VIETNAM INSTITUTE OF METEOROLOGY, HYDROLOGY AND CLIMATE CHANGE

SOCIALIST REPUBLIC OF VIET NAM
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DOCTORAL THESIS INFORMATION WITH NEW SCIENTIFIC CONTRIBUTION, THEOTETICAL STUDY

***1.* Dissertation title:** *Analysis and assessment of the key factors in flooding in the lower Ca basin*

- Major: Hydrology
- Code: 9440224

2. PhD Candidate: Nguyen Xuan Tien

Supervisors: Prof. Dr. Tran Hong Thai

Institution: Vietnam Institute of Meteorology, Hydrology and Climate Change

3. Introduction:

Flooding is an ancient threat to humankind. According to Jonkman (2005), the total number of people killed and affected by natural disasters in the world from 1975 to 2001 was 2 million and 4.2 billion, respectively. The number of deaths and affected by floods in the period was 175 thousand and 2.2 billion people, respectively. Floods have the most significant impact compared to other natural disasters, even though not the most significant cause of death. The tremendous flooding causing death and terrible destruction in the history of China happened in 1931 that killed approximately 3,700,000 people, which is still circulated for posterity nowadays. Today, the modern update of information shows more clearly that flooding is the ongoing fierce worldwide. The damage caused by floods is enormous. Moreover, under the impact of climate change, flooding is increasingly showing signs of increasing in magnitude and frequency. The task of research and finding solutions to cope with this type of disaster is always scientific, urgent, and practical.

In Vietnam, there were also great floods recorded through the legend of Son Tinh - Thuy Tinh from the age of Hung Vuong. The embankment structure of the Red River is proof of historical flooding prevention. In central Vietnam, severe floods often

threaten people's lives. Historic flooding in 1999 devastated many places in the region that killed 645 people and caused damage up to 3,721 billion VND. In the downstream of the Ca River basin, flooding occurs frequently. The historic flood that happened in 1978 inundated a total of 31 communes and killed 37 people. The damage caused by the flood is estimated at approximately 60 billion VND. Recently, the floods that happened in 2019 and 2020 have flooded this area, lasted 10 to 14 days, and caused significant damage to the socio-economic development of the whole region. For the reasons mentioned above, the name of the Thesis, "Analysis and assessment of the key factors in flooding in the lower Ca basin" was chosen as the topic of the Thesis.

4. New contributions of the dissertation

The thesis has the following innovation:

- *Firstly*, Quantify the threshold of rainfall causing flooding in the inside/outside area of the dyke system of the Ca basin in case of reservoir operation impacts and natural flow in three different flooding phases;

- *Secondly*, Determine the relationship of reservoir operations and downstream inundation in the Ca basin;

- *Thirdly*, Assess the impact of sea-level rise due to storms on flooding in downstream of the Ca basin.

PhD Candidate

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