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Mitigation Strategy of *Soil Transmitted Helminths (STH)* Through Environmental Risk Identification and Anthelmintic Basic Materials in the Endemic Land Units of Coastal Rural Ambon Island

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Abstract: ***Corresponding to the decree of the Indonesian Health Minister (2006), Brooker (2000, 2004, 2006), Salakory., Et al (2010), Soil Transmitted Helminths control (STH) can be conducted by some interventions, namely; it is needed to be done the integrated research to find the risk environmental and endemic areas, forming a healthy perception of society, especially in the areas with a high risk environment, performing a mass treatment with local wisdom-based approach. The mass treatment with the local wisdom approach is intended to encourage the health care-seeking behavior of the poor people. It is conducted the image analysis of multy spectral satellite to determine the components of the risk environment. The result of image interpretation, then processed through Geographic Information Systems with ArcView program to produce a map of that risk environment distribution of Soil Transmitted Helminths (STH). The residents with the risk to be infected by Soil Transmitted Helminths (STH) who lived on the land units corresponding to the risk environment would be examined in its faeces to know the prevalence of infection due to the Soil Transmitted Helminths (STH), to obtain the identification and activation test of the anthelmintic basic materials from surrounding environment (local wisdom). The next stage is to make a software of environmental information system called by Soil Transmitted Helminths risk (STH). On the basis of these policy recommendations, it is conducted the prevention and treatment on the risk group. The preventive action is measured in the form of selection of the famous young doctor. Treatment to the risk group who was positive of Soil Transmitted Helminths (STH) is conducted by using the drugs that are derived from the surrounding environment (local wisdom). The usefulness of the results is expected can be formed a healthy perception in a group of risk, decreasing the prevalence of soil-transmitted Helminths (STH), using anthelmintic with basic materials that is obtained from the coastal environment of the Ambon island, providing a policy reference for stake holder in the health field of Maluku province. The method used is a combination of surveys, True Experiment in the laboratory, and Development.***

Keywords: *STH*, Endemic, Risk, medicine

1. Introduction

In accordance with the characteristics of the Maluku area, with the broad of Sea about 92% and the number of islands around 1034 of small and large islands, so the University of Pattimura is decided the Bina Mulia Kelautan as the Principal Scientific Pattern (PIP). The concept of archipelago in this case is not in the sense of a such sea but the sea and island is seen as a unity of the meaning. That mean, the sea is not a barrier but as a connecting bridge of economic activity, and also as a sociocultural community uniting, both inside and between islands.

The competitive research outcome of Marine and Island Pattimura University in 2012 and 2013 was produced specifically a data base and mapping Issues, as well as the map of research locations in the following years in 11 districts/cities in the province of Maluku. This is very important because as long as there has no any *data base* yet and the prepared and integrated map issues in the province of Maluku. The existing research along this has been more partial, temporary, unsustainable and therefore has not had a positive impact both on the science development of the marine field and agriculture of small islands and toward the regional development. Therefore, decentralization of the research that begins with a data base and integrated problem map of cross-institutional is an initial research hand the scientific independence of Pattimura University in the field of ocean and islands.

If in 2012 is the foundation of the excellent research, so that in 2013-2014 the Research Institute of the Pattimura University would be conduct the basic research and applied about the oceanic and island, along with the basic research in the fields of social, cultural, economic and political of the small island's society. The Outcome of basic research and applied is an engineering technology in the form of appropriate technology and socio-cultural engineering that is adaptive towards the changing technologies that are generated and developed in the archipelago and agricultural small islands. Furthermore, in 2015 the Pattimura University would be focused on the changing the commodities that are generated in the previous years research and the current year into a superior products based on the natural resources and the local wisdom.

The study result of the first year's Competitive Grant (2008), through the *invitro* culture study have been conducted in the Laboratory of Parasitology, Faculty of Medicine UGM, produced six dynamics formula and the direction of development, as well as 63 growth indexes of *Soil Transmitted Helminths (STH)* in the land units of Ambon Island. The Continued competitive grants research in the

second year (Salakory: 2009) is intended as the verification toward that formula, it is founded that the area with an alluvial soil distribution, and in damp conditions until permanently submerged almost along year was potentially high for an egg populations and infective larval's *Soil Transmitted Helminths (STH)* in the soil.

