



KEMENTERIAN PERTANIAN
REPUBLIK INDONESIA



DINAS PETERNAKAN
DAN KESEHATAN HEWAN
PROVINSI SUMATERA UTARA



GLOBAL ALLIANCE
FOR
RABIES CONTROL



Center for Indonesian Veterinary Analytical Studies

REPORT



Baseline Survey in Nias Island for Rabies Eradication

**Nias Island,
November 25th – December 6th, 2013**

**Directorate of Animal Health, Ministry of Agriculture
Livestock and Animal Health Services Office of North Sumatera Province
Global Alliance for Rabies Control
Center for Indonesian Veterinary Analytical Studies**

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1. Introduction

1.1. Background

Rabies or mad dog disease is an acute viral zoonoses which is challenging to eradicate. Death is imminent in animals or humans with clinical symptoms. Several historically free regions in Indonesia are now infected by rabies. One recently infected region in 2010 was Nias Island in the province of North Sumatra. This incident caused public unrest because rabies had claimed 37 human lives by May 2011. Nias Island was declared rabies infected by Minister of Agriculture Decree No. 1242/Kpts/PD.620/3/2010 on March 19, 2010, on the Declaration of Rabies Infection in Gunungsitoli city, North Sumatra Province.

Similar to Bali, which was recently infected in 2008, Nias also has a significant free-roaming dog population. The presence of this population facilitates the spread of rabies on the island. Mass vaccination of host animals and public awareness were implemented to control the disease, however further spread could not be prevented.

In response to this situation, the government in collaboration with the Global Alliance for Rabies Control (GARC) took a more comprehensive and systematic approach to control rabies on Nias Island. Since 2014, GARC provided financial and technical support for rabies control efforts in Nias. The government through the Directorate of Animal Health, the Livestock Service Office of North Sumatra Province and all district/municipal service offices responsible for animal husbandry and animal health functions were directly involved in this effort.

For the implementation and evaluation of the program, a survey was conducted to collect baseline data and information by the Center for Indonesian Veterinary Analytical Studies (CIVAS) in collaboration with the Livestock Service Office of North Sumatra Province and authorized district/municipal service offices. Data collected include the geographical condition of Nias Island, human resources, population of host animals, rabies cases in host animals, rabies cases in humans, available facilities and infrastructures, program implementation and challenges, and public support and participation at village level. This information is expected to support the development of rabies eradication strategies in Nias Island.

1.2. Objective

Objective of this survey was to identify current capacities and challenges for the implementation of the rabies eradication strategy in Nias Island through the collection of baseline data and information.

2. Method

2.1. Time and Location

The baseline survey was conducted in 5 (five) districts/city in Nias Island: Gunungsitoli, Nias, North Nias, West Nias, and South Nias; from November 25 to December 6, 2013. Data was collected in each district/city for 2 days.

2.2. Target

Primary targets were Health Offices and service offices responsible for animal husbandry and animal health functions within each district/city.

Data was also collected from 1 to 2 villages in each district/city. Villages selected were those with the largest dog population, history of rabies incidence in animal or human, least distance from the local Livestock Service Office, and had a meeting with the local farmers.

Data was also collected from a church community since people in Nias are mostly Christians. Gunungsitoli city parish was selected to represent other parishes on the island.

Respondents from each service office were division or section heads or staff appointed by the division head. Meanwhile, respondents from villages or the church parish were village chiefs and the person responsible of the parish.

2.3. Data Collection

Data were collected from Service Offices using forms and discussions, while data from villages and the church parish were collected from discussions.

Data collected from service offices responsible for animal husbandry and animal health functions include human resources, host animal population, vaccination, available stock of rabies vaccines for animals, animal bite cases, support facilities, data on institutions or offices involved in rabies eradication, and issues or challenges related to program implementation.

Data collected from the Health office include human resources, number of Rabies Centers, available stock of rabies vaccine for human, human bite cases, support facilities, public awareness programs and issues or challenges related to program implementation.

Data collected from villages and the church parish include public willingness and participation to support rabies eradication programs.

2.4. Data Analysis

Data were analyzed descriptively and presented in tables and graphs. Discussion results were used to complement and elaborate existing data.

3. Results

3.1. Profile of Nias Island

The island of Nias is part of North Sumatra province. It is 125 kilometers west of mainland Sumatra (Figure 1).

