34<sup>th</sup> International Vegetable Training Course Vegetables: From Seed to Table and Beyond

# MODULE III: Vegetables for Sustainable Development **Project Monitoring and Evaluation**

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Shriniwas Gautam



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#### Who are we?





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#### **Today's Session Plan**

- Understanding different phases of project, Other concepts
- Importance of monitoring and evaluation phases
- Project Indicators: Process and outcome indicators
- Planning for monitoring and evaluation in a project
- Logical framework for monitoring and evaluation
- Methods of evaluation (if time allows)





## What is a project?

- Project: "An enterprise carefully planned to achieve a particular objectives/ aim."
- Project is a document that answers 7 W and 1H
  - Different types of projects: Let us have some examples from each country (agricultural sector).
  - Difference between Project, Program, Policy, Plan?



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## Project, Program, Policy

	Project	Program
Objective	Planned, interrelated activities, one to few outputs and outcomes	Multiple outcomes, multiple projects, may cut through sectors, multiple projects, geographical area, institutions, donors
Scope	Time and area of intervention limited Limited Risk	Not tightly defined and may change during the life cycle Higher risk
Duration	Relatively short term, fixed duration	Longer term, has fixed beginning but may not have fixed ending (as multiple project may complete at different times)
Stakeholders/ Beneficiaries	Relatively small and uniform	Large and diverse
	A about	



# Example of project and program

- Project name: USAID AVRDC Vegetable Postharvest Project
- Many agencies have projects with USAID to tackle postharvest loss and in many countries

**Program:** Feed the Future Initiative (a Global Hunger and Food Security Program, postharvest just one component).

- Advancing role of women in agriculture
- Boosting productivity, sale and opportunity

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- Fighting hunger/ provide better nutrition



## How are these projects awarded ?

Each donor has its own criteria for selection of country/ project.

# **19 focus countries selected** based on **5 criteria:**

- + Level of need
- Opportunity for partnership
- Potential for agricultural growth
- Opportunity for regional synergy
- + Resource availability



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1 Selection



#### **AVRDC** Mission:

Alleviating poverty and malnutrition in the developing world through the increased production and consumption of nutritious and health-promoting vegetables.

Germplasm	germplasm discovery	conservation and evaluation, gene
Breeding	genetic enhancement, varietal development, selection of indigenous lines, seed production	
Production	safe and sustainable vegetable production systems	
Consumption postharvest nutritional s		t management, market opportunities, security, diet diversification, human health
technology dissemination		monitoring and evaluation



Types of projects	
Research	Development
projects	projects

Research Project: Knowledge gaps from previous research or identified development problem

Development Project: Needs of a target population such as poor farm families

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#### **Research and Development Continuum of AVRDC activities (selected projects)**



#### Where will your project fit in the continuum?



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#### **Exercise 1: Choose a project**

- Choose any one project for use in today's session/ or to work as DAP
- What are its objectives
- Duration (start/ end date)
- Who are the stakeholders, target group, beneficiaries? (\*\*)

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#### Some distinctions: Stakeholders, target group, beneficiaries

**Stakeholders** - groups that have a role and interest in the objectives and implementation of a program or project (target groups, direct beneficiaries, implementers, and resource providers, donors, government etc.).

**Target groups** - the main stakeholders that are expected to gain from the results of that program or project; sectors of the population aimed to reach in order to address their needs based on socio-demographic, economic characteristics.

**Direct beneficiaries** - usually institutions and/or individuals who are the direct recipients of project inputs/ interventions. In micro-level interventions, the direct beneficiaries and the target groups are the same.





#### **Project Cycle: Various phases of a project**





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# Phase 1: Identification of a development or research problem (Planning)

- Project planning: 7W, 1H answers
- WHY: A problem to solve
- What: Type of intervention/s

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- Where for Whom: Target area and people
- When: Duration (start and end)
- By whom, what cost: Resources
- How: Mechanism (Theory of change/ impact pathway).

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# Theory of change (Impact pathway)

- Explains the process of change by outlining causal linkages of a project, its shorter-term, intermediate, and longer-term outcomes.
- The links between a development/ research problem with process and outcome indicators is explained rationally.
- Theory of change can be mapped –as the "outcomes/ impact pathway".



