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Promoting homestead gardens to improve dietary diversity in Rural India: a randomized controlled trial

Submission date
21/05/2024

Recruitment status
No longer recruiting

Registration date
28/05/2024

Overall study status
Ongoing

Last Edited
13/10/2026

Condition category
Nutritional, Metabolic, Endocrine

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Many people in rural India suffer from poor nutrition because they cannot afford or otherwise do not have access to a full range of food groups. While backyard gardens could produce crops to supplement existing diets, irrigation water is often unavailable during growing seasons - a barrier that will be aggravated by climate change. This study aims to test an intervention designed to increase the consumption of a wider range of foods by promoting backyard gardens irrigated with “grey water” - relatively clean wastewater from dishwashing and bathing.

Who can participate?
Households in 82 communities in Ganjam and Gajapati Districts of Odisha, India

What does the study involve?
Half of the communities will be randomly assigned to receive the intervention. The intervention includes community activities designed to build awareness and capacity, as well as the provision of seeds, fencing, irrigation equipment and pest-control strategies. The intervention will be delivered by Gram Vikas, an Indian NGO. The other communities will initially serve as controls and will be offered the intervention at the end of the 12-month trial. Dietary diversity is assessed by recording the number of food groups consumed in the previous day based on a 24-hour dietary recall.

What are the possible benefits and risks of participating?
Not provided at time of registration

Where is the study run from?
Emory University (USA)

When is the study starting and how long is it expected to run for?
January 2024 to March 2027.

Who is funding the study?
1. CARE USA
2. Rose C. Gangarosa

Who is the main contact?
Dr Sheela Sinharoy, Sheela.sinharoy@emory.edu

Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Protocol serial number
CARE USA US3J3/ANO5US0002/8

Study information

Scientific Title
Climate Resilient Odisha Produce Study (CROPS): a randomized controlled trial in rural Odisha, India

Acronym
CROPS

Study objectives
Individuals living in households that receive the intervention will have significantly higher dietary diversity than individuals living in households that do not receive the intervention.

Ethics approval required
Ethics approval required

Ethics approval(s)
1. Approved 15/04/2024, Emory University IRB (1599 Clifton Rd NE, Atlanta, 30322, United States of America; +1 (0)404 727 3889; irb@emory.edu), ref: STUDY00007613

2. Approved 20/05/2024, Independent Ethics Committee of XIM University (Plot No.12(A), Nijigada, Kurki, Harirajpur, Puri, Odisha, 752050, India; +91 (0)674 23777000; deansgpa@xim.edu.in), ref: XU2024520212VC

Primary study design
Interventional

Study design
Non-blinded cluster-randomized controlled trial

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Dietary diversity

Interventions
Current interventions as of 06/01/2026:
Following enrollment and baselining of study participants, the 82 rural villages in Ganjam and Gajapati Districts in Odisha will be randomized using a random number generator either to the intervention arm (41 communities) or the control arm (41 communities).

Intervention arm:
1. Community meetings/trainings to:
1.1. Build knowledge, skills, and self-efficacy related to climate-smart agricultural techniques for year-round production of fruits and vegetables through backyard gardens
1.2. Improve knowledge of the importance of dietary diversity for all household members and self-efficacy related to food preparation and distribution
1.3. Increase women’s negotiating and decision-making power in the household
2. Distribution of inputs and hardware including seeds and seedlings, supplies for integrated pest management (e.g., fencing material), and hardware for greywater capture and re-use (e.g., PVC pipes, watering cans)

Control arm:
No intervention (offered the intervention at the end of the trial)

The trial will be conducted from June 2024 to June 2026. The study protocol and ethics approvals authorize additional follow-up for up to 24 months following the completion of the trial to assess longer-term impacts.

Current interventions as of 12/09/2024:
Following enrollment and baselining of study participants, the 82 rural villages in Ganjam and Gajapati Districts in Odisha will be randomized using a random number generator either to the intervention arm (41 communities) or the control arm (41 communities).