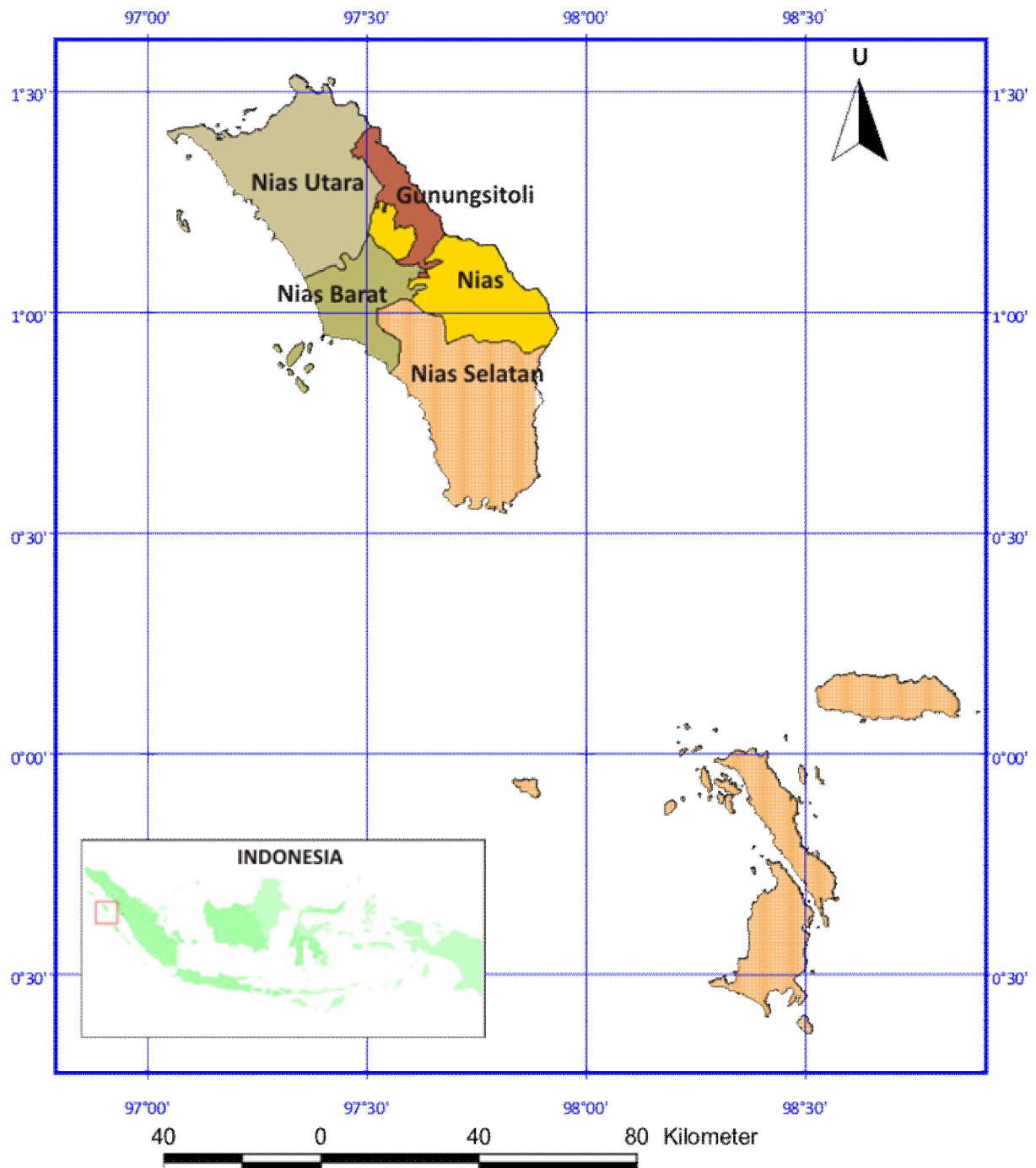


Figure 1. Map of Nias Island

3.1.1. Geographical Position and Features

Nias Island is divided into 4 districts: Nias, South Nias, North Nias, and West Nias, and 1 city: Gunungsitoli. The borders of each district/city are shown in Table 1.

Table 1. District/City Border

No.	City / District	North Border	East Border	South Border	West Border
1	Gunungsitoli	Sitolu subdistrict (North Nias dist.)	Indonesian Ocean	Gidodan and Hiliserangkai subdistrict (Nias dist.)	Hiliduho subdistrict (Nias dist.) Alasa Talumuzoi and Namohalu subdistricts (North Nias dist.)
2	Nias	North Nias district	Gunungsitoli city and the Indonesian Ocean	South Nias district	West Nias dist.
3	North Nias	Indonesian Ocean	The Indonesian Ocean and Gunungsitoli city	West Nias and Nias districts	Indonesian Ocean
4	West Nias	Tugala Oyo subdistrict (North Nias dist.)	Lolowau subdistrict (South Nias dist.)	Botomozoi subdistrict (Nias dist.)	Indonesian Ocean
5	South Nias	Nias district	Mandailing Natal subdistrict and Mursala island (Central Tapanuli dist.)	Mentawai Islands (West Sumatra)	Indian Ocean

The island of Nias is made of lowlands, narrow and steep hills and mountains. The topography of each district/city is different, posing different challenges for the implementation of vaccination programs. For example, 51% of South Nias district is hills and mountains and 48% of West Nias is lowlands and hills. Therefore, the availability of road access in these regions is crucial.

Knowledge and understanding of district/city topography is central to program implementation. There are road connections passable by motorcycle and cars to every district/city although some are damaged or under repair. Except in Gunungsitoli city, some villages are remote and can only be accessed on foot. This is one main challenge for the implementation of rabies vaccination on the island.

3.1.2. Government

The island of Nias is 5,320.58 kilometers square wide, comprised of 53 subdistricts and 845 villages/administrative villages (2012). Several new subdistricts and villages have been established in 2013; however the official list has yet been published. The area, number of subdistricts and villages in each district/city is shown in Table 2.

Table 2. Area, Number of Subdistricts and Villages in Nias Island in 2012

No.	City/District (source)	Area (km ²)	Number of Subdistricts	Number of Villages / Administrative Villages
1	Gunungsitoli (<i>North Sumatra in numbers 2013</i>)	469.36	6	101
2	Nias (<i>Nias in numbers 2013</i>)	980.30	10	165
3	Nias Utara (<i>North Sumatra in numbers 2013</i>)	1,501.63	11	113
4	Nias Barat (<i>North Sumatra in numbers 2013</i>)	544.09	8	110
5	Nias Selatan (<i>South Nias in numbers 2013</i>)	1,825.20	18	356
Total		5,320.58	53	845

3.1.3. Human Population

There are 766,411 people living on Nias Island with an average density of 801 people / Km². The human population and density of each district/city is shown in Table 3. The main occupation of the majority of Nias residents is agriculture (including crop agriculture, plantation, forestry, hunting and fishery).

