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Abstract: Overshadowed by the socially destructive consequences of war, the natural world is often a casualty of conflict. Whether in forests or agricultural sites, military activity causes many site disturbances. Focussing on the environmental aftermath of war, this article highlights some of the more common environmental problems that result from conflict in tropical regions.

I Forest Site Disturbances and Military Activity

Above: Deforested land in Beta Province, southern Brynania, near the town of Gattaca.

In conflict zones, forestlands are damaged due to shrapnel, bombs, and shelling. Many trees that are injured by shrapnel are suspect to fungal entry, infection and decay which inevitably lead to a reduction in the tree stock. Impact on fauna occurs indirectly through destruction of faunal habitat. Thus, military operations that degrade the quality of the floral ecology simultaneously weaken sources of food and shelter of the associated animal life. The connection becomes more evident in tropical regions due to the high proportions of fauna which are restricted to canopy habitat. Also documented are the effects of shrapnel on domestic wildlife. Livestock such as cows, water buffalo, and mature pigs may suffer foot and mouth injuries and have an increased probability of fungal infections and disease. The continuous threat of unexploded munitions, damaged riverbeds, and disrupted sea walls are likewise common legacies of war on the environment.

Forested areas face conversion into craters by high-explosive munitions. Reconstruction of such craters is both time consuming and labour intensive. On average 67 cubic meters of soil is required to fill a typical 241 kilogram bomb crater. A USAID reconstruction report from 1992 suggests that on average 500 work hours of hard labour are required to fill one crater. As was the case in South Vietnam, Brynania's forested area is twice as likely to constitute a target for a bomb or shell as the dense forest surroundings can offer insurgence groups a higher level of protection and maneuverability.

Large forest site disturbance due to military activity leads to the establishment of a vegetative cover remarkably different from the original. The new growth will establish an ecosystem-dominated by floral that was often secondary and with significantly lower species diversification. Where the vegetative cover on tropical upland sites is destroyed, re-growth vegetation may begin occupying within months. However, the pioneer vegetation will most often herbaceous. Initial forests may begin to crowd out the second cycle of Imperata grasses within 10 to 15 years. As is the case with temperate zones, significant forest recovery may take up to 40 years. However, even after 40 years the forest may only contain approximately one fifth of the tree species that it originally sustained.

Deforestation in Brynania is at crisis levels. Experts suggest that over-exploitation by concession holders, as well as illegal logging and domestic consumption of timber are having dire environmental consequences. Some suggest that commercially valuable species of trees in most of Brynania's forests will be all gone by the year 2005 unless more effective controls are imposed.

Brynania has growing rates of unlicensed harvesting of tropical hardwoods by combatants. Forced displacement and persistent unemployment has driven much of the Zaharian population to unofficial employment. Large-scale smuggling operations, some under the direct supervision of the Zaharian militia in order to finance the war effort, make their way across the Brynania-Icasia border. Once in Icasia, the hardwood is transported to North America, Europe and parts of Asia for goods manufacturing and consumption. It often finds its way onto department store shelves. For example, according to Greenpeace, the department store LEAKEA, a favourite source of home furnishing for North American and European students, gets 17% of its hardwood from conflict zones and 8% from Brynania. Both the Government of Brynania and the Government of Icasia officers are thought to facilitate the trade - accepting bribes from smugglers or collecting extortion taxes through a complex web of informal levies and protection charges on illegal timber operations.

II Agricultural Disturbances and Military Activity

Above: Unexploded ordinance found by international observers in July 1996 near a farmer's field 55km south of Biku, Brynania.

Often the object of offensive attacks, agricultural fields play a strategic role in economic warfare. Offensive scorched earth tactics at presumed enemy crops attempt to suppress insurgencies by destroying their means of survival. The long term environmental effects of such strategies are staggering. In Brynania for example, peasant farming areas amass some 45 thousand hectares and produce the food supply of approximately 1.1 million subsistence farmers, mostly ethnic Zaharians. A further loss of indigenous fruit trees and the destruction of rural well water systems have further impeded the livelihood of the areas inhabitants. Well water and field irrigation systems become useless, and settlers abandon their fields in search of more productive areas. Migration into neighbouring countries and displacement into undeveloped areas is common as inhabitants begin the settling process again leading to the destruction of more and more of the country's "Southern Wilds".

Meanwhile, scorched earth has left the valleys rich farmland "barren, grey and lifeless"(USAID, Brynania Reconstruction and Development Planning Assessment Report, 1992). This decrease in arable land and lower yields in agricultural goods in conjunction with unexploded ordinance that litter fields retires potential farmland, compounding farmland overproduction. Conflict also often destroys or damages farm equipment and once fertile farmland becomes barren due to environmental degradation and overproduction, or inefficient because of unworkable capital.

Thus, military activity has dire consequences for the short term and long term health of the environment. The forest ecology of tropical regions, including both its flora and fauna, is susceptible to military destruction with a designated healing rate equivalent to 40 years. Secondly, agricultural farmland and populations that rely on subsistence farming are at particular risk of offensive scorched earth strategies. In the short term, these strategies effect the agricultural yield and in the long term, can lead to undeveloped land and the destruction of further flora and fauna. Lastly, conflict can damage groundwater and irrigation systems, which may lead to further inefficiencies of agricultural production.

Given the vast devastation and its subsequent limited re-growth for both forests and agriculture, we conclude that the casualties of war are not only human but in addition, include the natural world in all its diversity.