



**Climate Smart  
Forest Economy  
Program**  
Unlocking Forests' Potential

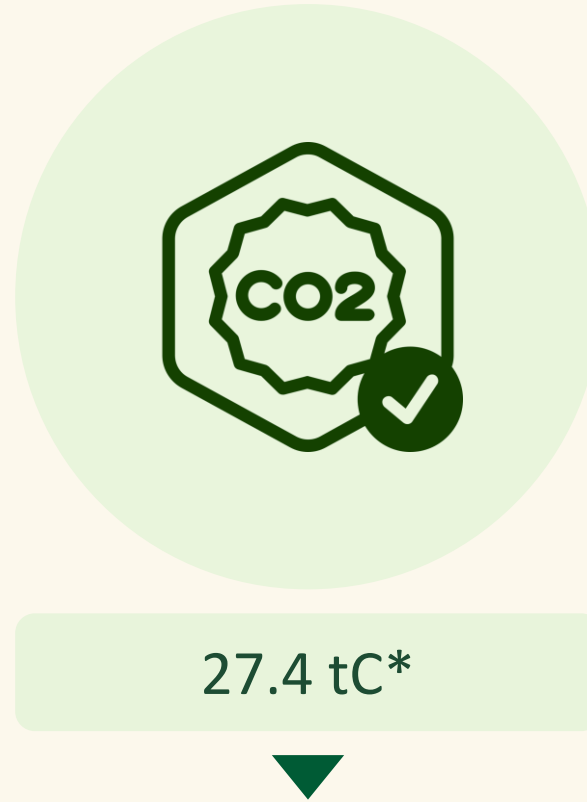
# Climate Smart Forest Economy Program

AGA KHAN AGENCY FOR HABITAT (AKAH)

CASE STUDY

AUGUST 2022





THE HYBRID HOUSES being built for this project will lead to a net sequestration of ~27.5 tC from the atmosphere, and initiatives supporting the use of scrap wood could add an additional 2.9 tC to the carbon stored



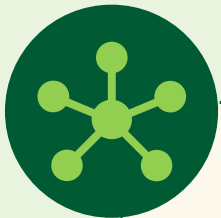
## WORKING ALONGSIDE COMMUNITIES

The Climate Smart Timber Housing for Low-Income Communities in Gujarat initiative aims to work with local communities to redesign housing opportunities and shift to constructing sustainable and locally produced hybrid (sandstone and timber) houses.



## AFFORESTATION

Demonstrating sustainable community management of forests and agroforestry through community participation and by integrating afforestation research from AKAH India.



## KNOWLEDGE SHARING

Knowledge sharing on Climate Change Mitigation through the breakthrough initiative with demonstration of climate smart timber homes and sustainable forest management.

DRIVEN BY



**AKAH HAS BEEN LONG BEEN PROVIDING RESOURCES IN INDIA,** their main objective is to address the challenges brought about by the increasing number of natural disasters in low-income and disaster-prone regions

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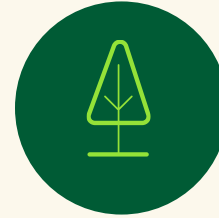


**IN GUJARAT, AKAH AIMS TO REDESIGN HOUSING OPPORTUNITIES** by using timber in their rural housing projects and making use of local community managed forests to benefit both the forest and housing communities, while creating climate and economic value

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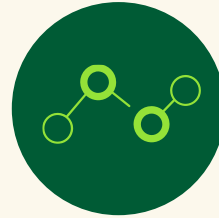


**BY BUILDING CLIMATE-SMART ECONOMY, AKAH WILL BE REDUCING EMISSIONS** in the construction industry as well as increasing forest cover, and in turn, assist in moving India closer to meeting the country's NDCs



**THE ORGANIZATION SUPPORTS COMMUNITIES IN INDIA** build affordable climate-resilient homes and implement reforestation projects

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**LEVERAGING THE 3S FRAMEWORK (SINK, STORAGE, AND SUBSTITUTION)** CSFEP's collaboration with AKAH, will present an opportunity to multiply social and climate benefits