Table 3. Human Population in Nias Island in 2012

No.	City/District	Population	Density (per Km ²)
1	Gunungsitoli (<i>North Sumatra in numbers 2013</i>)	128,377	273.43
2	Nias (<i>Nias in numbers 2013</i>)	132,860	135.53
3	Nias Utara (<i>North Sumatra in numbers 2013</i>)	128,533	86.60
4	Nias Barat (<i>North Sumatra in numbers 2013</i>)	82,701	152
5	Nias Selatan (<i>South Nias in numbers 2013</i>)	294,069	161.12
Total		766,500	144.06

The religion of most residents is Protestant Christian. Afterwards are Catholic, Islam, Buddhism and Hindu. Each religion has its own congregation which could be involved in rabies eradication efforts.

Additionally, there are other social structures on the Island which can be involved in rabies eradication effort which include government supported groups such as Family Welfare Education groups (PKK), neighborhood meetings, youth groups, religious groups, cultural communities, and non-government organizations. Existing social organizations/structures are shown in Table 4.

Table 4. Public Groups and Organizations in Nias Island

No.	Public Groups and Organizations	Presence in District/City				
		Gunungsitoli	Nias	North Nias	West Nias	South Nias
1	Family Welfare Education (PKK - housewives)	Yes	Yes	Yes	Yes	Yes
2	Neighborhood meeting (Women/Men)	No	Yes	No	Yes	Yes
3	Youth groups	No	Yes	Yes	Yes	No
4	Religious groups	Yes	Yes	Yes	Yes	No
5	Cultural communities	Yes	Yes	Yes	Yes	Yes
6	Non-government organizations / social organizations	No	Yes	Yes	Yes	No

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2. Data from Service Offices Responsible for Animal Husbandry and Animal Health Functions

3.2.1. Human Resources

Human resources in service offices responsible for animal husbandry and animal health functions are crucial for the implementation of rabies eradication programs in Nias Island. Resources available at service offices are inadequate to reach and cover all areas on the island due to large distance and difficult terrain. Public participation should be encouraged to assist the implementation of programs in their respective communities.

There are only 3 (three) veterinarians working in animal husbandry and animal health services on Nias Island. Among the 3 (three), only 1 (one) veterinarian is a government employee (North Nias), while 2 (two) others are casual labors (Gunungsitoli and West Nias). Human resources in all district/cities in Nias Island are shown in Table 5.

Table 5. Human Resources

No.	City/District	Government Employee	Casual Labor	Contract Worker	Training
1	Gunungsitoli	11 people (Head of Division, Head of Section, staff, vaccinators)	7 people (veterinarians, paramedics, vaccinators)	4 people (vaccinators)	Vaccination, medical and paramedical training
2	Nias	7 people (Head of Division, Head of Section, staff)	-	-	Vaccination
3	Nias Utara	3 people (1 Head of Division, 2 Heads of Section)	-	1 people	Vaccination and public awareness
4	Nias Barat	2 people (1 Head of Division, 1 Head of Section)	-	1 people (Veterinarian)	Vaccination, reproduction health and management, prevention and mitigation of infectious animal diseases
5	Nias Selatan	13 orang (Head of Section, staff, public awareness officers)	22 people	-	Vaccination

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2.2. Host Animals

Dogs are the main target for rabies eradication programs, however information on other host animals, such as cats and monkeys, are also important. Records show there were 37,613 dogs, 10,101 cats and 401 monkeys in Nias Island. Some animals have owners, while others are stray / feral. Pet owners generally allow their animals to free-roam.

Pet dogs mainly guard the house or accompany their owners to the field. The people in Nias Island also consume dog meat, which gives rise to dog trade between regions. Therefore, movement control measures need to be implemented to prevent disease spread. Data on animal population and ownership status in districts/city in Nias Island is shown in Table 6.

Table 6. Host Animal Population in Nias Island in 2013

No.	City/District	Population								
		Dog			Cat			Monkey		
		O	S/F	T	O	S/F	T	O	S/F	T
1	Gunungsitoli	2,821	-	2,821	5,631	-	5,631	61	-	61
2	Nias	17,304	-	17,304	1,990	35	2,025	-	-	-
3	North Nias	2,472	2,310	4,782	1,230	739	1,969	50	143	193
4	West Nias	-	-	3,693	-	-	-	-	-	-
5	South Nias	9,013	0	9,013	476	0	476	147	0	147
Total		31,610	2,310	37,613	9,327	774	10,101	258	143	401

Note : O = Owned; S/F = Stray/Feral; T = Total

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

One aspect of the rabies eradication program is population control. Population growth is an important factor that needs to be considered in any program; therefore data on female population is also important to estimate the number of new dogs born every year.

Excluding the dog population in West Nias, 38.66% of the dogs in Nias Island is female. The highest percentage of females is in South Nias (51.40%) and the lowest is in Gunungsitoli (19.99%). Data on dog population by sex is shown in Table 7.

Table 7. Dog Population in Nias Island by Sex in 2013

No.	Kota/Kabupaten	Populasi Anjing				
		Total	Jantan		Betina	
			Number	Percent	Number	Percent
1	Gunungsitoli	2.821	2257	80.1	564	19.99
2	Nias	17.304	11,000	63.57	6,304	36.43
3	Nias Utara	4.782	3,170	66.29	1,612	33.71
4	Nias Barat	3.693	Unavailable			
5	Nias Selatan	9.013	4,380	48.60	4,633	51.40
Total populasi		37.613	20,807	61.34	13,113	38.66

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

Dog density and human to dog ratio

The overall dog to human ratio in Nias Island in 2013 was 1:20. By district/city, Nias district has the smallest ratio (1:6), while Gunungsitoli city has the largest (1:45). By density, the dog population in Nias district was most dense (18 dogs/Km²), while the population in North Nias was the least dense (3 dogs/Km²). Dog to human ratios and densities are shown in Table 8.

