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Research Paper

Climate Resilient Veggie Patches- an innovation with urban poor community in slums

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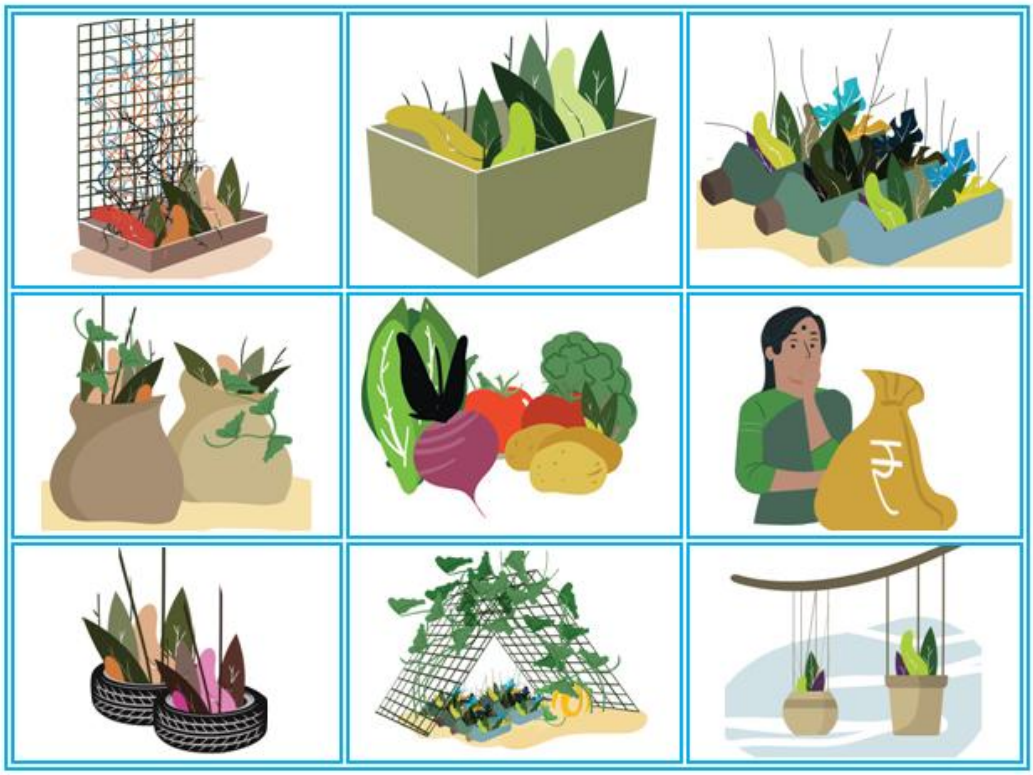
IGSSS climate change portfolio
Indo-Global Social Service Society (IGSSS) is a non-profit organisation was established in 1960 with the mandate for a humane social order based on truth, justice, freedom, and equity. IGSSS works in 15 States on the thematic issues of Inclusive & Sustainable Cities; Humanitarian Support & Inclusion; Health, Nutrition & Sanitation; Livelihood & Food Security; Climate Resilience; Unleashing Youth Potential; Building Capacities; Partnership for Sustainable Development. IGSSS works on building climate resilience across its intervention areas among both urban and rural communities. IGSSS's approach is a weaving of local indigenous solutions with sustainable technologies to address this global issue. Climate smart practices, natural resource management, introduction of sustainable technologies (Clean energy, weather forecasting, urban greening, waste management etc), initiatives for adaptation & mitigation, integration of disaster risk reduction are key elements that seeks to foster resilience among vulnerable communities to current and future shocks. IGSSS networks with innovators, local, regional and national organizations, technical experts and research institutions to create some innovative solutions.



