

The legacy of agent orange: empirical evidence from central Vietnam

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Abstract

This paper seeks to provide a socio-economic impact assessment for Vietnamese victims of the principal US military herbicide, Agent Orange, used during the Vietnam War in the period 1961–71. The study is based on a field survey of 30 affected and 30 unaffected households in Quang Tri province. With this assessment, the paper attempts to address the broader issues of compensation currently available to victims. The coverage and composition of current benefits are deemed inadequate as an effective redress. In view of this, revision of current compensation, the mobilization of an international donor fund and spurred non-governmental support is strongly recommended.

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Introduction

Between August 1961 and April 1971, the US Military is reported to have dispersed some 72 million litres of herbicides over the former South Vietnam, of which 42 million litres were Agent Orange. This represents the world's largest dioxin contamination (10–80 Organizing Committee, 1993, p. 2).² Agent Orange (AO) was a term of the US Military for a mixture of herbicides, containing a dioxin by-product, that was used for purposes of defoliation and crop destruction.³

The former was aimed to destroy plant cover to enemy troops while the crop destruction programme was aimed at food denial, namely the control of rice distribution and production (Johnstone, 1971, p. 714). Amidst doubts over their effectiveness, as well as preliminary scientific evidence in the US of possible birth defects resulting from AO exposure, the programmes were discontinued in 1971 (Ibid.). Over time, there has been a number of studies both in Vietnam and abroad into the environmental and health effects of the chemical; however, 30 years on, the full effects are yet to be known.

In recent studies, Vietnamese scientists have revealed there still exists a residual dioxin quantity in the soil directly proportional to the areas sprayed with Agent Orange (10–80 Committee, 1993, p. 463). A further study 1994–98 by a Canadian group, Hatfield Consultants, confirmed that defoliants had destroyed 50% of mangrove forests in Vietnam and had irreversibly altered ecosystems (Hatfield, 1998). The Vietnamese government, in cooperation with other governments and international organizations, has begun the process of inland and mangrove afforestation. However, results to

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²According to American government sources, AO was used in Vietnam between January 1965 and April 1970 (Environmental Agents Service, 2001, p. 1).

³Agent Orange was a mix of two herbicides, known conventionally as 2,4,D and 2,4,5,T that contained dioxin by-product 2,3,7,8-TCDD (10–80 Organizing Committee, 1993, p. 461).

date have been modest due to a shortage of manpower and funds (10–80 Committee, 1993, p. 465). It was estimated that in order to cover the forest area destroyed it would take many more decades, perhaps even a century with industrious labour and a steady supply of international funding.

In terms of the human health effects, an early study by Vietnamese scientists in cooperation with a New York-based scientist showed disproportionately high levels of dioxin in the blood of residents in southern sprayed areas compared to a number of control groups in the north (10–80 Committee, 1993, pp. 5–8). As recently as 1995, dioxin blood levels were found to be between 25 and 170 times higher in sprayed villages than in northern villages (Cayo, 2000). Meanwhile, in the US the National Academy of Sciences has set out a list of diseases that are found to have “sufficient” evidence or “suggestive” evidence of an association to AO (Institute of Medicine, 2000). Updated in 2000, these include sufficient evidence of soft-tissue sarcoma, non-Hodgkins lymphoma, Hodgkin’s disease and chloracne, and suggestive evidence of respiratory cancers (lung, bronchus, larynx, trachea), prostate cancer, multiple myeloma, acute and subacute transient peripheral neuropathy, porphyria cutanea tarda, type 2 diabetes, spina bifida and acute myelogenous leukemia in the children of veterans. In the US some 300,000 veterans have undergone medical tests and an estimated 2000 children are potentially suffering from the birth defect spina bifida (Veteran Affairs, 2000, p. 4.8). Meanwhile in Vietnam preliminary research estimates 1 million first, second and third generation victims of AO (Vietnam News, 2001a). Of these, 50,000 deformed children are believed to have been born to parents exposed either by location or through access to sprayed foodstuff (Vietnam Investment Review, 2000). In some villages one in every 10 children suffers serious birth defect such as spina bifida, cerebral palsy, physical and/or mental retardation, missing or deformed limbs (Satchell, 1999). The full extent of the problem, however, remains unknown. Current estimates are based on a National Health Survey that was begun in 1999 as a preliminary register of persons who reported or displayed any possible AO-associated diseases. It is very possible that the social stigma attached to AO-affected persons could have cautioned them (especially unmarried men and women) from an open disclosure in the survey. Furthermore, prospects of benefits may have led others to claim diseases without blood testing and medical verification. At a quoted \$2000 per person, blood testing for supernormal levels of dioxin continues slowly (Mai Phuon, 2001).⁴ More recent government estimates put

numbers at 3 million while a Columbia University study estimates up to 4 million persons may be directly affected by AO (Tran Dinh Thanh Lam, 2004; Stellman, Stellman, Christian, Weber, & Tomasallo, 2003).