#### An Example of Impact pathway (IPM program)





# Impact pathway simple example: Tomato grafting

Problem: Flooding causing tomato farmers a big crop loss



#### **Exercise 2: Impact Pathway**

• Prepare a framework of theory of change (impact pathway for your project)





# Stage 2: Formulation, Appraisal



Assessing feasibility of project:

- Technical: Project design in terms of Interventions, target group, implementation plan vis-à-vis Project objectives
- Institutional: Capacity to implement
- Economics: Cost and Benefit of project
- Financial: Use of budget for project activities



# **Implementation and Monitoring**

 Implementation: Execution of the project activities as planned (may be modified based on monitoring and midterm evaluation).

#### • Monitoring:

- What is happening ?
- Is a continuous process
- Regular collection of data/ information, and periodic analysis

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#### **Evaluation**

- What has happened?
- Results are compared with the objectives.

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- Improves further implementation by pointing out the strengths and weaknesses.
- Helps in attracting more \$\$\$





# Why Monitor and Evaluate Projects

Project stakeholders need to track if inputs/ activities are happening as planned, bringing about results to meet the project objectives.

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- Learn what works and why
- Make good decisions
- Use resource efficiently
- Track progress
- Assess impact
- Make project implementation team accountable

- Satisfy donors: Donors are also accountable to their tax payers
- So, want to see effectiveness of dollars spent
- Want to see if the project can bringing intended impacts/ outcomes



# Monitoring and Evaluation is done by tracking Indicators

- Framework of M&E developed before project implementation (but can be modified).
- M&E framework (plan) should identify the indicators
- Monitoring is tracking these indicators during the implementation phase (process indicators)

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• Evaluation is comparing results with the outcome/ impact indicators.



#### Indicators



#### • GDP

- Life expectancy
- Crop yield
- % of women



- Anything that helps to inform, sign or any visual condition, symptom, or index (number). Expressed as quantity data (number, percentage, ratio), and quality.
  - Basis for project progress tracking.
  - Enable project stakeholders/ decision-makers to assess progress towards the achievement of intended outputs, outcomes, and impacts.





## **Millennium Development Goal**

All 189 <u>UN member states</u> (now 193) and at least 23 <u>international</u> <u>organizations</u> committed to help achieve the MDGs by 2015:













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# Indicators: pre-requisite for M&E

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- SMART
- <mark>S</mark> = Specific
- M = Measurable
- A = Attainable
- R = Relevant
- T = Targeted (Time bound)

- Who: small farmers
- How many: 1000 farmers
- How often: every week
- How much: 10%, 10 dollars

- When: In two years
- Where: In Village A



#### Indicators

# How many indicators?

- At least one per result
- At least one per core activity (training, technology generation etc.)
- Too many indicators make it difficult/ costly
- Based on mix of data collection strategies/ sources (surveys, participatory approaches)



# **Exercise 3: Developing indicators for your project**

# Prepare list of 10 indicators for a project that you work or worked in the past or plan to develop/ work in the future



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#### Indicators (Process and outcomes indicators)

- Input/ Activity Indicators: Number and types of activities of the project carried out (Number of Pheromone traps distributed, Number of training organized, .....)
- Output Indicators: Change related directly to the activities of the project (Number of farmers who completed vegetable IPM training and whose knowledge increased,.....)
- Outcome Indicators: Change demonstrated due to project interventions in medium to longer term (adoption of IPM practices, ....)
- Impact Indicators: Measure long-term affect of project interventions (example: Percentage reduction in poverty, .....)





#### **Exercise 3 continued: Group the 10 indicators you developed**

Stage	Indicators
Impact	
Outcomes	
Outputs	
Inputs / activities	

Specific Measurable Attributable (or Achievable) Relevant Targeted (or Time-bound) Evaluated Reviewed

#### SMART or SMART(ER)

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# Let us classify the indicators

Input

Activity

Output

**Outcome** 

#### Impact



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# Indicators (process and output):

