Presentation 2024

# FOOD AND NUTRITION SECURITY VULNERABILITY TO THE DON SAHONG HYDROPOWER DAM

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# Introduction

- Dams and reservoirs are the most common types of man-made infrastructure on the planet

- Humanity began construct dam as a method of utilizing water resource, avoiding natural challenge, electricity

# Introduction

•Mekong river is the world 's 12 longest river, and one of the 35 global hotspots (Winemiller, K.O. 2014)

•The Mekong River is home to around 1200 species, with 18% of the total diversity being indigenous to the system (Pin et al., 2020)

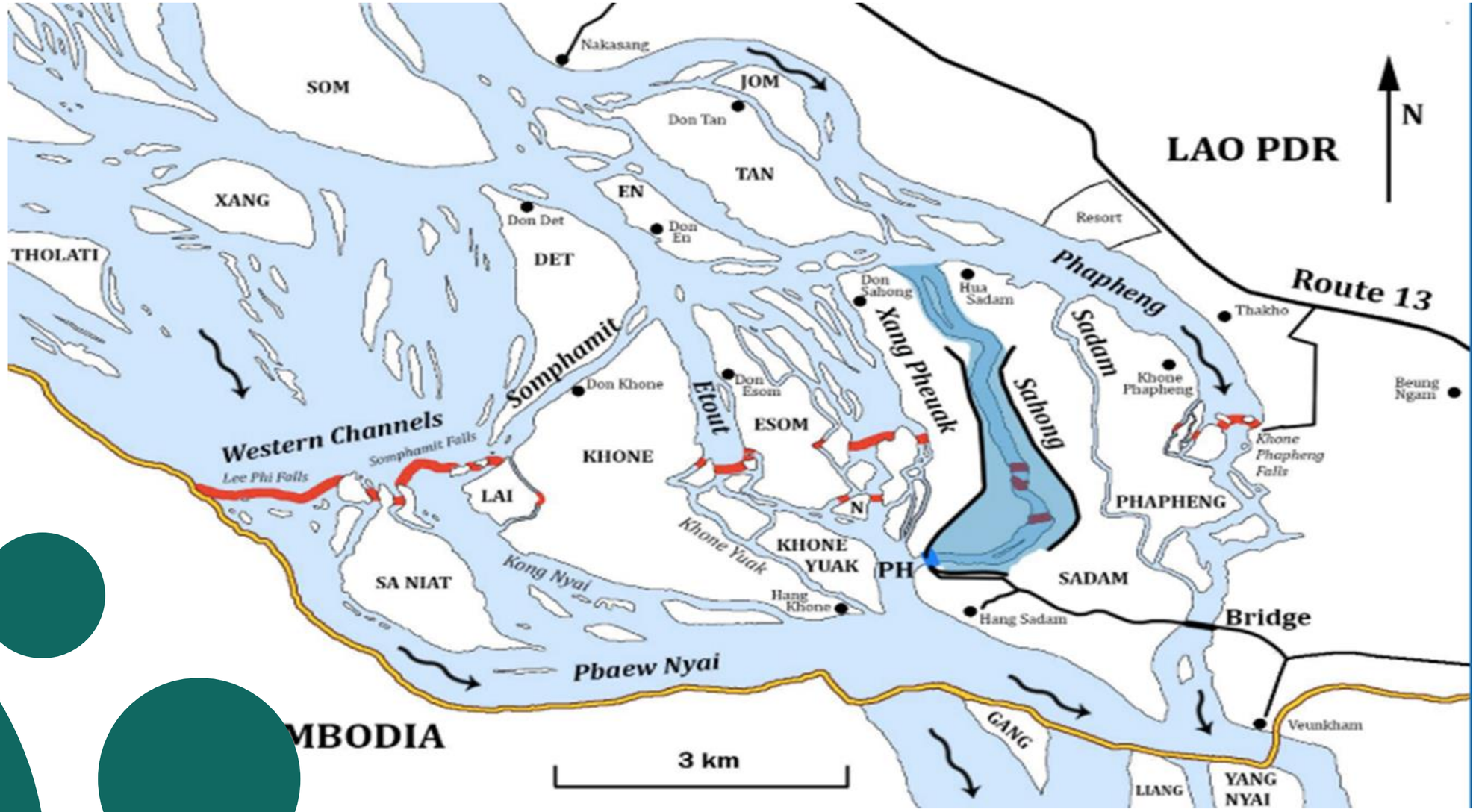
•The harvest from wild capture fisheries in Laosamounts to 64,600 tons, accounted 78% of the country’s total fish

•The Mekong River Basin is unique globally in that the annual variations between low water and high water volumes in the mainstream river .

