

# SUMATRAN RHINO

OF

SABAH

*"A Bitter & Sweet Story"*



*DR EDWIN J BOSI D.V.M*

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<i>Contents</i>	<i>Page</i>
A horn that invites death .....	1
I became a Vet .....	3
Becoming a Conservationist .....	8
The Rhino Controversy .....	10
Looking for Rhinos .....	13
Rhino in a Pit Trap .....	20
I am a Wildlife Vet .....	24
Breeding the Rhinos .....	32
Steve Romo Came to Visit .....	49
Romo Had a Rhino Baby .....	52
SOS Rhino (Borneo) .....	56
RPUs and Volunteers .....	61
Working with Stakeholders .....	66
Annelisa's Tragic End in the Congo .....	78
Searching for the Rhinos .....	80
Obstacles and Challenges .....	89
Extinction no more .....	95

## *A horn that invites death*

The Sumatran rhinoceroses were roaming the jungle of Borneo when the earth was created. To many this ancient species, the smallest among the five that inhabit the earth is the last prehistoric link to our past. In Sabah, the Sumatran rhino is a subspecies called *Dicerorhinus sumatrensis harrissoni*. They have survived where others such as the dinosaurs had perished. Naturalists who came to Borneo in the 19<sup>th</sup> century in search of adventure claimed that rhinos were to be found everywhere. There were incidents where people were attacked by these animals while gathering forest products or while trekking inside the forest, even at its periphery.

There were many rhinos that were killed for their horns while others had their specimens taken for study and collection for museums. The rhino horn is a valuable commodity and for that they are persecuted, killed and their horns torn off from their head. They are used to make handles of daggers for the kings and sultans and into cups for drinking with the belief that it can neutralize any poison. Rhino horns are very expensive commodity despite the fact that it is not much difference to our finger nails. In Asia, especially in China, the rhino horn is an ingredient in traditional medicine. When scraped, the fine thin pieces are put into a cup of hot water and drunk. It is believed to have the ability to reduce fever. The so-called "rhino drinking water" is so popular and is openly



## The Rhino controversy

A year after my graduation, Sabah saw a political upheaval in 1985. The Berjaya government was challenged by a new political party, Parti Bersatu Sabah (PBS). Berjaya lost and in the first year of PBS in power saw the beginning of the controversy surrounding the Sumatran rhino. I had lost a golden opportunity in my working career. The then Chief Minister, Harris Salleh, had personally sent me to study veterinary medicine as he was not happy to note the absence of qualified veterinarians within the local or indigenous community. In 1984 I was the first, "Kadazan Anak Negeri", and a native to qualify as a veterinary surgeon. I was in the seventh batch. Datuk Harris was so pleased that he wanted me to further my studies in the same field.

I had no idea that the Sumatran rhino existed in Sabah. The zoos in the United States had made plans to capture the rhinos and then relocate them to the United States for breeding. I later learned that they were already rearing a few rhinos in their zoos. I must say the Americans had already done their homework and they even knew where exactly the rhinos were living. Their proposal elicited strong sentiments from the public that made the PBS government decide that the capture and breeding of the Sumatran rhinos would be done *in situ*, in other words, to be done in Sabah. At that moment in time I cannot make out who was right, the Americans or the government. A Steering Committee called the

Sumatran Rhino and Wildlife Conservation Committee (SRWCC) was established in September 1985 under the Chief Minister's Department co-chaired by two Ministers, Tan Kit Sher and Aariah Tengku Ahmad. I was a member of this committee representing the Veterinary Department. There were many sub-committees under SRWCC. SRWCC was keen to conduct surveys to obtain more accurate estimates of rhino numbers and to locate isolated animals threatened by land clearing and logging.

The committee was also aiming to capture threatened animals which were to be relocated or retained for captive breeding. It wanted to promote conservation consciousness through public education and step up enforcement against poachers. A powerful Technical Sub-Committee was established and I was also roped in to provide veterinary support. I knew very little about this species and started to read up anything and everything about the rhino especially the Sumatran rhino.

The others in the Technical Sub-Committee were Chairman Lamri Ali (Director, Sabah Parks), the late Patrick Mahedi Andau (Chief, Game Unit, Forestry Department), Dr. Ghazali Ismail, Dr. Murtedza Mohamad, Dr. Rob Stuebing and Dr. Ridzuan Hashim (National University, Sabah Branch), Mr Mohd Khan Momin Khan (Director-General of Perhilitan), Dr. Mustaffa Babjee (Director-General of Veterinary Services Malaysia), Prof M. R. Jainuddin (UPM), Dr. John Payne (WWF) and Joseph

Gasis (Yayasan Sabah). The executive secretary was Sue Jayasuria.

It never crossed my mind that I would be taking charge of the operation to determine the density and where about of the rhinos. I was quickly seconded to SRWCC as the Project Coordinator for six months and that brief time working with the rhino project became a memorable experience. As an incentive, I was promoted to Senior Veterinary Officer during my term as Project Coordinator. After few meetings with the Technical Sub-Committee, the plan of action was created. SRWCC had an office at the Likas Expo ground for the Project Coordinator and Executive Secretary.

Together, Sue and I worked fast to establish a strong field team. We personally recruited the members, purchased a 4-wheel drive, knapsacks, camping gears, compasses, maps, satellite phones and all other equipment needed for the operation. We saw the qualifications of Jimli Perijin and David Antonius and appointed them team leaders. I am happy to learn that both of them continue to serve in the wildlife department.

## *Looking for rhinos*

I went out with the survey team and surveyed most of the forests in the east coast including the oil palm plantations that shared boundaries with the forest reserves. We gathered intelligence on the rhinos from the villagers, our own local field team members and oil palm managers. From these expeditions, we managed to confirm the presence of the Sumatran rhinos in Tabin Wildlife Reserve, at Danum Valley, Malua Forest Reserve and Silabukan Forest Reserve. We did not see them physically but their fresh hoof prints and in some cases dung were good enough evidence. In fact, on September 21<sup>st</sup>, 1986 we saw fresh hoof prints measuring 24cm on our way out of the camp between the Linbar estate and the main road to the Jerocco/Kretam estate.

The sub-technical committee also visited and recommended a site at Tabin reserve as the operation office or base for SRWCC. A building was put up for the field team and there were rooms specially meant for researchers to conduct their study on plants browsed by the rhinos. It was close to the Lipad river and is presently the office site for the Wildlife Department in Tabin. In early 1986, my survey team almost had an encountered with the rhinos at the south-western part of Tabin reserve. We were scouting the area south of the reserve that was recently logged. We stopped at the top of the hill to look for rhino tracks when we heard peculiar sounds coming from the ravine.





The Technical Sub-Committee members of SRWCC taken at Sabah Parks (HQ) Kundasang. Standing left to right, Joseph Gasis, Lamli Ali, Patrick Mahedi Andau, Datuk Dr. Mustaffa Babjee, Dr. Murtedza Mohamad and Dr. Ridzuan Hashim. At the back from left, Dr. Rob Stuebing, Dr. Junaidi Payne, Dr. Edwin Bosi and Prof Dr. M. R. Jainuddin.

The sounds were familiar and I knew they were rhinos because I had just returned from Malacca Zoo to meet up with Dr. Zainal Azahari who was in-charge of the rhino program in Peninsular Malaysia. It was also an opportunity to familiarize myself with the captive Sumatran rhinos there. It is said that the Sumatran rhinos have the most melodious calls among the five species. As we inched ourselves towards the sounds, our smell must have given our presence away as we heard crashing sounds of broken twigs and shrubs, and a few loud exhalations of air from the rhinos. When we arrived at the site, we realized that we have disturbed them from

enjoying a wallow rest in the mud. The mud was still slimy and reddish. I remember very well that there were three animals based on the size of the hoof prints. One of them was definitely a baby calf.



The first survey team of SRWCC. Standing from right, Godfrey Johniu, Joseph Gasis, Jimli Perijin, Kasturi, Arsid, Lamansah, David Antonius, Paul Gasis, Mohamad, Walter Gusui and Jaafar Mandog. Squatting from right, Joseph Kindingan, Jali Engkong, Mimoh Siponong and Lai Chi Sol.

I took my survey team to Danum Valley after Joseph Gasis informed me that his research staff had encountered two rhinos at their research plot there. Although we failed to see the animals, we were able to take measurements of their relatively fresh hoof prints. Indeed, there were two of them. We also took some time to collect plant samples that were browsed, dung samples and at the same time, extended the surveying areas in Danum Valley to look for more evidence. This

trip to Danum Valley would never be forgotten as upon our return from the one-week surveying, the town of Lahad Datu when we returned from our one week survey we found out that the town of Lahad Datu was attacked by pirates, who also robbed a bank. Just a week prior to the attack, we have stopped by at Lahad Datu for lunch and it was that very same spot where the intense fighting erupted between the intruders and the police. It was sheer luck for us and on hindsight, I am thankful for my guardian angel. I learned that more than 20 people were killed and many injured. I later learned that the pirates paid a heavy price when they were pursued by the security forces out into the Sulu Sea and where they were ultimately killed. There is still evidence of bullet marks on some of the buildings in Lahad Datu, which serves as a good reminder of that fatal incident.

Despite the unwanted but expected tag as "The Wild East", Lahad Datu is the gateway to the known rhino habitat, Tabin reserve and Danum Valley. In order to create a different image for Lahad Datu, the district was proclaimed a rhino district and with that a beautiful statue of a rhino was placed close to the airport. The statue was sponsored by the Lions Club of Lahad Datu and the Lahad Datu District Council. I provided photographs of a Sumatran rhino to the Lions Club. Due to the road construction near the airport the rhino statue had since vanished.

Our next action plan was to train our team in capturing and relocating of the rhinos. This training was done with the assistance from the rangers from the Game office of the Forestry Department. The pit trap method was selected and adopted by SRWCC. Firstly, the team settled on a site along a riparian reserve somewhere in Sukau and constructed the base camp. The rhino highway was mapped out and spots were identified for the pit traps. The traps were made by digging a four by eight feet and six feet deep rectangular hole.

A bamboo raft was made and the team practiced to perfection on moving the rhino-in-the-crate across the crocodile infested river. An empty wooden crate was used during the practice runs. We had to stock up on building materials such as timber, plywood, ropes, nut and bolts. The National Department of Wildlife (Perhilitan) had assigned their officer Mohd Tajuddin Abdullah to SRWCC who later joined Universiti Sarawak Malaysia (Unimas). Tajuddin had a wide range of experience with the Department of Wildlife (Perhilitan) and had been successful in trapping rhinos in Peninsular Malaysia using the pit-trap method. We managed to have cooperation with the Malaysian Armed Forces, especially the Air Force, to be on standby.

