

FORESTS AND WETLANDS IN MÉKONG DELTA DURING THE VIÊT-NAM'S WAR

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ABSTRACT

Thirty years after the end of the conflict in 1975, the debate on the controversial use of herbicides in Viêt-Nam remains heated. The chemical component of this war carried was the programm Ranch Hand (1961-1971), which aimed to the total destruction of the vegetational cover. At that time, the international scientific community already realized what would be the catastrophic environmental and medical consequences in the post-war period. The disappearance of very large surfaces of forests, mangrove forests and others plant communities durably endangered biodiversity ; the soils and water were also polluted. Since 1974, reports of the American National Academy of Sciences have listed the number of air missions and the quantity of herbicides spread per military area and year. Although their statistics include variations, errors and omissions, these sources give an idea of the extent of the phenomenon. Nowadays, the American Defense Department tends to open its files to researchers. The few ones that are already available prove of priceless value for the history of defoliation and bring new dimensions. We can now weigh war as a disturbance and locate the number of missions and the type and quantity of herbicides, which will eventually allow us to evaluate the impact of defoliation on ecosystems and people.

INTRODUCTION

The weapons and the wars, including the chemical war, have direct and indirect effects on the environment : involving an obvious rupture of the balance ecosystems, they have also effects on the arable and forest lands. The chemical and biological weapons are with at the origin an intentional pollution of the environment by the dispersion of chemical poisons and / or virulent micro-organisms. During the war of the Gulf, Iraq released thus from great quantities ; hydrocarbons pollute the Kuweït littoral and set fire to 700 oil wells, contaminating troposphere. This example is rather symptomatic the new shapes of contemporary wars ; that of Viêt-Nam remains the reference as regards chemical war. For certain researchers, in spite of devastations, nature has an untameable will to survive and to be regenerated. Others insist on the contrary on the long-term effects, the restoration and the regeneration of the contaminated ecosystems can not intervene at a terribly slow rate.

Although harmful effects of the war of the environment were known for a long time, it is connection with the massive use of the weedkillers which the international community managed from there to recognize inacceptability of the military attacks against the ecosystems, as a strategy of war. The amounts used during the war of Viêt-Nam were ten, even fifteen times higher than those recommended in agriculture.

SUBJECT OF RESEARCH

A historical retrospective is necessary to include / understand the origin and stakes of this chemical war. From 1940 to 1975, Indochina was the theatre to access a revolutionary war and nationalist against France, then a war of liberation against United States of America and reunification by a communist regime, always with the capacity today. Since 1946, the Vietnamese soldiers Viêt-Minh (members of the revolutionary league for the independence of Viêt-Nam) opened fire in Tonkin on the French garrisons. This first war completed with the agreements of Geneva of July 1954, which envisaged creation in the north of the 17th parallel of the Democratic Republic of Viêt-Nam, in the south of State of the south Viêt-Nam. From 1954 to 1964, North Viêt-Nam rearms, but especially maintains the guerrilla and terrorism in the South. After the departure of the French troops, the United States of America deals with the national army Vietnamese Southerner. Under the presidency of Lyndon Johnson, the soldiers claim new materials, people to protect air bases, then to launch big operations.

The tactics are simple : to seek the contact, even disadvantage for the troops, to bludgeon and use support of fires to destroy enemy mechanics, not to leave the ray action of artillery to avoid the body with body, finally not to venture the night out of the bases. This article relates to the operation *Ranch Hand* which caused very extensive damage for the ecosystems. Its role in the outcome of the war of Viêt-Nam and in the effects on the environment of this chemical war known as surgical was recognized.

