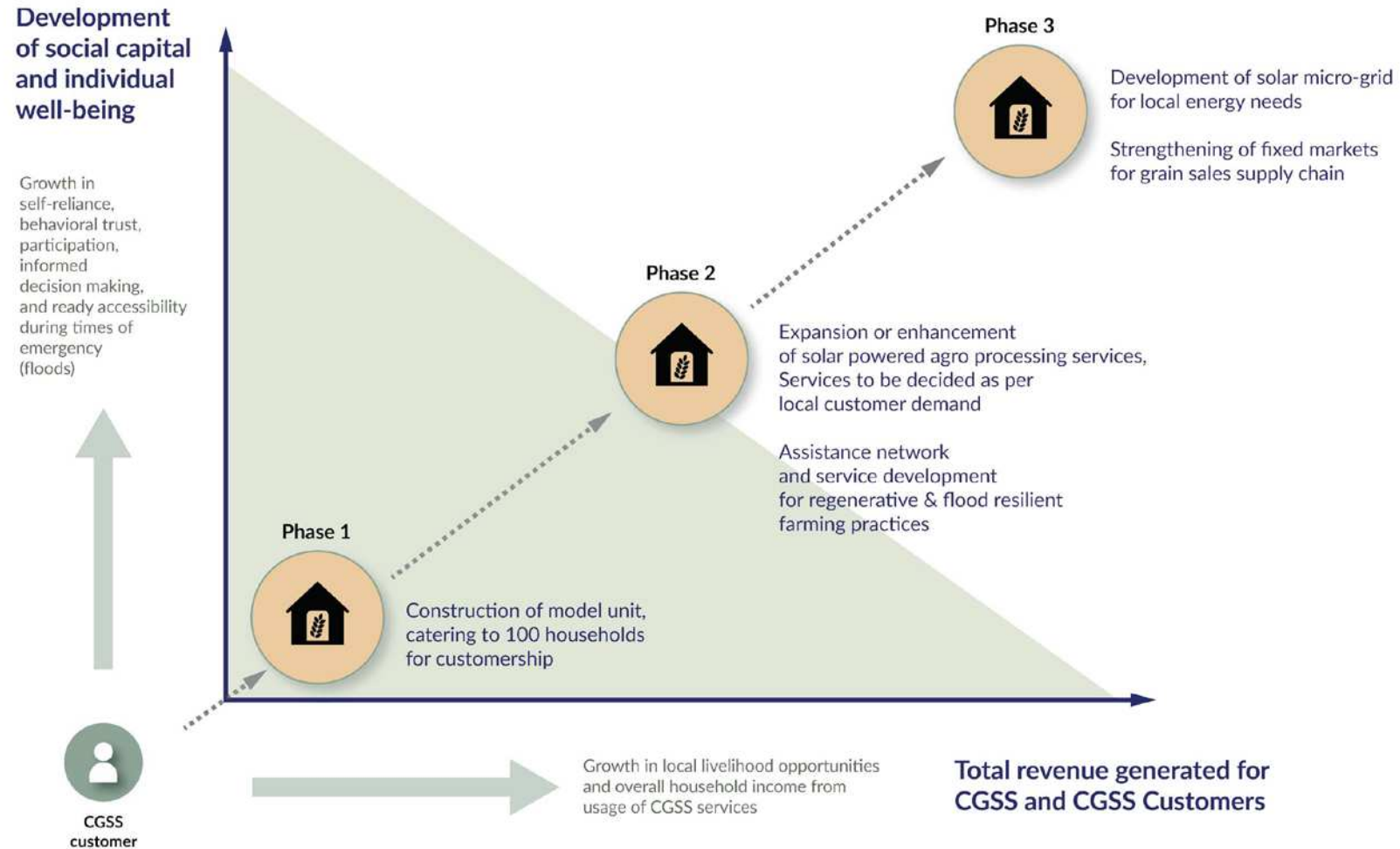
Collaborative Grain Storage System





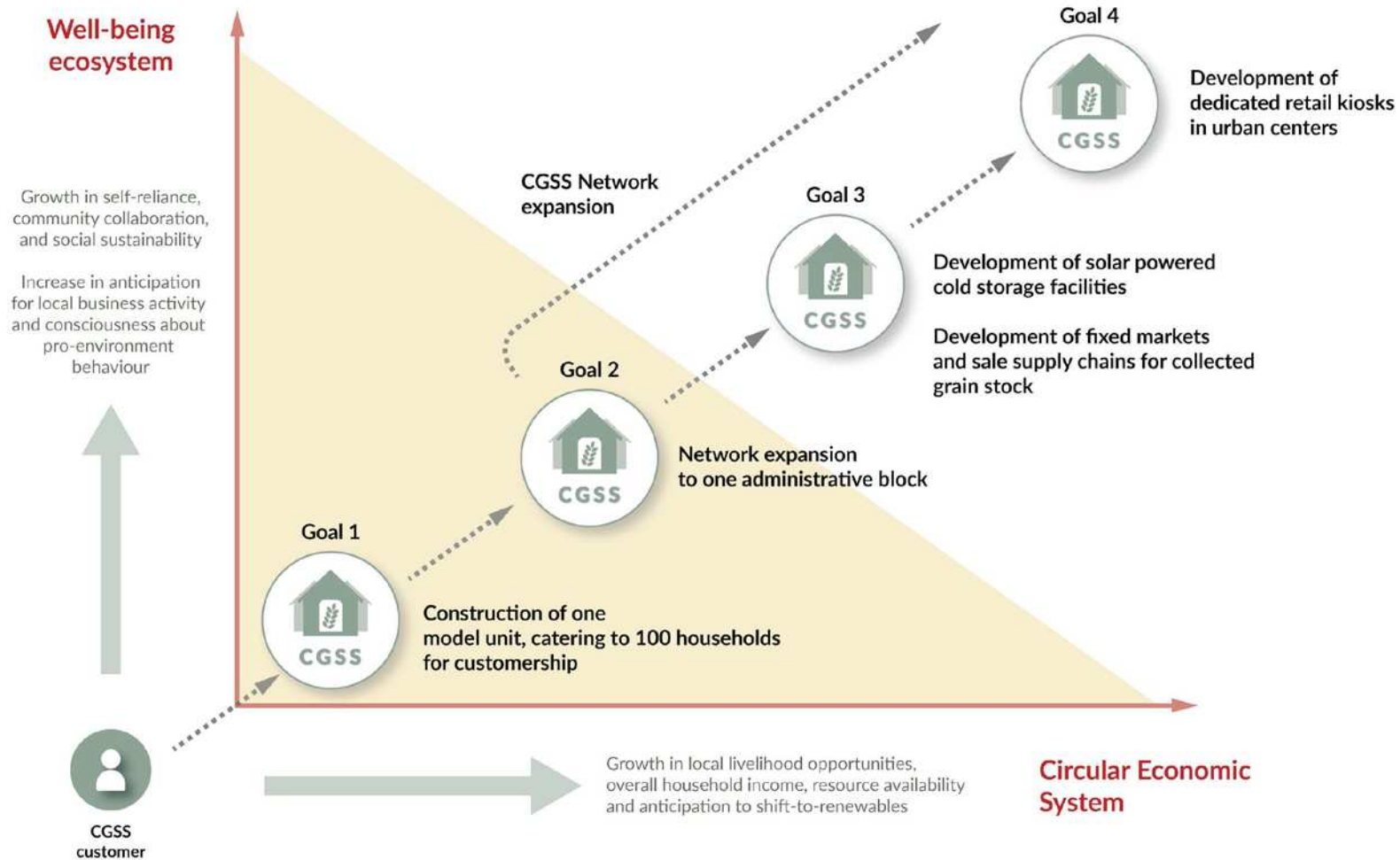
Evolution map 1

Evolution of a CGSS Storage and Service unit after it has started business



Evolution map 2

Evolution goals of the concept of CGSS towards ecosystem creation



This project is a work-in-progress

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This project is a work-in-progress and invites collaborations to design a resource-effective tomorrow. Let's create together.

Thank you for your interest.



Bhaskarjyoti Das

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