# Risk Factors affecting Project Implementation in the National Irrigation Administration: A Basis for an Updated Risk Register

***Paulo Denise L. Praiwan [1], John Carlo R. Tadeo[1], Rick Donald Sy Manzon[2], Joefil C. Jocson[2]***

[1]*Student, Graduate School, Master of Engineering Management, Nueva Ecija University of Science and Technology, Cabanatuan City, Philippines.*

[2]*Professor, Graduate School, Master of Engineering Management, Nueva Ecija University of Science and Technology, Cabanatuan City, Philippines.*

*Corresponding Author: paulopraiwan07@gmail.com*

**Abstract: -** Any project will unavoidably include some level of risk during its implementation or completion. These are often seen as factors that have an impact on the project's cost, schedule, and quality goals. As a result, a risk management strategy is required to control these hazards. One such strategy is the creation of a risk register, which is a requirement of the National Irrigation Administration, which is primarily responsible for maintaining and creating irrigation systems. This study aims to validate the current risk registry of a certain Irrigation Management Office by identifying the impact or importance of the risks using the Risk Assessment Matrix and Relative Importance Index (RII), determine any additional risks based on the views of relevant stakeholders involved in the construction project implementation and assessed its risk level and RII, and propose an updated list of risk factors for the Risk Registry focusing on the construction project implementation of the agency for recommendation. Using a descriptive research method, the researchers revealed that there are thirteen (13) factors that needs to be considered in the proposed risk registry of the involved Irrigation Management Office wherein five (5) were from the current risk registry while eight (8) of which were from the recommendations of relevant stakeholders. Overall, it is recommended for the risk registry to be updated, as well as further study of the subject matter.

**Key Words: —** ***Personality Prediction, AI, HR, OCEAN Model, Decision Tree.***

## I. INTRODUCTION

### *1.1 BACKGROUND*

There is no way to avoid discussing risk in the era of raging globalization because it has become a necessary component of daily living. Everywhere, in every aspect of life, there is a risk. Construction is one such sector where risk is a constant factor (Szymanski, 2017). Any project's execution or construction will inevitably include some level of risk.

Manuscript revised December 25, 2022; accepted December 26, 2022. Date of publication December 28, 2022.

This paper available online at www.ijprse.com

ISSN (Online): 2582-7898; SJIF: 5.59

These are typically viewed as things that affect the project's goals for cost, schedule, and quality. Risks in this industry include risks on project management process, financial risks which may include local tax system, inflation, and currency rates, legal risks, safety risks, and environmental risks.

A risk management plan must then be created early in the planning phase for construction in order to address risks as they arise. To limit risks, make decisions about how to handle them, and use them to strengthen your business, a good risk management plan must have clear-cut yet thorough procedures. Having a risk management strategy is more important than ever due to the occurrence of rising expenses, new industry trends, more complex projects, and heightened safety concerns. Thus, companies and agencies who are involved in construction project implementation must create a plan for them to know how to mitigate and/or address the risks that they may have

encountered and one of which is the National Irrigation Administration.

The National Irrigation Administration (NIA) is a government-owned and controlled corporation and is largely in charge of managing and developing irrigation systems. On June 22, 1963, Republic Act (RA) 3601 established it. Presidential Decrees (PD) 552 from September 11, 1974, and 1702 from July 17, 1980, each altered the organization's charter. Both the Agency's financing and its scope of jurisdiction were expanded. The agency's mission is to plan, construct, operate and maintain irrigation systems consistent with integrated water resource management principles to improve agricultural productivity and increase farmers' income. In this light, one of the agency's goals is to construct irrigation systems in support of the agricultural program of the government.

However, just like any project implementing body, the agency is not exempted from the risks that are included with any construction project implementation. Thus, the office implements a risk management procedure that conforms with the ISO 31000:2018 standard to establish, document, and maintain a procedure for risk management of the National Irrigation Administration and to define the system for assessment, which includes identification, analysis, and evaluation, and treatment of risks and opportunities (NIA, 2020).

One of the requirements to conform to this standard is the development of a risk registry. While largely used for regulatory compliance, risk registers also assist project managers in keeping track of project hazards (Everitt, 2022). The International Organization for Standardization (ISO) describes a risk register as "a record of information concerning identified risks." However, as new policies are continuously being formed and different situations arise, there is a need to assess the current risk registry of the agency and update it with the help of different relevant stakeholders especially risks that affects construction project implementation before a new construction year begins.

In this matter, the researchers assessed and recommended an updated risk registry of a certain Irrigation Management Office of the National Irrigation Administration. The goal of this study is to assess or validate the current risks being considered in the risk registry of the agency by determining the Risk Level and Relative Importance Index (RII) of each of the considered risks and include the risks based on the opinions of relevant stakeholders of the office.

### 1.2 Significance of the Study (Knowledge Gap)

In the construction sector, risk management is a crucial component of project planning and management. Risk management studies and addresses a variety of hazards connected to building projects, such as financial risks, environmental risks, socio-economic risks, and risks related to construction. Nobody was ever unaware of the environment's turbulence and erratic nature in the building sector. It is easily influenced by outside elements (technical, design, logistics, physical, operating, environmental, socio-political, force majeure, etc.), which have the potential to both sabotage initiatives and produce an irreversible aberration. As a result, risk management becomes a crucial tool that aids in the identification of potential risks, their analysis, and the corrective actions that might be taken to avoid them in each project.

Throughout the course of a construction project, there exist hazards. When a danger arises, you must be able to recognize it and take prompt action with the proper risk response. In this light, the National Irrigation Administration needs an updated risk registry to be able to take the necessary action and response if they have encountered a certain risk within that registry.

This would greatly benefit project engineers so that upon encounter of any risk, they will be able to address them properly and not create any further risks or worsen the situation that they may experience.

### 1.3 Objectives of the Study

- Validate the current risk registry of a certain Irrigation Management Office by identifying the impact or importance of the risks using the Risk Assessment Matrix and Relative Importance Index (RII).
- Determine any additional risks based on the views of relevant stakeholders involved in the construction project implementation and assessed its risk level and RII.
- Proposed an updated list of risk factors for the Risk Registry focusing on the construction project implementation of the agency for recommendation.

### 1.4 Scope and Limitation

The study is limited to the determination of the impact or importance of the current risks indicated in the risk registry of a previous Irrigation Management Office of the National

Irrigation Administration and to create a comparison of its current impact description of each risk level and relative importance index. This will also include the determination of any additional risks based on the views of relevant stakeholders involved in the construction project implementation and assessed its risk level and RII. After which, the researcher shall combine the aforementioned data to develop an updated Risk Registry focusing on the construction project implementation of the agency for recommendation.

## II. METHODOLOGY

The study utilized a descriptive research method. Descriptive research is a type of analysis that focuses on outlining the features of the population or issue under study. This descriptive methodology emphasizes the "what" of the research issue more so than the "why."

Without concentrating on "why" a certain occurrence happens, the descriptive research method primarily focuses on characterizing the nature of a demographic segment. In other words, it "describes" the research's subject without explaining "why" it occurs.

Moreover, descriptive research is quantitative research that aims to gather measurable data for the population sample's statistical analysis. It is a well-liked market research instrument that enables us to gather and explain the characteristics of the demographic segment.

### *2.1 Description of the Study Area*

The study area includes the risk registry of the Bulacan-Aurora-Nueva Ecija Irrigation Management Office of the National Irrigation Administration Regional Office No. III. However, since the 1st of August of 2022, the office has been subdivided into two (2) irrigation management office namely Bulacan Irrigation Management Office and Aurora-Nueva Ecija Irrigation Management Office. In this study, the researcher shall only take into consideration the risks that may affect the Aurora-Nueva Ecija Irrigation Management Office. The study is also considered to be very timely because of the current changes being applied to the office which they may include in their 2023 Risk Registry which will be their first risk registry as a separate office from the Bulacan Irrigation Management Office.

NIA-Aurora-Nueva Ecija Irrigation Management Office develops the potential irrigable areas of the two (2) provinces into national and communal systems, namely Aurora and Nueva Ecija with 33,956.74 hectares of potential service area. The total developed area for the two (2) provinces as of the 3rd quarter 2022 is 25,309.26 has. or 74.53% of the total potential area with 8,647.48 has. remaining area for development.

The office started as a separate Aurora Provincial Irrigation Management Office (PIMO) and Nueva Ecija PIMO under NIA Regional Office No. III. Based on the NIA Rationalization Plan (RAT Plan) under Executive Order No. 718, these offices were merged to Bulacan PIMO thus, creating Bulacan-Aurora-Nueva Ecija Irrigation Management Office (BANE IMO) on 2008.

On October 11, 2021, Executive Committee Resolution No. 38 s. 2021 was approved wherein the existing National Irrigation Systems of NIA-UPRIIS that are not within the service area of Pantabangan Dam shall be transferred under the management of NIA Regional Office No. III. This shall add two (2) existing national systems (i.e. Upper Tabuating Irrigation System and Aulo Irrigation System) to the Province of Nueva Ecija and one (1) on-going national irrigation system (i.e. Balbalungao SRIP) in the same province. The two (2) existing systems will increase the service area of the office by 1,700.87 hectares which is scheduled to be transferred on December, 2022. Aside from the National Irrigation Systems, the office also serves Communal Irrigation Systems covering a service area of 25,309.26 hectares with 15,810 farmer-beneficiaries for both provinces (NIA ANE IMO, 2022).

### *2.2 Data Collection*

The data in this study was collected using a typical survey questionnaire method. The purpose of a questionnaire is to collect information from respondents about their attitudes, experiences, and opinions. You can gather quantitative and/or qualitative data with questionnaires. In the social and health sciences as well as market research, questionnaires are frequently utilized. However, only a few research questions are suitable for a questionnaire survey. Its applicability is determined by the types of data required to address a research issue and the subjects the researcher wants to interview. Surveys should not be used to gather data on delicate subjects like sexual orientation or illegal behavior (Preston, 2009).

More so, the study utilized a risk assessment matrix (see Figure 1) which is also referred to as a probability and severity risk matrix, it is a visual tool that illustrates various risks that could harm an organization. The possibility that the risk event will occur and the possible impact that it will have on the business are two intersecting aspects that form the basis of the risk

matrix. In other words, it's a tool that enables you to see how likely a risk is compared to how serious it is.

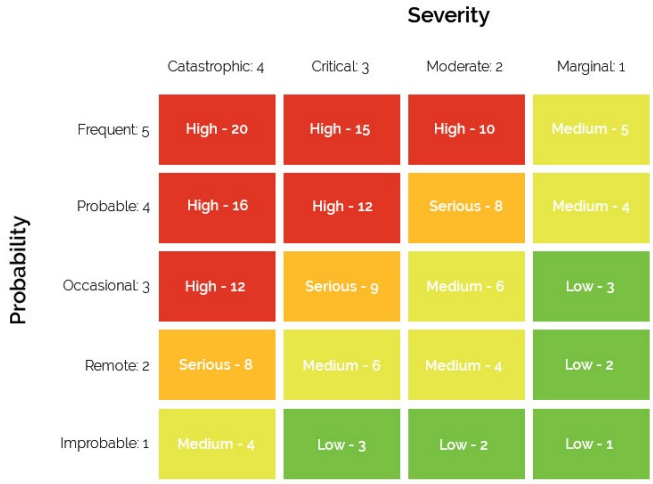


Fig.1. Risk Assessment Matrix

On the other hand, the study also utilized the Relative Importance Index (RII) through a 5-point Importance Likert Scale which is described as follows:

Table.1. 5-point Importance Likert Scale

| Score | Range | Description |
|---|---|---|
| 1 | 1.00 – 1.49 | Not Important all |
| 2 | 1.50 – 2.49 | Somewhat Unimportant |
| 3 | 2.50 – 3.49 | Neutral |
| 4 | 3.50 – 4.49 | Somewhat Important |
| 5 | 4.50 – 5.00 | Extremely Important |

Moreover, the Relative Importance Index (RII) is used to determine the relative importance of the various risks to be considered. The RII will then be computed using:

$$RII = \frac{\sum W}{A \; x \; N}$$

Where W denotes the respondents' weightings (ranging from 1 to 5) for each factor, and A denotes the highest weight. N is the overall number of responders, with W being the weight (in this example, 5). The risk is taken into consideration more critically the higher the RII value.

## III. Results and Discussion

### *3.1 Level of Risk of the Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry*

Table.2. Level of Risk of The Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry

| Issue/s Arising from Processes | Cause/s of Issue/s | Risk | Severity | Probability | Risk Rating | Risk Level |
|---|---|---|---|---|---|---|
| Intervention of indigenous people resulting to delays with regard to some project implementation | Preservation of indigenous people's environment | Delayed implementation of projects | 2 | 2 | 4 | Medium |
| Calamities, typhoons, earthquakes, etc. | Force majeures | Delayed implementation of projects and damage to build structures | 4 | 3 | 12 | High |
| Delayed release of funds | Proposed national budget not yet approved | Delayed implementation of projects | 3 | 3 | 9 | Serious |
| Illegal Informal Settlers | Lack of authority to prohibit illegal informal settlers | Delayed implementation of projects | 4 | 3 | 12 | High |
| Request for cutting of trees may not be granted | Lack of supporting papers | Delayed implementation of projects | 3 | 1 | 3 | Low |

*Interpretation:*

*Probability*
*5 - Frequent*
*4 - Probable*
*3 - Occasional*
*2 - Remote*
*1 - Improbable*

*Severity*
*4 - Catastrophic*
*3 - Critical*
*2 - Moderate*
*1 - Marginal*

Currently, there are five (5) risk factors that affect the project implementation in the risk registry of the Bulacan-Aurora-Nueva Ecija Irrigation Management Office. These are (1) intervention of indigenous people resulting to delays with regard to some project implementation with a severity level of 2 and probability level of 2, this has a risk rating of 4 and a medium risk level; (2) calamities, typhoons, earthquakes, etc. with a severity level of 4 and probability level of 3, this has a risk rating of 12 and a high risk level; (3) delayed release of funds with a severity level of 3 and probability level of 3, this has a risk rating of 9 and a serious risk level; (4) illegal informal settlers with a severity level of 4 and probability level of 3, this has a risk rating of 12 and a high risk level and; (5) request for cutting of trees may not be granted with a severity level of 3 and probability level of 1, this has a risk rating of 3 and a low risk level.

### *3.2 Computed Level of Risk of the Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry*

Table.3. Computed Level of Risk of The Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry

| Issue/s Arising from Processes | Cause/s of Issue/s | Risk | Severity | Probability | Risk Rating | Risk Level |
|---|---|---|---|---|---|---|
| Intervention of indigenous people resulting to delays with regard to some project implementation | Preservation of indigenous people's environment | Delayed implementation of projects | 3 | 3 | 9 | Serious |
| Calamities, typhoons, earthquakes, etc. | Force majeures | Delayed implementation of projects and damage to build structures | 4 | 3 | 12 | High |
| Delayed release of funds | Proposed national budget not yet approved | Delayed implementation of projects | 3 | 3 | 9 | Serious |
| Illegal Informal Settlers | Lack of authority to prohibit illegal informal settlers | Delayed implementation of projects | 3 | 2 | 6 | Medium |
| Request for cutting of trees may not be granted | Lack of supporting papers | Delayed implementation of projects | 2 | 2 | 4 | Medium |

*Interpretation:*

*Probability*
*5 - Frequent*
*4 - Probable*
*3 - Occasional*
*2 - Remote*
*1 - Improbable*

*Severity*
*4 - Catastrophic*
*3 - Critical*
*2 - Moderate*
*1 - Marginal*

On the other hand, 20 relevant stakeholders from the office and the contractors of the office rated the current risk factors based on the risk assessment matrix. This revealed that (1) intervention of indigenous people resulting to delays with regard to some project implementation with a severity level of 3 and probability level of 3, this has a risk rating of 9 and a serious risk level; (2) calamities, typhoons, earthquakes, etc. with a severity level of 4 and probability level of 3, this has a risk rating of 12 and a high risk level; (3) delayed release of funds with a severity level of 3 and probability level of 3, this has a risk rating of 9 and a serious risk level; (4) illegal informal settlers with a severity level of 3 and probability level of 2, this has a risk rating of 6 and a medium risk level and; (5) request for cutting of trees may not be granted with a severity level of 2 and probability level of 2, this has a risk rating of 4 and a medium risk level.

### *3.3 Relative Importance Index of the Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry*

Table.4. Relative Importance Index of The Current Risk Factors of Bulacan-Aurora-Nueva Ecija IMO Risk Registry

| Issue/s Arising from Processes | Weighted Mean | Description | RII | Rank |
|---|---|---|---|---|
| Intervention of indigenous people resulting to delays with regard to some project implementation | 3.05 | Neutral | 0.61 | 5th |

| | | | | |
|---|---|---|---|---|
| Calamities, typhoons, earthquakes, etc. | 4.9 | Extremely Important | 0.98 | 1st |
| Delayed release of funds | 4.7 | Extremely Important | 0.94 | 2nd |
| Illegal Informal Settlers | 4.35 | Somewhat Important | 0.87 | 3rd |
| Request for cutting of trees may not be granted | 3.35 | Neutral | 0.67 | 4th |

*Interpretation:*

*1.00 – 1.49 Not Important all*
*1.50 – 2.49 Somewhat Unimportant*
*2.50 – 3.49 Neutral*
*3.50 – 4.49 Somewhat Important*
*4.50 – 5.00 Extremely Important*

The researchers also determined the Relative Importance Index (RII) of the current risk factors included in the risk registry of the Bulacan-Aurora-Nueva Ecija Irrigation Management Office. Using the 5-point Importance Likert Scale, it revealed that calamities, typhoons, earthquakes, etc. were considered to be the most important risk factor with a 4.9 weighted mean and 0.98 relative importance index, followed by delayed release of funds with a weighted mean of 4.7 and 0.94 relative importance index, illegal informal settlers with a weighted mean of 4.35 and 0.87 relative importance index, request for cutting of trees may not be granted with a weighted mean of 3.35 and 0.67 relative importance index, and intervention of indigenous people resulting to delays with regard to some project implementation with a weighted mean of 3.05 and 0.61 relative importance index.

### *3.4 Computed Level of Risk of The Additional Risk Factors For Aurora-Nueva Ecija IMO Proposed Risk Registry*

Table 5. Computed Level of Risk of the Additional Risk Factors for Aurora-Nueva Ecija IMO Proposed Risk Registry

| Issue/s Arising from Processes | Cause/s of Issue/s | Risk | Severity | Probability | Risk Rating | Risk Level |
|---|---|---|---|---|---|---|
| Farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems | The area of their farmlands will decrease | Delayed implementation of projects and may result to change of design | 3 | 2 | 6 | Medium |
| Continuous cropping of farmers despite on-going project implementation | Need of continuous income through continuous cropping | Delayed implementation of projects | 4 | 4 | 16 | High |
| Lack of coordination from Irrigators Association especially when settling papers on Right to Construct | Farmers are pre-occupied | Delayed implementation of projects | 4 | 2 | 8 | Serious |
| Citizens refusing to construct irrigation systems within or near their property | Personal decisions and safety reasons | Delayed implementation of projects and may result to change of design | 3 | 3 | 9 | Serious |
| Internal conflict within the members of the Irrigators Association about the design of the system | Farmers wants the canal to be near their farmlands | Delayed implementation of projects and may result to change of design | 3 | 4 | 12 | High |

| | | | | | | |
|---|---|---|---|---|---|---|
| Inactive officers of the irrigators association, members lack information about the project or changes | Farmers are pre-occupied | Delayed implementation of projects and may result to change of design | 3 | 2 | 6 | Medium |
| Equipment breakdowns of the contractor | Irregular check-up and maintenance of the equipment | Delayed implementation of projects | 2 | 3 | 6 | Medium |
| Delay in the delivery of materials to the site | Unworkability of the site, especially during rainy season; Lack of experience of site engineer | Delayed implementation of projects | 2 | 3 | 6 | Medium |

*Interpretation:*

*Probability*
*5 - Frequent*
*4 - Probable*
*3 - Occasional*
*2 - Remote*
*1 - Improbable*

*Severity*
*4 - Catastrophic*
*3 - Critical*
*2 - Moderate*
*1 - Marginal*

From the inputs of the 20 relevant stakeholders, the researchers determined an additional eight (8) risk factors for the proposed risk registry of the Aurora-Nueva Ecija Irrigation Management Office.

This includes (1) farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems with a severity level of 3 and probability level of 2, this entails a risk rating of 6 which can be interpreted as medium risk level; (2) continuous cropping of farmers despite on-going project implementation with a severity level of 3 and probability level of 2, this entails a risk rating of 6 which can be interpreted as medium risk level; (3) lack of coordination from Irrigators Association especially when settling papers on Right to Construct with a severity level of 4 and probability level of 2, this entails a risk rating of 8 which can be interpreted as serious risk level; (4) citizens refusing to construct irrigation systems within or near their property with a severity level of 3 and probability level of 3, this entails a risk rating of 9 which can be interpreted as serious risk level; (5) internal conflict within the members of the Irrigators Association about the design of the system with a severity level of 3 and probability level of 4, this entails a risk rating of 12 which can be interpreted as high risk level; (6) inactive officers of the irrigators association, members lack information about the project or changes with a severity level of 3 and probability level of 2, this entails a risk rating of 6 which can be interpreted as medium risk level; (7) Equipment breakdowns of the contractor of the project with a severity level of 2 and probability level of 3, this entails a risk rating of 6 which can be interpreted as medium risk level; and (8) delay in the delivery of materials to the site with a severity level of 2 and probability level of 3, this entails a risk rating of 6 which can be interpreted as medium risk level.

Conflicts arising from right to construct issues and request of compensation from the National Irrigation Administration is commonly encountered on communal irrigation systems. According to the Republic Act 10969, also known as the Free Irrigation Service Act, this law exempts all farmers with landholding of eight hectares and below from paying irrigation service fees for water derived from National Irrigation Systems (NIS) and Communal Irrigation Systems (CIS) that were, or are to be funded, constructed, maintained, and administered by the National Irrigation Administration (Senate of the Philippines, 2020).

In this light, the government provides free irrigation services in exchange of the cooperation of the involved irrigators association and the citizens of locations that may be affected by the construction of irrigation systems in aiding the office in implementing the project.

### *3.5 Relative Importance Index (RII) of The Additional Risk Factors For Aurora-Nueva Ecija IMO Proposed Risk Registry*

Table.6. Relative Importance Index (RII) of the Additional Risk Factors for Aurora-Nueva Ecija IMO Proposed Risk Registry

| Issue/s Arising from Processes | Weighted Mean | Description | RII | Rank |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems | 4.35 | Somewhat Important | 0.87 | 5th |
| Continuous cropping of farmers despite on-going project implementation | 4.55 | Extremely Important | 0.91 | 2nd |
| Lack of coordination from Irrigators Association especially when settling papers on Right to Construct | 4.15 | Somewhat Important | 0.83 | 6th |
| Citizens refusing to construct irrigation systems within or near their property | 4.5 | Extremely Important | 0.9 | 3rd |
| Internal conflict within the members of the Irrigators Association about the design of the system | 4.65 | Extremely Important | 0.93 | 1st |
| Inactive officers of the irrigators association, members lack information about the project or changes | 4.4 | Somewhat Important | 0.88 | 4th |
| Equipment breakdowns of the contractor | 3.35 | Neutral | 0.67 | 8th |
| Delay in the delivery of materials to the site | 3.75 | Somewhat Important | .75 | 7th |

*Interpretation:*

*1.00 – 1.49* *Not Important all*
*1.50 – 2.49* *Somewhat Unimportant*
*2.50 – 3.49* *Neutral*
*3.50 – 4.49* *Somewhat Important*
*4.50 – 5.00* *Extremely Important*

On the other hand, the relative importance index (RII) of the additional risk factors from the relevant stakeholders revealed the following: (1st) the most important risk factor is the internal conflict within the members of the Irrigators Association about the design of the system with a weighted mean of 4.65 and 0.93 relative importance index; followed by (2nd) continuous cropping of farmers despite on-going project implementation, this is labeled by the office as 'System in Use' with a weighted mean of 4.55 and 0.91 relative importance index; (3rd) citizens refusing to construct irrigation systems within or near their property with a weighted mean of 4.5 and 0.9 relative importance index; (4th) inactive officers of the irrigators association, members lack information about the project or changes with a weighted mean of 4.4 and 0.88 relative importance index; (5th) farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems with a weighted mean of 4.35 and 0.87 relative importance index; (6th) lack of coordination from Irrigators Association especially when settling papers on Right to Construct with a weighted mean of 4.15 and 0.83 relative importance index; (7th) delay in the delivery of materials to the site with a weighted mean of 3.75 and 0.75 relative importance index; and (8th) equipment breakdowns of the contractor with a weighted mean of 3.35 and 0.67 relative importance index.

### 3.6 SUMMARY OF RESULTS

Table.7. Summary of Results

| Issue/s Arising from Processes | Risk Rating | Risk Level | Weighted Mean | Description | RII | Rank |
|---|---|---|---|---|---|---|
| Calamities, typhoons, earthquakes, etc. | 12 | High | 4.9 | Extremely Important | 0.98 | 1st |
| Delayed release of funds | 9 | Serious | 4.7 | Extremely Important | 0.94 | 2nd |
| Internal conflict within the members of the Irrigators Association about the design of the system | 12 | High | 4.65 | Extremely Important | 0.93 | 3rd |
| Continuous cropping of farmers despite on-going project implementation | 16 | High | 4.55 | Extremely Important | 0.91 | 4th |
| Citizens refusing to construct irrigation systems within or near their property | 9 | Serious | 4.5 | Extremely Important | 0.9 | 5th |
| Inactive officers of the irrigators association, members lack information about the project or changes | 6 | Medium | 4.4 | Somewhat Important | 0.88 | 6th |
| Illegal Informal Settlers | 6 | Medium | 4.35 | Somewhat Important | 0.87 | 7th |
| Farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems | 6 | Medium | 4.35 | Somewhat Important | 0.87 | |
| Lack of coordination from Irrigators Association especially when settling papers on Right to Construct | 8 | Serious | 4.15 | Somewhat Important | 0.83 | 8th |
| Delay in the delivery of materials to the site | 6 | Medium | 3.75 | Somewhat Important | .75 | 9th |
| Request for cutting of trees may not be granted | 4 | Medium | 3.35 | Neutral | 0.67 | 10th |
| Equipment breakdowns of the contractor | 6 | Medium | 3.35 | Neutral | 0.67 | |
| Intervention of indigenous people resulting to delays with regard to some project implementation | 9 | Serious | 3.05 | Neutral | 0.61 | 11th |

From the gathered data, there are 13 risk factors that need to be considered in the 2023 Risk Registry of the National Irrigation Administration Aurora-Nueva Ecija Irrigation Management Office under the project implementation risk factors. From this, it revealed that 3 of the 13 risks are High risk level which includes calamities, typhoons, earthquakes, etc., internal conflict within the members of the Irrigators Association about the design of the system, and continuous cropping of farmers despite on-going project implementation, which are 1st, 3rd, and 4th in the ranking based on the relative importance index, respectively.

On the other hand, 4 of the 13 risks are Serious risk level which includes delayed release of funds, citizens refusing to construct irrigation systems within or near their property, lack of coordination from Irrigators Association especially when settling papers on Right to Construct, and intervention of indigenous people resulting to delays with regard to some project implementation, which are 2nd, 5th, 8th, and 13th in the ranking based on the relative importance index, respectively.

6 of the 13 risks are Medium risk level which includes inactive officers of the irrigators association, members lack information about the project or changes, illegal informal settlers, farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems, delay in the delivery of materials to the site, request for cutting of trees may not be granted, and equipment breakdowns of the contractor, which are 6th, 7th, 9th, and 10th in the ranking based on the relative importance index, respectively.

## IV. CONCLUSIONS

This study entitled "Risk Factors affecting Project Implementation in the National Irrigation Administration: A Basis for an Updated Risk Register" aims to validate and improve the current risk register of the Bulacan-Aurora-Nueva Ecija Irrigation Management Office for it to be more applicable to the newly formed Interim Aurora-Nueva Ecija Irrigation Management Office for its proposed 2023 risk register.

In this light, the researchers have concluded that there is a need for an updated risk register especially since there were eight (8) additional risks that should have been considered based on the perspective of the relevant stakeholders. This included farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems, continuous cropping of farmers despite on-going project implementation, lack of coordination from irrigators association especially when settling papers on right to construct, citizens refusing to construct irrigation systems within or near their property, internal conflict within the members of the irrigators association about the design of the system, inactive officers of the irrigators association, members lack information about the project or changes, equipment breakdowns of the contractor, and delay in the delivery of materials to the site.

Moreover, the researchers have concluded that the risks affecting project implementation ranges from Medium-level risks to High-level risks. Thus, there is a need to address these aforementioned risks as soon as it arises to prevent problems and issues concerning project implementation in the agency.

### *RECOMMENDATIONS:*

The researchers proposed the following to be taken into consideration by the National Irrigation Administration Aurora-Nueva Ecija Irrigation Management Office in formulating their 2023 Process Level Risk Registry under project implementation:

| Issue/s Arising from Processes | Cause/s of Issue/s | Risk | Severity | Probability | Risk Rating | Risk Level |
|---|---|---|---|---|---|---|
| Intervention of indigenous people resulting to delays with regard to some project implementation | Preservation of indigenous people's environment | Delayed implementation of projects | 3 | 3 | 9 | Serious |
| Calamities, typhoons, earthquakes, etc. | Force majeures | Delayed implementation of projects and damage to build structures | 4 | 3 | 12 | High |
| Delayed release of funds | Proposed national budget not yet approved | Delayed implementation of projects | 3 | 3 | 9 | Serious |
| Illegal Informal Settlers | Lack of authority to prohibit illegal informal settlers | Delayed implementation of projects | 3 | 2 | 6 | Medium |
| Request for cutting of trees may not be granted | Lack of supporting papers | Delayed implementation of projects | 2 | 2 | 4 | Medium |

| | | | | | | |
|---|---|---|---|---|---|---|
| Farmers requesting for compensation from NIA if their farmlands will be affected by the project, especially for communal irrigation systems | The area of their farmlands will decrease | Delayed implementation of projects and may result to change of design | 3 | 2 | 6 | Medium |
| Continuous cropping of farmers despite on-going project implementation | Need of continuous income through continuous cropping | Delayed implementation of projects | 4 | 4 | 16 | High |
| Lack of coordination from Irrigators Association especially when settling papers on Right to Construct | Farmers are pre-occupied | Delayed implementation of projects | 4 | 2 | 8 | Serious |
| Citizens refusing to construct irrigation systems within or near their property | Personal decisions and safety reasons | Delayed implementation of projects and may result to change of design | 3 | 3 | 9 | Serious |
| Internal conflict within the members of the Irrigators Association about the design of the system | Farmers wants the canal to be near their farmlands | Delayed implementation of projects and may result to change of design | 3 | 4 | 12 | High |
| Inactive officers of the irrigators association, members lack information about the project or changes | Farmers are pre-occupied | Delayed implementation of projects and may result to change of design | 3 | 2 | 6 | Medium |
| Equipment breakdowns of the contractor | Irregular check-up and maintenance of the equipment | Delayed implementation of projects | 2 | 3 | 6 | Medium |
| Delay in the delivery of materials to the site | Unworkability of the site, especially during rainy season; Lack of experience of site engineer | Delayed implementation of projects | 2 | 3 | 6 | Medium |

Moreover, aside from the use of the National Irrigation Administration, this may be used by the Local Government Units (LGUs) within the provinces of Aurora and Nueva Ecija that may be included in the Devolution of Communal Irrigation Systems as amended by the Mandanas-Garcia Supreme Court Ruling. The Mandanas-Garcia Ruling requires that in addition to internal revenue collections, customs collections must also be included in the expansion of the income base used to compute local government units' (LGUs') national tax allocation (NTA). Along with the 13.9% increase brought on by the rise in internal revenue collections, this guarantees LGUs a 24% increase in their revenue share. Particularly for NTA-dependent LGUs like the barangays, the figures are promising.

However, this entails that certain national agencies will devolve certain functions to the LGU and the National Irrigation System may be one of them especially in assisting irrigators association with their irrigation systems and resolutions for proposed new systems.

Overall, the researchers recommend further study of the subject matter.

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