Prior to this, I have made arrangements to transport a cow to the Lok Kawi army camp near Kota Kinabalu in a wooden crate. We witnessed how the helicopter lifted the loaded crate over the South China



Sea and back with ease. It was a success. That would be how we would lift the rhino from the middle of the dense jungle! The idea became a reality when a helicopter lifted a rhino out of the jungle in Danum Valley in 2014. It was not a Nuri but a Sikorsky S-64 helicopter.



The rhino statue at Lahad Datu with the airport at the background.

The first rhino captured by SRWCC was at Kg Linbar, Sukau on 28<sup>th</sup> March 1987 but it died in the pit. The second, Tanegang was caught on 14<sup>th</sup> July 1987. I remember this rhino very well because of a wire snare around his leg which was digging into the flesh. I can imagine his misery walking and limping with the pain. At least Tanegang, as he was named, did not become a trophy for the poachers. We brought him to Sepilok

where Tanegang was able to live a normal life after the snare was removed. Tanegang was very aggressive for the first three weeks but after being fed with jackfruit leaves and fruits he began to accept the presence of humans.

I can say that Sumatran rhinos can easily adjust to humans. The cover picture of this book is my picture with Tanegang when he was moved to Sepilok.



Joining two rhinos is a high risk activity.

## *Rhino in a pit trap*

In 1986, my contract with SRWCC ended and I returned to my old job but remained in the Steering and Technical Sub-Committee. Not long after that I received a call from Rob informing me that a rhino had fallen into a trap at Sukau. I remember hastily grabbing my medical box, and rushed to the airport at Tanjung Aru and catch an Army Nuri helicopter to Sukau. I can still remember how the helicopter was lifted high up into the sky as we crossed the ridge near Kundasang. I was told it was caused by the two air currents flowing upwards from both sides of the ridge that sudden lift came as a surprise to me as we made our way to Sukau. It was not difficult to spot the camp site from the air and especially when aided by the Global Positioning System (GPS). As we approached the site I could see the capture team waving at us.

It was late afternoon when we landed at the site of the camp and we did not waste any time as we quickly went to check on the animal in the pit. We were in a forest, which wasn't too dark but it was very dark in the pit. My heart was pumping fast. This was after all, my very first encounter with a Sumatran rhino. I observed there was no movement of the animal and it appeared lifeless on its sternum. However, someone had to confirm whether or not it was alive. That was a job of the attending veterinarian. I was lowered into the pit with a rope, stepped on the animal at the hindquarter and with more confidence used my stethoscope to check for any

heart beat. I tried to resuscitate the animal by jumping on its thorax close to the heart but there was no response. I finally yelled to confirm that it was dead and I was pulled out of the pit.

After getting out safely I discussed the next plan of action with Rob and Murtedza. We decided to get the animal out of the trap for necropsy the same day. The instruction was given to the field team and in no time the rhino was out of the pit. I took some stomach content for analysis but reminding my field staff to bury the rest of the offal. It is thought that the dung of Sumatran rhino is medicinal since it browses more than 70 species of plants. The stomach content of a dead wild rhino is of course a very precious item. Doing a necropsy on a huge animal alone was no easy task. I was fortunate to have the assistance of a Japanese veterinarian Dr Kenzi who was at that time volunteering at the Sepilok Orangutan Rehabilitation Centre. We took lots of samples. I remember finding a massive amount of blood in the thorax and after removing the skin, there was a massive muscular hemorrhage at the pectoral region. We collected samples in formalin for further examination and analysis.

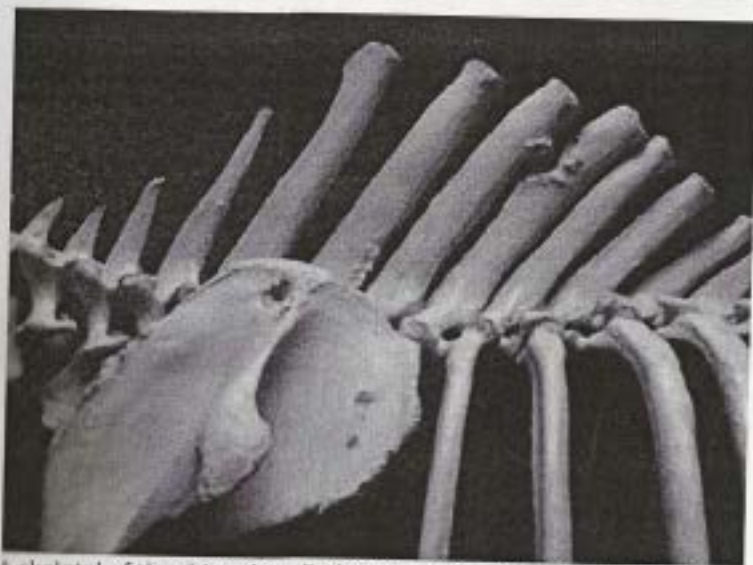
I took time to inspect the pit and found that the twigs were flattened. I realized that there were not enough twigs in the pit to break the fall. I came to the conclusion that the animal died of hemorrhagic shock and respiratory failure caused by the impact of the fall on



his sternum. After the postmortem, a team from the Sabah Museum came with short notice. They told me they did not want to miss this chance of adding a Sumatran rhino to their collection. The skin was removed professionally and Mr Jelius Gantor took possession of the hide and bones. I spent some times at the Museum to follow up with their works on the skin and skeletons. I was extremely impressed with their work when I saw the mounted rhino skin and the skeleton. The taxidermy and skeletons are well preserved and displayed at the Sabah Museum for public viewing. I had the opportunity to assist in the anatomical description of the rhino parts. The task was made easy because I had a great working relationship with Mr Raymond Goh at the Sabah Museum.

Prior to this fatal incident a rhino was also found to have fallen into a pit trap but it managed to escaped by digging the soil causing the wall to collapse. This incident was an eye opener to the capture team who then installed marine plywood on the walls of the pit and never forgetting to put in enough twigs in the pit. The twigs were meant to break the fall of the rhino. The capture team must check the pit trap frequently and be ever ready to take out the crate as soon as the animal was captured. This was to avoid prevent the rhino from developing hyperthermia in the pit as it would struggle violently to try and free itself from the crate.

As I studied the skeleton of this rhino, I found a hole at the left vertebrae which can only mean that this male rhino was previously shot by poachers. There is also crack to the 3<sup>rd</sup> and 4<sup>th</sup> dorsal thoracic vertebrae which possibly was the result of the impact of the bullet. If I recall it well the Museum staff had also found a bullet lead lodged in the spine of the animal. This setback was the beginning of many successful captures.



A skeletal of the rhino that died at Kg Linbar, Sukau displayed at the Sabah Museum. You can see the evidence of a bullet hole on the left shoulder blade and upper part of the dorsal thoracic vertebrae.

## *I am a wildlife vet*

In 1988 the Game Branch of the Forestry Department merged with SRWCC to establish a new department called the Sabah Wildlife Department which was headed by the Game Unit head, Patrick Mahedi Andau. The PBS government was overthrown only three months after winning with a slim majority in the general election of February 1994. Their three Assemblymen crossed over to the opposition resulting in the collapse of the government. The National Front (BN) took over the helm of the government. I was relieved of my job as Group Manager of Livestock in KPD Holdings and transferred out to take care of the orangutan at the Sepilok Orangutan Rehabilitation Centre in Sandakan.

My wife was transferred from the Veterinary Department to the Public Works Department in Kota Kinabalu. I remember my life was a mess. It was not an easy task to take care of three growing children from Sandakan but somehow things began to settle down. I went home to Penampang almost on a weekly basis and later I realized I was not the only one in this predicament. Soon a group of us would find ourselves on the same trip home and called ourselves "weekend husbands". As time passed, visits home became less frequent as my family began to settle down. I saw the change in government as a major disruption in the civil service. Ironically I found myself back at Sepilok not only looking after the orangutans but also the rhinos and other wildlife. I have

the natural tendency to study more about the situation of the rhinos at Sepilok.

It was nine years ago that I was scouting the entire forest in Sabah in search of the rhinos. Since then a total of 10 rhinos were captured and relocated to Sepilok where the Sumatran rhino breeding facility was. There were eight males and two females. The facility is in the same area and is adjacent to the famous orangutan rehabilitation Centre. I was only involved with the capture and relocation of Tanegang when I was with SRWCC and of Malbumi when I was with the Sabah Wildlife Department at Sepilok.



Rob Stuebing (left) and I (behind Rob) with the Air Force helicopter pilot and crew at the base camp at Sukau.



I was informed of the most spectacular capture on June 1994 of a rhino named Lunparai. She was found sleeping with the dogs in a villager's stilt house. When the villager called and informed the department about this rhino no one believed him. Lunparai was quite docile and after several attempts to lure her into the crate with jackfruit leaves she finally relented. The two wildlife rangers who managed to lure the baby rhino into the crate were Sampaladon and the late Herman Stawin. Lunparai was well taken care of at Sepilok where she grew up to be one of the most "domesticated" rhino and a darling to all the rangers working at the facility.



We made many replicas of Linbar's horn and the anti-pyretic drinks supposedly derived from the rhino horn.



I visited the Sabah Museum to see the taxidermy display of the rhino that died in the pit at Kg. Linbar, Sukau.

Things began to look more positive and in no time, I was keeping myself busy with the orangutans, elephants and the rhinos. There was also other wildlife that needed to be cared for such as the sun bears, otters

and clouded leopards. In this respect I have pioneered the capture and relocation of elephants in Sabah using tranquilizer gun, sedatives and heavy machinery. I helped to establish the wildlife clinic at Sepilok. A new clinic was built and equipped well to handle all the treatments and surgeries. We have adequate rooms for post-surgery monitoring of the animals. The clinic has an x-ray machine, postmortem room and high-power microscopes. I had to check for endo-parasitism in feces, parasites in blood smears and did semen evaluation as part of the routine.



Collecting semen and blood and doing an evaluation at Sepilok.