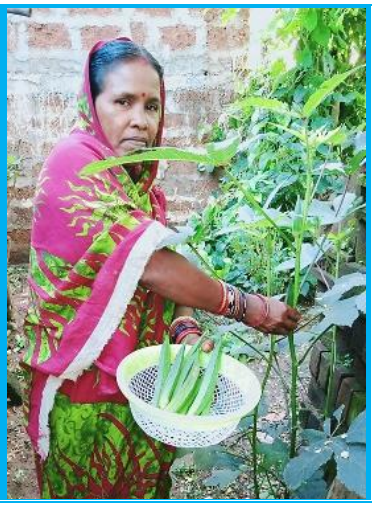
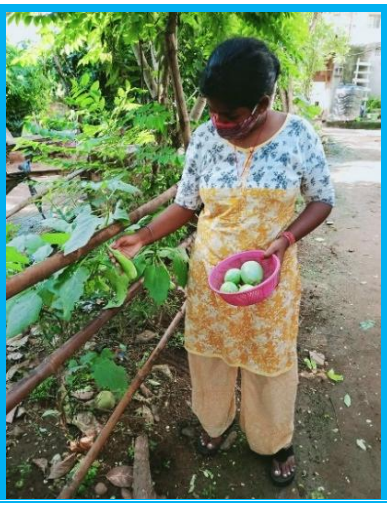
Voice from field

Gorakhpur, Uttar Pradesh

"Now I can feed to my children with quality vegetables" happily said Sangeeta, 38 years age, a housewife from Ramgarh Harsaiya slum, municipal ward number 15, Gorakhpur, Uttar Pradesh. Sangeeta's husband is a wage labor, an only earner of the family of five members. The family's bread and butter became a big challenge due to his irregular income. Sangeeta decided to initiate a climate resilient veggie patch within her household premises couple of months before the last winter, when she saw the regular source of vegetables from her neighbor's veggie patch across the year. **The household waste land was transformed to a dense veggie patch in very short time** by Sangeeta. This was possible only by the organic treatments of land and other value additions through natural means in support with IGSSS team.

In the last winter, Sangeeta cultivated seven types of winter vegetables. This was resulted in a yield of total 10 kilo vegetables. Sangeeta used these vegetables to feed her family members. This saved Rs 2000/- per month from her family expenditure. Sangeeta is planning to sale the additional vegetables after consumption from next season, this will **ensure an alternative source of income for her family.**

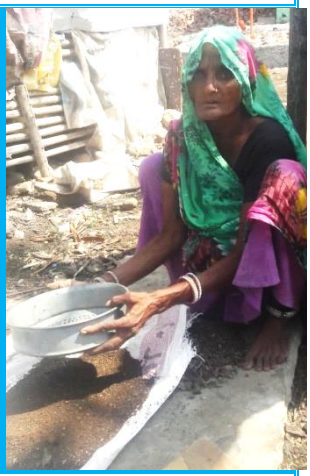
Bhubaneswar, Odisha


"*We spent extreme time during the pandemic days, we had regular source of vegetables from our veggie patches while food crisis was visible in most of our neighbors, we shared additional vegetables to our neighbors after consumption* ", expressed by Sulochana, Sunita and other women, KolathiaBhoiSahi slum, municipal ward number 49, Bhubaneswar. Couple of months before lockdown, the 20 women from KolathiaBhoiSahi slum together started climate resilient veggie patches in spare spaces of their houses associated by IGSSS team. Each family received an average yield of 15 to 20 kilos vegetables monthly from these patches. They distributed the additional yield to their neighbors after consumption during lockdown period. Sulochana distributed 20 kilos ladies-finger and Sunita distributed 50 kilos brinjals to their neighbors. Due to this the women became very popular. Their popularity helped in easy replication of this model in the slum. **This innovation became a big preparedness during any climate emergency including pandemic situation.**

Indore, Madhya Pradesh





"*Waste is money*", said the women leaders, Ahirkhedi Mohalla Vikas samiti, Municipal ward number 5, Indore. Couple of years ago, a group of 12 women, financially marginalized, started recycling of domestic wastes into compost under the guidance of IGSSS team.The women started this from their interest. In this process big volume of domestic wastes was required in the pits, this wastes was converted to compost through natural means within two months after sealing the pit. The women became popular shortly when they started wastes collection from neighbors and waste segregation in a common space of the slum for refilling the pits. **Slowly they initiated a planned waste disposal system in the slum through domestic waste collection as per the requirement for compost pit. Apart from this, it became a source of income for them**. At present they are running 12 pits simultaneously each with 25 kilo domestic wastes capacity. They receive 2000/-

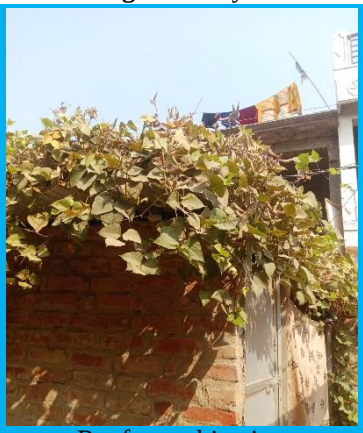
profit approximately from selling the compost in the last month. The slum dwellers are happy, they appreciate the women for hard work and commitments. This makes the women feel proud.