The use of Agent Orange in the Vietnam War is allegedly a war crime. A lack of political resolve on the part of governments, and a lack of accessible judicial forums for individuals, has, however, resulted in few legal actions for the compensation of victims (Palmer, 2004). Since the US government cannot be sued without its consent, all civil action to date has instead proceeded against US companies involved in the manufacture of AO. In 1984, a class action lawsuit brought by American and Australian veterans resulted in a settlement of \$180 million that extended only to veterans with death or total disability claims (Smoger, 1993 in 10–80 Committee, 1993, p. 458). In Vietnam, it was only in January 2004 that the first suit was filed by three victims against several dozen US companies including Dow Chemical and Monsanto, in a New York district court (Agence France Press (2004); Kokkoris, Moore, & Goodman, 2004). Compensation has thus for the most part relied on domestic mechanisms. In the US, subsequent to the Agent Orange Act of 1991, any veteran who served however briefly in Vietnam and is suffering from any of the above-listed National Academy of Science AO-associated diseases with at least 10% disability are entitled to compensation from the Department for Veteran Affairs. Compensation consists of payments rated according to disability (\$98 per month for a veteran with 10% rating to \$2036 for a 100% rating), hospital care and medical services, and the possible provision of nursing home care (Veteran Affairs, 2000, p. 3). Children are eligible for vocational training support if suffering from spina bifida. While the American government is required by law to compensate American or Vietnamese-Americans living on its soil it has yet to compensate victims in Vietnam. In 1997, the US Ambassador to Vietnam questioned the availability of scientific evidence to establish the “exact consequences of Agent Orange” (Ha Thang, 1997). In early 2000, the Vietnamese government formally introduced the AO Central Payments Programme. Compensation consists of monthly payments ranging from \$3.40 to \$7.14 for adults and children who have partially or totally lost the ability to work (Vietnam Investment Review, 2000). As in the US programme, compensation is only extended to children suffering from the condition of spina bifida and furthermore includes orphans of deceased persons as a result of AO-associated diseases; however, the US programme includes spouses and

(footnote continued)

⁴Note the American government does not test American veterans for dioxin on the basis of the National Academy of Science’s finding in 1993 that results are not usually meaningful

due to common background exposures, variations amongst individuals, and possible measurement errors and exposure to other herbicides (Environmental Agents Service, 2001, p. 2).

dependent parents as well as children. Under the Vietnam programme, no provision is made for non-monetary benefits except for humanitarian center assistance and medical treatment for orphans. To remedy this, the Vietnam Red Cross Society Fund was established in 1998 with donations from societies in Denmark, the US, Switzerland and other international organizations to provide treatment and rehabilitation, literacy and vocational training programmes and monetary support for victims in selected provinces (Vietnam News, 2001a, p. 7). Meanwhile, other non-governmental and inter-governmental support has been largely area based and non-specific to AO.

Government and international donors have thus recently tried to address the issue of compensation but there are no studies to quantify the socio-economic costs borne by individuals affected by AO in Vietnam. This paper, therefore, attempts first to provide a preliminary assessment of the social and economic costs of victims (including loss of income, increase in resources devoted to medical expenses, educational and marital attainments) and, second, to review the current mechanisms of compensation available to victims. The findings of the paper are based on a field survey of 30 affected and 30 unaffected households in Quang Tri province in May 2001. Section two outlines the survey site and representation of affected and unaffected households and section three summarizes the methodology adopted for socio-economic assessment. The fourth section presents the results of the survey and is followed up with a review of current compensation in terms of coverage and composition. A concluding note and suggestions for further research complete the paper.

The survey site and representation

Vietnamese sources have recorded the spraying of AO 10 and 30 km from the center of defined localities in the then South Vietnam (10–80 Organizing Committee, 1993, p. 15). It is reported that only 4 and 1 localities were exempt from spraying to this degree (10–80 Organizing Committee, 1993, p. 7). Sprayed localities are listed in Table 1 with details on the number of flying missions and quantity of AO sprayed.