Input	Output	outcomes	Impacts
Seedling	Vegetables	Increased income of farmers	Reduced poverty and hunger
Scientists	New variety	Adoption of improved varieties	Reduced poverty and hunger
Resource persons	Training manuals on IPM	Increased knowledge and skills, reduced pesticide use	Reduced health risks, improved environment
Budget	Vegetable collection center	Increased access to market, increased income	Reduced poverty, higher living standard of farm families
Project field staffs women	Women farmer's saving and credit group	\$ 1000 saving with the group	Women Empowerment, Increased access to resources

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# **Monitoring and Evaluation**

	Monitoring	Evaluation
When	Continuous: day to day	Periodic: Important milestones
What does it do	Documents progress	In-depth analysis of achievements
Focus	Input, Activities and output	Outcomes and Impacts
Use	Alerts managers to problems	Provides managers with strategy and policy options
Purpose	Self-assessment, controlled by management	Internal or external
	Accountability	Accountability



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#### WHEN monitoring and evaluation take place




### M& E: Logic Model Approach

Input	Activity	Output	Outcomes	Impacts
What we invest	What we do with	What work we	Benefits or changes	Long term
(staff, time, other	the inputs	accomplished	for participants	consequences of
inputs)	(training, apply	(results of	during or after the	the interventions
	inputs)	participation of	project due to	(change in
		beneficiaries)	project activities	conditions)
		(trained farmers,	(Change in learning,	
		built infrastructure)	actions)	

Your Planned work

#### Intended or unintended results





#### **Results Chain**



Research results

Development results

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#### Disease resistant tomato variety R&D project



#### **Means of verification**

Example of disease resistant tomato cultivar (R&D project)

Stage	Indicators of achievement	Means of verification	
Impact	Higher income More stable income	From a survey of tomato growers	
Outcomes	Farmer adoption rate Higher yields	From a survey of seed distributors and tomato growers	
Outputs	Yield of new cultivar Qty of seed distributed	Measure in field and farm trials; record qty of seed	
Inputs / activities	<pre># resistant breeding lines; # selected lines; # crosses</pre>	Screening of field experiments; count lines affected plants <10%	- Monitoring



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#### Our 4x4 table is called the Logical framework (log frame matrix)

Stage	Indicators of achievement	Means of verification	Important risks and assumptions
Impact	Higher income More stable income	growers	
Outcomes	Farmer adoption rate Higher yields	From a survey of seed distributors and tomato growers	
Outputs	Yield of new cultivar Qty of seed distributed	Measure in field and farm trials: record ant of seed	
Inputs / activities	# resistant breeding lines; # selected lines; # crosses	Screening of field experiments; count lines affected plants <10%	



#### **Risks and assumptions**

Example of disease resistant tomato cultivar (R&D project)

Stage	Indicators of achievement	Means of verification	Important risks and assumptions
Impact	Higher income More stable income	From a survey of tomato growers	Tomato price is stable
Outcomes	Farmer adoption rate Higher yields	From a survey of seed distributors and tomato growers	Private or public sector interested to multiply the seeds
Outputs	Yield of new cultivar Qty of seed distributed	Measure in field and farm trials; record qty of seed	Find farmers willing to try it out
Inputs / activities	# resistant breeding lines; # selected lines; # crosses	Screening of field experiments; count lines affected plants <10%	Lines are suitable for crossing



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**Project Title: "School Gardening promotion project: Improving nutrition by agriculture diversification"** 

Vegetables Go to School: Improving Nutrition by Agricultural Diversification is a project to address malnutrition, particularly among children, by establishing comprehensive school vegetable garden programs in selected countries in Africa and in Asia. The project is supported by the <u>Swiss Agency for Development and</u> <u>Cooperation.</u>





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## **Example of logframe matrix for vegetable go to school project (AVRDC)**

Table 3 Example logframe matrix of a development project promoting school vegetable gardens