Jamshedpur, Jharkhand

"*I am tension free now. I can serve vegetables to a local hotel regularly from my veggie patch. The waterlogging could not stop me to produce vegetables in rainy season*", claimed by Ahalya, 38 years age, a housewife of a 5 members family, Beldi slum, municipal ward 12, Jamshedpur.

Ahalya was very interested to the climate resilient veggie patch when she saw it from one of her neighbors. Her husband was a street vendor, had low earning. As the result daily feeding to children with nutritious vegetables was a big challenge to Ahalya. This led Ahalya to build climate resilient veggie patch in her household premises. Cultivation across the year was smoothly undertaken by her except in rainy season. Due to the waterlogging in her household premises cultivation in rainy season was a challenge for her. Regular suggestions from IGSSS team helped her in preparing portable gardens and rooftop cultivations which was the utmost solution for addressing waterlogging risk. As the result she harvested 30 kilos vegetables in last rainy season. The additional vegetables after consumption were distributed to the neighbors and sold to a local hotel for income. Ahalya was paid 1000/- for serving vegetables to the hotel. **Addressing waterlogging risks through climate resilient veggie patch was a learning** for Ahalya

Trellis cultivation



Rooftop cultivation

Sack cultivation

Durg, Chhattisgarh

"*We are happy to see our school premises full of green vegetables*", stated by the students of Government primary with middle school, Potiyakala, Durg. Some local women groups-initiated climate resilient veggie patch within the school premises in association with the school authority and IGSSS team. The main aim of the veggie patch was to enhance the aesthetic value of the school premises and a continuous production of vegetables for daily school mid-day meal. The hard work of women led to produce about 150 kilos vegetables, in the last winter, which the market price is 17000/- approximately. The women agree with the school now to serve mid-day meal through producing and cooking of vegetables within the school premises. **This ensures nutritious vegetable for school mid-day meal and brings dense greenery in the school premises**.

CLIMATE RESILIENT VEGGIE PATCH, AN INNOVATION WITH URBAN POOR COMMUNITY IN SLUMS

Objective

Incentivizing slum environment through an innovative, climate resilient veggie patch driven by urban poor community for an alternative and regular source of seasonal vegetables, consistent income and improvement in quality of slum environment.

Rationale

Uncontrolled deforestation, concretization, waste and emission is very pertinent in the cities at present. Due to this, city environment has become imbalanced. This environmental imbalance led to chronic illness and deterioration of life quality in majority of poor community residing in slum. Dormant response from the city administration is enhancing the impact of this environmental imbalance on the urban poor community. Upliftment of life quality of urban poor community is possible if this environment imbalance has been addressed.

IGSSS piloted an innovation with urban poor community in some of the selected cities. The innovation is a *'climate resilient veggie patch*' for an alternative and regular source of seasonal vegetables, consistent income of urban poor community and improvement in quality of slum environment.

This model veggie patch is,

1. Promoting plantation practices and addressing imbalance in slum greenery
2. Producing vegetables across the year and led to a stable alternative income.
3. Recycling a big volume of daily domestic waste into compost and liquid manure which is an allied part with this model
4. Rejuvenating slum waste lands through natural means to initiate the veggie patch. This led to low or no priority to concretization
5. Reusing big volume of single user plastic bottles for bottle drip irrigation and minimizing the impact of dry and desiccation during extreme heat wave days
6. Minimizing the impact of flood and cyclone in veggie cultivation through judicious use of waste portable containers, sacks etc. Apart from this, rooftop cultivation, trellis cultivation rescues the veggie plants from flood and water logging
7. Functioning effectively during the lockdown days due to its homestead production

Couple of years ago, in selected cities, 1009 families started this model successfully at household premises and in slum common lands in association with local duty bearers and IGSSS team. This model is very simple. The raw materials are available locally with low or no cost. Easy short-term gain from vegetable (seasonal) and compost production (two months). Scope to use big volume of domestic waste. Aesthetic value. High impact in small duration. Due to this the outreach of the model is enhancing through replication. This document explains the effectiveness of the model and serves as a knowledge product to upscale and value addition in long run

Location

State	Odisha	Chhattisgarh		Jharkhand	Madhya Pradesh	Uttar Pradesh
City	Bhubaneswar	Raipur	Durg	Jamshedpur	Indore	Gorakhpur
Urban poor family	143	229	150	68	29	390

Gain/ Impact

An integrated impact of climate resilient veggie patch from the 6 pilot cities is visible. The impacts are categorized in four categories.