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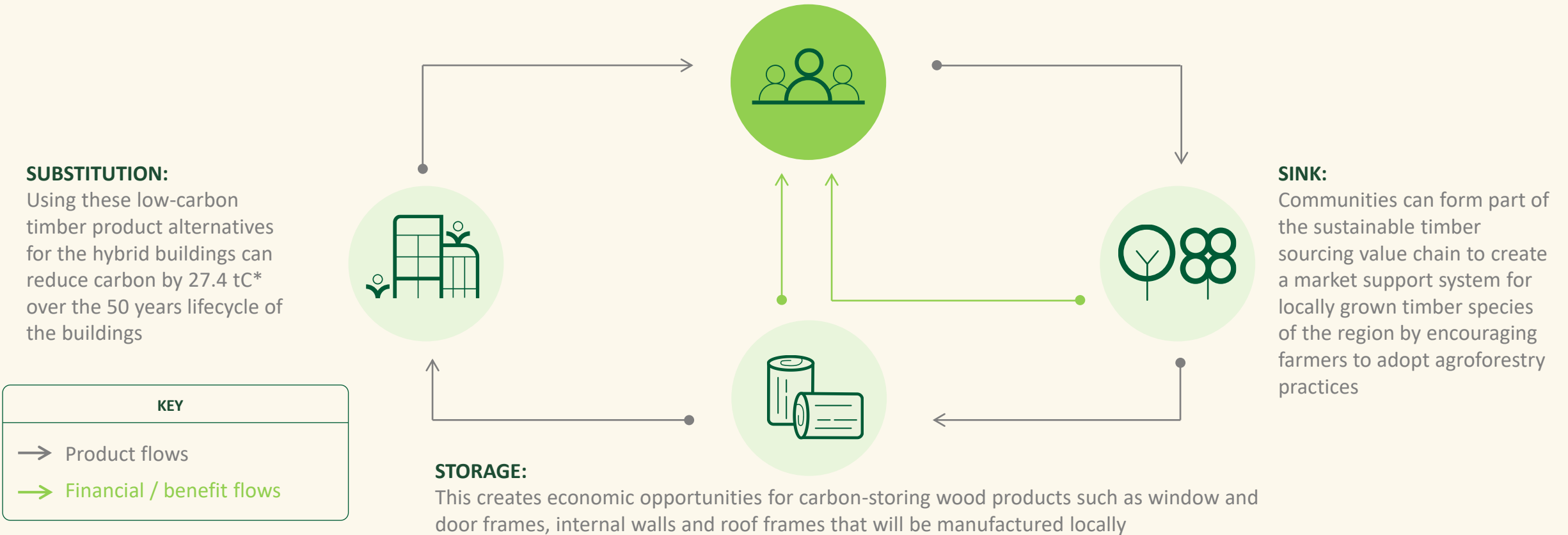
**THIS RESULTS IN 27.4 TC\* BEING SEQUESTERED, STORED, AND SUBSTITUTED** across these activities over the 50-year lifespan of the four hybrid houses being built

*\*All values were calculated for the construction of four houses, however, only three houses were constructed because of supply disruptions*

# THE AKAH STORY

Through the development of a local climate smart forest economy (CSFE), and leveraging the 3S framework, AKAH can reduce emissions in its construction activities and engage communities through afforestation.