Table 8. Dog to Human Ratio and Dog Density in Nias Island in 2013

No.	City/District	Human Population	Dog Population	Area (Km ²)	Dog : Human Ratio	Dog Density (dog/Km ²)
1	Gunungsitoli	128,377	2,821	469.36	1: 45	6
2	Nias	132,860	17,304	980.30	1: 8	18
3	North Nias	128,533	4,782	1,501.63	1: 27	3
4	West Nias	82,701	3,693	544.09	1: 22	7
5	South Nias	294,069	9,013	1,825.20	1: 33	5
Total		766,500	37,613	5,320.58	1: 20	7

3.2.3. Vaccination

Vaccination of host animals is an integral part in the rabies eradication program. Success is indicated by the achievement of at least 70% coverage. Vaccination has been implemented in Nias Island since the first case of rabies was known (2010); however 70% coverage has yet been achieved even until the last program in 2013. One exception was vaccination in Gunungsitoli in 2011 where coverage was 78%. Rabies eradication will be hard to achieve if the program only relies on current efforts. Inadequate human resources and lack of public participation were several factors which contribute to low vaccination coverage. Rabies vaccination coverage by district/city is shown in Table 9.

Tabel 9. Vaccination Coverage in Nias Island

No.	City/District	Vaccination coverage in host animals											
		2010			2011			2012			2013		
		N	V	%	N	V	%	N	V	%	N	V	%
1	Gunungsitoli	2,980	1,544	52	2,527	1,959	78	2,449	1,550	63	2,821	1,157	41
2	Nias	-	-	-	-	-	-	8,440	3,880	46	17,304	2,702	32
3	North Nias	-	-	-	-	-	-	-	-	-	4,782	-	-
4	West Nias	2,678	2,216	83	1,899	902	47	3,750	2,265	60	3,693	1,202	33
5	South Nias	-	-	-	-	-	-	7,842	3,721	47	9,013	2,693	30

Note : N = Number of animals; V = vaccinated animals; % = percent vaccinated

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2.4. Vaccine Stock

Local governments acquire rabies vaccines from the provincial government. In 2013, 24,502 doses of vaccine were provided for the island of Nias. Comparing government reports, there was discrepancy between the number of doses used and the amount provided in 2013 in districts/city and the number reported from vaccination programs. This calls for improvement in data recording and management capacities in each district/city. Data on vaccine stock and use is shown in Table 10.

Table 10. Vaccine Stock and Use

No.	City/District	Number of Vaccine Doses											
		2010			2011			2012			2013		
		U	S	T	P	S	T	P	S	T	P	S	T
1	Gunungsitoli	3640	1010	4650	3796	910	4706	2305	630	2935	3040	960	4000
2	Nias	-	-	-	-	-	-	-	-	-	9000	-	9000
3	Nias Utara	-	-	-	-	-	-	-	-	-	4000	2000	6000
4	Nias Barat	2216	1700	3916	802	720	1522	2265	1650	3915	1202	1300	2502
5	Nias Selatan	-	-	-	-	-	-	4000	0	4000	3000	0	3000
Total		5,856	2,710	8,566	4,598	1,630	6,228	8,570	2,280	10,850	20,242	4,260	24,502

Note : U = Number of doses used; S = Available stock; T = Total

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2.5. Support Facilities

Facilities and infrastructures are important for the implementation of the rabies eradication program. Before the tsunami disasters in 2004 and 2005, the island of Nias was isolated and underdeveloped. Afterwards, infrastructures such as roads and public facilities were built.

Even so, facilities and infrastructures available are still lacking for effective implementation of animal health programs. Only one district, West Nias, has an operational vehicle (one unit). Only 2

districts, Nias and West Nias, have computers. The island also lacks a veterinary laboratory, public awareness materials, and border posts / checkpoints to control the movement of host animals.

Vaccination equipment, such as syringes, needles, coolboxes, freezers and dog-catching tools, are very lacking and even unavailable in some districts/city. GARC has provided aid in the form of 1 freezer and 3 cool boxes for each district and city in Nias Island. Available facilities and infrastructures in districts/city in Nias Island are shown in Table 11.

Table 11. Facilities and Infrastructures in Nias Island

No	Type of Facility/Infrastructure	District/City				
		Gunungsitoli	Nias	North Nias	West Nias	South Nias
1	Automobile for Animal Health Operations and Technical Units	None	None	None	None	None
2	Motorcycle for Animal Health Operations in City/Districts	None	None	None	1	None
3	Computer with internet	None	None	None	None	None
4	Computer without internet	None	Available	None	2 (1 broken)	None
5	Veterinary Laboratory (<i>For rabies testing</i>)	None	None	None	None	None
6	Public awareness materials <ul style="list-style-type: none"> ▪ Brochure ▪ Leaflet ▪ Poster ▪ Flip chart ▪ Book ▪ Video 	None	None	None	None	None
7	Border Post/Check Point	None	None	None	None	None
8	Vaccination and cold chain equipment <ul style="list-style-type: none"> • Syringe • Needle • Coolbox (including aid from GARC) • Freezer (including aid from GARC) • Dog catching tool 	None None 4 2 None	None None 4 2 None	Ada Ada 4 2 None	1 box None 5 4 (1 broken) None	None None 3 1 None

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2.6. Other support structures for Rabies Control programs (institutions and agencies)

Support and participation from other parties, i.e. government offices other than those related to animal husbandry and animal health functions, animal health organizations, and existing social organizations, is essential for the success of rabies eradication in Nias Island.

Quarantine stations are important to control animal movement in and out of the island; however there is no quarantine agency in Nias. In addition to effort from service offices responsible for animal husbandry and animal health functions, active participation from Education Offices, social communities and non-government organizations to disseminate information on the cause, transmission, prevention and management of rabies in humans and animals is highly recommended to increase public awareness and knowledge.

All districts/city in Nias Island have kindergartens, elementary schools and high-schools. Colleges are also available in all districts/city, except in West Nias. Public groups and organizations such as Family Welfare Education groups, neighborhood meetings, youth groups, religious groups, cultural communities and non-government organizations are also present. If these institutions and groups could be actively involved in rabies eradication efforts, Nias Island could be liberated from rabies. Institutions and agencies on Nias Island are shown in Table 12.

Table 12. Potential Support Institutions and Agencies for Rabies Eradication Programs

No	Institution / Agency	District/City				
		Gunungsitoli	Nias	North Nias	West Nias	South Nias
1	Animal Quarantine	-	-	-	-	-
2	Indonesian Veterinary Medical Association	-	-	-	-	-
3	School					
	• Kindergarten	Available		Available	44	101
	• Elementary school	105	75	Available	103	335
	• Junior highschool	Available	25	Available	43	203
	• Senior highschool	Available	20	Available	23	85
	• College	3	2	Available	None	2

Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.2.7. Challenges

Major challenges were the lack of human resources, operational vehicles, remote locations and difficult terrains, and lack of public participation and involvement. Challenges faced in each district and city are shown in Table 13.

Table 13. Challenges faced in districts/city in Nias Island

No.	City/District	Challenges	Recommendation
1	Gunungsitoli	<ul style="list-style-type: none"> • Lack of village officials to assist vaccination campaigns • Owners unwilling to catch or handle their dogs during vaccination • Poor public participation • Operational budget inadequate • Operational vehicle for vaccinators unavailable • Not enough vaccinators • Some villages inaccessible by vehicle 	
2	Nias	<ul style="list-style-type: none"> • Operational vehicle unavailable • Not enough vaccinators • Some villages are very remote • Frequent electrical blackouts could affect vaccine shelf-life 	<ul style="list-style-type: none"> • Recruit more people (veterinarians, vaccinators) • Request aid in the form of operational vehicles • Buy a generator
3	North Nias	<ul style="list-style-type: none"> • Lack of human resources • Lack of facilities • Some places difficult to access 	Recruitment of cadres should come from village chiefs
4	West Nias	<ul style="list-style-type: none"> • Lack of operational vehicles 	<ul style="list-style-type: none"> • Continue vaccination campaigns • Increase operational budget
5	South Nias	<ul style="list-style-type: none"> • Not enough vaccinators • Poor public participation • Difficult terrain (some places are only 	<ul style="list-style-type: none"> • Recruit/train more vaccinators • Routine public awareness • Provide operational vehicle (motorcycle)

	accessible by foot) • Operational cost very high	• Adjust operational budget to geographical conditions
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Source : Data from service offices responsible for animal husbandry and animal health functions in each district/city

3.3. Data from Health Offices

3.3.1. Human Resources

The number of people assigned to work on rabies in Health Offices range from 2 to 9 officers. There are also 1,985 volunteers/cadres under the coordination of Health Offices in Nias Island. These cadres, however, are not trained to manage rabies incidences. The list of human resources available to Health Offices in Nias Island is shown in Table 14.

Tabel 14. Human Resources in Health Offices

No.	City/District	Health Office (Resources for Rabies)	Medical Doctor	Volunteer/Cadre
1	Gunungsitoli	9	-	150 (Integrated Service Post/Posyandu) 28 (Mosquito Larva Control/Jumantik)
2	Nias	3	-	152 (Integrated Service Post/Posyandu cadres)
3	North Nias	4	3	166 (Integrated Service Post/Posyandu cadres)
4	West Nias			
5	South Nias	2	-	1,489

Source : Data from Health Offices in each district/city

3.3.2. Rabies Center

Rabies centers are hospitals or community health centers (puskesmas) assigned as referral facilities for treatment of animal bite cases in human. There are 19 rabies centers on the island, excluding West Nias (Table 15).

Table 15. Number of Rabies Centers

No.	Kota/Kabupaten	Jumlah
1	Gunungsitoli	3
2	Nias	7
3	North Nias	4
4	West Nias	Unavailable
5	South Nias	5
Total populasi		19

Source : Data from Health Offices in each district/city

3.3.3. Human Rabies Vaccine

Data on human rabies vaccine administration in each district/city is very limited, although hospitals report giving post-exposure treatment to many patients. In 2013, North Nias used 31 of 31 doses provided, West Nias used 205 of 360 doses provided and South Nias used 184 of 292 doses provided. Human rabies vaccine was not provided in Gunungsitoli city, while data from Nias district was unavailable. Use of human rabies vaccine is shown in Table 16.

Table 16. Stock and Use of Human Rabies Vaccine

No.	City/District	2010			2011			2012			2013		
		U	S	T	U	S	T	U	S	T	U	S	T
1	Gunungsitoli	-	-	-	-	-	-	-	-	-	-	-	-
2	Nias	Data unavailable											
3	North Nias	75	0	75	65	0	65	118	0	118	31	0	31
4	West Nias										205	155	360
5	South Nias	-	-	-	196	63	258	818	154	972	184	108	292

Note : U = Number of doses used; S = Remaining stock; T = Total

Source : Data from Health Offices in each district/city

3.3.4. Rabies Cases in Human

During the start of the outbreak in 2010, there were 988 cases of animal bites and 24 fatalities. The number of bite cases decreased from 2010 to 2013, but was still high. In 2013, there were 430 bite cases and 1 fatality in Nias district, which resulted from late treatment. The patient did not seek post-exposure treatment after being bitten and was admitted to the hospital after symptoms had developed. Overall, there were 2,768 animal bite cases between 2010 and 2013 with 47 fatalities (1.7% fatality rate; Table 17, Figure 2). A map of rabies cases by district/city in Nias Island is shown in Figure 3.

