

# THE IMPACT OF THE SALINITY INTRUSION IN SOCIAL, ECONOMY AND ENVIRONMENT DIMENSION OF BAN DUNG, UDON THANI AREA

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**Abstract:** This study is aimed to educate the impacts and figure out the solutions for the salinity intrusion in Ban Dung, Udon Thani area. It was done by collecting the information with Qualitative and Quantitative Research; semi-structured interview, focus group discussion and questionnaires. Sample of population is 384 people, consists of Community leader, inhabitants, entrepreneur and agents from government agency. The studied-information is summarized and is debated according to the study's purpose, and is presented by lecture. The result shows, there are two factors that cause the saline soil and salinity intrusion in Ban Dung district. First one, it's involved with geology; it's a low lying areas where the level of the soil surface is lower than the level of the underground salt water. Second, the use of the land by human such as, salt farming without knowledge causes the salinity intrusion to the low lying areas. The salinity intrusion impacts the inhabitants in Ban Dung district, firstly, the economy because the agriculture will stop developing, the agriculturist cannot plant many kind of crops. Then, the income will be limited. Secondly, it impacts the social; there will be disputes and conflicts between the entrepreneur, inhabitants and agriculturist, in case of salt water floats into the area. Furthermore, the impact to the environment is the limited of biodiversity since there are very few plants and animals naturally live in salt water. The solutions for the salinity intrusion in Ban Dung district are, firstly, to dig the mini water-well to sustain the salt water, secondly, to wash out the saline soil from the farm by using rainwater or the water from irrigation. Lastly, choosing the rice and plant species that suitable for the saline soil, etc.

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**Keywords:** The Impact, Salinity Intrusion, Social Economy And Environment Dimension

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## I. INTRODUCTION

Rock salt production issue tends to be highly increased especially in many areas in northeast. It affects the environment such as the saltiness contaminates the upper-ground and underground fresh water which causes the soil and water to be decadent since the saltiness spread out. Inhabitants' professions are affected, specifically in the agriculture, for example, planting in this particular area produces fewer products which lead to the overall economy, social, quality of life and environment problems of the area.

Moreover, the mentality and livelihood of inhabitants who live near the salt field are also affected from being afraid of the land subsides because the salt hole. (Peangta Satarugsa, 2003) In the current year, 2016, rock salt production in northeast, still, continuously, causes trouble especially the saline soil and water. They are obstacles for being able to develop the agriculture. They, also, cause troubles to the inhabitant who is an agriculturist and to the fresh water which will be hard to find in the future.

### 1.1. The Objective of the Research

1. Educate the salinity intrusion in Ban Dung district, Udonthani province.
2. To figure out the solutions for the salinity intrusion in Bandung district, Udonthani province.

## II. RESEARCH METHOD

It was done by collecting the information with Qualitative and Quantitative Research; semi-structured interview, focused group discussion and questionnaires. Sample of population is 384 people, consists of community leader, inhabitants, entrepreneur and agents from government agency. The studied-information is summarized and is debated according to the study's purpose, and is presented by lecture.

## III. RESEARCH RESULTS

Ban Dung district locates at the northeast of Udonthani province. It is far from Udonthani 75 kilometers and from Bangkok 642 kilometers. Most of the area is a plateau, mixing with highland and low land. Approximately 50% is a sparse forest and mixed forest. Soil is a loam and mountain. The important rivers are HuayLuang River, HuaySongkram River and HuayTuanderm. There are 3 seasons; summer starts at February to April, the weather is hot and dry. Rainy season starts at May to October; there is too much rain water which causes flood in some area. And winter starts at November to January; the weather is cold and dry.

Ban Dung district is a source of rock salt production. The production areas are thousands of acres. The process is to dig the artesian well approximately 70

meters, then, drain the underground salt water from melted salt rock up to the farm, then, dry in the sun for about 15-16 days, then, pack them up to sale to the industrial factory, to eat and to use it as a fuel. The raw salt is 400 baht per ton. The boiled salt is 1,000 baht per ton. The salt can be produced about 200,000 ton per year. The production areas are about 4,000 acres, consists of 6 districts, Ban Dun, Sri Sudtho, Pone Sung and Ban Chai. There are 228 entrepreneurs. The production process is about 6 months per year, starting at December to early May. Rock salt is valuable to many industrial factories such as, making mirror and leather factory.

Rock salt from Ban Dung consists of boiled salt; salt that is produced from boiling. 1) Starting from draining salt water from underground at the depth of 35 meters by wind pressure. 2) Releasing the drained underground salt water to the steel boiler sizes 4 x 7 meters until the level of the salt water is at the edge of the steel boiler. 3) Using husk as a fuel, continuously boil salt until the water dry, then, water becomes salt. Process time is approximately 15 hours. While boiling, the husk needs to be filled constantly in order to sustain the temperature. From the process, there are 3 kinds of salts, first, Young Sea Salt, it comes from salt flakes that float on the water while boiling. Young Sea Salt is a white flake, light weight and is convenient in cooking. Grain of salt comes from the process of boiling the salt water, and then it becomes salt. Its appearance is fine and white. It is very good for consuming, cooking, fermenting fishes and pickled fish, etc. Moreover, salt crystals crystallize from boiling process. It is the white fine sheet of crystal. It is one of the ingredients for the fertilizer and feed. – sun-dried salt on mortar farm: it is a salt from sun-dried on the mortar, starting from draining the salt water from the underground, then, release it on the mortar farm, let the salt dried by sun for approximately 15 days. The salt water will become salt as desired. And the salt water crystallize under the mortar farm, it can be used to feed animal and the fertilizer. –Sun-dried salt on the soil: it is a salt from sun-dried on the soil, starting from draining the salt water from the underground, then, release it on the soil farm, and then let the salt dried by sun for approximately 15 days. The salt water will become salt as desired. And the salt water crystallize under the soil farm, it can be used to feed animal and the fertilizer.

The rock salt production in Ban Dung district is important for the economy and communities as follow: 1) Spending time in the summer between December to May produce salt for the dealings and consuming in family. 2) There will be more employment if it's an export industry. 3) Communities around the production site will be well-adjusted in agriculture, for example, knowing the exact plant that suits the saline soil such as, mango, tamarind and the rice seeds that endure the saline soil. And, 4) Knowing where the fresh water is, digging the pool

very wide and large instead of digging too deep to avoid the underground salt water gush up to the ground. Meanwhile, rock salt production also causes the problem for the community as follow: 1) Transforming the cottage industry to an export industry needs high-end technology and equipment, for example, using water pressure to demolish the stone layer and underground salt. Draining too much water continuously may cause ground subsidence. 2) Salt water from salt pan will spread out to very wide area and will cause problem to the nearby communities. 3) Soil from salt pan is no longer competent. 4) The nearby rivers are affected from the spread of the salt water. The water, then, becomes brackish water which can't be consumed and incompetent in planting. 5) There will be many immigrants finding a job, if the management isn't good, they will be the social problem.

Conclusions/Discussion: These factors are the results of saline soil and water in Ban Dung district. 1) Geology; it's a low lying area where the level of the soil surface is lower than the underground sea water. And, 2) the use of the land by human such as, salt farming without knowledge causes the salt water spreads to the low lying areas. The salinity intrusion impacts the inhabitants in Ban Dung district: firstly, the economy because the agriculture will stop developing, the agriculturists cannot plant much kind of crops, then, the income will be limited. Secondly, it impacts the social; there will be disputes and conflicts between the entrepreneur, inhabitants and agriculturist, in case of salt water floats into the area. Furthermore, the impact to the environment is the limited of biodiversity since there are very few plants and animals naturally live in salt water. The result of the study conform to Prasit Kanurat's and Seksan Yongvanish's study (2002) which found that the impact from rock salt production is, the community won't be unemployed, and economy of the community will be pleasant. Nevertheless, the impact to the social is the conflict and also to the ecology which is very difficult to solve—the dissemination of saline soil affects the agriculture, fishery and ground subsidence. As for the most problems and demand, are due to the effect of environment; soil, water, forest, public land and especially a ground subsidence. Solutions for the salinity intrusion in Ban Dung district are 1) Dig the small pool to store the salt water. 2) To wash out the saline soil out of the pan by rain water or an irrigation water 3) choosing the exact plant or rice seed that suits the saline soil. The result conforms to Arunee Yuvaniyom et al's study (1993

2) Which found that peanut and vegetable such as lettuce are highly effective against the salt water; they provide less production than other vegetable that is experimented. On the other hand, soybean, white radish and collards are able to endure the salt water more than other which is also experimented. Moreover, the influence from the salt water reduces

the time to fully grow and hasten to the production phase. 3) Leader or representatives from local administrations of each region should participate in the study of how to develop the area. (Phusit Phukamchanoad, 2014)

#### IV. SUGGESTIONS

1. All of the relevant agencies should cooperate in solving problem. The agencies consist of state agency (subject to region and local), private agency (company, store and entrepreneur) and inhabitants (rock salt agriculturist, common agriculturist). They must specify the rules, regulation, order and principle in specific area, help one another control, monitor and zoning the area in order to prevent the salinity intrusion and also the conflicts. There should be a study of factors affect the decision to tourism in Thailand to compares the Japanese language learning motivation from different groups such as efficiency result and low efficiency result students.
2. All of the relevant agencies cooperate in managing the water resource, soil resource and forest resource by indigenous knowledge. State agency should support the learning process of the community by spreading out the knowledge

or the indigenous knowledge. By doing so, it leads to apply and/or combine the knowledge with the new technology to match with folkways as efficiency as possible.

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