I remember doing hand and leg amputations on three orangutans that were badly burned when they were electrocuted. This electrocution normally happens when they strayed from the Centre to the nearby orchards, and when pursued by the farmers they would climb the electric posts along the road. I somehow knew that an orangutan had been electrocuted when all of a sudden there was a power blackout in the Centre. The power line in the Centre is now placed underground to avoid further electrocution and blackouts.

As far as the orangutan is concerned, I had a veterinarian from Sweden, Asa Fahlman, working with me to come up with a drug combination to allow the darted Orangutan to fall gradually instead of falling like a heavy ball. I was also involved in many researches, writing research papers and providing supports to the foreign researchers like Nathan Wolfe. Nathan who studied at Harvard was researching malaria in orangutan. He would climb trees to obtain mosquitoes at that height. I either authored or co-authored several papers on orangutans, pygmy elephants as well as on nutrition of Sumatran rhinos with Dr. Annelisa Kilbourn. I also published a few papers written with Dr. William Karesh, Dr. Nan Schaffer, Ellen Dierenfeld and Patrick Mahedi Andau.

There were so many requests from foreign documentary film producers who wanted to film the orangutans. The best one that I could remember was by



Prospero Productions from Western Australia entitled "Hutan – Wildlife of the Malaysian Rainforest". I cannot recall how many documentary films that I have been a part of. I also entertained a Japanese photographer who came to create a book about my life as a wildlife veterinarian at Sepilok. I became quite a celebrity because the documentary films would be screened to the visitors of Sepilok before they ventured into the forest to watch the orangutans during their feeding time.

I remember Michael Hackenberger who owns the Bowmanville Zoo in Ontario, Canada who came with his family to visit me at Sepilok. At the Kota Kinabalu airport, he told me I was with them throughout the flight as they were watching the documentary film "Hutan" in flight. I thought that was cool. I came to know Michael when I was at a seminar in Cincinnati Zoo through Steve Romo. Michael convinced me to fly to Ontario after the seminar to see his zoo especially the elephants, white tigers and black panthers. Michael has been training his big cats to perform in films for the American film industry.

The most interesting research that I was a part of was when I supervised a Japanese student Hisashi Matsubayasi with his research on the mouse deer. This research inspired me to look into the breeding of the Sumatran rhinos. There were also the works to ensure the visitors were well taken care of and to keep Sepilok a prime tourist attraction. I was also involved in giving talks in forums and seminars. I was totally immersed in my

work as a wildlife veterinarian and manager of the centre. I have to manage the visitors coming to see the orangutans and to see that both parties are safe. The Sepilok center shows the conservation and education aspects of our works on wildlife. I had to attend to other species such as crocodiles, snakes, eagles, pangolins, proboscis monkeys and macaques just to name the common ones.

The most exciting moments were the capture and relocation exercises on the orangutans and pygmy elephants. On retrospect, I felt bad as I had practically buried myself with works and had to spend less time with my wife and children.



Sumatran rhino hoofs

## *Breeding the rhinos*

I had a brief discussion with the Director Patrick Andau during one of his visits to Sepilok and told him of my intention to start working on breeding the rhinos. When I first came to Sepilok there were three males and two females rhinos in captivity then. Later, Malbumi became the latest addition. One of the males' deaths was believed to be due to an overdose of tranquilizer a few months before I made my move to Sepilok. That incident made everyone jittery including Patrick, so much so that he reminded me not to administer any sedation to the animal. Despite that, I remember telling him that if nothing could be done for these captive rhinos, we might as well return them back to the forest.

Having said that, I was given the green light to work on the breeding of the animals and I never looked back. I decided to try the mouse deer breeding technique on the rhinos. I selected the two females Gelogob and Lunparai to mate with Sidom and Tanjung. All four individuals have their own enclosures. My focus was on Gelogob to Sidom since he was much bigger and looking mature. They were separated by two enclosures, one which is about 100' x 50' for Gelogob and a huge half an acre for Sidom

I was reading many articles on rhino breeding but nothing seemed to get close to what I felt would work on

this particular species. I was reminded by reports of aggression and biting when the Sumatran rhinos were joined together. In fact, I have seen our female rhinos been badly bitten by the male at the neck during attempts to join them for breeding.

I was then supervising the Japanese student, on Hisashi's mouse deer research at Sepilok reserve. I assisted him in the trapping of the deer, tranquilizing them and managing them from dying from stress. I also found time to read articles on mouse deer until I came upon the topic on breeding of this species.



A pair of mouse deer on display at the Sabah Museum and note the male with long sharp canine teeth.



The breeding of mouse deer is spectacular. When too many males are in the same enclosure they will fight among each other. It is a natural instinct to bite off the testicles of their competitors so that they will not be able to mate and pass their genes. My friend Fred Lojingki was rearing some mouse deer at his farm at Kg Maang Penampang and he confirmed to me that this testicle-biting among the adult males does in fact, happen. The male mouse deer is armed with long sharp canine teeth.



That's me administering an intravenous injection of antidote to revive the elephant.

In captive breeding, the male and female mouse deer were separated by small enclosures. When the

female is on heat or sexually receptive she will emit pheromones which will be detected by the male. The male will be pacing up and down the wall seeking the female on heat. The female will also exhibit her interest in the male. It is important to let the female into the male enclosure and let her search for her mate. With the female in receptivity she will allow him to mount her without any problem after a brief courtship of pushing each other. When she is in heat mating occurs naturally.



Enjoying "quality" time with an orangutan at Sepilok.

I have stationed my Rangers to monitor their behavior from eight in the morning to six in the evening. We looked at their body language, the vocalizations they made in terms of loudness and frequency and also to check for any physical changes in the female particularly the vulva. As the rhinos were precious animals, rangers

were stationed at the rhino facility throughout the night. Even at night the Rangers were asked to take note of anything peculiar in relation to their behavior. The head ranger David Antonius was assigned to this task who was assisted by James Kapis and Silih Sikim.

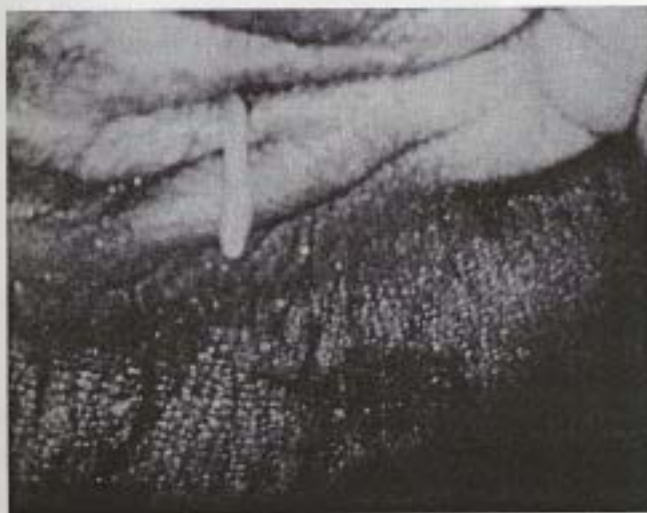
I cannot leave out all the officers and staff at Sepilok who had played their roles in making my work with the rhinos, go smoothly. We were such a good team.



These are the hardworking and dedicated Rangers at Sepilok. (Not in picture is Elizabeth Lagan).

As her heat approaches, she began to make more noises. She would be active and spend more time walking around in the enclosure at the same time, checking out the calls from the adjacent enclosure. The male would suddenly appear at the gate separating the enclosure looking for the female on heat. At the iron-gate both would meet, where their lips will contact followed by a

few head-butting. She would pace along the wall and pursued by the male. I noticed he was having an erection as he paced up and down along the wall. They would again spend more time at the iron-gate. It appeared that that would be their routine for two or three days, until the interest for each other waned and both return to their wallows. We have noticed that her vulva was swollen and stringy clear mucous was seen oozing out. The mucous discharge was sometimes not seen when she was standing but it was obvious when she lied down to rest on the concrete floor. The presence of a mucous discharge dripping out of her vulva was a good indication that she was on heat.



A mucoid discharge from the vulva when a female is on heat.

It took me three months to monitor the behavior and confidently pin-point her heat at 28 to 30-day cycles.



I was so confident that a natural mating would occur on the 28<sup>th</sup> day and confidently invited Patrick to come and witness the event. He flew in from Kota Kinabalu and that afternoon we were at sitting on the walkway of the breeding enclosure to witness the first natural mating of Sumatran rhino.



A newly caught Sumatran rhino would charge at the Rangers in the enclosure. Sumatran rhinos have prehensile lips which they used for browsing.

I had now placed Sidom in the smaller enclosure which has a walking board or walkway around it. This walkway allowed me and the Rangers to observe and move rapidly to the animals if there was any aggression. Gelogob was in the larger enclosure but was at the iron-gate looking out for her mate. Our camera and video men were all set to record the first natural mating of the rare and illusive Sumatran rhino. So on the 28<sup>th</sup> day of the fourth month I decided to join the pair for breeding. That was about 3.15pm when I gestured to my Ranger to open the iron-gate. Gelogob entered the enclosure and walked towards Sidom who was wallowing in the mud. I saw Gelogob exhaling strongly, startling Sidom with the presence of another rhino. Sidom then jumped out of the wallow and ran 30 feet away. He stopped, looked back and then started to approach Gelogob. I said to myself "This was it". If a fight ensued resulting in some nasty deep long wounds on the neck or hindquarters, I can kiss my reputation goodbye.

However, the boys were ready with the plywood and empty tins to separate and distract them just in case. It turned out to be a spectacular scene. They turned out to be a loving couple with a courtship that involved head-butting, pushing, rubbing and biting gently. At times we could see Sidom pushing her on the neck and shoulder, and also biting gently on her ears. The head butting and pushing went on for more than one hour.



This is the smaller enclosure and used for the breeding.