The United States of America engaged in the wars Indochina and Viêt-Nam without real awakening of the type of war they should face and lead, to untie the persistent crises since the years 1950. Since 1961, the war became American. With the air engagement corresponding to the bombardments on the North Viêt-Nam and spreadings weedkillers, the target of the war became the destruction not of an army, but of a whole nation. The objective was to exterminate not only the very whole army Vietnamese soldiers Viêt-Minh, but also the populations which helped them. Bombardments were supplemented by actions of modification of time and climate, an aspect of the war which remains very badly known. This aim of general destruction was clear, even if the historical documents show an ignorance more or less pretended by the American official authorities as for the effects with short and long-term of the chemicals on the environment and on the health of the people.

The scientific community of the geographers, especially of the American ecologists, Canadian and Vietnamese asked for after war a continuous estimate, a monitoring and an evaluation of military impact on the environment, and encouraged research on the interactions between safety and stability of the ecosystems on the various scales.

This community recommends a demilitarization of the ecologically important areas and asks prohibition of the military use (or of any other hostile use) of the technical of transformation of the environment and of that of convention on prohibition of the development and the storage of the weapons bacteriological, biological, of toxins and on their destruction.

This article reconsiders a dark period of American history (1961-1971) that much would wish to overlook. Although the facts are proven, the military sources remain still not very accessible. The interest of such a research is to find new data to bring a lighting, explanations on the chemical war, in spite of the character taboo of the subject. Our work of historical biogeography is at the scale of the South Viêt-Nam to include / understand the disturbances of the environment, methodology by Geographic Information System (GIS) was privileged, because it allows approaches by spatial modeling and analyzes the most complex phenomena. Contribution of the civil and military archivist sources (topographic maps, pictomaps, air photographs) and of recent sources (satellite, ground) allowed to use statistical methods, to carry out space geotraitements and analyses. To have part of the step and results obtained, we will evoke to access general context of military handling of the environment, then the program of defoliation, finally sources historical relating to the possible operation *Ranch Hand* and their uses.

MILITARY HANDLING OF THE ENVIRONMENT

To the North American army, which engage neither its aviation nor its armoured tanks, but uses the ground and the camouflage, disperses and gathers at high speed, seeks the body with body and tackles bases of artillery or of the aerodromes, the American command exploits the aeromobility. Also used for the transport of infantry, helicopters and planes allow to free from the roads in a badly served country, to supply the bases semi-logistics and the units with operations.

The environmental disasters are often collateral effects of military operations, but they can also be deliberately caused. To break the balance of an ecosystem or to exploit of it; instability becomes a weapon. Then is spoken; *Environmental Warfare*. work of Westing provides a very detailed definition of this concept and developments which the soldiers ambition to give him. This author, by illustrating his remarks by cases borrowed from passed conflicts, distinguishes two categories. Handling which implies the use of massive disturbances, with large scales, are for example the voluntary rupture a dam or set fire to a forest. With *Environmental Warfare* the concept of *Green Conflict*, appeared in 2003 adds. It covers in fact all the explosive situations, of the local riot with the international conflict while passing by insurrection, repression or the civil war, directly related to the change of the environment.

During the war of Viêt-Nam, intensive bombardments, arsons and massive and repeated pulverizations of weedkillers devastated thousands of km² of forest ecosystems. On very broad surfaces in Viêt-Nam, but also in Kampuchea and Laos, the destruction of the forest settlements, impoverishments faunistic and floristic, the erosion of the grounds, the disorganizations of the trophic chains testified to the

structural and functional ruptures in the ecosystems. Environment had really become a target. On the arable and forest lands, the objectives were the targeted and total destructions of vegetable cover, the natural resources, the voluntary modifications of the ecosystems, the durable disturbances and the deprivations of refuge. Techniques of war by air (spreadings of weedkillers, dispersion of napalm, bombs, sowing iodized bad grasses) are on the matter more effective than the terrestrial way (bulldozers). They cause damage wide and durable.

RANCH HAND AND THE PROGRAM OF DEFOLIATION

« *You only can prevent the forests* ».