	Target in long run	Total gain in last kharif and rabi season		
Waste management	Minimizing slum household waste to Zero	A total 200 Kg waste containers are reused for plantation. Approximately 1300 Kg domestic wastes are recycled in compost and vermicompost. More than 75 kg domestic liquid wastes are recycled in liquid manure 1000 single use plastic bottles are reused in bottle drip irrigation for watering the seedlings		
Resiliency	100% urban poor community have veggie patches can withstand extreme climate events	Approx 1700resilient veggie patches from 1009 urban poor families responded positively during cyclone, flood, heat wave, water logging and other climate emergencies. These units consist of rooftop cultivation, trellis cultivation, sack cultivation, pot cultivation, tire cultivation, bottle cultivation etc		
Greenery	100% slum families		Kharif	Rabi

	have dense green cover in their houses	Survival rate (Average)	60%	80%
		Crown cover(Average)	65%	90%
		Yield (total in 6 cities)	40 quintals	70 quintals
		Vegetable species (average in each city)	7 types	10 types
		Apart from this, an average 5 varieties of friendly insects andbirds have emerged in each city in the veggie patch		
Income/ savings	100% slum women can earn & save from this veggie patch	The yield from veggie patches is approximately 60% more than that of input cost. 505 women are able to earn money through this model 355 women can save money from this model.		

How the model incentivizes environment

1. Usage of slum waste land for veggie patches resulted in dilution of interest of slum dwellers in concretization. This positively impacted on slum biodiversity and soil moisture content.
2. During vegetable cultivation, usage of compost or vermi-compost as one of the co product from this model increased the macro and micronutrient in the soil. Apart from this Sesbania sp (bio manure) seed and bone-dust was also used to rejuvenate the soil health.
3. Recycling of domestic wastes in compost and vermi compost led to build a planned household waste disposal practice in slum dwellers. This maintained slum hygiene and cleanliness
4. Reuse of plastic bottles for plantation and bottle drip irrigation minimized the rampant trash of single use plastic, exclusively toxic for soil health
5. Reusing waste containers judiciously for plantation managed slum wastes
6. Veggie patches incentivized slum biodiversity through emergence of friendly insects and birds. Aesthetic value of slum increased.
7. Continuous yield from the veggie patches even in extreme climate events, pandemic situation reveals resiliency of thismodel
8. This is an initiative which collectivized slum dwellers for an integrated long-term gain with harmony and peace

Steps for resilient veggie patches

There are two types of resilient veggie patches in slums.

1. Household level veggie patch- It is built in household spare space by the family members; where waste containers, sack etc are used mostly for plantation
2. Community level veggie patch- It is built in community waste land in slum premises through collective actions.

   The steps to build veggie patch is given in the table below;

	Household level (individual)	Community level (collective)
Waste Management	Recycling domestic wastes into, Portable compost unit Portable liquid manure unit	Recycling domestic wastes into, Compost pit Portable vermi-compost unit Portable liquid manure unit
Resiliency	Space selection Soil preparation using compost, vermi-compost and bone dust etcnaturally. Bottle drip irrigation Portable plantation (Rooftop, trellis, pot, sack, bottle, tire plantation etc) Seed conservation	Site selection Earthwork Land shaping Soil preparation using Sesbania sp seeds (bio-manure), compost, vermi-compost, bone dustetc naturally Trench/ drip irrigation Fencing Plantation (Intercropping/ mixed cropping) Seed conservation
Greenery	Seed sowing Watering Weeding Patrolling Monitoring of health and survivability of vegetable plant	Seed sowing Watering Weeding Patrolling Monitoring of health and survivability of vegetable plant

	Spraying organic/ natural pesticide, if required	Spraying organic/ natural pesticide, if required
Income/ saving	Harvesting Consumption Saving	Harvesting Consumption Selling Income Saving

Strategy

1. Simple- This is a very simple model, easy to initiate if interested.
2. Utmost resources- The raw materials are easily available in slum premises. This model helps in using utmost volume of domestic wastes from slum houses.
3. Participatory- Ensures participation of urban poor community, women, youth, influential persons and other stakeholders.
4. Inclusive - Elderly persons, pregnant women can initiate this model due to easy watering through bottle drip irrigation.
5. Immediate gain- Seasonal vegetable led to an immediate gain. Apart from this community leadership and ownership is an additional gain.
6. Sustainability- Veggie patches are resilient to extreme climate events. This model is successfully initiated with low input cost in household premises by individual family or in slum common lands collectively.
   The above-mentioned strategies led to easy replication of this model. 155 families(approx.) are replicating this model in six cities.