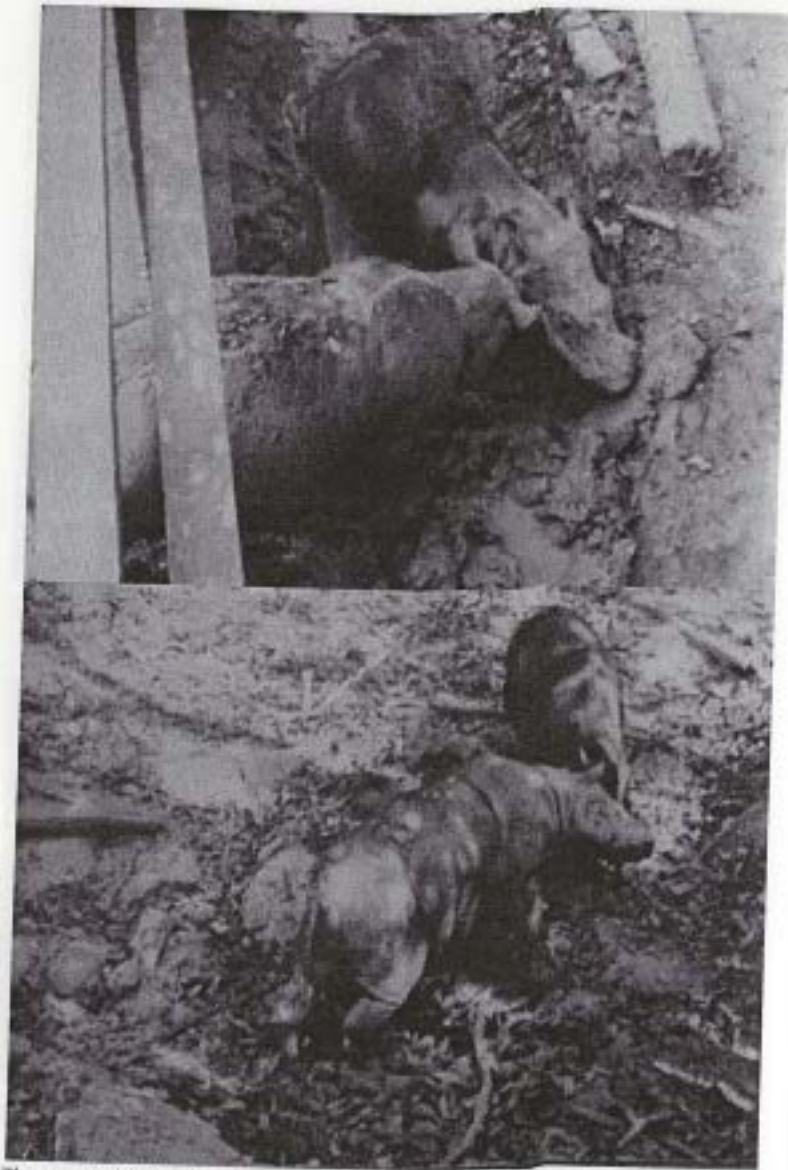
The smaller enclosure with the larger enclosure behind the iron gate.



Sidom and Gelogob looking at each other at their first encounter and then the courtship began.







The courtship in the rhinos took many hours before mating.

Finally, she turned around and walked away with Sidom following closely behind. She stopped after finding a flatter area and then allowed Sidom to mount her. Sidom adjusted himself well with the front legs on her shoulder. He started inching forward and after a moment of stability his penis came out of the sheath and became erect. Then he started to bring his penis upward looking for the opening of the vagina. Sidom would adjust himself to allow the tip of his penis to find the vagina.

After penetration, both of them stayed very quietly. One can see muscular movement at the base of the penis something which is similar to that of a mating boar. The first mating lasted for about eight minutes, two minutes of which the penis was inside the vagina. We managed to observe at least four to five mountings but of short durations of about two minutes. The first natural mating was the longest. It was a long wait but it was all worth it. After all it was the first natural mating of the Sumatran rhinos in captivity. Gelogob went away and buried herself in the mud wallow. We thought the game was over so we put Sidom back into his enclosure. The following day we returned Gelogob into the enclosure only to find that she had no more interest in Sidom. From our study I found that Sumatran rhino estrus cycle is between 28 to 30 days. The 28<sup>th</sup> day is most accurate for breeding. I also found that the duration of receptiveness was less than four hours.



The historic natural mating occurred between Sidom and Gelogob on 26 October 1995. The penetration, a rare picture taken by Senior Ranger Paimin Diun.

When the receptiveness is over, the female has no more interest in the male. This feature was supported and observed with another female Lunparai which was also bred by Sidom. Interestingly both females were on heat at about the same time. It was a good decision to get her out of the enclosure when she had no more desire for him. After the 28<sup>th</sup> day the pair can still be joined together in the same enclosure for another two days without any aggression.

However, they would rather spend their time in their own wallows. Thereafter it was time to separate them to their own enclosures for the safety of the female.



A captive rhino enjoys wallowing in clean water. In the wild, Sumatran rhino loves to wallow in mud basically to cool itself and keep off biting tabanus flies. I had rarely seen them defecate in their mud wallows.

26 October 1995 was indeed a historic date when Sidom mated Gelogob without any untoward incident. On 28 October 1995 Sidom mated with Lunparai naturally. At last, there was a window of hope that we



finally can get the rhinos together safely to breed and an opportunity in seeing a first captive born Sumatran rhino in 120 years.

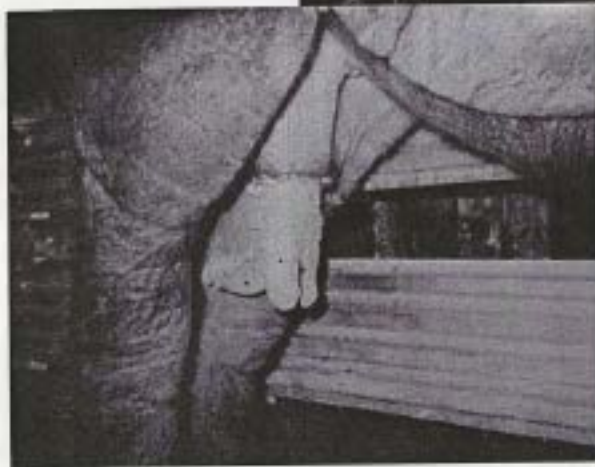
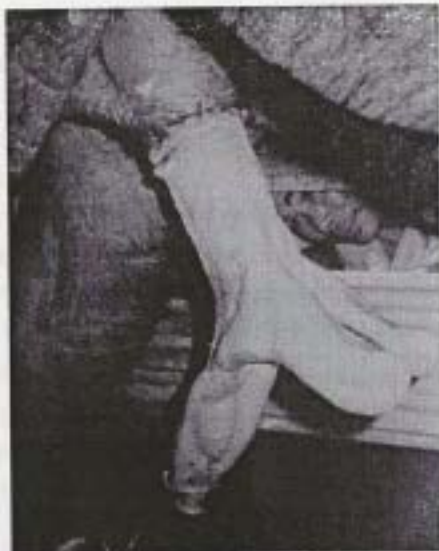
My team continued to monitor the two females daily. My focused was on Gelogob as there was a clear evidence of penetration. We now confirmed that the two wings on the penis that was thought to be a hindrance to mating were actually important in locking the penis in when it was inside the vagina. It could possibly be used to create a sensation to stimulate the female to ovulate. Like the cats, the rhino's ovulation is induced which explained for the presence of the two wings on the penis. Lunparai and Gelogob did not show any heat for three months. I have no ultrasound equipment but relied on my skill on pregnancy diagnosis (PD) acquired from my work with cattle and buffaloes. It was difficult to palpate on such a big animal. Nevertheless I was able to feel an enlargement of the uterus. I continued to undertake the PD every month for the next six month but did not feel any change in the size of the uterus. I tried to feel for the ovaries but failed.

Finally I found out that she was not pregnant as she started to show heat again. The breeding continued but again there was no pregnancy. This time there was no more worry to breed the rhinos. The team knew that when the female and male rhinos commenced their interest and head-butting on the iron-gate they are safe

to be joined together. My team was always reminded to let the female into the male enclosure.

The centers for Sumatran rhino breeding were all worried about the nasty savage behavior of the male rhinos when they are joined. They can inflict deep long cuts on the neck or hindquarters with their canine teeth. Nevertheless the anatomy of the male penis became a case of deliberation among the rhino breeders. When relaxed, the penis, especially the wings were placid and during erection they become turgid. It was speculated that the wings were the hindrance to natural breeding. Our works at Sepilok have shown that the wings were not an issue in mating.

We have noticed that the wings were placid during penetration and my guess was they would become turgid when inside the vagina to cause stimulation leading to ovulation. Due to this, it is necessary for the mounting to be on a flat ground.



The rhino penis when relax (left) and erect thus, the mystery of the wings has been unraveled.

## *Steve Romo came to visit*

I have written a detailed report on this spectacular breeding success and it was published by a well-read journal called *Pachyderm*. My paper can be found in *Pachyderm* No. 21, 1996. This publication caught the attention of someone in Cincinnati Zoo. John Romo, popularly known as Steve was the Area Supervisor-Hoofed Stock. He called me in June 1996 but I told him that it would be impossible for me to tell him everything over the phone. In July Steve was knocking on my door. I was shocked to see a six foot man grinning at me. He introduced himself and I invited him to stay at my house which was in the Centre. I have practically been staying with the orangutans and having Steve was a much welcomed break. I saw our common affinity to cold beer and soon we became acquainted. I would never forget what he told me that his bosses told him if he was not "ashamed" to come to Sepilok to meet and learn from me. He told me he just brushed his boss comments aside.

Steve was such a nice gentleman. Firstly I briefed him on the mouse deer breeding technique and on to monitor and detect for the estrus in the female rhino. I told him about all the important and relevant behavioral and physical signs that need to be monitored. I showed him the enclosures, the data we gathered and finally, the videos of the copulation. After all these were transmitted to him and followed by many hours of beer drinking, his lasting words were, "Edwin, I will breed my animals".



Despite never hearing from my friend Steve, I knew he was already busy trying to get the male Epuh and female Emi to breed naturally. I was informed of his successful breeding of the rhinos without any aggression and biting. With that breakthrough in the United States, I continued the effort at Sepilok. Indeed, Steve had beaten me on this matter but there was a consolation here as it was at Sepilok where we had opened the window to the natural breeding of the Sumatran rhino. Had I not unravel the mystery of natural breeding of this species there would never be any successful attempts to breed the rhinos knowing very well from past experience of the tragic traumas inflicted on the females by their male counterparts.

I did not want to miss the opportunity to visit Steve at Cincinnati Zoo and had registered myself for a wildlife conservation seminar that was being held around that area. I was well taken care of by Romo as he brought me to some of the best waterholes in his big 4-wheel drive, which included a Hooters bar. While driving down a certain part of the city Steve would remind me to lock the door and pull the windows up. It seemed that carjacking is common in the area! Seeing the Sumatran rhinos was a must. Before that, he brought me to his office to meet up with his workmates. Steve also took me to see the facilities and the breeding enclosure. He was very excited as he showed me around. It was also nice to meet Dr. Terri Roth who was heading the rhino breeding program at the zoo. Steve was also so excited about his

now completed tattoo on his whole body and was more than eager to show me. I must confess I was very impressed with it as it did cost him a whopping US\$20,000.