Quang Tri province was chosen as an upper middle sprayed proxy for total sprayed areas with a reported 150 flying missions and quantity of 66021/hectare. Quang Tri borders the demilitarized zone along the 17th parallel that once divided the north from the south and represents one of the most heavily AO-exposed regions in the country (Vietnam Investment Review, 1999). According to the 1999 National Health Survey, of a population of 576,666 the province is home to 15,000 persons affected by AO, of which 5240 are children suffering from birth defects (Vietnam Investment Re-

Table 1
Agent orange flying missions and quantity by locality

Provincial locality	Missions no.	Quantity (l/ha)
Tay Ninh	334	21007
Ma Da (Tri An)	507	19206
Song Be	246	17693
A Loi	271	14737
Hue	196	6964
Quang Tri	0	6602
Giong Trom (Ben Tre)	115	4384.5
Bac Lieu	35	3191.7
Bien Hoa	38	2609
Ho Chi Minh City	73	2423
Tra Vinh	35	1332.2
Co Quao (Rach Gia)	20	485
Da Nang	8	185

Source: 10–80 Organizing Committee, 1993, Ministry of Health, Ministry of Science, Technology and Environment, The II International Conference on Herbicides in War—“The Long Term Effects on Man and Nature”, Final Report, Hanoi, 15–18 November 1994, p. 15 (figures are aggregate for 30 and 10 km radius).

view, 1999). Within the province of Quang Tri there are nine districts and 136 communes, which contain any number of villages (Quang Tri Statistical Office, 2000). The two districts of Gio Linh and Cam Lo were identified as accessible, yet separate, AO-sprayed areas with a reported AO-affected population. Within Gio Linh and Cam Lo districts there are 20 and nine communes, respectively. For each district, single communes, Gio Mai and Cam Thuy, respectively, were chosen on the basis of their similarities with Quang Tri in terms of population size and characteristics.⁵ These communes, Gio Mai, Gio Linh district and Cam Thuy, Cam Lo district are marked on the map as known AO-sprayed areas. Within each commune the same selection criteria were applied to select the final two villages for survey (Charts 1 and 2).

Whilst we are primarily interested in measuring the costs borne by individuals affected by AO, data were collected at the household level and later appropriated per capita because the majority of workers were farmers whose income (and often medical expenses) was pooled amongst family members.⁶ Given that the affected

⁵Based on the above statistics, approximately 2.6% of the Quang Tri population is AO-affected. Gio Mai commune in Gio Linh district has a reported population of 4667 persons of which 2.8% are AO-affected while Cam Thuy commune in Cam Lo district has a population of 4608 and 2.1% affected persons.

⁶Survey statistics indicate that in both communes around 70% of households derived their main income from farming, and in particular crops of rice, peanuts and cassava.

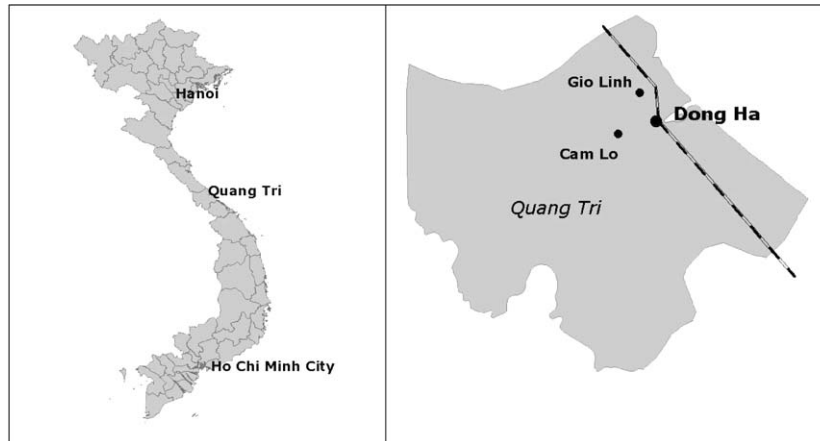


Chart 1 & 2. Quang Tri Province.