•The broad difference in ecological and hydrological conditioncause fish and other aquatic need to be move to difference location to be survive (Baird, 2014)

# The Khone Fall and Don Sahong Channel

# Don Sa Hong Channel



# Objectives

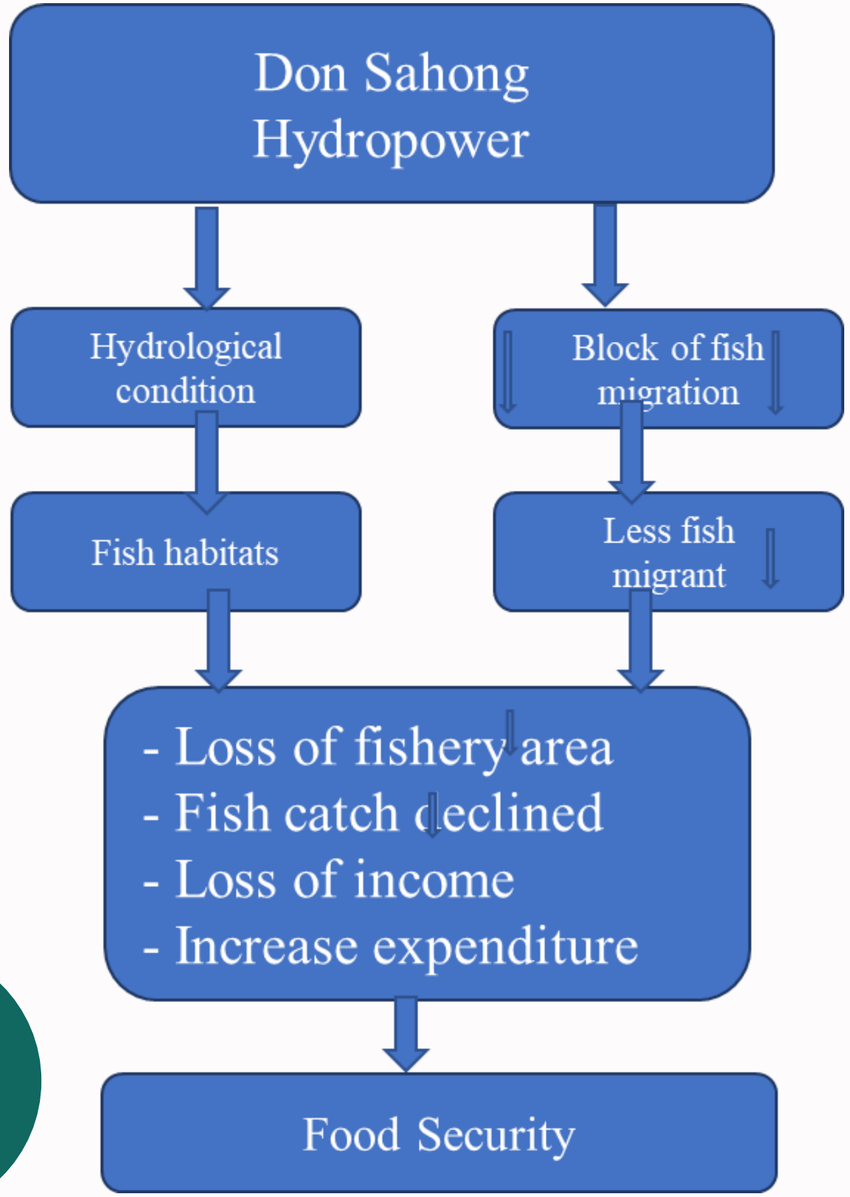
01

To examine the impact of the Donsahong Hydropower Project on food and nutrition security vulnerability of the local communities.

To provide relevant stakeholders with policy recommendations to mitigate the effects of Donsahong Hydropower Project on on food and nutrition security vulnerability.

02

# Conceptual Framework



# METHODOLOGY

## Sample Selection

- In the first stage, Khong district was selected
- In the second stage 12 villages (both affected and non-affected)

## Methodology

- Endogenous switching regression (ESR) was employed
- Due to it can controls for biases originating from both observed and unobserved sources (Lokshin & Sajaia, 2004)

## More detail about sample

- household has been identified as affected if they used to fishing or living along the Sahong channel before building dam
- non-affected if they never fishing or living along the Sahong and Sa Dam channel before building dam.

