SANA

SCIENTISTS AGAINST NUCLEAR ARMS

THE EFFECTS OF NUCLEAR ATTACK ON BRITISH AGRICULTURE

People often assume that much of Britain, apart from military and urban target areas, would largely escape the effects of a nuclear attack, provided simple precautions were taken. *This is not borne out by scientific studies, using freely available, published information.*

The sources we have used are official US Government publications, based on detailed studies at Hiroshima and Nagasaki, and at 400 atmospheric nuclear tests before, and 50 after, the Partial Test-Ban Treaty was signed in 1963.

There are four main categories of effects of nuclear explosions on the rural environment: prompt, direct effects; delayed effects; indirect dislocation; global consequences.

1 Prompt, direct effects

Three prompt effects will be considered: damage from *heat*, *blast* and *radiation*.

What are the risks of burns and fires in the countryside?

HEAT-FLASH	Radius of circle, in miles, for moderately clear weather, inside which:	
	50-100 per cent of exposed farm animals and humans killed directly by burns	dry vegetation ignited
1 Megaton groundburst	4.6	4.1
1 Megaton airburst	5.8	5.2

In addition, permanent eye damage can occur up to 25 miles distant by day, and up to 50 miles by night.

Wouldn't many places be protected from the heat-flash?

Yes, the figures above are for objects in the line of sight of the fireball. However, fires in farm buildings, fuel stores, hay and straw bales and woodlands would cause additional deaths from burning and asphyxiation.

How well can living things stand up to blast?

BLAST	Radius of circle, in miles, inside which:	
	50-100 per cent of farm animals and humans killed by blast*	30 per cent of trees blown down
1 Megaton groundburst	0.6	4.5
1 Megaton airburst	0.8	5.7

*These figures apply to people and animals in the *open*, where they will have already been killed by the heat-flash. Inside, or near buildings or woodland, blast casualties occur at much greater distances (see SANA *Briefing on Nuclear Weapons: Physical and Medical Effects*).

Which areas would be affected by fallout?

FALLOUT	Length and widest point, in miles, of plume of fallout after 24 hours, inside which:	
	50-100 per cent of exposed farm animals and humans killed by radiation	100 per cent of coniferous trees killed by radiation
1 Megaton groundburst	52 × 9	28 × 6

The lethal fallout plumes from a groundburst extend over 50 miles downwind in the first day. Their direction is governed by the winds a few thousand feet up, the exact distribution of radioactive fallout depending upon wind speed, rainfall, etc.

What about protection?

Animals in the fields would be exposed to the full dose; those under cover would still receive radiation through the roof, by breathing in or eating dust particles, and from contaminated water supplies.

Aren't these figures exaggerations?

The data show only the effects of a single nuclear explosion, and have not been chosen from the most extreme cases. For example, the heat-flash would be much greater beneath a layer of cloud or over a snow-covered surface. Nor have the important interactions between sub-lethal effects been included, e.g. an animal with radiation sickness will be less likely to survive injury or disease from other causes.

Anyway, modern warheads are being made smaller, aren't they?

Yes, but dividing a 1 Megaton (=1,000 kiloton) warhead into 10 × 100 kiloton warheads *increases* the area of damage done (in fact, it can more than double it). Also each of the modern 'MIRVed' warheads on a single missile can now be targeted independently, so that far more targets can be attacked than before.

But don't the authorities say that 'most of the UK population would live through a nuclear strike and extensive areas of the country would be undamaged'? (*The Scotsman*, 20 October 1982)

Such statements are based on Government data that seriously underestimate the areas affected and the casualties to be expected. The British Medical Association Report (1) considers that 'the projections from SANA give a more realistic estimate of the blast, heat and radiation effects of nuclear weapons. We understand that the Home Office is currently revising its calculations'.

The book, *Doomsday — Britain after nuclear attack* (2), presents the calculated effects of thirteen different scenarios, all using far fewer nuclear warheads than are known to be available for targetting on Britain. The detailed computer studies and maps show just how widespread would be the prompt, direct damage to rural as well as urban areas.

2 Delayed effects of fallout

What parts of the UK would be subjected to delayed effects?

Much would depend on wind direction, and on nuclear explosions on the Continent. The 'realistic' scenarios in *Doomsday*, based on a SSW wind, had after two weeks produced radiation levels lethal to 50-100 per cent of unprotected farm animals and humans, across more than one third of the land surface of the UK.

Surely parts of the country would escape?

That's possible, certainly. However, the plumes of fallout from groundbursts continue downwind for hundreds of miles. For instance, a single groundburst in the Scottish Borders would bring a dose, in the first year, sufficient to make people and animals seriously ill as far as Orkney or the Outer Hebrides (if the wind had been southerly) and Carmarthen or East Anglia (if it had been from the north).

What about the rest of Europe?

Recent research suggests that the fallout reaching the Earth in the weeks following a nuclear war may have been underestimated. Thus it is possible that after a month half the people in the world living between 30° and 60°N would have been exposed to radiation dose several hundred times greater than the normal background values.

How can radiation spread so far?