This currency was that of the soldiers of the operation *Ranch Hand*, which carried out missions of defoliation above the South Việt-Nam and the Hô Chi Minh track. Use of the weedkillers dated from the beginning of the year 1950. In 1961, the president of the South Việt-Nam, Ngô Đình Diêm, request in the United States of America to lead in its country of the air operations of pulverizations of weedkillers. In August the missions of start; air army South American, with helps of the Americans. The request of Diêm however causes a debate of general policy within the American government. In November 1961, president John Kennedy authorizes the use of the weedkillers, in limited experiments which require the Vietnamese participation and agreement, mission by mission, of the American embassy, of the command of the military aid in Việt-Nam and of the South Vietnamese government.

The operation *Ranch Hand*, started in January 1962 against the forests, is extended in November to the destruction of the cultures. When it finishes, nine years later, 70.000.000 liters of chemicals approximately (primarily Orange Agents for all the vegetation, Blue for the cultures and White for the forests) were pulverized on nearly 20 % of the total surface area of the South Vietnamese jungle, including 36 % of its forests of mangroves, that is to say approximately 26 000 km² touched. The littoral areas were abundantly sprinkled, in the military zones 1, 2, 3 and 4; zone 3 as a whole was the privileged target of the defoliation campaigns. These zones correspond little to the zones of bombardment, located more at north of the country, except around the 17th parallel. On the other hand, they are concentrated in the zones of strong population densities, where an increase in the health hazards.

The map of synthesis on spreadings of the weedkillers was carried out starting from the American data, in particular of work of Westing and Stellman. The volumes poured in ten years border the 75 000 000 liters according to Westing, with years with very strong spreadings in 1967, 1968 and 1969 : 19,4, 19,3 and 17,3 millions liters, is more two thirds of the total quantities. Orange Agent, with its 45,7 millions; White Agent, with 20,6, liters millions are employed, with frequencies of passage of the planes above the forests estimated at one to four spreadings by site, more rarely beyond, to ten.

Activity of *Ranch Hand* is not limited to the defoliation of the jungle. From 1962, the cultures are aimed by means of Blue Agent, in order to limit, even to stop the supply of the Viêt-Cong.

TO RECONSTITUTE THE OPERATION RANCH HAND

After the publication; a study on the residual effects of the operation Ranch Hand, National Academy of American Sciences concluded that, any good considered, the harmful effects of the program on South Vietnamese people health seemed to have been less important one could have feared it. No proof expresses directly ascribable physiological disorders with the weedkillers was found. Today, thirty years later, 32 000 requests for pensions of disability deposited by veterans Vietnamese and based on the use of Orange Agent are in suffering. To here, the American ministry of the War veterans do not granted any of these requests.

That it is during or after defoliation, research on the effects of the weedkillers never really ceased, well it is difficult for the American researchers to reach the défoliated, even bombarded sites. The absence; access to the data always limits progress of the work. The archivistic sources occupy of this fact in research a very particular place. However, their consultation is not in general possible; at the end of several decades. Our study uses the McLeod report / ratio, resulting from HERBS file. The initial data comprise the name of the province, the type of agent, the number of gallons transformed into liters for the quantities.

Thanks to the methodology of the GIS, spatial modeling and analyzes, we could combine multiple information resulting from various, civil and military sources. The spatialized study of spreadings, with scale of all the South Viêt-Nam, made it possible to put forward the zones most touched by the weedkillers while differentiating the types of differents agents.

CONCLUSION

This work could not however be sufficed for itself: it supplements a thorough research on the sites tests. It is in the Mekong Delta what they were chosen, because they answer several beforehand given criteria : they are zones of mangrove forests true whose ecosystems knew era of the forestry developments and forestry installations, they were the target, during the war of Viêt-Nam, of bombardments and repetitive spreadings of defoliant, and they were retimbered following disappearance partial or complete of their vegetation. The war is not the only disturbance. It can not explain all the changes in the landscapes. It is necessary to also take into account the forestry practices, hydraulic installations since French colonization in 1860 and the more recent uses of aquaculture, which contributes on longer temporal scales to the general disturbances. That makes it possible to relativize the weight of the war.

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