# Variable

| Variable | Definition | Measurement |
|---|---|---|
| Dependent variable: being effected by dam construction (first stage) | Household who live, and used to fishing along Sahong channel, and Sadam channel. | Dummy, assumes 1 if household affected, 0 otherwise |
| HFIAS | Househole food | The continous index |
| (second stage) | insecurity status as define in (Coates et al., 2007) | measure between 0 and 27 |
| (HDDS) | Households Dietary Diversity score (Abafita & Kim, 2014) | The continous index |
| (second stage) | | measure between 1 and 15 |
| Gender | Gender of the | dummy variable: |
| | household head | 1 if the head is male and otherwise |
| Status | Marital status of | dummy variable: |
| | household head | 1 if the head is married and otherwise |
| Edu | Education of the | Measure in year |
| | household head | |
| Age | Age of the | Measure in year |
| | household head | |
| Souceofincome | Number of income | Continuos |
| | source, agiven household has | |
| Credit | Credit status of a | dummy variable: |
| | household | 1 if family loan form financial institution and otherwise |
| Lgincome | Land owned by household, both agriculture and non-agriculture | hectares |

# Sample selection

| No | Description | Number of questionnaires |
|---|---|---|
| **Non-Affected Villages** | | 119 |
| 1 | Hinsew Village | 29 |
| 2 | Muangsene Village | 30 |
| 3 | Haoy Village | 30 |
| 5 | Na Village | 30 |
| **Affected Villages** | | 163 |
| 6 | Done Khone Village | 39 |
| 7 | Done Det Village | 39 |
| 8 | Done Sahong Village | 45 |
| 9 | Done Sadam Village | 40 |
| **Total** | | 285 |

# Methodology

## Involves a two-step procedure (Lokshin & Sajaia, 2004)

- In the first step, , the binomial probit regression was used to estimate the probability of a given household being affected by the construction of the dam

$$SD_i^* = \alpha Z_i + \mu_i$$

$$SD_i^* = \begin{cases} 1 \; if \; SD_i^* > 0 \\ 1 \; if \; SD_i^* \leq 0 \end{cases}$$

Where, $SD_i^*$ is an unobserved latent variable that depends on whether a given household is affected or not due to the dam construction

In the second step, one derives separate food insecurity regressions for those affected and non- affected households. These regression functions can be given as follows.

For affected : $FI_{1i} = \beta_{i1} X_{1i} + \theta_1 \widehat{\lambda_{1i}} + \varepsilon_{1i} \; if SD_i^* = 1$

on-affected : $FI_{1i} = \beta_{2i} X_{2i} + \theta_1 \widehat{\lambda_{2i}} + \varepsilon_{2i} \; if SD_i^* = 0$

# Character of Sample household : (Continous variables)

| Variables | Mean | Std.dev | Affected household (163) | Not-affected (119) |
|---|---|---|---|---|
| | | | Mean | Mean |
| Age (years) | 48.61 | 13.95 | 49.26 | 47.72 |
| Edu (years) | 6.49 | 3.67 | 5.36 | 8.03 |
| Souceofincome | 2.62 | 1.24 | 2.43 | 2.88 |
| lgIncome | 17.644 | 0.864 | 17.495 | 17.849 |

# Character of Sample household (Categorical variables)

| Variables | | Frequency | % | Affected household (163) | | Not-affected (119) | |
|---|---|---|---|---|---|---|---|
| | | | | Frequency | % | Frequency | % |
| Gender | Female | 28 | 9.93 | 17 | 10.43 | 11 | 9.24 |
| | Male | 254 | 90.07 | 146 | 89.57 | 108 | 90.76 |
| Status | Single | 35.00 | 12.41 | 21 | 12.88 | 14 | 11.76 |
| | Maried | 240.00 | 85.11 | 136 | 83.44 | 104 | 87.39 |
| | Windows | 7.00 | 2.47 | 7 | 3.68 | 1.00 | 0.84 |
| Credit | No | 185.00 | 65.6 | 114 | 69.94 | 71 | 59.66 |
| | Yes | 97 | 34.4 | 49 | 30 | 48 | 40 |