The finer particles of dust take months or years to reach Earth's surface, by which time they may reach any country in the world through high-level winds. As an example, radioactivity was increased worldwide by the atmospheric testing of nuclear weapons in just a few locations.

How long does fallout remain dangerous?

Most of the 300 or more radioisotopes in fallout decay very rapidly, which is why exposure in the first minutes, hours and days is particularly damaging. However, at least 28 radioisotopes still occur at low levels in the UK environment, due to these atmospheric tests, mostly carried out 20-30 years ago, thousands of miles from Britain.

How can they persist so long?

Strontium-90 and Caesium-137 are radioisotopes in which it takes 28-30 years for half the original radioactivity to decay, and 56-60 years for three-quarters to have gone. They are also absorbed by plants and retained in the bodies of animals, so that they accumulate in our food supplies. Such internal sources of radiation probably cause increases in cancers and genetic mutations all over the world.

Carbon-14, which can substitute for ordinary carbon in any organic molecule in any living cell, has a 'half-life' of over 5,000 years. That of the very toxic Plutonium-239 is 24,000 years, so that a nuclear attack on a nuclear weapons store, for example, would pollute our environments far beyond the forseeable future.

Would freshwater supplies by contaminated?

'The number of deaths due to contaminated water supplies will be large, although substantially less than those killed in the immediate aftermath of the attacks. But it will be impossible for the survivors and their offspring to avoid the risk of genetic damage caused by radioactive contamination of fresh water'. (Nuclear War: The Aftermath) (3).

3 Indirect dislocation

Surely this dislocation will be negligible compared with the prompt and delayed effects?

No, it could well turn out to be more damaging. 'The effects of a nuclear war that cannot be calculated are at least as important as those for which calculations are attempted'. (*The Effects of Nuclear War*, Office of Technology Assessment, US Congress) (4).

What sort of indirect effects would be important?

Particularly those involving the disruption of supplies of energy, water and materials to farms, and agricultural services and marketing.

But our farmers pride themselves on being self-reliant, and able to cope with anything!

Yes, they are used to the vagaries of the weather, and to foreseeing and solving problems. But the modern British farm is a highly sophisticated concern, dependent on numerous inputs and outputs. For example, breakdown of the national electricity grid would at once dislocate the work of farmers throughout the country, and threaten poultry in intensive units with asphyxiation.

But don't farmers have standby generators?

Both generators and the power take-off from tractors could provide emergency power supplies. But how would diesel or petrol stocks be replenished when communications were severed, road transport dislocated and refineries ablaze?

What about water supplies?

Mains water supplies would be interrupted by loss of electricity to the pumps, as well as by fracture of pipes. The provision of the large quantities of water required daily by farm

animals, particularly dairy cattle, would depend on there being a stream, river, or pond nearby — and all of these would be subject to contamination by radioactive fallout.

What materials would farmers run short of?

Perhaps the most important would be fertilisers and pesticides. A study by Crossley (5) estimates that the drop in crop yields resulting from a lack of agrochemicals could be as high as 75 per cent. Farmers normally also buy in their supplies of improved seeds and animal feed concentrates, rather than carrying large stocks on the farm.

Couldn't farming survive by simplifying techniques?

Yes, to some extent. However, the modern farm is very far from the situation of subsistence agriculture, and depends upon a sophisticated blend of a few skilled people operating energy-dependent machinery. The cattle industry, for instance, is highly dependent on a supply of deep-frozen semen from a few selected bulls.

Simplified farming, such as occurred before the Industrial Revolution, was based on plant varieties, draught animals, tools, skills and a pool of agricultural labour which hardly exist today. To some extent, horses bred for riding or racing could be used to pull farm vehicles, ploughs, etc., but a great deal would have to be done by hand. However, as the BMA Report points out, 'even if a sufficient number of old-fashioned implements, such as scythes, were available, the techniques for using them have been lost'.

What are the implications of all this?

Food production in Britain for many years would be very greatly reduced, and imports would presumably dry up almost entirely. Excluding a diminished fishing industry, Crossley (5) has estimated that, irrespective of the scale of deaths from prompt and delayed effects of nuclear war, only some 4-11 million people could actually be fed, even assuming fair distribution.

4 Global consequences

The fourth effect of nuclear explosions, and possibly the most damaging of all is considered in SANA's *Briefing on Nuclear Winter: The Global Consequences of Nuclear War.*

References

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3 'Nuclear War: The Aftermath'. *Ambio*, Vol. 11, Nos 2 and 3, 1982, and Pergamon, Oxford, 1983.

4 *The Effects of Nuclear War*, Office of Technology Assessment, US Congress. Croom Helm, London, 1980.

5 Crossley, G.J., *The Effects of Nuclear War on British Agriculture and its Implications for the Survivors*, Bradford University School of Peace Studies, 1984.

6 *Weapons of Mass Destruction and the Environment*, Stockholm International Peace Research Institute, Taylor and Francis, London, 1977.

SANA
SCIENTISTS AGAINST NUCLEAR ARMS

112 Newport Road, New Bradwell, Milton Keynes, MK13 0AA Tel: (0908) 321283

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