SWABHIMAAN IMPACT EVALUATION (2016-2021) DISSEMINATION, 2022

Impact Evaluation Methodology

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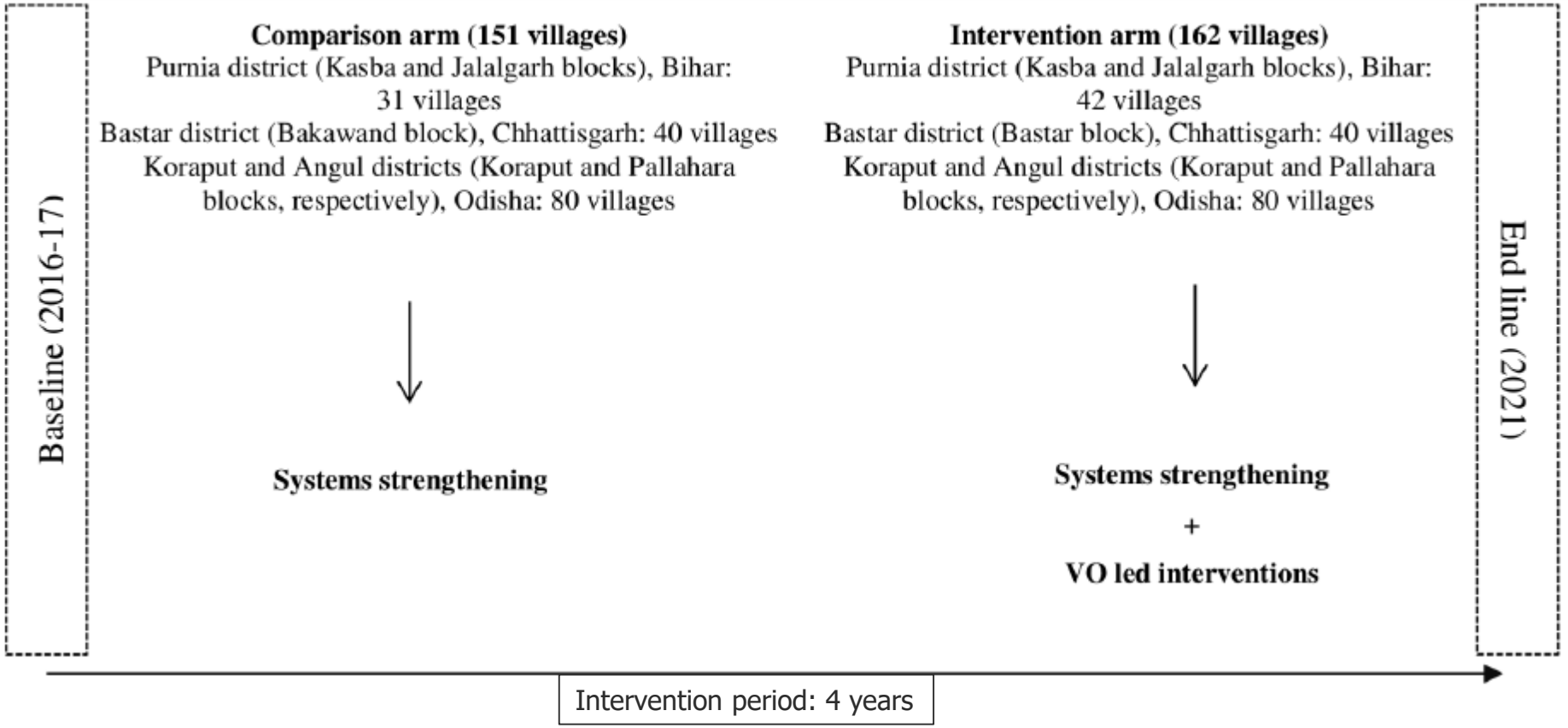
INTRODUCTION

- Swabhimaan: is a randomized control nutrition demonstration programme to improve women's nutrition before, during and after pregnancy.
- A package of nutrition-sensitive and nutrition-specific interventions was delivered through community- and system-actions via DAY-NRLM's platforms.
- Target groups:
  - Adolescent girls
  - Pregnant women
  - Mothers of children under age two years

EVALUATION DESIGN



- Unit of assignment to intervention and control arms was a cluster of villages in Bihar and Chhattisgarh and a Gram Panchayat in Odisha. Bihar: 23 intervention PSUs
- Bihar: 23 PSUs in intervention and 22 PSU in control arm; Chhattisgarh: 41 PSUs in intervention and 48 PSUs in control areas and Odisha: 21 PSUs in intervention and 19 PSUs in control areas