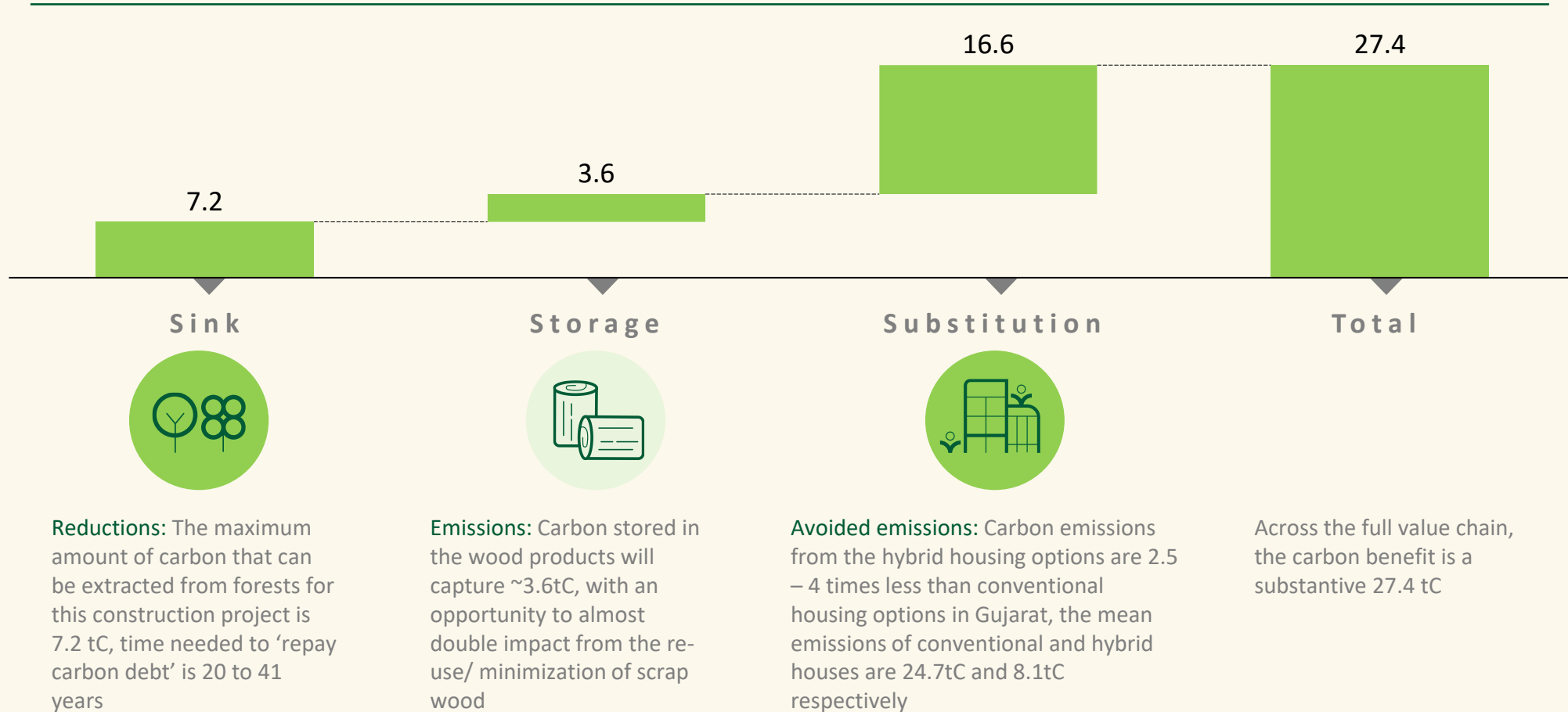
AKAH works with local communities in Gujarat, India



\*All values were calculated for the construction of four houses, however, only three houses were constructed because of supply disruptions

Over the next 50 years, this project will lead to a net sequestration of 27.4 tC from the atmosphere, the most impactful area is in substituting conventional houses

## Estimated C reductions and emissions by function over the 50-year period (tC)\*



\*All values were calculated for the construction of four houses, however, only three houses were constructed because of supply disruptions

# LEVERAGING KEY PARTNERSHIPS, AKAH HAS SUPPORTED THE DEVELOPMENT OF A CSFE ACROSS THE 3S FRAMEWORK COMPONENTS

## KEY ACTIVITIES

## PARTNERSHIPS



### SINK

AKAH has supported research identifying sustainable timber sourcing potential for their housing project, particularly on the availability and potential of local timber species.

In the future, AKAH will conduct a similar exercise for bamboo to initiate and support bamboo agroforestry.



They supported consultations with local stakeholders conducted by Preferred by Nature (including Gujarat State Forest Department, growers, and community members). They are also exploring a partnership with the Gujarat State Forest Department.



### STORAGE\*

AKAH will partner with institutions working in bamboo-based industries that have demonstrated a history of creating value chains in local communities.



They are developing a partnership with the Centre for Indian Bamboo and Resource Technology (CIBART) and Architect Neelam (an expert in bamboo construction) to create a bamboo-based value chain which includes equipping themselves and the community with knowledge on how to treat bamboo for use in construction.