Table 17. Human rabies case in Nias Island by district

No.	City/District	Number of Cases								Note
		2010		2011		2012		2013		
		B	F	B	F	B	F	B	F	
1	Gunungsitoli	697	18	117	2	181	1	152	0	
2	Nias	164	5	122	3	148	2	81	1	Patient did not seek post-exposure treatment
3	North Nias	127	1	69	4	119	1	53	0	Patient did not seek post-exposure treatment
4	West Nias	-	-	146	0	137	0	25	0	
5	South Nias	-	-	119	5	192	4	119	0	<ul style="list-style-type: none">• Patient did not seek post-exposure treatment• Admitted to hospital with symptom
Total		988	24	573	14	777	8	430	1	

Note : B = Animal bite case; F = Human fatality from rabies

Source : Data from Health Offices in each district/city

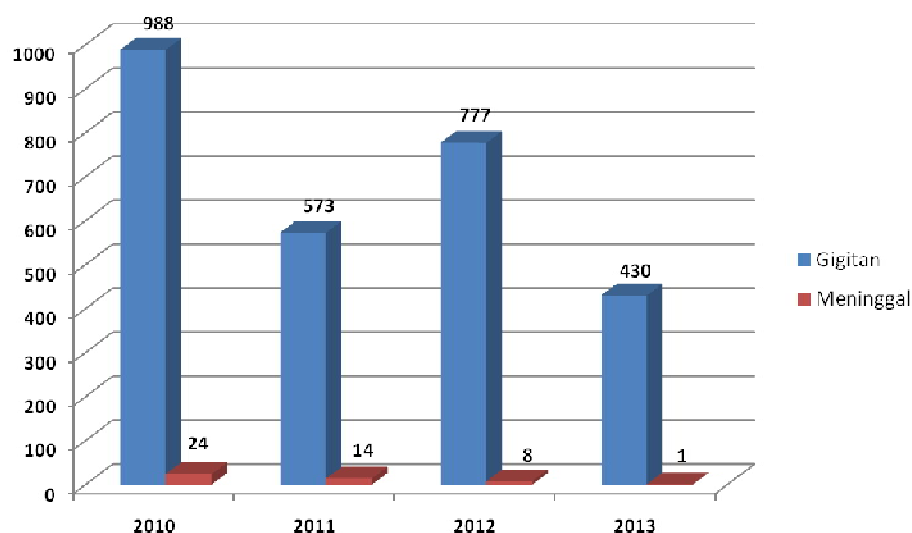


Figure 2. Annual Animal Bite Case and Human Rabies Fatality in Nias Island

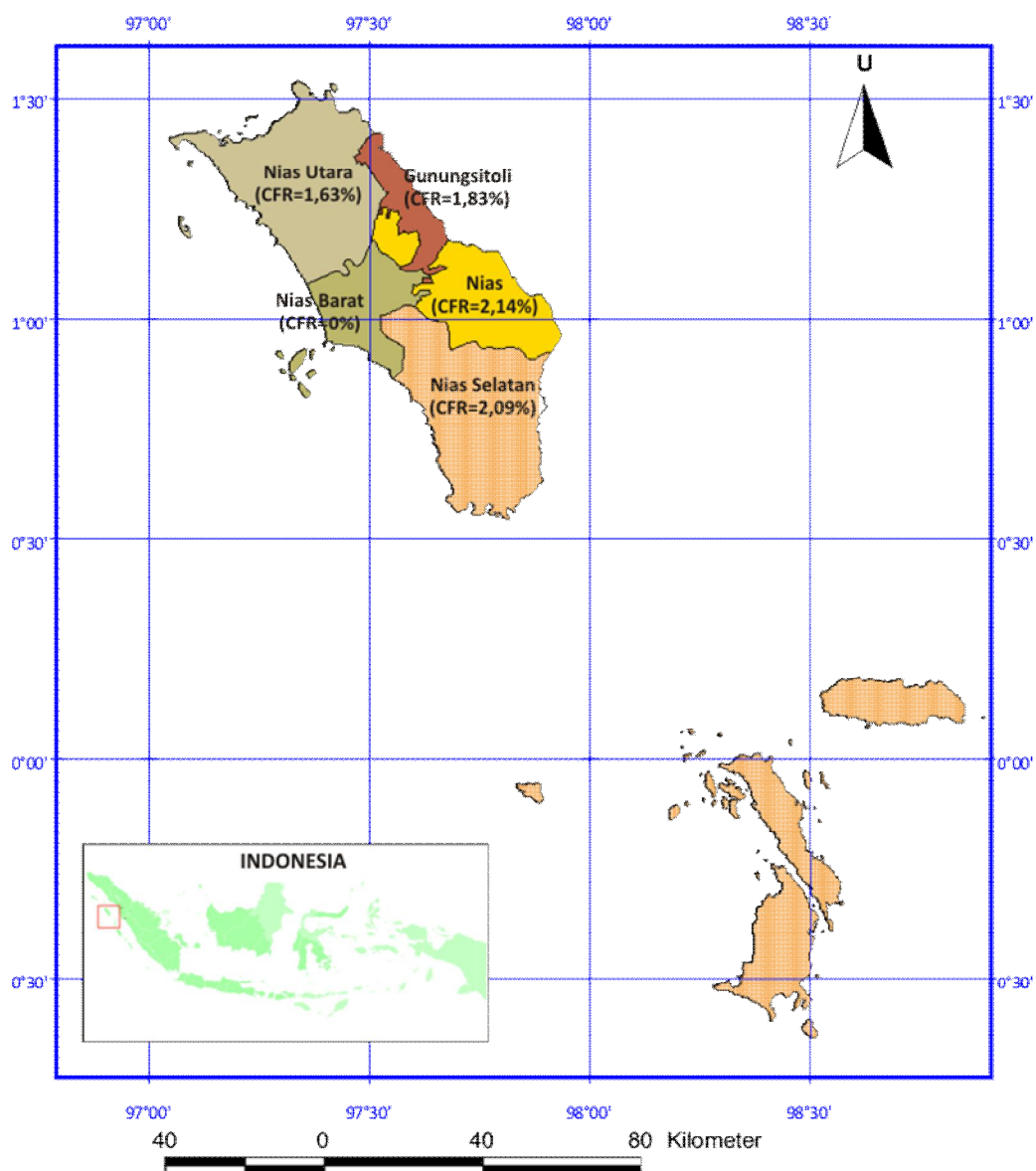


Figure 3. Map of Animal Bite Fatality Rate due to Rabies in Nias Island (2010-2013)

3.3.5. Support Facilities

Support facilities such as Integrated Service Posts (Posyandu) and Community Health Centers (Puskesmas) are widespread in all districts/city. There are 1-2 units of Posyandu in each village and 1-2 units of Puskesmas in each subdistrict. Data from 2012 list 1,026 units of Posyandu and 54 units of Puskesmas in Nias Island (Table 18).

Table 18. Number of Posyandu and Puskesmas in Nias Island in 2012 by District/City

No.	City/District	Posyandu	Puskesmas
1	Gunungsitoli	149	4
2	Nias	158	8
3	North Nias	164	11
4	West Nias	115	5
5	South Nias	440	26
Total		1,026	54

As part of their service, Health Offices have public awareness programs on important health issues. Direct meetings, posters, and radio discussions were some approaches used for rabies public awareness in Nias. However, no public awareness material, such as brochures, leaflets, posters, flip charts, books or videos are currently available. Public awareness programs for rabies in Nias are shown in Table 19.

Table 19. Public Awareness Program in Nias for Rabies Education

No	Public awareness	District / City				
		Gunungsitoli	Nias	North Nias	West Nias	South Nias
1	Direct meeting	Yes	-	-	Unavailable	Yes
2	Poster	Yes	-	-	Unavailable	-
3	Radio discussion	Yes	-	-	Unavailable	-
4	Loud speaker announcement	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable

Source : Data from Health Offices in each district/city

3.3.6. Challenges

Several challenges faced by Health Offices are related to human rabies vaccine availability. Not enough doses are available and acquiring more doses is difficult. Furthermore, there is a lack of budget. Some Health Offices recommend educating cadres to help manage animal bite cases and give rabies education regarding host animals and dog management. Table 20 lists all the challenges faced by Health Offices.

Table 20. Challenges faced by Health Offices in Nias by District/City

No.	Kota/Kabupaten	Permasalahan	Saran
1	Gunungsitoli	<ul style="list-style-type: none"> Vaccine procurement takes a long time 	
2	Nias	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