households (a household in which at least one member is affected) represent only 8% of the total population of households in Gio Mai and Cam Thuy communes, to select randomly from the total population of households would have necessitated a very large sample to adequately represent affected households. A disproportionate stratified systematic sample method was consequently adopted where the population was divided into affected and unaffected strata and a survey of every X th household taken from the given population list (Sapsford, 1996, pp. 33–34).⁷ With an affected household population proportion of 9.63% in Gio Mai commune and 6.3% in Cam Thuy commune, adequate representation of affected households was estimated at 18 and 12 households, respectively.⁸ An equal control group of 30 unaffected households provided the basis for comparison. To stand up against affected households these households were ensured to have had an equal exposure to AO and similar demographics to that of affected households. For instance, it may have been possible that survey respondents had immigrated to the region from other provinces and thus were not directly exposed to AO. Or, it may have been possible that unaffected households simply had more household members, and

⁷Note this method is adequate in this case where the order of household lists were alphabetic and therefore did not display any patterns that may lead to a bias.

⁸The precision of sample estimates has been found to depend much on the sample size and little on the size of the population sampled (Sapsford, 1996, p. 49). Statistical techniques allow us to balance the costs of surveying against the level of precision required or standard error, as given by the following sample size formula: $n = p(1 - p)/[SM]^2$ where n denotes sample size, p is the population proportion and SM the standard error (0.13/1.96) (Moser, 1971, p. 147). In the case of affected strata in both communes, an interval range of 13 percentage points was allowed under a degree of confidence of 95%.

therefore labourers, or alternatively, access to employment that kept them away from the AO-contaminated land. Therefore, all unaffected households selected had a tenancy status of at least 30 years. Furthermore, in terms of demographics, average members per household for affected and unaffected were 4.2 and 4.7, respectively, and average age per capita at 31 and 26 years, respectively. In both cases over two-thirds of family members worked as self-employed farmers.

Since the affected stratum is of most interest, it was necessary to increase the proportion of the sample taken in the population to a level disproportionate with the unaffected strata. This is indicated in Table 2 with affected households representing 18.86% of the population compared to 1.63% for unaffected households. To bring the sample data back into line with the true population proportions, population weights were applied to the following estimates. The result is that only 3% of the total population was surveyed where each affected and unaffected household stands as a reasonable proxy for an equal number of households in each population.

Methodology of socio-economic impact assessment

The subsequent result estimates are henceforth generated from Vo's (2001) survey of 30 households affected by an exposure to AO and a control group of 30 unaffected households, across four villages in Gio Mai commune, Gio Linh district, and Cam Thuy commune, Cam Lo district, Quang Tri province. Analysis is provided of the real costs of illness in the form of lost productivity and output and the increase in resources devoted to medical care, together with effects on years of education and marital status of affected households

Table 2
Survey representation, Gio Linh and Cam Lo districts, Quang Tri Province

Subgroups	Affected		Unaffected		Total no.
	No.	%	No.	%	
Households					
Survey	30	50	30	50	60
Population	159	7.97	1836	92.03	1995
%	18.86		1.63		3
People					
Survey	37	20.90	140	79.10	177
Population	229	2.46	9066	97.54	9295
%	16.16		1.54		1.90

Source: Vo Xuan Hong, 2001, "Household Survey Data Bank, Gio Linh and Cam Lo districts, Quang Tri province, May 2001", Ho Chi Minh City: University of Economics.

compared to the control group of unaffected households. Averages per capita per annum of earnings (income), medical expenses and years of education of affected households are compared to that of unaffected households.⁹

Household income was collected according to the Vietnam Living Standards Survey 1997–1998 to include off-farm and on-farm income. Off-farm income was divided into sources from salaries, pensions, wages/self collected, self-employment and other transfers (including from relatives, local and/or national government). On-farm income was split between crops (rice, peanuts, sweet potato, red pepper and cassava) and livestock (pigs, chicken and duck) income. In each case, income was taken as total revenueless expenditure.

Medical expenses were collected as the sum of household hospital, local clinic, private doctor, traditional medicine and self-treatment expenditure per annum. Medical expenses range from tiered public services of central, district and provincial hospitals and commune health centers (*Donor Working Group on Public Expenditure Review.*, 1999, p. 48). Private health services extend in descending order of usage to drug commission sellers, general practitioners' clinics, traditional medicine clinics, and nursing homes. Also of consideration is the possible eligibility of AO victims to income and medical benefits from social assistance programmes, most fittingly, the Vietnam Health Insurance scheme and the Social Protection Fund for Regular Relief.¹⁰

⁹Debate exists over the choice of income or household consumption as a measure of living standards; however, income was chosen on practical grounds of ease of measurement (see Deaton, 1997, pp. 148–151).