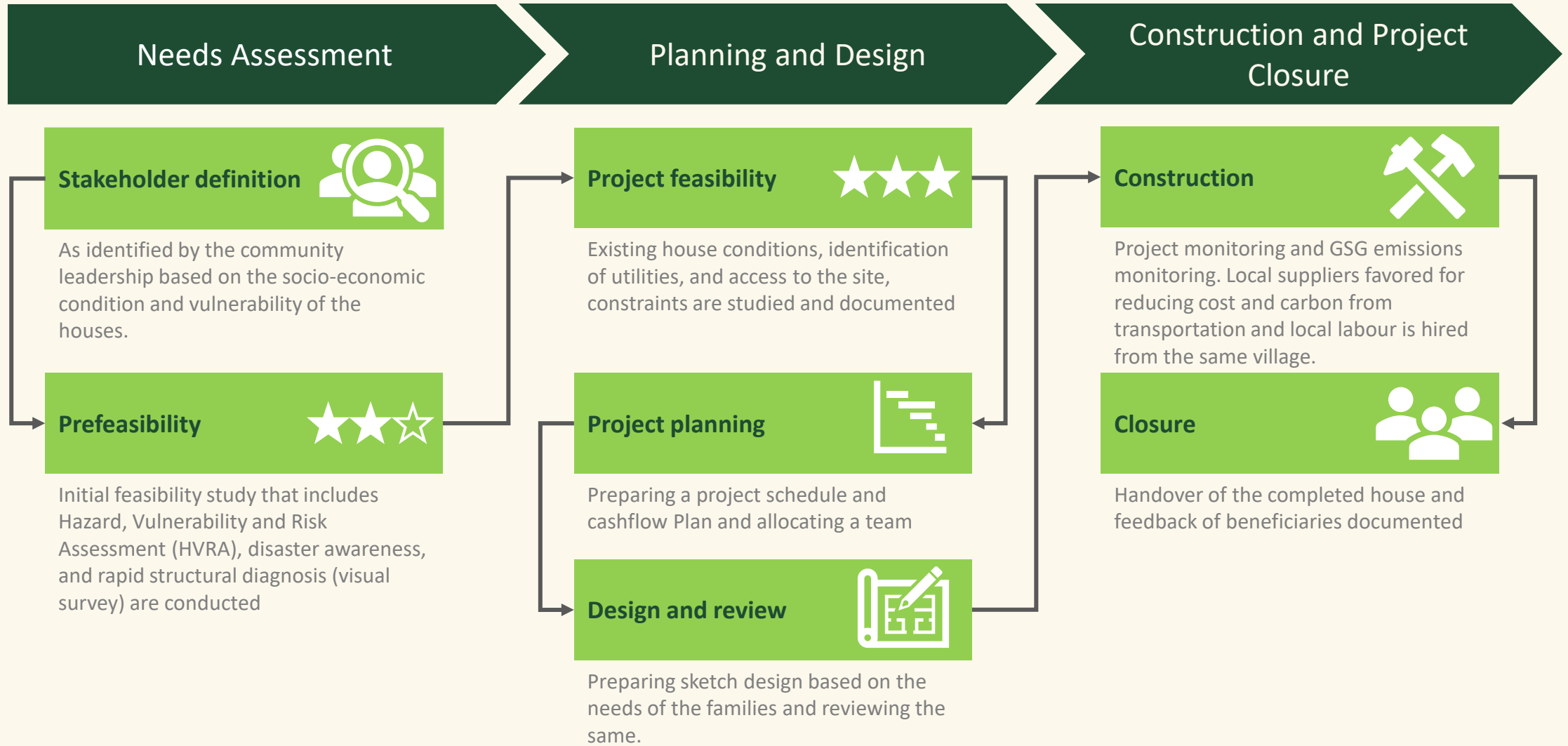


### SUBSTITUTION\*

AKAH will train masons from the community in bamboo construction. The agroforestry and construction will form part of the local bamboo value chain they are creating.



Local masons will be trained with the help of industry expert Architect Neelam.





# HOW CAN WE LEARN FROM AKAH TO REALIZE CLIMATE-SMART FOREST ECONOMIES LOCALLY?

Other factors that have contributed to AKAH's success include:

FACTOR	HOW AKAH ENSURED THIS
1 Capacity building of team in timber construction	Built capacity within AKAH team members in using timber as a construction material through working with experts. Further training is planned to build capacity in bamboo construction
2 Reintroducing timber for construction within community	The design of the pilot project was developed through community participation where the design, objectives, and benefits of the pilot were explained to the community, and inputs were taken in designing the spaces from them.
3 Identification of local timber species	Facilitated stakeholder consultation for research in local timber species and conducted strength tests which identified suitable timber that complies with construction codes.
4 Promoting Agroforestry ( <i>future</i> )	Promoting agroforestry as a material source through the capacity-building workshops that will be conducted
5 Livelihood generation ( <i>future</i> )	Creating bamboo based value chain through workshops and developing a program in partnership with other organizations and the community

AKAH's central focus, and greatest success factor, has been identifying suitable native timber species for construction, identifying existing markets in other regions of the country to promote timber agroforestry, and showcasing the use of timber in pilot projects, thereby reintroducing timber into construction after the ban on its use

- The agroforestry sourcing mechanisms of timber for the BI had not yet been developed when the carbon emissions were calculated, and it was difficult to make any conclusive predictions about the regrowth of the harvested forests. This is a function of the nascency in a market without any developed suppliers for the built environment.
- It is not possible to assess the effects of forest harvest on the losses of carbon from forest soils, which can be substantial if dense and unmanaged forests are harvested
- Emissions of carbon from producing materials and building construction are from the datasets mostly containing relevant assessments from industrialized countries
- The current version of the 3S Framework does not account for the effects of climate change on forest growth or technological development on carbon emissions of different materials