3	North Nias	<ul style="list-style-type: none"> Vaccine unavailable Vaccine procurement difficult (expensive) Budget for rabies very small 	<ul style="list-style-type: none"> Train cadres to hasten treatment of animal bite cases Rabies eradication should be prioritized in host animals

No.	Kota/Kabupaten	Permasalahan	Saran
4	West Nias		
5	South Nias	<ul style="list-style-type: none"> • There are many free-roaming dogs • Public lack knowledge on responsible dog ownership 	<ul style="list-style-type: none"> • Increase knowledge on rabies in host animals • Develop rabies cadres in villages • Increase public awareness on stray/feral dog management • Animal husbandry service offices should be more active in managing dogs

Source : Data from Health Offices in each district/city

3.4. Community Survey

Interview and discussion was conducted with 1 to 2 village chiefs from each district/city. In general, village chiefs were very supportive of rabies eradication programs from the government. Villages can help with the implementation of vaccination programs and disseminate information on rabies and its management. Public awareness training should be given to village chiefs so information dissemination could be carried out accordingly.

There was significant desire in the community to vaccinate their animals against rabies, however there were complaints about the time of the campaign as dog owners had businesses to attend to. Public awareness on rabies were given in some villages through community meetings. Those meetings, however, were targeted to adults. Public awareness should also be given to children through schools and churches. Additionally, the program should also build awareness on responsible dog ownership.

3.5. Cadre

To improve animal vaccination and recording for rabies eradication, assistance from cadres or volunteers is very important since government resources are very limited. There were several recommendations from the livestock service office or offices responsible for animal husbandry and animal health functions, health offices and village chiefs regarding rabies cadres:

- 1) Cadres should come from villages
 - Village chiefs are more respected
 - Wider coverage
 - More practical
 - Village officials know who owns dogs in the village
- 2) Youth or religious figures appointed by the village
- 3) Field Education/Extension Officer
- 4) Subdistrict official
- 5) Education (at least senior highschool for some villages, otherwise junior highschool)
- 6) Capable and willing to be a cadre
- 7) Has communication skills
- 8) Has spare time

Cadres/volunteers should be given training on rabies management and eradication so they can function accordingly.

4. Discussion

4.1. Human Resources

Human resources available at service offices responsible for animal husbandry and animal health functions were severely inadequate. There were only 3 veterinarians and a limited number of paramedics providing service for the entire island. Therefore, achieving 70% vaccination coverage with the current human resources is very difficult. Additionally, some regions are geographically challenging and some villages could only be reached on foot.