¹⁰The Vietnam Health Insurance programme entitles users to public health facilities and the Social Protection Fund for Regular Relief provides regular monthly benefits to three

As mentioned, a practical difficulty arose in attributing individual contributions to income and medical expenses and hence apportioning individual loss. This is especially the case in the four villages surveyed where pooled on-farm income represented the main source of income. Since the data was collected at the household level it was necessary to transform it to a per capita basis.¹¹ While statistical advances have attempted to construct weights that are theoretically appropriate to children, they are yet to yield widespread approval (Deaton, 1997, pp. 150–151). Equal weightings are here attached to adults and children.

The following results were derived from affected households identified in the National Health Survey which commenced in June 1999. The survey exists as a register of persons potentially affected by AO with diseases categorized to those able and unable to work. While enlisting diseases and disabling effects, the survey was not able to verify an exposure to AO and the alleged diseases of respondents. Respondents who reported or displayed any possible AO-associated diseases were short-listed to be later blood tested. In Vo's survey of May 2001, 25 out of the 37 affected persons surveyed had been positively blood tested for supernormal levels of dioxin but were yet to receive medical verification of diseases.

The other consideration, subject to the Vietnamese government AO Central Payments Programme for the year 2000, is the possibility of surveying survivors of deceased persons from AO-associated diseases. While their eligibility is not in question, such households form

(footnote continued)

groups of beneficiaries including the elderly, disabled and homeless (*Donor Working Group on Public Expenditure Review.*, 1999, p. 79, pp. 83–84).

¹¹Simply by dividing the total value by the number of members of the household.

Table 3

Gini-coefficient and average income and medical expenses for affected households able/unable to work and study and unaffected households

Subgroups (households)	Affected (x_2)			Mean	Unaffected (x_1)		t-stat ^a
	Able Mean	Unable Mean	Total Gini-coefficient		Gini-coefficient	Mean	
Income per capita (\$ p.a.)	41.69	30.48	0.46	33.93	0.48	65.86	-3.74
Medical expenditure per capita (\$ p.a.)	10.65	13.26	0.35	12.40	0.41	9.47	1.83
Education per capita (years)	5.34	5.16	0.18	5.22	0.23	5.81	-1.34

$t(54) \cong \pm 1.6723, p < 0.10$.

1USD:15650VND.

Source: author's calculation based on Vo (2001).

$$^a t = (\bar{x}_1 - \bar{x}_2) / \sqrt{s^2(1/n_1 + 1/n_2)}$$

a separate category and the information networks required to access them were not available in this context and are therefore excluded from this survey. Assessment is thus reduced to income and medical expenses per capita per annum and years of education per capita for the categories of (i) affected persons able to work and study (ii) affected persons unable to work or study.

Results

Of affected persons surveyed, 60% were adults of which over half (52%) were unable to work or study.¹² Of children surveyed, a similar proportion of 50% were unable to work or study. Greater than 40% of affected persons had zero education and 71% over the marriageable age of eighteen years were single. Affected households were found on average to have just under one half annual income per capita, and 31% greater medical expenditures per capita than unaffected households. They were also found to have lower within-group inequality of income and medical expenses than unaffected households as reflected by lower Gini-coefficients. When asked about coping mechanisms for major medical expenses, 28% of households reported that they sold productive assets of land or cattle, 18% borrowed from relatives or friends and 12% reduced their food intake. Others relied on savings, credit and or government support. Over 96% of households said that if they were to receive more income they would spend it on health care (Table 3).

When we break down affected households into those able and unable to work or study, the inequalities are even greater. Affected individuals with no capacity to

work or study had, on average, an annual income that was less than half, 40% greater medical costs and 11% less education (years) per capita than unaffected households. Compared to affected individuals able to work or study, those unable had on average over a quarter less income and near a quarter more medical expenses. Whereas affected individuals able to work experienced on average over a third less income (37%), 12% greater medical expenditures, and 8% less education per person per year than unaffected households. It is worthy to note that the overall effect of AO on education was found to be statistically significant. Therefore based on this preliminary data, the incidence of an AO-associated disease, on average, has marginal effects on years of schooling. The overall low level of education in the areas surveyed could potentially explain this as may the fact that over two-thirds of all households surveyed were in on-farm employment. Thus it could be said that levels of education had a limited effect on employment opportunities. Whilst this is the general picture, there is some evidence that AO-affected households had less opportunity for off-farm employment with 17% of unaffected households in public sector jobs compared to just 4% for affected households.