The late Steve Romo (left) with Andalas at Cincinnati Zoo.

## *Romo had a rhino baby*

Not long after my trip to the States, I was informed that one of the rhinos there was pregnant and they were able to detect the fetus by ultrasound. They even have video recordings of the fetus. However, I also learned that the rhino was unable to sustain the pregnancy. As 60 days later, the fetus just disappeared. It was like stillbirth. The Sumatran rhino breeding group had a meeting in Jakarta and I remember telling and recommending the use of progesterone to sustain the pregnancy. They took my recommendation and it worked. The first captive born rhino was born 16 months later and the male baby rhino was named Andalas. I thought it would have been appropriate to name it Romo. I learned that Steve passed away on 21<sup>st</sup> August 2012 due to cancer of the liver and pancreas and may his soul rest in peace.

I remember when Steve asked me about the poor state of Ipuh their male rhino. This was before the serious breeding started. I told him that it could be due to his nutrition deficit and I suggested feeding the rhino with ficus leaves and young stems. Our rhinos at Sepilok were consuming ficus from the ficus trees and jackfruits leaves. I was wondering if Steve could get his ficus in the United States. Steve did not wait long and soon he was flying the ficus plants from California I think. It made a difference as Ipuh made a quick recovery and later successfully bred Emi to produce a male Andalas (September 2001), female Suci (30<sup>th</sup> July 2004) and another male Harapan

(29<sup>th</sup> April 2007). Emi died in 2009, Ipuh in 2013 and Suci on the 30<sup>th</sup> of March 2014. Andalas has been returned to Indonesia in 2007 while Harapan followed in October 2015. The Indonesians have been successful in captive breeding with Andalas as the stud. I have been thinking hard about the failure of the females to sustain the pregnancies. I realized the importance of ultrasound machine in detecting early pregnancies, which unfortunately, was equipment that we did not possess at Sepilok.

The experience and findings from visiting the Cincinnati Zoo made me realized that Lunparai and Gelogob were possibly pregnant before. This is because both went through the similar episodes like Emi of losing her fetus in less than 60 days after copulation.

This was where the state of art facilities can make a lot of difference in breeding Sumatran rhino. Cincinnati Zoo has the best facility as it was, well-equipped, well-funded, and had adequate manpower and experts in the various fields of reproduction. What caused the females to lose their fetus before the 60<sup>th</sup> day is mindboggling. I can only say that the long period of sexual inactivity has disrupted their hormonal cycle. The other problem faced by female rhinos which have no sexual activity for a long period of time is the formation of cysts in the ovaries. This was one of the postmortem findings by Dr. Nan and Dr. Annelisa in a female rhino which was shot dead near



Sabah camp, midway between Sapulut and Kalabakan in Sabah.

At one time, I was the program officer for the United Nation Development Plan (UNDP) for the Sumatran rhinos in Sabah. Its funding was distributed to the Sabah Wildlife Department under the Sumatran Rhino Conservation project. I was also a member of the Asian Rhino Specialist Group (AsRSG). In the AsRSG, I had the opportunity to work with the Mohd Khan Momin Khan, the late Dr. Tom Foose and the late Dr. Nico Van Stoen three big names in Sumatran rhino conservation field. We had several meetings in Indonesia and Sabah including visiting all the breeding facilities at Sg Dusun Selangor, Way Kambas, Sumatra and Sepilok Sabah.

My wife Evelyn passed away on 28<sup>th</sup> August 1998 while I was away in Germany delivering two pygmy elephants to the Hannover Zoo. It was the toughest and longest journey of my life. Wildlife Ranger and elephant trainer Jabus or JB, Ranger Edward Rugu and I flew to Germany with MAS and I returned home alone in the same plane I was given assurance by the department that I would be transferred to Kota Kinabalu to take charge of the Loi Kawi Zoo but it never came through. I spent a few more months at Sepilok before calling it a day with the civil service. I tendered my early retirement in 1999 and within six months I received my approval letter. According to procedure, my file had to be screened by

the Inland Revenue department and also the anti-corruption agency (ACA).

My application must have been the fastest one approved by the government and I would like to take this opportunity to thank the Director of Veterinary Services Department who made it possible. Finally, no more bosses looking after me or spying on me.



For bigger animal like a rhino, poachers use wire snare.

## SOS Rhino (Borneo)

Finally, in February 2000 I was officially retired. I went home to Penampang and contemplated to open a veterinary practice. I have decided to spend more time with my children, Don and Jacqueline. My other daughter Amy was studying plant science resource and management at Universiti Malaysia Sarawak (Unimas) in Sarawak. The veterinary practice never materialized as I was already working part time as a fauna consultant in a few EIA projects with Chemsains and the Borneo Marine Institute, UMS. Then, there were more consultancy works that came my way.

While in service I remember Dr William Karesh from Wildlife Conservation Society (WCS) who was visiting me in 1996 mentioning how overworked I was and then came up with an idea of sending a veterinarian to help me. He came back to Sepilok with Dr Annelisa Kilbourn a US-trained veterinarian who easily blended into the Sepilok community and became an important asset to the Center. Karesh wrote a beautiful book "Appointment at the End of the World" where he talked about Annelisa and his plan for her in Borneo and Africa.

Annelisa was workaholic and passionate about animals. She helped with the treatment of the orangutans, elephants and sun bears. She was involved in the capture and relocation exercise of the pygmy elephants and orangutans. Annelisa was instrumental in

introducing tattooing on orangutans before they were released. She also introduced the micro-chips for all the animals. She wrote and co-authored so many scientific papers on matters such as nutrition for the Sumatran rhino, malaria in orangutan, capture and relocation of both pygmy elephants and orangutans. She could have contributed more to wildlife conservation had she not perish in a plane crash in the Republic of Congo.



Annelisa setting up the camera trap and her favorite sketch of a Sumatran rhino.



As I was about to say goodbye to the civil service my passion for the Sumatran rhino never faltered. I was not ready to give up on them as we had gone very far with the breeding program. Together with Annelisa we had prepared a proposal to continue the breeding of the captive rhinos at Sepilok and also to undertake surveys and protection of rhino habitat at Tabin reserve.

I had the opportunity to visit Chicago to meet up with both the President Dr. Nan Schaffer and Chairman Dima Elisa of SOS Rhino (USA), a non-profit conservation organization. Our presentation was well received. Dr. Nan had been working with the Black and White Rhino and a chance to work on the illusive and rare Sumatran rhino was too good of an opportunity to miss. After all she is an expert on Rhino reproduction and nutrition.



Mohd Khan and Terri Roth were attentive while Tom Foose and I were having a light moment at a Rhino meeting in Jakarta.

I came home to register SOS Rhino (Borneo) as an NGO which would aim to undertake the breeding and conservation program of rhinos in Sabah. As a Director of

SOS Rhino (Borneo) I was also appointed Program Officer of SOS Rhino (USA) while Annelisa was given the task of being the Rhino Conservation Officer.

I have written so much about the rhino at Linbar, which can be found to be on display at the Sabah Museum. I also wrote about Tanegang which was caught on 14<sup>th</sup> July 1987 and believed to have died of an overdose of sedative. We had a few spectacular stories of the rhinos like Lunparai, a young infant found sleeping with the dogs under a tilted village house in Bukit Belacon, Sukau. There was also a story of a radio-collared rhino that did not wait for his chance to escape even when confined in an electrified wire fence at Tabin reserve. I definitely wrote a fair bit about the breeding program involving Gelogob, Lunparai, Sidom and Tanjung. Takala died of tetanus before the breeding program started while Malbumi, the newest addition at Sepilok died of pathogenic *E. coli* infection. The fine looking male Tanjung died when he was crashed by a falling tree during a windy storm in his enclosure.

I left Sepilok with three rhinos in the Centre. Thereafter three more rhinos were captured for the breeding program. Today we are left with Iman and who is fighting for his life from cancer. These sad incidents were painful lessons. Sabah Wildlife Department Director Patrick Mahedi Andau was very helpful and allowed SOS Rhino (Borneo) to work on the rhinos at Sepilok and to undertake survey and protection at Tabin

Wildlife Reserve. Both Annelisa and Nan were working hard on the breeding of the rhinos while I focused on the rhino surveying and protection at Tabin Reserve. Equipments such as the ultrasound machine were acquired. Nutritional study was done which involved analyzing the samples of plants consumed, blood chemistry and hormones of the rhinos.

My buddy, Karesh delivered a GPS radio collar which Annelisa had it around one of the rhinos. We were checking if the collar is useful for the tracking of Sumatran rhino under the thick canopy of Sepilok forest. We got ourselves prepared just in case the collar worked. It was no doubt functioning where the canopy is opened and we were able to receive data from the collar. We were looking forward that maybe just maybe we would be able to have a second chance to radio collar a wild rhino for the Tabin reserve.

One of the rhinos with a radio collar on ran away by breaking through the electric fence and the collar did not remit any signal or data. However, it was nice to be informed by the villagers at Kg Tidung that they saw a rhino with "something" on its neck few months after it escaped. Sadly, the story about this rhino just ended there.

## *RPU's and volunteers*

As I said earlier, I was more focused in the field at Tabin Wildlife Reserve where I recruited many local boys and girls into the Rhino Protection Unit (RPU). With the assistance of Annelisa, members of the RPU were trained to be able to use GPS, read maps and compasses, survey in field and set up photo-trap cameras. We encouraged and accepted many local and foreign applications to join in our survey works at Tabin reserve. The involvement of foreign volunteers was crucial in promoting our conservation effort globally.



A GPS radio collar around the neck of a rhino at Sepilok and with Karesh in Gallaway Ireland.

The base camps were necessary and they must be strategically sited. I went to look for sites to establish our base camp. For a start Patrick allowed me to take over an abandon house next to the rhino enclosure at Tabin



Wildlife Reserve (TWR). Later he let us occupy a house built by a volunteer group called TrackForce which was within the wildlife department compound in Tabin reserve. Both bases are located on the western part of the reserve. After getting acquainted and recruiting a few boys and girls from the Tidung community into the RPU I found a site along the Segama river close to Tidung village and established a base camp there. I would like to thank Datuk Sam Manan, Conservator of Forestry for allowing us to occupy an abandon guard house at Dagat village. We then established a camp on the south-eastern part of TWR on a piece of land owned by a friend the late Ah Wee.