To reach good vaccination coverage, public participation is essential. People could contribute by participating in vaccination campaigns or becoming cadres/volunteers and help with the implementation of vaccination campaigns and give public awareness to children and adults about rabies and responsible pet ownership.

Health offices, on the other hand, already have 3 to 5 cadres in every village. These cadres, however, still lack knowledge on rabies management and require training. Optimizing village health cadres will reduce the time it takes for bite victims to receive post-exposure treatment at rabies centers or hospitals.

4.2. Host Animals and Vaccination

Allowing dogs to free-roam, a common practice by people in Nias, poses a challenge to the vaccination program and facilitates quicker spread of rabies between animals. Therefore, owner involvement is imperative during vaccination campaigns. Village chiefs report that people want to vaccinate their dogs, however campaigns were conducted at inconvenient times, making it difficult for vaccinators to capture and handle dogs. Therefore, it is recommended that future campaigns are conducted on holidays. Frequent announcement and reminders should be given regarding the time of the campaign and owners could participate by bringing their dogs to a gathering point. This way, achieving 70% vaccination coverage is expected to be more feasible.

The highest human to dog ratio was recorded in Gunungsitoli city, meanwhile dog density (per Km²) was reported highest in Nias district. However, knowing the lack of human resources in all districts/city in Nias Island and logistical challenges faced, better data on the dog population in Nias is warranted.

4.3. Rabies Vaccine Availability

Currently, there are enough doses of rabies vaccine provided for the vaccination of host animals, particularly dogs, in Nias Island. The Ministry of Agriculture has prepared 50,000 doses of vaccine for the next round of animal vaccination and the Provincial Livestock Service Office of North Sumatra will assist with operational costs. With the support provided, hopefully 70% or greater vaccination coverage can be achieved.

In contrast, the number of human rabies vaccines available through Health Offices is very few compared to the number of people bitten. This shortage was a result of slow provisioning and limited budget. Support is needed from the Ministry of Health, provincial government and regional governments to accelerate the procurement process and increase budget. Human rabies vaccines are also available through pharmacies and private doctors; however, it is very expensive.

4.4. Human Cases

In 2013, the number of human fatality due to rabies has decrease to 1 case. The patient died due to late post exposure treatment. Many fatalities were reported in the beginning of the outbreak because bite incidents were considered normal and not treated. There is a decrease in the number of cases reported between 2010 and 2013 although bite incidents were still high (430 cases in 2013). This indicates an increase in public knowledge on bite incident management and reporting.

Nias Island and Nusa Tenggara Timur (NTT) Province are similar in terms of dog ownership and consumption. However, data from the survey indicates that more deaths resulted from dog bites in Nias compared to NTT province (Fatality rate 1.7%). The Ministry of Health reported 17,704 bite cases and 95 human fatalities in NTT between 2008 and 2012 (Fatality rate 0.55%).

The case of rabies in Nias demands immediate attention and mitigation. Vaccination coverage should be increased, dog ownership practices should be improved, and public awareness should be strengthened.

4.5. Public Awareness

Service offices responsible for animal husbandry and animal health functions and Health Offices in Nias Island have carried out public awareness programs. These programs include public meetings, public awareness posters (early in the outbreak), radio discussion, school meetings and announcements using cars and loudspeakers.

In 2013, the offices were out of public awareness materials and programs were rare. Discussion with several villages confirmed they have not received any information on rabies in quite a while. This situation should be resolved because bite incidents still occur. Furthermore, preceding programs only covered rabies information, but not responsible pet (dog) ownership.

4.6. Potential Institutions for Rabies Eradication

The involvement of other institutions or agencies is important to achieve rabies eradication. For example, Nias Island lacks an animal quarantine agency. This allows unsupervised movement of animals in and out of the island. To remedy this issue, regional governments should request the establishment of a quarantine agency on the island. Other government offices, such as health offices, need to be involved in providing early rabies education in schools.

Besides government institutions, social groups or communities in Nias Island also hold many gatherings. These groups could be involved in rabies eradication program. For example, the head of Gunungstoli Parish was very eager to help disseminate information on rabies to members and facilitate vaccination campaigns. In light of this support, local service offices would hopefully include and involve these groups in the implementation of rabies eradication programs.

5. Conclusion and Recommendation

5.1. Conclusion

From this survey, the following can be concluded:

- 1) Resources in service offices responsible for animal husbandry and animal health functions are very limited. Remote villages and difficult access provides additional challenges.
- 2) Database management is still inadequate. There was mismatch between recorded data and field conditions.

- 3) Pet animals (dogs) are mostly free-roaming, making vaccination campaigns difficult and rabies spread easier.
- 4) Human rabies vaccines provided at Health Offices is severely lacking due to slow procurement and limited budget, meanwhile animal rabies vaccines for the next round of mass vaccination has been prepared.
- 5) Operational facilities are lacking and public awareness materials are out.
- 6) Need to give more public awareness on rabies and responsible pet ownership to children in particular.
- 7) Social groups and communities in Nias Island are eager to help rabies eradication programs.

5.2. Recommendation

- 1) Recruit and train cadres/volunteer and increase human resources.
- 2) Continue public awareness programs.
- 3) Gain support from policy makers in the central, provincial and regional governments regarding animal and human vaccine procurement, facilities and infrastructure, and rabies eradication policies.
- 4) Empower existiting social groups/communities to help with rabies eradication programs.

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Documentation

1. Gunungsitoli City





2. Nias District



3. North Nias District



4. West Nias District





5. South Nias District



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