Review of current compensation

Presently, there are three potential sources of compensation for affected persons: central government compensation, non-governmental and inter-governmental assistance. The central government's January 2000 initiative marks a positive step forward in the formal recognition and compensation of victims in Vietnam. Payments are directed towards persons as distinct from households and are in excess of previous provincial mechanisms (Vietnam Investment Review, 2000). Monthly payments range from \$3.40 to \$7.14 for all former soldiers, civilians and children of persons

¹²Persons unable to work were taken as those equal to or above 18 years unable to undertake regular full time employment on or off the farm.

Table 4
Government of Vietnam Compensation Programme 2000

No.	Affected person category	Benefits per person (\$ per annum)	Quang Tri (\$ per annum)	Viet Nam (\$ per annum)
1	Persons able to work or study	—	—	—
2	Adults unable to work or study	85.68	355,486	26,732,160
3	Children unable to work or study	72	188,640	14,400,000
4	Total		544,126	41,132,160

Note: annual Government of Vietnam figures are derived from maximum AO Central Payments Programme payments of \$7.14 and \$6.00 per month for adults and children unable to work (Vietnam Investment Review, 2000).

exposed to AO. There are three categories for eligibility to compensation including (i) those who have partially or totally lost the ability to work, (ii) children who have suffered deformities and lost the ability to work, (iii) and orphans also suffering deformities and unable to work. In the first two cases, victims are awarded monthly payments of up to \$7.14 and \$6, respectively, and payments are apportioned as a percentage of the minimum state salary.¹³ Only orphans of direct victims are eligible for humanitarian assistance and medical treatments (\$0.38 payment per month), and persons able to work or study, or those already receiving state benefits are excluded. Based on ratios derived from Vo's survey in Gio Linh and Cam Lo districts, Quang Tri, and conservative estimates of 1 million living victims, the maximum overall cost of the existing government compensation programme for Quang Tri and Vietnam is estimated at \$544,126 and \$41,132,160, respectively per annum.¹⁴ This represents around one-half of one percent of current public expenditure, which for a country with an income per capita of \$440 and some 33% of its population below the international poverty line, is a significant contribution (UNDP, 2003). In a review of basic social services by the Ministry of Labour, Invalids and Social Affairs, and the *United Nations Development Programme*, (2003), it was reported that in 1997

the overall proportion of state spending for social services including programmes for the poor, war contributor classes (veterans, invalids, martyrs), the disabled, victims of natural disasters and others (including street children, orphans, elderly, drug addicts) was 14% (MOLISA-UNDP, 1999, pp. 31–33). This nearly equals the share of state spending for education, which gives some indication of the scale of demands in this sector. Furthermore, not all needs are being met, with government sources reporting in 1998 that 15% of disabled, 24% of orphaned children, and 46% of the elderly were receiving state benefits (MOLISA-UNDP, 1999, p. 34) (Table 4).

The current compensation programme is thus constrained by the government's limited ability to pay. The programme extends only to those who have partially or totally lost the ability to work, children who have suffered deformities and lost the ability to work, orphans also suffering deformities, and those who are not already claiming state benefits. On this basis nearly half of affected adults and children surveyed who were able to work are not entitled to compensation. Furthermore, under the programme there are no formal provisions for non-monetary benefits except for humanitarian center assistance and medical treatment for orphans. To help counter this, it should be noted that the government has in addition set up a number of special schools or "peace villages" for children suffering from AO (BBC News, 1998). The Vietnam Red Cross Society is currently cooperating with the government to help fill the void with the provision of \$34,500 each to affected provinces for treatment and rehabilitation, literacy programmes and vocational training, as well as monetary support for victims (Vietnam News, 2001b, p. 6). However, the existing fund base of 2 million dollars falls well short in meeting current needs; amounting to an allocation of less than \$2 for each of the estimated 1–5 million living victims. Despite calls to foreign NGOs from the Vietnamese Foreign Minister, at the time of writing non-governmental and inter-governmental assistance has been area based and mostly

¹³Minimum state salary quoted at \$12.80 per month (Vietnam Investment Review, 2000).

¹⁴In Quang Tri province there are an estimated 7921 adults and 5240 children affected by an exposure to Agent Orange (Vietnam Investment Review, 1999). Based on ratios derived from victims in Gio Linh and Cam Lo districts it is estimated that 4149 adults will be unable to work and 2620 children will be unable to attend school. These ratios, in conjunction with programme payments of \$7.14 and \$6.00 per month for adults and children unable to work, exclusive of those already receiving benefits, were applied to preliminary affected person estimates of 13,161 and 1,000,000 for Quang Tri and Vietnam, respectively (Vietnam Investment Review, 2000; Vietnam News, 2001a). The calculated figures in Table 4 are the maximum amounts since maximum programme payments are applied.

non-specific to victims of AO (VNA News Agency, 2002). Examples of non-government activity include the work of Green Cross International in the provision of orthopedic childcare in Hai Phong and Hanoi, and a vocational training center set up by a Samaritan in Hanoi for victims of AO (Green Cross International, 1999; Vietnam News, 2001c).

Of the 30 households surveyed in Quang Tri province, all were yet to receive any support bar six households who received an average annual payment of \$3.58 from provincial authorities. Furthermore, there was found to be no health care or non-governmental support.

Conclusion and suggestions for further research

While steps forward have been made in the formal recognition of victims of AO, recent findings from Quang Tri province indicate that the current levels of assistance for victims are inadequate as an effective redress. With over 96% of affected households reporting that if they were to receive more income it would be spent on health care, the primary need identified for recipients is health care support. This support could take the form of monetary and or non-monetary benefits. A combination of benefits is recommended here for the reason that large on-going income payments can disrupt social cohesion. This is especially the case in Vietnam where almost everyone has been affected by war in one way or another, and where a large proportion (around three quarters) of the population live in rural areas constituting 90% of the poor (CPRGS, 2002, p. 66). It is foremost recommended that benefits be revised to better reflect the loss in income and increase in medical expenditures for all victims including those able and unable to work (affected households able to work reporting 37% less income and 12% greater medical expenditures per capita than unaffected households). Following the results from this preliminary research, income and medical benefits to those unable to work should be 25% greater than those able to work. Current monetary support should be revised to concentrate on the loss in income while medical benefits be extended in kind with the provision of treatment and prescription drugs. A government medical scheme already exists to some extent in the form of the government Health Insurance Card scheme that provides free health care, but its coverage is not universal and may infringe upon a recipient's right to receive monetary compensation as per the AO Central Payments Programme. Current resources fall short in meeting this recommendation but the special circumstances of this issue lend itself to a multiplicity of contributors. In consideration of the prior colonial involvement of France and the allied troop participation of the US, Australia, South Korea, the Philippines, New Zealand and Thailand, not to

mention the manufacturers of AO, there exists the real possibility of an international donor fund. This could perhaps be mobilized through the auspices of the existing Vietnam Red Cross Society Fund as an established fund with developed political channels of operation.¹⁵ Furthermore, in the immediate term there is the strong need for co-operation with local and foreign non-governmental organizations to provide necessary income and medical assistance. Full compensation, however, should also take account of the restrictions in capability borne by victims of AO including education, marital attainments and general social interactions. In this connection it is finally recommended that allowances be made in monetary benefits as well as access to vocational training centers, special education and counseling centers.

On this final point the research demonstrated here is lacking. Further analysis would better account for social damages for pain and suffering including broader aspects of diminished prospects of marriage, employment opportunities and community involvement. Another limitation and thus scope for further research is that these results were derived from survey participants in only two districts in one province and reflecting this small sample size are univariate methods of statistical analysis. Furthermore, the above results are derived from categories of those able and unable to work. Medical verification of diseases would allow for increased categorization according to a rating of disability and hence a more detailed cross-section of analysis and estimation of damages. However, special health examinations for potentially AO-affected persons will require a significant injection of additional funds. The benefits for victims of continuing research across all areas of this topic are great in that it may bring about a consortium of compensation that better reflects their loss. Compensation and accompanying international recognition are essential in the improvement of future living conditions and social acceptance of victims both within and outside of Vietnam.

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¹⁵See *Fund for Reconciliation and Development—Agent Orange* (www.ffrd.org/indochina/agentorange.html) begun in 1985 as a US-Indochina Reconciliation Project currently collecting monies on behalf of the Vietnam Red Cross Society Fund.

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