# House hold's Food Security Indicator

| Food security indicator | Non-affected | | | | Affected | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max |
| HFIAS | 5.59 | 7.31 | 0 | 27 | 7.76 | 6.52 | 0 | 27 |
| HDDS | 6.06 | 1.63 | 3 | 11 | 5.76 | 1.43 | 3 | 9 |

# Parameter estimates of the endogenous switching regression model (HFIAS)

| Variables | Affected household (163) | | Not-affected (119) | |
|---|---|---|---|---|
| | Coef. | z | Coef. | z |
| gender | -0.0904 | 1.756929 | -1.918282 | -1.58 |
| status | 4.681*** | 1.034158 | 1.593891 | 1.5 |
| edu | -0.2916** | 0.1602374 | -0.1401862 | -1.26 |
| age | 0.0210678 | 0.034759 | -0.0568** | -1.89 |
| sourceofincome | -0.2876243 | 0.4683377 | 0.0087718 | 0.03 |
| credit | 0.4116839 | 1.18343 | 0.5176607 | 0.68 |
| lgincom | -0.2052152 | 0.6740731 | -2.717** | -5.43 |
| _cons | 12.2298 | 11.22278 | 57.415** | 6.62 |
| /lns0 | 1.334172 | | | |
| /lns1 | 1.978854 | | | |
| /r0 | -0.2010602 | | | |
| /r1 | -0.7132133 | | | |
| | | | | |
| sigma0 | 3.796849 | | | |
| sigma1 | 7.234448 | | | |
| rho0 | -0.198394 | | | |
| rho1 | -0.6126878 | | | |
| Log likelihood = - | 994.03955 | | | |
| Wald test $\chi^2(7)$ = | 41.99 | | | |
| LR test of indep. eqns. : $\chi^2(2)$ | 10.42*** | | | |

# Parameter estimates of the endogenous switching regression model (HDDS)

| Variables | Affected household (163) | | Not-affected (119) | |
|---|---|---|---|---|
| | Coef. | z | Coef. | z |
| gender | -0.1168 | -0.3500 | 0.3037 | 0.6900 |
| status | -0.41268** | -2.1800 | 0.3731 | 0.9700 |
| edu | 0.0517* | 1.7100 | 0.0227 | 0.5500 |
| age | -0.0113* | -1.7400 | 0.0092 | 0.8500 |
| sourceofincome | -0.0318 | -0.3600 | -0.0874 | -0.7700 |
| credit | 0.1668 | 0.7600 | 0.0213 | 0.0800 |
| lgincom | 0.8203*** | 6.5900 | -1.108*** | 6.1400 |
| _cons | -7.343*** | -3.5400 | -14.45*** | -4.6400 |
| /lns0 | 0.3248 | | | |
| /lns1 | 0.2640 | | | |
| /r0 | 0.2793 | | | |
| /r1 | -0.6261 | | | |
| | | | | |
| sigma0 | 1.3837 | | | |
| sigma1 | 1.3022 | | | |
| rho0 | 0.2722 | | | |
| rho1 | -0.5554 | | | |
| Log likelihood = - | -610.88 | | | |
| Wald test $\chi^2(7)$ = | 49.61 | | | |
| LR test of indep. eqns. : $\chi^2(2)$ | 3.93*** | | | |

# Marginal effect of the dam construction on food security

| Food Insecurity Index | Mean | Std.Dev |
|---|---|---|
| $E(FI_{2i} \mid SD_i^{\square} = 1)$ | 11.35576 | 3.6875 |
| $E(FI_{1i} \mid SD_i^{\square} = 1$ | 5.793765 | 2.671962 |
| ATT | 5.56*** | |

| HDDS | Mean | Std.Dev |
|---|---|---|
| $E(FI_{2i} \mid SD_i^{\square} = 1)$ | 6.396129 | 3.6875 |
| $E(FI_{1i} \mid SD_i^{\square} = 1$ | 6.080827 | 2.671962 |
| ATT | 0.315*** | |

# Conclusion and Recommendation


- Higher levels of food insecurity and lower dietary diversity among households affected by the dam's construction
- This suggests that the dam has had a detrimental effect on the availability and accessibility of food for these households
- These findings underscore the need for comprehensive impact assessments and sustainable planning practices in infrastructure development projects
- By understanding these relationships, policymakers and stakeholders can make informed decisions and implement sustainable development practices that prioritize both infrastructure needs and the well-being of local communities.

# THANK YOU