Corresponding to the decree of Health Minister (2006), Brooker (2000, 2004, 2006), Salakory (2010), Soil control to the *Transmitted Helminths over (STH)* can be done with some interventions, namely; it is needed to conduct an integrated research to find an environmental risk and endemic areas, forming a healthy perception of society, especially in the areas with a high risk environment, conducting a mass treatment with a local wisdom-based approach. The mass treatment with local wisdom approach is intended to encourage a behavior care-seeking of poor people's health.

The life cycle of *Soil Transmitted Helminths (STH)* apparently requires the following factors: human factor, worms factor, and environmental factor. The human factor here has a role as the culture from the community, either directly or indirectly. The environmental factor is a echo epidemiology condition that is required for a maturation process of worm's eggs become infective eggs or became a larvae. If these conditions are full filled, then the worm's eggs would be quickly mature and it was ready to infect human. The worm factor itself, the most important was the durability of worms or eggs, and the larvae to wad the unfavorable conditions for their survival.

Epidemiological study by emphasizing on the inter-relationship between host, agent, and environment that was help the proliferation of a disease, it is needed to be used more widely in the public health as a policy in integrated controlling that was real to wads the problems of the public health. The controlling can be done in an integrated that is by using a satellite service for an epidemiological sensing, Geographic Information System (SIG), Medical Geography, Biometeorology, environmental health, as well as integration between all of them.

In Indonesia, the research on *Soil Transmitted Helminths (STH)* in the conjunction with an environmental factor's result that has been conducted by both academics and by the Research Center in the relevant agencies called; Sadjimin and Tjokrosonto (1980), Tanjido *et al*. (1981), Eddy *et al*. (1985), Noorhajati (1986), Salakory., *et al* (2008), East Java Health Office (2002/2003), Nurdian *et al*. (2003), Margiana *et al*. (2004), Hadju (2005), Setyono et al. (2006), Asomah et al. (2008).

Several studies of *Soil Transmitted Helminths (STH)* that has been done can be a reference to the research that is conducted as follows: (1). Tanjido *et al*. (1981), from the Child Health, Faculty of Medicine, Sebelas Maret University Surakarta Hospital, conducting a research on the treatment of worms with *pyrantel pamoate*, (2). Edy *et al*. (1985), conducting a research about the Infestations Prevalence of Intestinal Nematode in Suter Balinese village, (3). Asomah *et al*, (2008), who is conducted a research on the relationship between Helminths Infectious Anemia on a pregnant woman against the Genesis of BBLR in Banggai regency, Central Sulawesi, and (4). Ideham, *et al*. (2001), conducting the research on papaya seed's anthelmintic effects towards egg's ultrastructure. The method used is an experiment in the laboratory.

The previous studies that have been conducted are different with the research that would be conducted for the leading study of University in years 2012/2013. Where there were a differences on the issue, objective, variable, location, methodological, and the results obtained.

In abroad, the research on *Soil Transmitted Helminths (STH)* has been experienced a quite rapidly progressing when compared with in ground water. The research on *Soil Transmitted Helminths (STH)* has applied a remote sensing technology and SIG applications: (1). Brooker *et al*. (2002), has been conducting a research that is applied an employ Remote Seining (RS) and SIG to control a worm's problem in a program nationally in Chad - Africa., (2). Saathoft *et al*. (2006), have been conducting a research on the ecology variation of hookworms and the occurrence of re-infection in a rural of Kwazulu-Natal, South Africa, (3). Brooker *et al*. (2006), have been conducting a research by comparing the diversity of worm infection patterns in the rural population and urban environments in Brazil, (4). Brooker (2006), has been conducting a research on epidemiology special of *Schistosomiasis* in Africa, risk modeling, transmission dynamics and the controlling, and (5). Broker *et al*. (2000), has been written an article on *remote sensing* and SIG technology that can be used to control the *GH* infection in the human.

2. Method

Through a vitro culture techniques, it is produced a formula about the eggs and larvae growth dynamics and the *Soil Transmitted Helminths (STH)*, the dynamics of eggs and larvae population in the soil, as well as its prevalence (the Results of Competitive Grant Research, 2008). On the basis of that results, this research is conducted with approach of survey in the field *cross sectionally* (Kumar. 1996, Swanson and Holton., 2005, Sekaran. 2007). That study is conducted to obtain the data parameters of risk environment of *Soil Transmitted Helimths*, to see the concentration and eggs distribution that was containing larvae and larvae of *Soil Transmitted Helimths* in the soil as the land units.

This chosen of *cross-sectional* design, because the purpose of the study was to obtain data about environmental factors that was risk to support the happening of concentration and eggs distribution that was containing larvae and larvae of *Soil Transmitted Helminths (STH)* in the soil, and the prevalence of *Soil Transmitted Helminths (STH)* in the community. This taking of variable data is conducted simultaneously at the time of the study.

The combination research design between *Quasi Experimental* in the laboratory (the results of Competitive Grant Research, 2008), which is supported of research survey with the *cross sectional* design, and forwarded to the research development.

3. Results

Environmental Risk Data of *Soil Transmitted Helminths (STH)*

With the soil maps that is produced by the Faculty of Agriculture Unpatti (1989) scale of 1: 50,000 and the interpretation result of *Landsat TM* about Ambon Island has produced a map of soil types on this land with scale of 1: 110,000. The maphas also been corrected by a team of researchers at once is conducted the taking of soil sampling in the field.

Based on the soil type maps, it is seen that the distribution of soil types in the Hurnala village of Tulehu State was including the alluvial soil types, mean while in State of Waka was Podsolic. The characteristics of each type of soil is as follows. Alluvial type is dominated in the most of coastal areas of the Ambon island, the isthmus was junction of Hitu's area and Leitimur area (Passo), and the spots of watershed in the Ambon island. The Alluvial soil type is represented by Alluvial soil, that is obtained from the Hurnala village of petuanan Tulehu State, Salahutu subdistric Central Maluku Regency. Thr main material was alluvial. The drainage condition was rather bad until average, with aslant of a slope was 0-3%. The using form of the land was residential population, with the state of the vegetation is dominated by coconut and sago.

The results of physical observations on the first layer to a depth of 0-9/15cm, it is seen that the color of soil was *Dark olive gray* HUE 5 GY 4/1 until *Black* HUE 2.5 GY 2/1. The cultured rooting were much, the medium roots were average , the depth of a groundwater during the research was conducting (late summer/beginning of the rainy season) is shallow ± 2M, 24-hour of puddle duration, the puddle level of rainy season was 50cm, the summer puddle level is 0.

This soil type has shallowsolum until deep (50cm -> 50cm). Podsolic is spread on the small area of the hills from the central part Leitimur area, and a small area of the hills of the central towards the Southwestern Hitu area of Ambon Island.

Podzolic soil type is represented by podzolic soil, that is derived from the village Hatalai South Leitimur District Ambon City. The main materials were granite and loose material. The drainage conditions were good until very poor, with aslant of slope was 8-15%. The using form of a land was residential population, with a state of mixed farms vegetation, and longevity fruit plants.

The results of physical observations on the first layer with a depth of 0 - 15cm, it is seen the ground colors were *yellowish brown* HUE 10 YR 5/6 until *bright reddish brown*. The cultured rooting were little, the depth of ground water during the research was conducting (late summer/beginning of the rainy season) is very deep ± 300M, the duration of puddle is 0, the puddle level of rainy season is 0, the puddle level of summer season is 0. The distribution of soil type that is found on the Ambon island.

After it is conducted the testing of **F tes**t and **t test** and it was knowing the use of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between the Alluvial texture class and Podsolic, the next step was to figure out how big the difference is. From the output shown on the description of 95% *Confidence Interval of the Difference* and column of *Equal variance not assumed* the lower average are: 9,183 units and upper are 9903 units, with an average difference 0.72 units.

The distribution differences of the of soil texture was due to the distribution difference factors that was influence the soil texture, such as: a) the main material of the soil, b) climate, c) topography, d) organisms, e) time is needed for the process of the soil formation. The soil texture differences are affected of: a) the soil structure, b) the consistency of the soil, c) plant's root, d) water-holding capacity, e) caption exchange capacity, f) porosity, g) infiltration rate, and h) the movement of water and air in the soil (Hardjowigeno and Sarwono. 1993). The distribution of the soil texture is followed an Ambon island land units can be see in appendix.

After the testing of **F test and t test** and it is noted the using of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between the percentage content of alluvial sand and Podsolic, the next step was to figure out how big the difference is. From the output is shown on the description of 95% *Confidence Interval of the Difference* and column of *Equal variance not assumed* if the lower average is 71.61987% and upper is 72.46444%, with the average difference is 0.84%.

The differences of sand's content is may allowed the existence of a land units with the coarse-textured soils, medium and fine. Soil with coarse texture was more easily to absorb the heat, either directly or conduction. In the Daytime, the temperatures was higher than the soil with fine-textured. In the night, the soil with coarse-texture was more quickly released the heat that is absorbed, so that the daily amplitude is become extreme. The soil with a coarse texture was also quicker to pass the ground water, so that it is only few of waters oil that was living in the pores of its capillary. The Soil condition with the state of loose-texture, the soil temperature is quite hot, but it was suitable for the growth of the eggs of *A. lumbricoides*, *T. trichiura* and (Ogata, 1924 in Morsihita, 1972, Soedarto 1992). In the alluvial land units for example, it was suitable for the egg population growth of *A. lumbricoides*, the prevalence is also likely to be higher than the Kambisol and Gleisol.

After the testing of **F test** and **t test** and it is noted the using of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between the dust content percentage of alluvial and Podsolic, the next step was to figure out how big the difference is. From the output is shown on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* the lower average is -19.12367% and upper is -29.10064%, with an average difference about -9.97697%.

It was different with the alluvial land units that have a coarse-textured soil, for example Rensina's land units that has a medium texture. The medium textured soil was tend to

have a warmer temperature, the content of soil water was average until much, so that it was in the humid conditions. The condition like this was tend to be suitable for the growth of eggs and larvae of Hookworms (Ogata, 1924 in Morsihita, 1972, Soedarto 1992). The land units with the medium-textured soil, would be found the population of eggs and larvae of hookworms in the soil. The Prevalence of Hookworms was tend to be higher than the other land units. In the long dry season, this land unit was less suitable for the growth of Hookworm's larva.

After the testing of **F test** and **t test** and it is noted that the using of *Equal variance assumed* and *Equal variance not assumed*, and it is known that there was a real difference between the percentage of the alluvial clay content and Podsolic, the next step was to figure out how big the difference is. From the output is shown on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* the lower average is -52.95451% and upper is -42.71847%, with an average difference about -10.23604%.
The land unit with fine-textured soil, such as for example Podzolik, was in the wet condition because it is kept a lot of water in the pores of its capillary. It was suitable for the growth of Hookworm's larvae, but the eggs of *A. lumbricoides* can also be found in the dry months. If it is compared with the much vegetation one. The much vegetation land one was tend to be damp and it was very suitable for the growth of eggs and larvae of *Soil Transmitted Helminths (STH).*

The Land surface temperature is affected to the growth and development of eggs and larvae of *Soil Transmitted Helminths (STH)* in the soil. Udonsi and Atata (1987) found the optimum limit of the soil temperature influence on the hatching rate of *Necator americanus*, which was not happening a hatching on soil temperature of $<15^{o}$C and $> 30^{o}$C. The highest hatching (93%) is occurred at 30 °C, and it is maintained at a temperature of 26 °C for 4 days.

This study is limited to not connecting the variable of land surface temperature with the population of eggs and larvae variation of *Soil Transmitted Helminths (STH)* in the soil. There search is limited to obtain the temperature data at only of the measurement (daily)time, and to obtain the temperature variation during one year to be required a periodic measurement (time series). Saathoff *et al.* (2005) was also limiting his research by also to not connecting the climate factor with its Hook worms prevalence, because it is assumed that the climate variation in the study area would be small. The Climate data is also required a high spatial resolution, and therefore it can't be provided by the researcher.

After the testing of **F test** and **t test** and it is noted that the use of *Equal variance assumed* and *Equal variance not assumed*, and it is known that there was a real difference between the percentage of alluvial dust content and Podsolic, the next step was to figure out how big the difference is. From the output that is shown on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is -1.08734% and upper is -0.208245%, with an average difference about -0.8791%.

The distribution differences of soil porosity is closely related to the distribution of soil texture. The number of pores is determined by the texture and type of clay. Land with 50 Percent pore is an ideal soil conditions, whereas the half of macrospores to carry the water due to the gravity and the half of microspores to be hold the water from the pull of gravity. The Soil with coarse- texture having a much amount of microspores, so that the ability to retain the water was much less than the medium and fine textured soil. These different conditions would be allow the population variation of eggs and larvae of *Soil Transmitted Helminths (STH)* in the soil. Each type of *Soil Transmitted Helminths (STH)* has a different tolerance to external environmental conditions.

Then the data of that Soil porosity to be processed with the SIG to obtain the thematic maps about soil porosity. The results was arranging with the land unit map, so that it is produced a map of soil porosity based on land units.

After the testing of **F test** and **t test** and it is noted that the use of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between the percentage of water content of alluvial terrain and Podsolic, the next step was to figure out how big the difference is. From the output that is shown on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is -37.768634% and upper is -29.771309%, with an average difference about -7.99733%.

The distribution differences of water wide soil content is closely related to the distribution of the soil texture. The number of pores is determined by the texture and type of its clay. Land with the 50 Percent pore is an ideal soil condition, whereas the half of macrospores is to carry the water due to the gravity and its half microspores is to hold the water from the pull of gravity. The soil with coarse-texture was having a munch amount of the microspores, so that the ability to retain the water to be more less than the medium and fine textured soils. These different conditions would be allow the variation of eggs and larvae population of *Soil Transmitted Helminths (STH)* in the soil. Each types of *Soil Transmitted Helminths* (STH) have a different tolerance to the external environmental conditions.

Then the data of that wide Soil water to be processed with the by the SIG to obtain the thematic maps about the content of wide water soil. The results was arranging with the land units, so that it is produced the water content of wide soil by land units.

Soil that was keeping a quite a lot of groundwater is tended to be damp or wet conditions. For example Alluvial land units, although it is coarse-textured but if it is inundated during the rainy season, it would be appropriate for the growth of eggs and larvae of Hook worms besides *A. lumbricoides* and *T. trichiura*. The land unit of Gelisol, although it texture was fine but in the long dry season it is less suitable for the growth of eggs and Hookworm'slarva,

otherwise the eggs of *A. lumbricoides* and *T. trichiura* can be grown.

Then the data of that wide Soil water to be processed by SIG to obtain the thematic map of wide water soil. The results was arranging with a map of land unit, so that it was producing a map of wide water soil content based on the land units.

After the testing of **F test** and **t test** and it is noted the use of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between permeability of alluvial soil and Podsolic, the next step was to figure out how big the difference is. From the output is seen on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is -1.08734% and upper is -0.208245%, with an average difference about -0.8791%.

The distribution differences of soil permeability is closely related to the distribution of soil texture. The number of pores is determined by the texture and type of its clay. Soil with 50 Percent pore was an ideal soil condition, where as the half of macrospores were to carry the water due to the gravity and the half of microspores were to hold the water from the pull of gravity. Soil with coarse-texture that having a amount of much microspores, so that the ability to retain the water was more less than the medium and fine textured soils. These different conditions would allowed the population variation of eggs and larvae of *Soil Transmitted Helminths (STH)* in the soil. Each type of *Soil Transmitted Helminths (STH)* has a different tolerance to external environmental conditions.
Then the data of soil porosity to be processed by the SIG to obtain thematic maps about soil permeability. The results was arranging with a map of land unit, it was producing a map of soil permeability based on the land units. The soil permeability is closely related to texture and porosity. Soil have any different permeability from one to another, there was a slow, medium, fast, very fast. The permeability differences may allowed any population dynamics divergence of eggs and larvae of *Soil Transmitted Helminths (STH).*Then the soil permeability data is processed by SIG to obtain the thematic map about soil permeability. The results was arranging with a land unit map, so that it was producing a soil permeability map based on the land unit.

After the testing of **F test** and **t test** and it is noted the using of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between the *pH* of Alluvial and Podsolic, the next step was to figure out how big the difference is. From the output is seen on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is -1.08734% and upper is -0.208245%, with an average difference about -0.8791%.

Each type of soil has*pH*.H2O that have variation. The land is said acid if its *pH* was <7, it is neutral if pH was 7, and alkaline if pH was > 7 (Buckman and Brady, 1982). There were two main factors that are caused the changing of soil's *pH*, namely; 1) it was producing an increasing of adsorbed hydrogen, 2) the increasing of adsorbed alkaline content. The differences of soil's *pH* in the seventh units of land are depended on that two factors. The growth of soil organisms normally on the soil's pH of > 5 - <8 (Buckman and Brady, 1982). The Growth of eggs and larvae of *Soil Transmitted Helminths (STH)* on the optimum *pH* of 6.0 (Undosi and Atata, 1987). Then the soil's *pH* data to be processed by SIG to obtain the thematic maps on soil's *pH*. The results was arranging with a land unit map, so that it was producing a soil's *pH*.H2O distribution map based on the land unit.

After the testing of **F test** and **t test** and it is noted that the use of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between organic materials of Alluvial and Podsolic, the next step was to figure out how big the difference is. From the output is seen on the description of 95% *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is 0142 and upper is 0445, with an average difference about 0303%.

The organism's soil data on each samples point are processed with SIG to obtain the thematic map on soil organism. Then the results were arranging with a land units map, so that it was producing a distribution maps of soil organisms ingredient based on land unit.

After the testing of **F test** and **t test** and it is noted that the using of *Equal variance assumed* and *Equal variance not assumed*, and it is known there was a real difference between rooting in the alluvial soil and Podsolic, the next step was to figure out how big the difference is. From the output is seen on the description of 95% of *Confidence Interval of the Difference* and *Equal column variance not assumed* that the lower average is 6303 and upper is 7735 units, with an average difference about 1,432 units.

Identification of Anthelmintic substances With the Material from Environment (local wisdom)
It was conducting a meeting with mothers of Hurnala village Tulehu land Salahutu sub district of Central Maluku regency and the mothers of Wakal land Leihitu sub district. The meeting by intended to get an image of how the mothers of Hurnala village family were doing a treatment action against their family, if it is acquired the signs that their members had a suffer of worm infection in the intestines. The objectives of the treatment were their knowledge about the treatment of wormy by giving a medicine that was mixing from the environment where they are lived.

The results of that meeting was quite complete, because every mother who came can be describe one type of medicine that along this has been used to treat the sufferer of wormy in their families and their relatives family or neighbors who are asked for their help.

First Respondent: She was ordinary to treat the wormy on the children and grand children by using the sea shells, or in the local language is called as *Rock oyster* from:

Phylum	:Molusca
Class	:Bivalvia
Ordo	:Ostreoida
Family	: Ostreoidae
Genus	Crassostrea

The sea shells that are attached to the rocks in the wet coastal zone ("*meti*" in the local language). Shells were taking by gouging with the "machete" the local appellation for wood cutting tool that are not easily broken or destroyed. At home, it is taken about 5-7 pieces of shells, then crush it by tapping it with a hammer carefully, just like a man who is crushing a walnut to then to take its content. Then that content is eaten rely or made a "*colo-colo*" (a type of Moluccas foods that is made from orange juice and adding by soy sauce, chili and onion slices). These medicine is usually eaten in the morning before breakfast and then forwarded to the breakfast by porridge. Between 1-2 days, after eating its shells, the adult worms would be came out with the feces of the patient. According to the mother, this medicine is suitable for the type of the great big size and length worm (i.e *A. lumbricoides*). It was still accordance her, the worms are often came out with the nest. After it is already were no any worms in the stool again, so that mean it was no longer the worms in the stomach (i.e in the intestine). Furthermore, the children was drinking given by turmeric water or feeding by yellow rice. The first, mother was getting this knowledge from her parents (mother)

Second respondent: It was ordinary to treat the wormy on her children and grandchildren by using of certain foliage that is in the local language called as "*Kontu Kontu*" leaves, because it is stink was just like a fart" or derived from:

Kingdom	:Plantae
Sub Kingdom	:Tracheobionta
Sub division	:Spermatophyta
Division	:Magnoliophyta
Class	:Magnoliopsida
Sub Class	:Asteridae
Ordo	:Rublaceace
Genus	:Paederia
Species	:*Paederia scandes*

This leaf is generally found by wild growing in the residential land or ex of garden.

How to Use It:

It is taken a *Kontu-Kontu* leaves as much as one wad of adults hand. Leaves to be washed cleanly with a water, then it is to be boiled with a water (one drinking cup). The stew is allowed to be stay to boiling until its water stew approximately a half cup. After it was a luke warm, filtering the water with a tea strainer, pouring it into the glass and it is drinking given to the children with a symptom of flatulence and high body temperature (it was allegedly suffering of wormy). The leaf stem part that is looked like a rope is enveloping twisted to the children's body especially in the bloated abdomen. for more easily then it is wrapped again with a cloth (in local language is called as "*poro string*" = it is commonly used to wrap the baby's abdomen).

After the boiled water was drinking, 1-2 days later the worm would be came out with the feces. Generally the worms that were coming out have a shaps like a "coconut rasp" by white color. The roundworm or *A.lumbricoides* was also came out). The doses for a children and adult were distinguished. For adults it was drinking a half of cup and for children it is drink a quarter of a glass, and for toddlers it was drinking a 1/6 cup of that stew water.

Third respondent: It was ordinary to treat the wormy by making a bark concoction of "*frangi pani*", the local term for:

Kingdom	:Plantae
Sub Kingdom	:Tranchebionta
Division	:Spermatophyta
Sub Division	:Ansiospermae
Class	:Dycotyledonae
Ordo	:Apocynales
Family	:Apocyanaceae
Genus	:Plumeria
Species	:*Plumeria acuminate*

How To Use It:
The bark is taken or peeled about 7 strands with a sizes of 4 x 7 cm. The outer leather part to be cleaned or shaved down until its underneath leather, then it is washed with fresh water and boiled with 2 cups of water. It is boiled until the water which had two cups to be one cup. The boiled water is drink given in the morning before the breakfast and then forwarded to the breakfast by porridge.

For child is only used about 3-5 strands, of course it is adapted to the age of the child. After the stew water was drinking, between 1-2 days it woul be came out together with the feces of its patient. The worms that was coming out with a red big size (*A. Lumbricoides*), and also the worm with shaps like a "coconut rasp (intestinal worms).

Fourth respondent. It was ordinary to treat the wormy by feeding the seed of "*petai china*" or *lamtoro gung*, the local designation for:

Kingdom	:Plantae
Sub kingdom	:Tracheobionta
Super division	:Spermatophyta
Division	:Magnoliophyta
Class	:Magnoliopsida
Sub Class	:Rosidae
Ordo	:Fabales
Family	:Fabaceae
Genus	:Leucaena
Species	:*Leucaena leucocephala*

This species was commonly found in the Wakal Land, because it is used as the greening plants that can be found in everywhere. The seeds of *Chinese Petai* are usually eaten alone at the time it is plucked from the tree, and this without having to adjust the age of the patient. Generally it is to be liked by the children. Between 1-2 days after feeding it the worms would be came out the worm with shapes like a "coconut rasp" (pinworms).

4. Closing

Several conclusions that can be made as follows:

1. To obtain the risk environmental data of *Soil Transmitted Helminths (STH)* risk in the endemic areas of rural coastal Ambon Island accurately and quickly, then it is used a Landsat TM image. The acquisition of Landsat TM through the collaboration with the Department of Remote Sensing of the Geography Faculty, Gadjah Mada University with the LAPAN side. The Landsat TM image that is obtain, then to be processed by using the *Er*

mapper program to obtain the usage data. The interpretation result data of that *Landsat TM +*, then to be process by *ArcView* to produce a thematic map, which then is combined with some production result map of Agriculture Faculty Pattimura University (1985). It is retrieved three pieces of the thematic maps, namely; soil type map, land form map, land using map, its overlapped results are produced a map of land unit. The 9 pieces of maps were then overlaid to the land unit map, so that is obtained a thematic maps of environmental risks, according to land unit.

2. It is identified a risk environment of *Soil Transmitted Helminths (STH)*, which is consisted of: the soil type data that was covering Alluvial soil type and Rensina soil type, the soil texture data which are included the contents of sand, dust content, and clay content, surface temperature data, the porosity soil data, the data of wide soil water content, permeability soil data, the data of soil's *pH*, the vegetation density data, soil organisms data, and the data of rooting in the soil. It also has been done the hypothesis test by using t test to see whether there or not the difference in the average population.
3. The researcher's discussion results with the mothers of Hurnala village, Tulehu Land Salahutu sub district and the mothers of Wakal land Leihitu sub district Central Maluku regency are successfully identified about four ingredients locally anthelmintic that are obtained from the surrounding environment. That traditional wormy medicines during this has been used since the old time by inheritance to the generation of their parents.

5. Suggestion

From the conclusion above, so the several suggestions that can be submitted as follows:

1. By has been identified and generated the *Soil Transmitted Helminths (STH)*, risk environment map in the coastal rural endemic area of Ambon Island, it is expected to provide the accurate information to the planners and policy makers in the health sector, in this case the District Health Office with all its stake holders in term of doing the prevention of wormy infection issue in community effectively and efficiently.
2. By has been identified of four locally ingredients of wormy medicines that are obtained from the surrounding environment and these traditional medicines during this has been used inheritantly since the old generations of their parents, it is expected to be followed with the activation of toxic and its clinical testing, before it is referred as the basic material of anthelmintic, as well as worm medicine that was safe for consumption.

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