## SINK

**The maximum amount of carbon to be extracted from forests for this construction project is 7.2 tC**

- Potential forest area to be harvested to meet the demand for timber from the hybrid houses is around 0.05 ha
- Timber harvested from this area will contain ~ 7.2 tC

Replanting a similar area with teak and sal will repay the carbon debt in 20 to 41 years, with more carbon sequestered over the building's lifespan

- Time needed to 'repay carbon debt' (regrow forests storing 7.2 tC aboveground) is 20 to 41 years
- After 50 years (building' lifespan) forests can accumulate 9 to 18 tC



## STORAGE

**Carbon stored in the wood will capture ~3.6tC, with an opportunity to almost double impact from the re-use/minimization of scrap wood**

- Hybrid (sandstone and timber) houses will store ~ 3.6 tC over 50 years
- Initiatives supporting the use of scrap wood could add up to 2.9 tC in addition. Given this opportunity, AKAH and other builders using wood should consider the question of minimization or the re-use of scrap wood

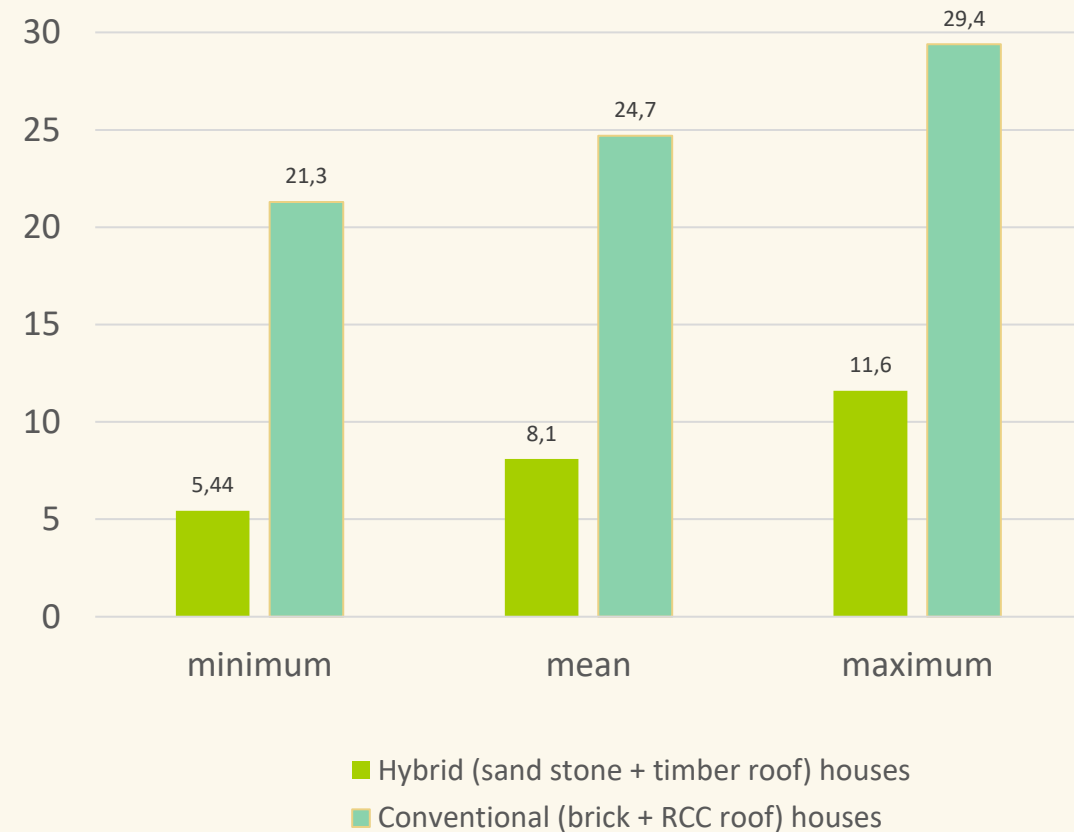
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## SUBSTITUTION

- Carbon emissions from the hybrid housing options are **between 2.5 and 4 times less** than conventional housing options in Gujarat
- This difference in emissions represents a large opportunity for substitution through the built environment
- The scaling of this program and adoption by others, will support India in meeting its NDCs and boost green growth in the country
- **Increased use of timber in elements of the house would further increase this difference/impact**

## Carbon Emissions



*Note: All values were calculated for the construction of four houses, however, only three houses were constructed because of supply disruptions*