With these camps in place we were able to enter Tabin reserve by the western, northern and eastern sides. In the western part of Tabin reserve, there is already a 22km road into the core areas. In the north we were able to access Tabin reserve by boat through the Tabin river. The camp on a hill at the south-east allowed us to quickly enter Tabin reserve by trekking. In short, our RPUs were well positioned to do the necessary research work on the rhinos. I started with two RPUs and eventually had five RPUs comprising of 25 members before I left SOS Rhino in 2006. One of the bad memories was losing my trained RPU leaders to other similar NGOs because of the difference in wages. After a while, the problem ceased as we began to recruit people with passion on their work rather than for the money and we move on. We also had a Sri Lankan-trained veterinarian Dr Thaya coming on

board who at the same time, was pursuing his Masters degree on rhino nutrition at UMS.

The main tasks of the RPUs were to undertake surveys and to protect the reserve from encroachments. We made couple of aerial surveys of Tabin reserve to better understand the landscape. My first aerial survey in a helicopter over the reserve was with Annelisa, Karesh and Ranger Jomius to count the orangutan nests. Our orangutan translocation program had achieved its objective as we found many nests along the western part of the reserve. In an earlier aerial survey prior to the translocation exercise Tabin reserve did not register many orangutan nests.

My second aerial survey was with the volunteers from Temasek Polytechnic, Singapore who hired the helicopter. In this survey we were focused on looking at the boundaries of the reserve with the oil palm plantations and villages. We noticed that the reserve is not safe from encroachment. This was where we realized the importance of setting RPU bases at strategic areas around the reserve. The RPUs manned their base camps and patrol the boundaries on a daily basis. We were aware that the encroachments often came from the southeast as there were many villages nearby. Our patrolling intensified after one of our RPUs came face-to-face with about twenty people in the reserve who based on parts left scattered on the river bank, had killed a sambar deer, barking deer, mouse deer and a soft shell

turtle. Members of our RPU who were recruited from the village where the poachers resided managed to brief them of the consequences if they were caught again in the reserve. The photographic evidence of the poachers reminded them that action will be taken should they continue their illegal activity.



Finding a carcass of a hill tortoise in the reserve.

I appointed a graduate, Leni Tupang as the RPU Field Coordinator and when she left for a better job I recruited another graduate who hailed from Sarawak, Fadzilla Nor to take over. I had Tinju Isa and Sarinus Aniong who were both very reliable RPU team leaders. Additionally, I had also appointed few more RPU leaders who were equally good. The main office was manned by Gem Asildo with Lonia Adam and Anne Lajuat. Faye Jinu joined SOS Rhino (Borneo) briefly as a conservation

officer in-charge of public relation while local veterinarian Dr Rosa Sipangkui came on board much later.



Flash flood in the forest can be dangerous.



## Working with stakeholders

The role of the RPU was not just to survey rhinos and protect the Tabin reserve. As a Program Officer, I have also engaged with oil palm plantations, villagers and also government officials through various events and activities. I was always actively participating in seminars and forums organized by the oil palm industry. On the other hand, I organized a few seminars on rhino conservation, inviting officials from the plantations, government agencies, NGOs not only to participate but to contribute papers as well. I had also presented papers on Sabah's rhino conservation efforts in Singapore, Indonesia and Australia. A few names I would like to mention were the late Khoo Eng Ming the chief of PPB Oil Palm and his officers, Simon Geh and Simon Siburat as well as the late Yam Wee Wee. All of whom, had one way or another assisted me on various occasions.

I had the opportunity to invite the Director of Fisheries, Datuk Rayner Stuel Galid to Dagat. Rayner and I came a long way as friends. We were roommates at UPM and to me working with fishermen and having a friend heading the fishery department was a bonus. There was a big reception for him and his officers given by the villagers led by their Chief Salleh. We had lunch during the fasting month and when I queried the Chief regarding this, he just said that they would extend an extra day in the fasting month. This was because according to Salleh, it was the first time a high ranking

officer had visited his village, as not even a driver had visited them before. From then on, more visits and assistance were rendered to the fishermen in Dagat.



Director of Fisheries Department Datuk Rayner Stuel Galid (4<sup>th</sup> right) visited Dagat together with his officers and met with Village Chief Salleh (3<sup>rd</sup> right).





I had engaged with the oil palm industry through seminars and forums. I gave many talks overseas including this one at Darwin University courtesy of UMS Borneo Marine Research Institute Senior lecturer Dr. Pushpa M Palaniappan, a PhD student at Darwin.

I was also looking at promoting the Tabin reserve for eco-tourism. A Japanese NGO and the wildlife department had established a home-stay program in Dagat. The local and foreign volunteers were so excited about Tabin and enjoyed being with the Tidung community that their nice reports attracted more volunteers to register with SOS Rhino.

I took the opportunity to invite Sipadan Diving pioneer Samson Shak and the tourism industry player K L Tan to visit and experience the Tabin wildlife and hospitality of the Tidung community. But first, I had to get them excited about our rhino conservation program which, fortunately they were and with that, they decided to join me in my visit to Dagat.



I also brought in Samson Shak (seated, back) and K L Tan (right), two major tourism players in Sabah to assess the tourism potential of our rhino conservation effort.

As a member of the Lions Club of Penampang (Host) I took the opportunity to invite the members and their family to come and visit the Tidung community. They were living in the base camp along the Segama river, and had experienced the boat cruise and wildlife viewing along the Segama and Tabin rivers. As an NGO the Lions club also did a health project with the primary school children, donated school stationary, food parcels and a water tank to the school.





Lions club of Penampang (Host), family members and RPU members at Kg Tidung for familiarization visit.



RPU members.



Briefing volunteers before going out for survey work.



I briefed the volunteers on Sumatran rhinos and survey area before sending them out for the field surveys.



RPU staff and volunteers from the United Kingdom.



RPU staff and volunteers from Zurich, Switzerland.



The five RPU base camps at the Tabin reserve located strategically around the reserve.





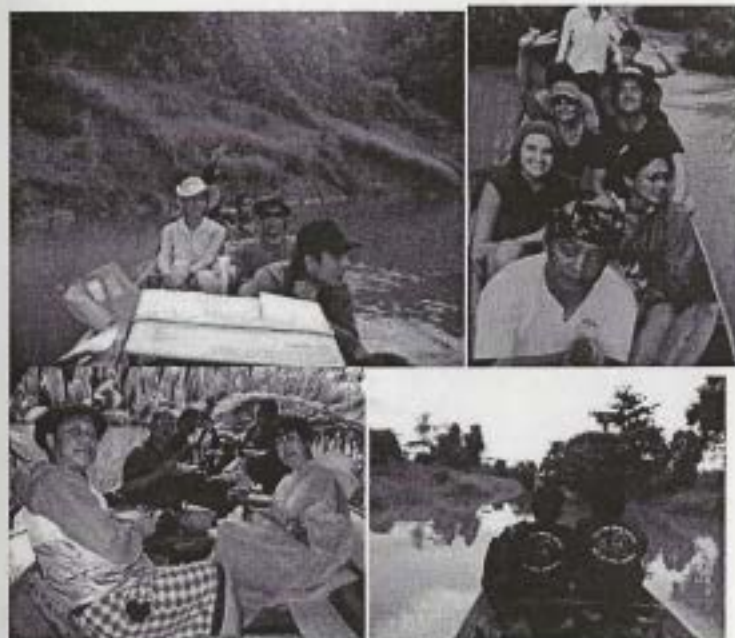
We waded in a river on our return to base camp and in less than 20 minutes, this river was flooded.



We took GPS reading of all the rhino wallows we came across as reference while looking for rhino hairs in them.



We made it to the highest peak of Tabin reserve, Mt. Hutton, less than 500 meters above sea level. The high water of Tabin brought us deep into the reserve.



My RPU's made this boat which we used to bring RPU's and volunteers into the reserve. During patrolling, we took our lunch break under the canopy of the nipah palms. Note our RPU's with striking t-shirts on boat patrol.



Pushing and removing the stones to allow the boat to pass through during the drought.



More pictures of my RPU's. We also managed to form a football team.



Gem Asildo (left) receiving a t-shirt. Anne Lajuat (2<sup>nd</sup> right), Dr Petra (left) and Dr. Nan (right).



Lonia Adam (right) with RPU's. Dr. Rosa Simpangkui and Faye Jinu (right) checking on the rhino at Sepilok.



Fadzilla Nor (centre) with Ranger and RPU's at Sepilok. Leni Tupang (right) at the Annelisa's memorial service at Tabin.



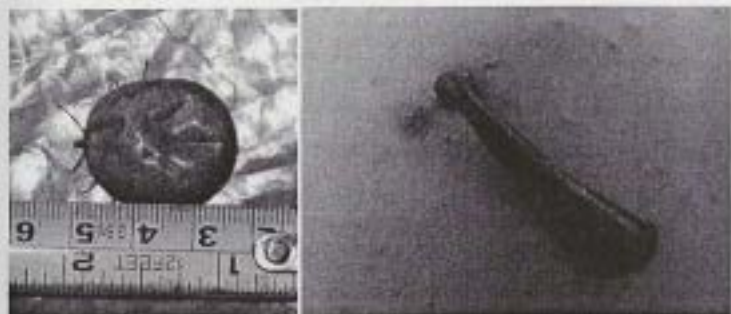
## *Annelisa's tragic end in the Congo*

Annelisa was offered by Dr. Karesh a full time job to work with the Wildlife Conservation Society (WCS) in the Republic of Congo. She had spent sometimes in Africa and was one of the scientists who identified the causal agent of Ebola. She was not sure whether to continue with SOS Rhino or to take up the job with WCS. I told her to follow her heart and with that she left for Congo on the 1<sup>st</sup> of November 2012. The next day she was killed in a crash landing of a 4-sitter propeller plane. It was tragic news for me and for SOS Rhino. I was in Labuan when I received a call from Dima in Chicago informing me of the tragic event.

As it was planned that I would attend the Earthwatch workshop on the 8<sup>th</sup> November in the United States, I was fortunate enough with the timing to be able to attend Annelisa's funeral in New York. I saw her dad, mom and sister again; however this time, it was far different from the first time we met. It was truly a sad atmosphere. Earlier, they had come to visit Annelisa at Sepilok where I took the opportunity to show them around. We trekked to the mangrove swamp at Sepilok Laut and then travelled on the road to Tabin reserve. My last conversation with her was about her disappointment for not being able to show me around but had arranged for her sister and parents to take care of me whenever I

am in the States. She was remembered well by the veterinary and conservation fraternity with a huge gathering being held in her name at the Bronx Zoo to celebrate her life. I sat in one of the Zoo's iron bench which has her name on it. Later, I also organized a gathering amongst the officers and RPU's of SOS Rhino (Borneo) at the base camp in Tabin to celebrate her life. The death of Annelisa was deeply felt by the staff at Sepilok and RPU's in Tabin.

I went to London to attend the Rhino Day event in June 2005 and caught up with a friend Henreitta who was a crew member and photographer for a documentary film production who did a documentary on wildlife at Sepilok. She took me to a concert where we befriended Dr. Petra Kretzschmar from Germany. When she told me that she was a biologist I asked if she was interested to work with the rhinos in Borneo. In no time she met up with Dr. Nan and was recruited into the rhino breeding program at Sepilok.



A rare finding of a large tick but leeches were very common.

## Searching for the rhinos

As a Program Officer I organized a few rhino conservation seminars and forums. In the 2<sup>nd</sup> Rhino Conservation seminar of June 2002 Laurentius Ambu from the Sabah Wildlife Department reported that there were 15 to 30 rhinos in Sabah according to the finding of Davies and Payne in 1982. My friend Mohd Khan Momin Khan gave a better number of 38 in Tabin and Danum Valley while Tom Foose and Nico Van Strien gave an estimate of 30 known and a possibility of 70 rhinos roaming the whole of Sabah. My task was to get a precise population of rhinos at the Tabin reserve which also became the main focus of SOS Rhino.



Picture shows the Tabin reserve in the Dent Peninsular

The reserve is 120,000 hectares or 1200km<sup>2</sup> big or twice the size of Singapore located in the east coast of the Dent Peninsular of Sabah. I kept telling myself it is only 60 by 40 km in size. The government has named it

as a wildlife reserve because of the presence of the Sumatran rhinos. In the mid-80s, the reserve was logged for timber. However, the ridge forest was spared while the secondary forest eventually recovered.

Tabin Wildlife Reserve has recorded about 71 species of mammal and 220 species of birds. The forest type comprises of virgin forest, secondary forest, riverine forest, and Nipah palms swamp forest. The primary vegetation was mainly lowland Dipterocarp forest but is now a typical secondary Dipterocarp forest with open canopy and dense tangled vegetation in the lower layers. The *Macaranga* species dominates the forest, together with the woody climbers, gingers, rattans and ferns. The core area is mainly virgin forest. There are seven mud volcano areas in Tabin reserve. It has been reported that the rocks and water in the area are highly saline, with salinity ranging between 20-30%. The main mud volcanoes are Lipad located about 2km from the western boundary and the other is situated within the core area. The former is the larger one with approximate 70m diameter while the latter is only about 30m in diameter. Many wild animals, like the ungulates and monkeys, frequent these sites. Even the Sumatran rhinos are known to go there as well.

Sumatran rhinos are browsers and are also consumers of wild fruits. It has been reported that a Sumatran rhino consume as many as 321 plants comprising more than 147 species. Due to this inherent



nature, Sumatran rhinos require a large home range. The presence of mud volcanoes with a high level of sodium within the Tabin reserve serves well for the Sumatran rhino. I have already mentioned how in 1986, my team almost came face-to-face with the rhinos in Tabin when I was with SRWCC. My job in Tabin while under SOS Rhino (Borneo) was more focused. With the establishment of the RPU I started to undertake surveys.

There was a road that led from the wildlife office in the west to the core area, a distance of 22km. The core areas have a mud volcano and the ridge forest that is still pristine. The road was made to facilitate research by the Wildlife Department and UMS. This dirt road was extended KM52 to the east by cutting and making a jungle path all done by the RPU which had helped me to plan for the surveys. This 52 kilometer transect was our reference. As far as I knew we had practically covered the whole of Tabin reserve through our smaller surveys. We found many old and fresh hoof prints. We made some moulds and study every feature of the prints. We also detected rhino presence at Dagat village and subsequently received confirmation of sightings by the villagers there. We also included DNA analysis by searching for and collecting hairs stuck on the side walls of the wallows. We found special areas where the rhinos deposited their dung and we had set out to collect the fresh ones in those areas.

We examined the plants that were browsed, collected them, identified them and undertook nutritional analysis. We procured and set up photo-trap cameras in the reserve. We stationed our RPUs around the reserve to protect it from encroachments through active patrols. I was with the team when Francis came to inform me of a rhino in a wallow. We went to see it only to find that it had moved away. We then followed the track and the trail of mud on the shallow stream but failed to find the rhino. I must say that that was my other chance to view a rhino in the wild. Despite my lack of rhino sighting, I am proud to know that one of my Rangers Justin Lanjang was able to record a video of a rhino which was merely six feet away from him in the Tabin reserve.

One must have a good basis and confidence when studying the hoof print of the rhino in the wild. We were lucky because we had the captive rhinos at Sepilok. I brought members of the RPU to Sepilok armed with measuring calipers. We practiced taking the measurements of the toe in the middle and the width of the outer and inner toes on the rhinos when they were in the chute. We later let them out in the forest and then measured the hoof prints. We made a comparative study and that made us well versed with hoof print measurements. This exercise made our hoof measurements in the field pretty accurate.

I organized a major extensive survey with the Sabah Wildlife Department and which also involved many other agencies such as the Forestry Department, Universiti Malaysia Sabah (UMS) and WWF. The result of this extensive survey and all of the other minor surveys from 2000 to 2002 allowed me to write a paper on the presence, distribution and density of Sumatran rhinos in the Tabin Wildlife Reserve together with Annelisa, Nan and Leni Tupang.



Thaya, Jali, Paul and I collecting plant samples along a path that had been browsed by the rhinos. We took many measurements of fresh hoof print.



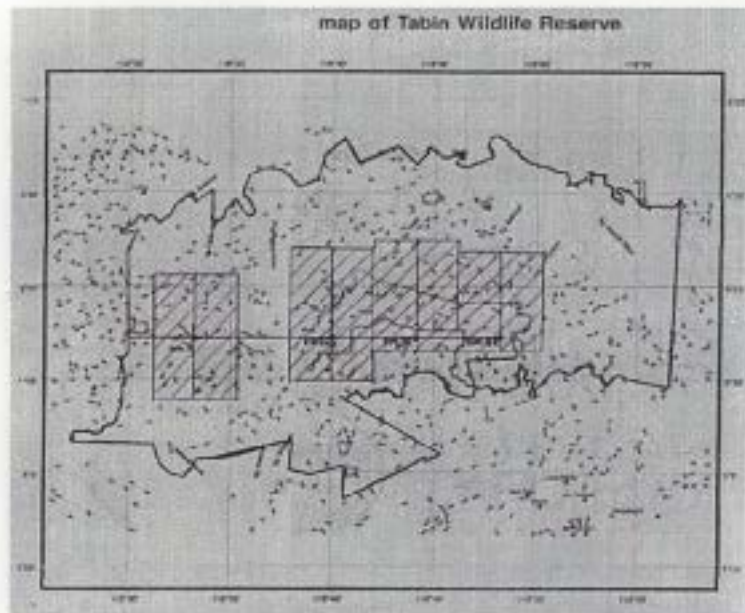
Rhino dung collected and dried. We found some mango seeds.

I cannot remember if the paper was ever published as by then, I was already on my way out of SOS Rhino. It has been more than 10 years since I left SOS Rhino (Borneo) when I realized that I should share my work on the Sumatran rhino of Sabah. SOS Rhino (Borneo) had undertaken numerous small surveys where we found both fresh and old hoof prints. The vastness of the Tabin reserve did not allow us to pin point the number of rhino roaming inside the reserve. The extensive survey was planned and I had decided to use a fishbone survey methodology. This was to ensure that most, if not all, areas in Tabin reserve was covered. This fishbone method can only provide good results when there are enough people to cover all the survey transects at the same time for a fixed duration. Fortunately, we had enough manpower to do just that.

The fishbone method would provide concrete data on the number of rhino in Tabin by the size of the fresh hoof prints. It was so important that all members of



the survey teams were trained on hoof print measurement before embarking on the survey. The teams were also provided with GPS to accurately record the location of the hoof prints. It was a successful survey as the teams saw fresh hoof prints of Sumatran rhinos. One of the field team members even saw a rhino passing through their jungle camp in the morning of 22<sup>nd</sup> of February 2002. It was an adult male with a horn length of 6-7 inches with a hoof print size of 19cm diameter.



Picture shows the fish-bone survey method.



We measured the front toe and the width of first and third toes of a captive rhino at Sepilok.



Finding fresh rhino hoof prints and measuring them to determine the number of rhinos. To get more clarity, white powder was used on the hoof prints.

The rhinos were mainly concentrated in the middle of the reserve, an area with good secondary forest and a presence of a mud volcano. Fresh rhino tracks were seen at the mud volcano on two separate occasions. Obtaining the most accurate Sumatran rhino census in the Tabin reserve was a daunting task as we were dealing with a very illusive species. We can determine the rhino population by two factors; known and possible.

The extensive surveys and other smaller surveys had given good results and after covering an area of approximately 550 km<sup>2</sup> of the reserve, I was able to come up with six known and 16 possible number of Sumatran rhinos in the reserve. I am glad that more surveys were conducted after my departure from SOS Rhino. I had a chance to read a report of the 2007 extensive survey where they found a minimum of five rhinos where two were believed to be young adults.

I am saddened by the fact that encroachment and poaching inside the Tabin reserve still continues. I read the same recommendations from various authors writing on rhino conservation in Sabah of having a stringent anti-poaching team and ensuring full protection of the rhino habitats. Somehow these recommendations including mine did not get very far.

## *Obstacles and challenges*

I believe this book is important in highlighting the achievements and accomplishments of SOS Rhino (Borneo) which somehow have been overlooked by present day researchers of the Sumatran rhinos in Sabah. It is fortunate that my paper on the natural breeding of the Sumatran rhinos at Sepilok had been published in a journal otherwise the wildlife department's effort, as well as mine, would have gone unnoticed. In the same vein I needed to write about the great work of the rhino surveys by SOS Rhino (Borneo).