STUDY HYPOTHESES AND OUTCOMES

It was hypothesised that over a intervention period of 4 years, Swabhimaan's community-led interventions will lead to:

- A 15% reduction in the proportion of adolescent girls with a BMI<18.5
- A 15% reduction in the proportion of adolescent girls with a BMI<18.5
- A 0.4 cm improvement in mean MUAC among pregnant women and
- 5-20% improvements in the coverage of 18 essential nutrition indicators as a secondary outcome

SAMPLE SIZE ESTIMATION

- State-specific sample size calculations were done to determine the appropriate number of adolescent girls, pregnant women and mothers of children under 2 to be surveyed to be able to assess achievement of hypothesized targets for primary outcomes.

- **Kelsey's Formula:** $N_{Kelsey} = ((Z\alpha/2 + Z\beta)^2 [P0 (1-P0) + P1 (1-P1)]/(P0-P1)^2$

Where, $Z_{\alpha/2} = 1.96$; $\beta = 0.8$

P0: Adolescent girls and mothers with BMI<18.5 (%) and mean MUAC in case of pregnant women

P1: Expected improvement in the outcome indicators (%)

5% refusal rate and design effect of 1.5.

Sample Size: Baseline and Endline Surveys							
State	**Adolescent girls**		**Pregnant women**		**Mother of children under 2yrs**		
	Baseline	**Endline**	**Baseline**	**Endline**	**Baseline**	**Endline**	**Total**
Bihar	1704	1119	936	443	2612	1162	**7976**
Chhattisgarh	2921	2078	823	715	2539	2082	**11158**
Odisha	1727	1111	814	540	3604	1522	**9318**
Total	**10660**		**4271**		**13521**		**28452**

SAMPLING FRAME

- Out of the 2011 Census, sampling frame of all villages of Jalalgarh, Kasba, Koraput, Pallahara and Bastar blocks was compiled.

- These villages served as Primary Sampling Units (PSUs) for Swabhimaan.

- Sampling frame contained information about the estimated number of residential households, population, population belonging to scheduled caste and scheduled tribe (SC/ST) and the literacy rate of women (6+ years) in each village.

- A ‘village’: unit of at least 500 households. Villages smaller than 500 households were merged with the adjacent village in order to fulfill the criteria of at least 500 households.