Intervention arm:
1. Community meetings/trainings to:
1.1. Build knowledge, skills, and self-efficacy related to climate-smart agricultural techniques for year-round production of fruits and vegetables through backyard gardens
1.2. Improve knowledge of the importance of dietary diversity for all household members and self-efficacy related to food preparation and distribution
1.3. Increase women's negotiating and decision-making power in the household
2. Distribution of inputs and hardware including seeds and seedlings, supplies for integrated pest management (e.g., fencing material), and hardware for greywater capture and re-use (e.g., PVC pipes, watering cans)

Control arm:
No intervention (offered the intervention at the end of the 12-month trial)

The trial will continue for a period of approximately 18 months from June 2024 to December 2025. The study protocol and ethics approvals authorize additional follow-up for up to 24 months following the completion of the trial to assess longer-term impacts.

Previous interventions:
Following enrollment and baselining of study participants, the 90 rural villages in Ganjam and Gajapati Districts in Odisha will be randomized using a random number generator either to the intervention arm (45 communities) or a control arm (45 communities).

Intervention arm:
1. Community meetings/trainings to:
1.1. Build knowledge, skills, and self-efficacy related to climate-smart agricultural techniques for year-round production of fruits and vegetables through backyard gardens
1.2. Improve knowledge of the importance of dietary diversity for all household members and self-efficacy related to food preparation and distribution
1.3. Increase women's negotiating and decision-making power in the household
2. Distribution of inputs and hardware including seeds and seedlings, supplies for integrated pest management (e.g., fencing material), and hardware for greywater capture and re-use (e.g., PVC pipes, watering cans)

Control arm:
No intervention (offered the intervention at the end of the 12-month trial)

The trial will continue for a period of approximately 18 months from June 2024 to December 2025. The study protocol and ethics approvals authorize additional follow-up for up to 24 months following the completion of the trial to assess longer-term impacts.

Intervention Type
Mixed

Primary outcome(s)
1. Dietary diversity among adult women measured using a 24-hour dietary recall at midline, endline, and ongoing follow-up surveys

Previous primary outcome(s) as of 18/02/2026:

1. Dietary diversity among adult women measured using a 24-hour dietary recall at baseline, 6, 12, 18 and 24 months

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Previous primary outcome as of 06/01/2026:

Dietary diversity among adult women of reproductive age (18-49 years) is measured using a 24-hour dietary recall at baseline, 6 months, 12 months and 18 months

Key secondary outcome(s)
1. Dietary diversity among children under age 5 and other household members measured using a 24-hour dietary recall at baseline, midline, endline, and ongoing follow-up surveys

2. Food insecurity measured using the Food Insecurity Experience Scale (FIES) at baseline, midline, endline, and ongoing follow-up surveys

3. Subjective wellbeing measured using the World Health Organization-5 (WHO-5) scale at baseline, midline, endline, and ongoing follow-up surveys

4. Self-efficacy measured using researcher-developed questions specific to self-efficacy for gardening and self-efficacy related to nutrition at baseline, midline, endline, and ongoing follow-up surveys

5. Agricultural production diversity measured using researcher-developed questions related to variety of crops grown in each season at 18 months, 24 months, and ongoing follow-up surveys

6. Household water insecurity measured using the Household Water Insecurity Experience (HSWE) scale short form at 18 months, 24 months, and ongoing follow-up surveys

7. Women's income-earning measured using a researcher-developed questionnaire about participation in work for which payment was received at 18 months, 24 months, and ongoing follow-up surveys

8. Mid-upper arm circumference (MUAC) among adult women and up to one child under age 5 per household measured using a MUAC z-score measuring tape at 18 months, 24 months, and ongoing follow-up surveys

9. Women's empowerment measured using questions adapted from the project-level Women's Empowerment in Agriculture Index at baseline, midline, endline, and ongoing follow-up surveys

Previous key secondary outcome(s) as of 18/02/2026:

1. Dietary diversity among children under age 5 and other household members measured using a 24-hour dietary recall at baseline, 6, 12, 18 and 24 months
2. Food insecurity measured using the Food Insecurity Experience Scale (FIES) at baseline, 6, 12, 18 and 24 months
3. Subjective wellbeing measured using the World Health Organization-5 (WHO-5) scale at baseline, 6, 12, 18 and 24 months
4. Self-efficacy measured using researcher-developed questions specific to self-efficacy for gardening and self-efficacy related to nutrition at baseline, 6, 12, 18 and 24 months
5. Agricultural production diversity measured using researcher-developed questions related to variety of crops grown in each season at 18 and 24 months
6. Household water insecurity measured using the Household Water Insecurity Experience (HSWE) scale short form at 18 and 24 months
7. Women's income-earning measured using a researcher-developed questionnaire about participation in work for which payment was received at 18 and 24 months
8. Mid-upper arm circumference (MUAC) among adult women and up to one child under age 5 per household measured using a MUAC z-score measuring tape at 18 and 24 months

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Previous secondary outcome measures as of 12/09/2024:

1. Dietary diversity among children under age 5 and other household members measured using a 24-hour dietary recall at baseline, 6 months, 12 months and 18 months
2. Food insecurity measured using the Food Insecurity Experience Scale (FIES) at baseline, 6 months, 12 months, and 18 months
3. Subjective wellbeing measured using the World Health Organization-5 (WHO-5) scale at baseline, 6 months, 12 months and 18 months
4. Self-efficacy measured using researcher-developed questions specific to self-efficacy for gardening and self-efficacy related to nutrition at baseline, 6 months, 12 months and 18 months
5. Women’s empowerment measured using questions adapted from the project-level Women’s Empowerment in Agriculture Index at baseline, 6 months, 12 months and 18 months

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Previous secondary outcome measures:

1. Dietary diversity among children under age 5 measured using a 24-hour dietary recall at baseline, 6 months, 12 months and 18 months
2. Food insecurity measured using the Food Insecurity Experience Scale (FIES) at baseline, 6 months, 12 months, and 18 months
3. Subjective wellbeing measured using the World Health Organization-5 (WHO-5) scale at baseline, 6 months, 12 months and 18 months
4. Self-efficacy measured using researcher-developed questions specific to self-efficacy for gardening and self-efficacy related to nutrition at baseline, 6 months, 12 months and 18 months
5. Women’s empowerment measured using questions adapted from the project-level Women’s Empowerment in Agriculture Index at baseline, 6 months, 12 months and 18 months

Completion date
31/03/2027

Eligibility

Key inclusion criteria
Current key inclusion criteria as of 06/01/2026:
Intervention: Adults 18 years and older, and if applicable, their offspring aged less than 5 years, who live in the study area in Odisha, India

Evaluation: Households in 82 communities in Ganjam and Gajapati Districts of Odisha, India

Previous participant inclusion criteria as of 12/09/2024:
Intervention: Adults 18 years and older who live in the study area in Odisha, India

Evaluation: Households in 82 communities in Ganjam and Gajapati Districts of Odisha, India

Previous participant inclusion criteria:
Intervention: Adults 18 years and older who live in the study area in Odisha, India

Evaluation: Households with a child aged under 5 years (up to 25 households, one adult woman and one adult man per household) in each of the intervention and control villages

Participant type(s)
Population

Healthy volunteers allowed
Yes

Age group
All

Lower age limit
0 Years

Upper age limit
110 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Adults unable to consent
2. Individuals who do not meet age requirements
3. Prisoners
4. Cognitively impaired or individuals with Impaired Decision-Making Capacity

Date of first enrolment
31/05/2024

Date of final enrolment
30/06/2026

Locations

Countries of recruitment
India

Study participating centre
Gram Vikas, a Non-Governmental Organization registered in India under the Societies Registration Act 1860
Plot No. 72/B
Forest Park, Bhubaneswar
Odisha
India
751009

Study participating centre
Ganjam and Gajapati Districts
Odisha
India
N/A

Sponsor information

Organisation
CARE USA

ROR
https://ror.org/038espn32

Organisation
Rose C. Gangarosa

Funder(s)

Funder type
Charity

Funder Name

CARE USA

Funder Name
Rose C. Gangarosa

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Sheela Sinharoy, sheela.sinharoy@emory.edu.

IPD sharing plan summary
Available on request