It is reported that more than 40 rhinos have been captured for the captive breeding program and more than half have died. There are currently three active rhino breeding centres, namely in Cincinnati Botanical Garden, USA, Way Kambas in Sumatra and Sepilok in Sabah, Malaysia. The Centre at Sg. Dusun in West Malaysia had to close after losing all their rhinos to a bacterial infection. It is also a sad day for the Sumatran rhino conservation field in Sabah when in 2014, the government conceded that the Sumatran rhino in the wild is extinct and the captive breeding program had not been successful. Sepilok Sumatran Rhino Breeding Centre under the Sabah Wildlife Department must be put on record and be recognized as the pioneer in the natural breeding of the Sumatran rhinos. It paved the way for the Cincinnati Zoo to create history by producing three Sumatran rhino babies, Andalas, Suci and Harapan. The



knowledge was also transferred to Indonesia when Andalus was moved to Indonesia and was bred with wild-caught Ratu, giving birth to a male baby on June 2012, becoming the first captive bred Sumatran rhino in Indonesia. They produced another female offspring in May 2016.



With my RPIUs and volunteers at the core area's mud volcano.



Landed on the mud volcano at the core area.



Mud volcano at the Tabin reserve is a good source of minerals.



Mud volcano is also popular with humans for the so-called skin therapy (photo credit: Melvin Disimon).

The aerial survey we undertook on April 2002 showed a network of plantation roads along the boundaries shared with the Tabin reserve and finger-like roads poking inside the reserve. There is a massive network of rivers at the northern part of the reserve and villages were not far away from the reserve. I think the oil palm plantations around the reserve have been very responsible and the one that gave us a lot of support was PPB Oil Palm.

SOS Rhino had also engaged with the oil palm industry through our participation in seminars and forums organised by them.



There is a challenge in protecting the Tabin reserve where it shares boundary and rivers with oil palm plantations.

I knew pretty well back then, that Tabin reserve is not safe from incursions and intrusions by people. In fact, we have caught them red handed in the reserve and they were local people. Our RPUs were busy with both patrolling and surveying and they did a very commendable job. The enforcement is a tough job as one's life is always at risk. SOS Rhino did a good job on rhino surveying and protection of the Tabin reserve in Sabah. At its best, five RPUs comprising of 25 individuals were established to protect the rhinos in the reserve. These units were also involved in large-scale and routine surveys within the reserve. I am not sure what had happened to these RPUs after my departure.

Based on the hoof print sizes from the surveys back then, it was known that there were six rhinos. However, a span of ten years after my resignation in 2006, the species is now extinct. Since two had been held in captivity in Tabin reserve, I do like to know what had happened to the four rhinos that I was very certain to be still roaming in the reserve at that time. In fact, the 2007 survey indicated a minimum of five rhinos still roaming the reserve. On the other hand, I was aware that the rhino breeding program continued after I resigned from SOS Rhino (Borneo). I learned that Dr. Petra was able to get experts from Germany to help with the reproduction biology of the captive rhinos. Sadly, I read that the problem lied with the animal's reproductive system.



I must admit that I faced numerous obstacles and problems when I was working with the government and similarly when I was with the NGOs. I saw the limitation being the so-called "office politics" that was real and unhelpful. I entered politics thinking that I could do something positive as a government official. I was elected as an assemblyman for Kapayan on 5<sup>th</sup> June 2013 but I had to sit on the opposition bench when our party failed to win the majority. Nevertheless, I have been very vocal on issues concerning wildlife conservation and one of my highlights was elevating the status of the pygmy elephants to fully protected species under the Wildlife Conservation Enactment 1997. I also spoke about the sad fate of the Sumatran rhinos when I had the opportunity to do so.



It was common to encounter the pygmy elephants and hill tortoise

## *Extinction no more*

The captive rhinos have become more challenging in terms of their breeding and their care. When the government is left with namely three rhinos; Tam, Putung and Iman, there was a stronger urgency to do something for them. The government agreed to loan the male Tam to the Cincinnati Zoo for breeding as part of an international collaboration. Tam never made it to the States after finding that his sperm quality is not ideal. Putung had skin cancer and was euthanized to relieve her from her suffering while Iman who is also diagnosed with cysts in her uterus. The rhino experts have recommended that the sperms, ova and skin cell of the sick female rhinos can be harvested and stored for *in vitro* fertilization (IVF) by planting the embryos into surrogate mothers. In this aspect, the Indonesian government has kindly agreed to supply the sperm from Andalas and undertake an IVF with the ova from Iman.

The future of Sumatran rhino reproduction is best summed up by the Director of Sabah Wildlife Department Augustine Tuuga who said that the genomes of all four Sumatran rhinos in Malaysia are kept in living cell cultures both overseas and locally. For now we await the good news.

# Sick female rhino starts to eat more

**KOTA KINABALU:** The condition of Sabah's sole female rhinoceros, Iman, will remain grave if she does not start eating larger volumes of foliage.

Sabah Wildlife Department director Augustine Tonga said as of yesterday evening, Iman's prognosis remained grave.

"Bleeding is still present along with dark-colored blood, although less than yesterday. She also hasn't regained her appetite," he said in a statement.

Iman, who was brought from Irian on Dec 21 to about 100m on Dec 22 began to eat more yesterday.

"She ate 200 grams of leaves of about 7 types. She drank 200ml water and water with mineral materials from a bottle. She also walked and stood in the night and occasionally was in a drowsy state," he said.

He added that they had her on infusion (D5W), Dextrose and potassium totaling 10 litres.

They also give antibiotics, penicillin, vitamin B<sub>12</sub>, cortisone which are used to reduce pain.



Iman photographed along with her penpal.

Wild, and dangerous.

"By existing, she threatened

1.5 kg of leaves and drank 200ml

water," he said.

Iman getting attention from the public.

Unfortunately it looks like the Sabah rhino conservation program ended with the local extinction of the rhinos in the wild and the death of all but two captive rhinos. Even the last remaining female rhino Iman which was caught in Danum Valley is reported to be critically ill. As I write this book I am reading from the local newspapers about how precarious Iman is, diagnosed with uterine cysts and bleeding occasionally.

The extinction of the Sumatran rhinos in Sabah should be lessons for all of us. The recommendations from all the wildlife conservationist years ago should have been taken seriously and something could have been done about it. We should have given full attention to the plight of the Sumatran rhinos by giving more funding to upgrade facilities, provide better nutrition for the animals and to hire more manpower and experts for the caring and breeding program.



The local newspaper, Borneo Post, reported on Iman.

It looked like our protection for the rhinos in the wild had also proven to be inadequate. This is akin to the present day warning on global warming but somehow the reaction towards preventing and mitigating this phenomenon seemed to fall on deaf ear. The countries affected by rising sea water are crying out but those who are yet to feel it are unperturbed.



On hindsight I was right when I did not have a clue on how Sabah could be successful in its *in situ* rhino conservation program. Did we make the wrong decision in 1985 when we rejected the proposal from the American zoos? I like to think that we have actually made the right decision because the Americans did not manage to breed their Sumatran rhinos until we showed them the way. They were also having problems on the nutrition for these tropical rainforest animals. Sabah had so many rhinos in captivity but unfortunately we did not have what it takes to be successful in rhino breeding.

Our major contribution towards the global Sumatran rhino conservation movement was the breakthrough in discovering the natural breeding of the species. On hindsight we could have established a facility similar to Cincinnati Zoo and brought in the experts or move the animals to the United States as we only had two females to work with.

Forest cover is good only if it provides shelter and food for the wildlife. We must also give full protection to their habitat by keeping poachers at bay. We must now place the pygmy elephant as an umbrella species so that when we are protecting them and their vast habitat we are also protecting the other species which are also potentially in danger of extinction. Setting aside protected areas is an absolute necessity.

Learning from past experiences, we must start to build up our wildlife breeding capability by taking advantage of the facilities and experts in the Zoos or wildlife parks. The presence of many animals at the zoo and wildlife park is good for the visitors who must be made aware of the wildlife conservation program there. I have, on many occasions, raised the issue of game farming in the Sabah Assembly, with the suggestion of releasing their offspring back to the forest. I also brought up the breeding of other species at the zoo or wildlife park of having the same objective, eventually releasing them back to the wild. I talked about rearing all the three species of deer, wild cattle or "tembadau", wild pigs and even the flying foxes.

We need better facilities and equipment, more funding, manpower and experts. It is obvious that the oil palm industry must take the leading role in providing the funding for wildlife conservation and to help protect the habitat. The funding from the Malaysia Palm Oil Wildlife Conservation Fund must not stop but has to be further increased. The Ministry of Natural Resources and Environment must continue to fund and provide a stronger support for wildlife conservation. We need to establish corroborations and cooperation with other zoos, wildlife parks and the relevant organizations to stay relevant and up-to-date in the field of wildlife conservation.



More than twelve years of my life spent on wildlife conservation.

Our wildlife has caught the imagination of visitors worldwide. Our eco-tourism attractions are bringing more and more tourists. As one of the top revenue earners, we must not kill the goose that lays the golden egg. I had in the Sabah Assembly, recommended that our wildlife and plants that are endemic to Sabah and Borneo must be made State heritage. We cannot turn back the clock but we still have many wildlife species in Sabah that need our attention. I am worried for the pygmy elephants a species only found in Sabah, as well as the Orangutans and Proboscis Monkeys the two species which are endemic to Borneo. We must act and do something positive for our wildlife so that we can say the words loud and clear; extinction no more.

## *The Author*



Dr Edwin Bosi is a Veterinary Surgeon. He was in-charge of public health and quarantine at Kapayan, wildlife veterinarian at the Orangutan Rehabilitation Centre Sepilok, Program Officer for SOS Rhino (USA) and Director of SOS Rhino (Borneo). He was a member of the Asian Rhino Specialist Group (ARSG) and Program Officer for the Sumatran rhino conservation for Sabah under the UNDP. He was Research Associate at the Institute of Biology and Conservation University Malaysia Sabah. He worked as a consultant in fauna for the environmental impact assessment (EIA) and as Assessor for High Value Conservation Forest (HVCF) Roundtable Sustainable Palm Oil (RSPO). He is a practicing and consultant veterinarian in his partnership Companion Animal Clinic in Kota Kinabalu. Dr Bosi was elected Assemblyman for Kapayan in May 2013.