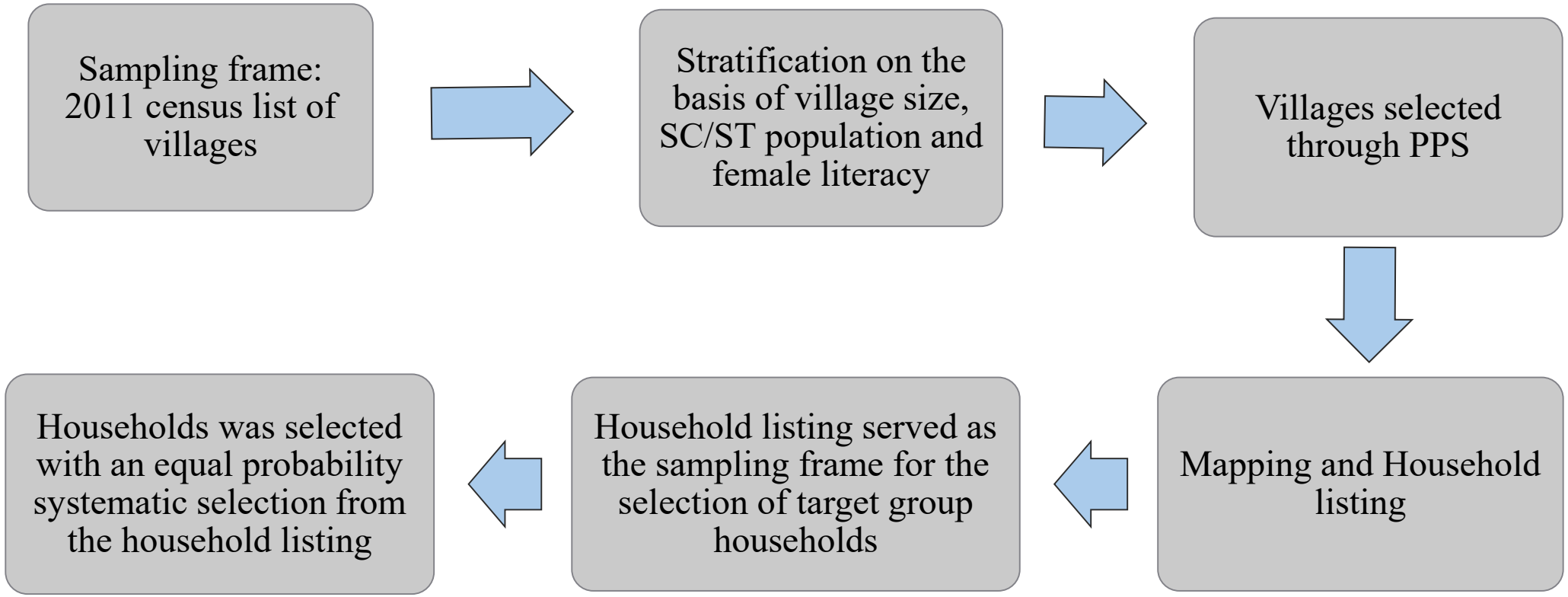
SAMPLING DESIGN & SELECTION

- The samples were drawn by using two-stage stratified sampling.
- In each stratum, three clusters were created based on the estimated number of households in each village.
- Two clusters, created based on the percentage of the population belonging to SC/ST.
- In each explicit rural sampling stratum, PSUs were sorted according to the literacy rate of women age 6 or more years before selection, .
- A household listing operation was done in selected PSUs to list all residential households.
- The resulting list of households served as the sampling frame for the selection of target group households in the second stage.

SAMPLING DESIGN & SELECTION

- Selected PSUs with more than 500 households were divided into segments of 100-200 households.
- Two segments were selected for the survey with probability proportional to the segment size. Therefore, in Swabhimaan cluster is a PSU or part of a PSU.
- In 2nd stage of selection, a fixed number of households per cluster was selected with an equal probability systematic selection from the household listing.
- The survey was carried out in the pre-selected households only. No replacements and no changes of the pre-selected households were allowed in the implementing stages in order to prevent bias.
- All adolescent girls (10-19 years) and women (15-49 years) who were usual members of the selected households were eligible for the survey.

SAMPLE SELECTION



SAMPLE WEIGHT

- Sampling weights are required to ensure the actual representativeness.
- Since the Swabhimaan sample is a two-stage stratified cluster sample, sampling weights were calculated based on sampling probabilities separately for each sampling stage and for each cluster.
- Notations: P_{1hi}: first-stage sampling probability of the i^{th} PSU in stratum h
  P_{2hi}: second-stage sampling probability within the i^{th} PSU (household selection)
- The probability of selecting the i^{th} PSU in stratum h is calculated as follows:

$$\frac{a_h M_{hi}}{\sum_h M_{hi}}$$

Where, a_h: number of PSUs selected in stratum h,
M_{hi}: number of households according to the sampling frame in the i^{th} PSU
$\sum_h M_{hi}$ be the total number of households in stratum h.

SAMPLE WEIGHT

- Then, the probability of selecting PSU *i* in the sample is:

$$P_{1hi} = \frac{a_h M_{hi}}{\sum_h M_{hi}} \text{X}\, b_{hi}$$

b_{hi}: proportion of households in the selected segments with respect to the total number of households in the PSU *i* in stratum *h* if the PSU is segmented; otherwise, $b_{hi} = 1$.

- Overall selection probability for each household in PSU *i* of stratum *h* is the product of the two stages selection probabilities:

$$P_{hi} = P_{1hi} X\, P_{2hi}$$

- Sampling weight for each household in PSU *i* of stratum *h* is the inverse of its overall selection probability:

$$W_{hi} = 1 \,/\, P_{hi}$$

STATISTICAL TECHNIQUES

- Mean and standard deviation to estimate mean diet diversity, BMI, height and MUAC.
- Difference-in-difference (DID) estimation to examine whether a particular intervention had an impact of a particular intervention on target population or on a specific target outcome.
  - Differential effects were tested using regression models that estimated differences in changes over time between the 2 groups.
  - The time points corresponded to the period in which baseline and endline surveys were conducted.
  - Techniques' approach is that the two groups are expected to trend consistently over time. Here the counterfactual is that the community intervention should be associated with improvement in utilization of nutrition services and outcomes.

Thank You