Results chain	Measurable indicators	Means of verification	Important assumptions
Impact/objective: - School vegetable garden based approaches improve nutrition among school children aged 6- 12 years within 2 years	<ul> <li>Dietary diversity</li> <li>Vegetable consumption</li> <li>Anthropometry, e.g., stunting, wasting</li> </ul>	<ul> <li>Food diaries, student weight and height at start and end of the school year for control and beneficiary schools</li> </ul>	
Outcome: - School vegetable gardens adopted and awareness among children raised	<ul> <li>Number of school girls and boys reached</li> <li>Food knowledge</li> <li>Preference for healthy foods</li> </ul>	<ul> <li>Monitoring forms.</li> <li>Food knowledge and food preference test conducted at start and end of the school year for control and beneficiary schools</li> </ul>	<ul> <li>School teachers are motivated and adjust the teaching curriculum</li> <li>Students are interested in the school gardens</li> </ul>
Outputs: - Prototype school vegetable garden designed - Project and control schools selected - Training materials available	<ul> <li>Production technologies made available (including crops, manuals, seed kits, etc.)</li> </ul>	<ul> <li>Selected vegetables and technologies posted on website for each school</li> <li>Seed distribution recorded using tracking forms</li> </ul>	<ul> <li>Schools have no technical constraints that cannot be solved (such as lack of water)</li> </ul>
Activities: - Training of trainers - Designing location-specific growing schedules - Randomly selecting control and beneficiary schools	<ul> <li>Names and number of trainers trained</li> <li>Number of schedules developed</li> <li>Names and number of project schools</li> </ul>	<ul> <li>Workshop registration list and feedback forms.</li> <li>Schedules posted on the website for each school.</li> <li>Name and location of school posted on website.</li> </ul>	<ul> <li>Local governments endorse the project</li> <li>Randomly selected schools are willing to participate in the project</li> </ul>
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# Exercise 5: Logframe Exercise for your project

Results Chain	Measurable	Means of verification	Important
	Indicators		assumptions
Impact/ objective:	1.		
	2.		
Outputs:	1.		
	2.		
	3.		
Outcomes:	1.		
	2.		
	3.		
Activities	1.		
	2.		
	3.		
	4.		





#### **Impact Evaluation / Assessment**

Why we want to know it?



- Accountability
- Resources are limited; their efficient use is important
- Verify and improve quality & effectiveness
- Address the concerns of skeptics
- Global shift in focus from outcomes to impacts (e.g. MDGs and now SDCs have clear measurable targets) and embraced by all major donors.

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#### 2. Evaluation answer important questions

- Did the project address the true development needs of the target population?
- Who were the main beneficiaries and who in the target population was excluded?
- Is it likely that project outcomes can be sustained after the project?
- Under what conditions can project outcomes be replicated and scaled up?



# Attribution Challenge at higher level of outcomes indicators

(6) Household Status: (5) + age, smoking and drinking habits, exercise levels, accidents, risk taking behaviors

(5) Household Income: (4) + food supplies, perceptions, awareness, food preparation methods, food preferences

(4) Household Income: (3) + Non-farm income, education, wages, remittances, family events

(3) Farm productivity: (2) + other technologies, output prices

(2) Crop yields: (1) + weather, resources, soils

1)Technology adoption

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\* Number of confounding factors increases

\* Impact of the technology becomes smaller in relative terms



#### **Baseline, Project intervention and Impact**





### **Program Evaluation and Impact**



## Solving counterfactual problem



What would happen to the farmer if he had not received the intervention (improved seed): Solves counterfactual problem, but that is not possible to know.





Can we compare the income of farmers who adopted the improved seed with who didn't?



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#### **Quantitative methods of evaluation**

- Experimental
- Non-experimental
- Quasi-experimental





#### **Best option: Experimental Methods: Randomized control design/ trail**



# Randomized selection of control and treatment in RCTs (source: AVRDC)





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#### **3. Randomized Controlled Trials** Avoiding biases through randomization

**Example of tomato-resistant variety** 

- 1. Identify villages for which the tomato is suitable
- 2. Randomly select a subsample of villages
- 3. Conduct baseline
- 4. Randomly allocate to the treatment and control group
- 5. Verify baseline
- 6. Introduce tomato to treatment villages. Promote it!
- 7. In 2<sup>nd</sup> year, collect follow up data
- 8. Quantify the impact





#### **Collect baseline data**

- Quantify **pre-intervention levels** of all outcome indicators
- Include all factors, apart from the project intervention, that may also affect the outcomes (eg. resources, education levels, experience, location, age)
- Verify that the treatment and control groups are statistically equivalent (reallocate if not)

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# When to do the baselines for evaluation ?

#### Preferred:

- Prior to project intervention (attribution)

#### **Acceptable after the intervention:**

- if there is delay between project activities and their measurable effect on outcome and impact performance indicators.
- But don't wait for too long.