Monitoring & evaluation

The effectivity of the model veggie patches is evaluated by tracking of four different sections by the urban poor community at the end of kharif and rabi season.

1. Effectiveness in aspect to slum waste management- This section tracks, the quantity of domestic wastes recycled to compost/ vermi compost & liquid manure, how many single use plastic bottles and waste containers are reused in the veggie patches etc
2. Effectiveness in aspect to resiliency- This section measures the survivability, yield etc of the veggie patches in pandemic and extreme climate situation like cyclone, flood, heatwave etc.
3. Effectiveness in aspect to slum greenery- This section evaluates the gains in slum greenery and biodiversity due to the veggie patches. How many varieties vegetable is surviving and growing healthy in each season, how many varieties of friendly birds, insects are emerging in the veggie patches, how much slum greenery has been restored etc
4. Effectiveness in aspect to income/ profit to the slum families- This section measures the income and profit from the veggie patches through vegetables, compost and other co products.

Scope

Apart from the usual time, effective responses are visible from veggie patches during climate emergency. It motivates slum women as it ensures vegetable yield. It gives a regular income to women, this empowers them. Very low input cost results a big return. This led to upliftment of life quality of slum poor community even who are extremely marginalized. Slum greenery and cleanliness is an additional impact from this model. The impact of veggie patches can be amplified through convergence with National Urban Livelihood Mission and other urban schemes and entitlements. Addressing deforestation, concretization, waste and emission is another scope of the model in long run.

Challenge

1. Extreme emissions and pollution led to unwanted delay in growth of the veggie patch in some cities. This challenge was addressed by usage of compost, vermi-compost and other natural manures as per the requirement.
2. Pathogenic infections were visible in the veggie patches due to the extreme climate change. This was minimized with the spraying of natural liquid manures as per the requirement.
3. Most of the slum women were working as daily wage labor, domestic worker, street vendor etc, hence they could not stay at home for long duration daily. This reduced their participation at initial stage. Customization of working time for veggie patches in association with IGSSS team increased their participation.Involvement of slum youth cadre helped the women in execution of the model.

Learning

1. Addressing climate emergency is possible collectively. Comparatively high impact was visible in the slums where the outreach of veggie patches was more. The model brought resiliency to slum urban poor community who are extremely vulnerable to climate change.
2. Short term gain has big acceptance. Most of the slum families undertook veggie patches only based on the seasonal outcome from their neighbors.
3. Active participation from slum women and youth enhanced outreach. Youth are highly enthused, motivated. Most of the slum youth came forward to disseminate the model and enhance the outreach. The women came forward when they became confident about the gains from the model. Most of the slum women undertook this model to save their family expenses.
4. Participation of slum community led to a successful waste disposal system. Collection and segregation of domestic wastes to fill the compost pits by slum women managed domestic wastes and maintained slum cleanliness.
5. Integration of lot of green veggie patches brought a green envelop in the slum. It gave aesthetic pleasure and mental peace to the slum dwellers.

Recommendation

1. The veggie patch model is an innovation of IGSSS. After field testing the model is successfully incubated in 260 slums, 13 cities by IGSSS team. This is the time for replications in the cities under different climatic zones. This will help in upscaling the model.

2. Assessment of technical viability of the model with the help of technical agencies. Although the model was designed in association with several resource agencies, but upscaling is possible only after technical validation.
3. Releasing the effectivity of the model in several journals, in symposium, for cross sharing and other value additions
4. Formation of city CSOs network. The network will have aims to build a common consensus on climate emergency, to initiate cross sharing, to find out possibilities of replication of climate resilient models including climate resilient veggie patches.
5. Sharing the model with local admin representatives, line departments, ULBs for convergence under municipal budgetary allocation.
6. Presenting the model in different global platform to create grand visibility

Proposed plan for veggie patches: