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Madagascar: Preventing Rift Valley Fever

Madagascar is an East African island nation located in the Indian Ocean with a population of approximately 27.69 million citizens. The Malagasy people originally formed from 19 different tribes which all had distinctive cultural representation from both African and Asian cultures. Out of these tribes, Merina was the most populous with 27 percent of Madagascar citizens making up this group. Other tribes with large populations include Betsimisaraka with 15 percent, Betileo with 12 percent, and Tsimihety which has 7 percent (“Malagasy Life”). As of 2019, 62.14 percent of Malagasy people make up the nation’s rural population (“Madagascar- Rural Population”). Andry Rajoelina, current President of Madagascar, is an extremely popular businessman and politician. However, the country has a poor economy due to mismanagement. Madagascar is “ranked 161 out of 189 countries in the 2018 Human Development Index of the UN Development Program (UNDP)” which makes Madagascar one of the poorest nations in the world (“Malagasy Life”).

The climate and geography in Madagascar make this country very suitable for producing crops like rice, bananas, cassava, and maize. Madagascar is surprisingly also the largest producer of vanilla making up 60 percent of the global supply. Common livestock raised in Madagascar includes zebus (a type of cattle), sheep, pigs, and goats. According to the United Nations’ website, “Madagascar,” most farmers in Madagascar are very small scale and on average “seven out of 10 smallholder farmers own no more than 1.2 hectares of the land” which equals 2.965 acres. This is extraordinarily small when compared to the average farm size in the United States which is currently 444 acres (“Farms and Land in Farms 2019 Summary”).

A typical family in Madagascar can vary depending on their location but on average a single household is made up of 4.6 people. Malagasy women on average have 5.2 children during their lifetime (“Madagascar Demographic and Health Survey”). The number of individuals living in a household, however, often rise if they are living in a rural community. Divorce is often common in the culture and it is expected that all children will marry and start families of their own. In rural areas, many women are married by the age of sixteen or, sometimes, even younger. Furthermore, in developed communities, specifically urban areas, women are more likely to have access to secondary education. This delays marriage and helps provide Malagasy women with increased opportunities. Homes in rural Madagascar are made of mud and woven mats. In the rainforest region of the country, many homes are made with bamboo, grasses, and thatch palm. A common dish consumed by families is called Romazava which includes a mixer of beef, pork, and chicken. It also incorporates some varieties of leafy greens and normally served with rice at almost every meal.

In Madagascar over half of the population lives in rural regions of the country. Almost 60 percent of farmers in rural areas depend on a different variety of livestock for their annual income. The average

yearly income is \$459 US dollars which makes Madagascar the sixth poorest country in Africa based on a World Atlas report. Roughly 69 percent of Madagascar citizens live in poverty. Even though the nation is working towards having a better education system, still 28 percent of women and 23 percent of men living in rural areas will never receive an education (“Madagascar Demographic and Health Survey”). Rural regions of the country face not only education problems but also difficulties with the economy, health care, access to fresh drinking water and malnourishment among children and adults. This causes many health issues to develop among the citizens of Madagascar. Malnourishment affects a great amount of the youth population, specifically, 2 in 5 children are considered to be underweight throughout the country. Anemia, which is a medical condition that is caused by the lack of red blood cells in the body, also is a common disease with 68 percent of children in Madagascar affected (“Madagascar Demographic and Health Survey”).

Availability to sanitary bathrooms, freshwater, and reliable electricity vary greatly depending on location. Amount of homes that have electricity can vary greatly from 84 percent in large cities to 11 percent in rural areas. However, nationally only 35 percent of homes have clean drinking water and 45 percent do not have modern toilet facilities. Both of these factors are a few reasons why there are so many health risks. Many obstacles prevent families from being financially stable and healthy, including cyclones, sanitation problems, minimum amounts of education, flooding, economy problems, and drought.

Currently, Madagascar has some of the worst economic management problems in the world. The economy shows few signs for great improvement and many families face severe consequences. The population of Madagascar is very susceptible to many emerging health risks due to its poor health care system and infrastructure. One disease that is threatening the human and livestock population of Madagascar is called Rift Valley Fever. RVF is an epizootic disease affecting both humans and ruminant animals like cattle, sheep, and goats. In humans, the viral disease has flu-like symptoms and in severe cases causes sufferers to have hemorrhagic fevers. Rift Valley Fever (RVF) has also proven to be more deadly than even West Nile Virus. It often occurs during years with heavy rainfall and is spread by mosquitoes, handling or touching contaminated animals, or meat products. RVF is most often found in areas of southeast Africa where it is common to raise cattle. Outbreaks have occurred throughout many African nations and have proven to be extremely deadly with a 15 percent death rate.

There are currently very few options available to treat people with Rift Valley Fever and it causes many farmers to lose numerous amounts of young livestock. Most Madagascar farmers make a large percentage of their income from ruminant animals. A large outbreak of RVF could cause economic problems with many farmers losing their only source of income. With less livestock being produced, many families would go hungry as there would be limited supplies of many animals made products and this would lead to more malnourishment among the Malagasy people. There would also not be enough health care to help the sick affected by Rift Valley Fever. The progression of RVF would cause Madagascar to become overwhelmed with economic and health problems that they will be unable to handle as a nation.

To lessen the impact on the nation of Madagascar due to Rift Valley Fever there needs to be an effective solution to prevent the disease. One solution would be to have all farmers vaccinate their livestock with the Smithburn vaccination. This vaccine is the most common and oldest medication used for controlling RVF in livestock and is also considered to be the most convenient because it only requires a single dose.

Using Smithburn vaccination, however, does have consequences. This medication is known for causing many problems among pregnant livestock including birth defects, abortions and only can provide limited amounts of protection from the virus. This vaccination can't be used in nations where RVF is not considered an epidemic. However, most livestock producers only use the Smithburn vaccination during times when there's a lot of awareness placed on RVF prevention. The vaccine solution comprises many different components that could help prevent outbreaks of Rift Valley Fever. Prevention of RVF will not eliminate the disease but it will decrease the number of cases throughout East Africa. By producers continuing to have an up to date vaccination plan with their livestock they will be able to save most of their herd. All vaccinations must be implemented before the onset of an RVF outbreak otherwise if given after an outbreak occurs it will cause the outbreak to rapidly escalate.

The best way to prevent the spread of Rift Valley Fever is to have farmers wear proper protective equipment when handling their livestock. Wearing gloves, long sleeves, face shields, and boots will decrease producer's chances of being exposed to infected animal's bodily fluids. Also, making sure that all animal products like meat and milk have properly been cooked or sanitized before consumption will help prevent the risk of contracting RVF. All citizens that live in areas where it is common to have outbreaks of RVF should be prepared to protect themselves against insects like mosquitoes that can transfer the disease. Purchasing bed nets and other methods of insect repellents will reduce exposure to the RVF virus. Researchers have found that the chances of acquiring RVF greatly increase with years with heavy amounts of rainfall. By forecasting future weather patterns with data information and satellite images researchers would be able to detect the onset of an outbreak and make it possible for a warning to be released to inform the public. All of these prevention methods would decrease the spread and impact that RVF would have on Madagascar farmers.

The next solution would be to use a more uncommon medication called the MP-12 vaccination. This medication was created after a pathogenic strain of RVF called ZH548 was found in a patient during the 1977-1978 outbreak in Egypt ("Rift Valley fever MP-12 vaccine Phase 2 clinical trial"). Lots of testing has been completed and researchers found out that MP-12 is safe for all ruminant animals and nonhuman primates. This medication is currently only being used for veterinary purposes. However, it has been tested for human use during the phase II trials. Thus far MP-12 has also shown to be long-lasting medication for many patients and only requires a single injection. Out of all of the human subjects tested they all showed positive outcomes. In the next few years with further testing, the MP-12 vaccination could be the first-ever Rift Valley Fever medication that works on both livestock and humans. Which would greatly help prevent and decrease the effects of RVF on farmers and their livestock. Nevertheless, all trials and research must be completed on MP-12 before it is ready for widespread human use.

Another part of the solution would be to put in place a direct text marketing plan. This concept should be used in tandem with other methods of treatment or prevention. A direct text marketing plan is when an organization or business uses mobile devices to send informational text messages to their clientele. This would benefit farmers in Madagascar because they could be more informed on the weather especially rainfall which causes an increased numbers in mosquito population and other possible problems that would make a RVF outbreak more likely to occur. This concept would allow farmers to be better prepared and allow them time to implement proper personal protective equipment and add vaccinations into their herds health plan. With increased availability of cell phones more farmers in developing nations are now able to have some type of mobile phone or know someone who does. In Madagascar currently 33 percent

of citizens have some type of mobile devices. This number has greatly increased from 2019 to 2020 by 9.4 percent which will only continue to grow in coming years (Kemp). Another way to make sure that all farmers that do not have mobile devices receive the same information is to put in place a chain reaction system. This method would require farmers with mobile devices to inform neighboring farmers in the community by regularly updating them on RVF developments. By using a bulletin board, word of mouth, or newsletters that farmers would post throughout the village when new updates occur. Direct text messaging is also attainable, cost effective, and could be used in other nations who are experiencing similar disease outbreaks. By using direct text messaging you could also help better educate Madagascar farmers by sharing important health and safety tips and RVF prevention ideas. But, the best part about a direct text marketing plan, once developed, could be easily operated in other countries that are struggling economically and are facing major health issues.

The International Livestock Research Institute (ILRI) has had a functional RVF research and prevention program in place throughout southeast Africa for many years. Their main mission is to supply developing nations with appropriate implements to aid their livestock production. Madagascar is currently one of the lowest ranking nations in African in gross domestic product per capita. However, a considerable amount of their RVF resources have been utilized in more financially stable nations like Kenya and Ethiopia. I propose that ILRI should be put in charge of funding, supplying, and educating Malagasy farmers. ILRI has the data technology to be able to put in place the direct text marketing plan as well as supplying farmers with proper protective equipment. By having leading professionals in charge of providing information to Malagasy farmers via mass text messaging service can ensure that they are being provided with correct information about weather patterns and new developments made on Rift Valley Fever vaccination research. By using the resources that they already have in place and their communication network with east African nations ILRI is the best contender to provide the communication plan service to Madagascar. By equally distributing their resources to nations plagued by Rift Valley Fever ILRI would be able to improve the health and economic problems that many citizens face.

All of these solutions would benefit any nation that is economically and physically harmed by Rift Valley Fever. However, Madagascar could see drastic changes if they implement any of these solutions. By having medical experts create a plan of action with Madascarger producers and other community members they will be able to grow economically as a nation and protect their citizens' overall health and wellbeing. However, to keep up with this plan of action farmers would need constant support from the experts to answer or solve any questions that they may have. Madascarger farmers need to have easy and affordable access to medication and other methods of prevention which the local economies and researchers will have to help support.

In conclusion, due to Madagascar's poor economic status, they will need others such as organizations like International Livestock Research Institute (ILRI) to help solve their Rift Valley Fever problems. The citizens of Madagascar do not deserve to suffer the frightening impacts of RVF on their health, family, and economy. Using a combination of many prevention methods like personal protective equipment, a direct text marketing campaign, and vaccinations will greatly decrease the number of families and livestock affected by RVF. Being able to have a stable source of income and food will help improve the lives of many who face malnourishment and extreme poverty throughout the country. Rift Valley Fever is a problem that must be addressed now to stop the deadly impact that RVF has on ruminant livestock and humans in Madagascar.

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