#### **Importance of Baseline studies**

- It is a starting point for a project:
  - Serves as a benchmark for all future activities.
- Establishing priority areas/planning:
  - Especially true when a project has several objectives.
  - Aspects of a project needing greater focus.
- Attribution:
  - Attributing change in target population to the project activities
- Evaluation:
  - Normally same baseline tools used during evaluation.
  - Minimize time and resources for designing evaluation tools
- Donor requirement:
  - Baseline integral for M&E and for donor to monitor project success during and after implementation.





### Conduct a follow up survey

Use the same indicators/ questionnaire standard as used for the baseline

 Conduct the follow up survey at the same time of the year (to avoid seasonal effects) example: Leafy Mustard in Cambodia

Interview the same respondent (avoid attrition problems)



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#### **Practical challenges with RCTs**

Addresses the selection bias and impacts can be attributed BUT

- Control group contamination
- Spillover effect
- Uncontrolled access to technology
- Imperfect compliance/retention
- Is it ethical ? Control group: Nothing, Placebo
- Will it be acceptable by the population/ patients/ farmers?



#### Randomization difficult in development projects





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## **Exercise of selecting random sample**





#### **Non-experimental Designs**

Descriptive methods of impact evaluation (not an analytical method)

**1. Before and After comparison of the beneficiaries** 

1. With and without comparison





#### **Non-experimental design** 1. Before and after comparison of beneficiaries





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#### Non-experimental design 1. With and without intervention comparison





#### **Quasi-experimental designs: Second best**

- Randomized experiments difficult
- Non-experimental have attribution problem and selection bias

**Quasi- experimental designs:** Nonrandomized Comparison Groups with Statistical Controls (aims to reduce selection bias)

- 1. Propensity Score Method (PSM)
- 2. Difference-in-Differences (DD) method

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3. Instrumental Variable Approach



#### **2. Propensity Score Matching** Match each adopter with its most similar non-adopter





## Population of adopters

## Population of non-adopters

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#### **1. Difference-in-Differences method** Combines with vs. without & before vs. after

	Without	With	Difference	
Before	P1	P2	P2 – P1	First, they are this different
After	C1	C2	C2 – C1	Then, they are this different
Difference	C1 – P1	C2 – P2	Double difference	
	Change in the	Change in the		

Change in the Change in the without group with group

Double difference: (Diff A4 – Diff B4)

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#### **1. Difference-in-Differences method** Combines with vs. without & before vs. after





#### **1. Difference-in-Differences method** Combines with vs. without & before vs. after

#### Advantage

- Straightforward method
- Much more robust than one-directional comparisons

#### **Disadvantage:**

- Changes in the without-group must accurately represent the changes that would have occurred in the with-group had the technology not been introduced
- Yet, we can never be sure of this so we can't rule out selection bias

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• Spillovers



#### Take away?

- 1. Impact assessment is not easy
- 2. Self-selection bias of adopters makes it difficult to find a valid control group
- 3. The use of DD and PSM can help
- 4. RCTs are more robust
- 5. If is always important to **randomize** and to collect **baseline** data.



#### How can we do better M&E

- Many limitations of quantitative methods
- Qualitative methods do not replace quantitative methods but will complement
- Mixed with Participatory methods is even better





#### Qualitative vs. Quantitative evaluation (data collection methods)

#### Quantitative

These method are usually easier to summarize and compare and to generalize.

These methods use instrument that can be administered to large number of respondents at once, therefore making collecting data from many respondents more reasonable (law of large numbers)

Surveys or questionnaires

Questionnaires that ask close-ended questions such as pre and post-tests

Clinical test, blood test (for iron deficiency) or other nutrient deficiency

#### Qualitative

Methods such as interviews and observations, are often-time intensive, making them difficult tot use with a very large number of respondents

Description of problems, behaviors, attitude, experience etc. These methods provide stories that illustrates the nature of the problem, ways to address problems.

In-depth interviews

Focus groups/ key informants

Open-ended / semi-structured questionnaires

Observation

Logs, journal, diaries, document reviews

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Mixed approach, best approach


## **Participatory Methods: Next Week**



