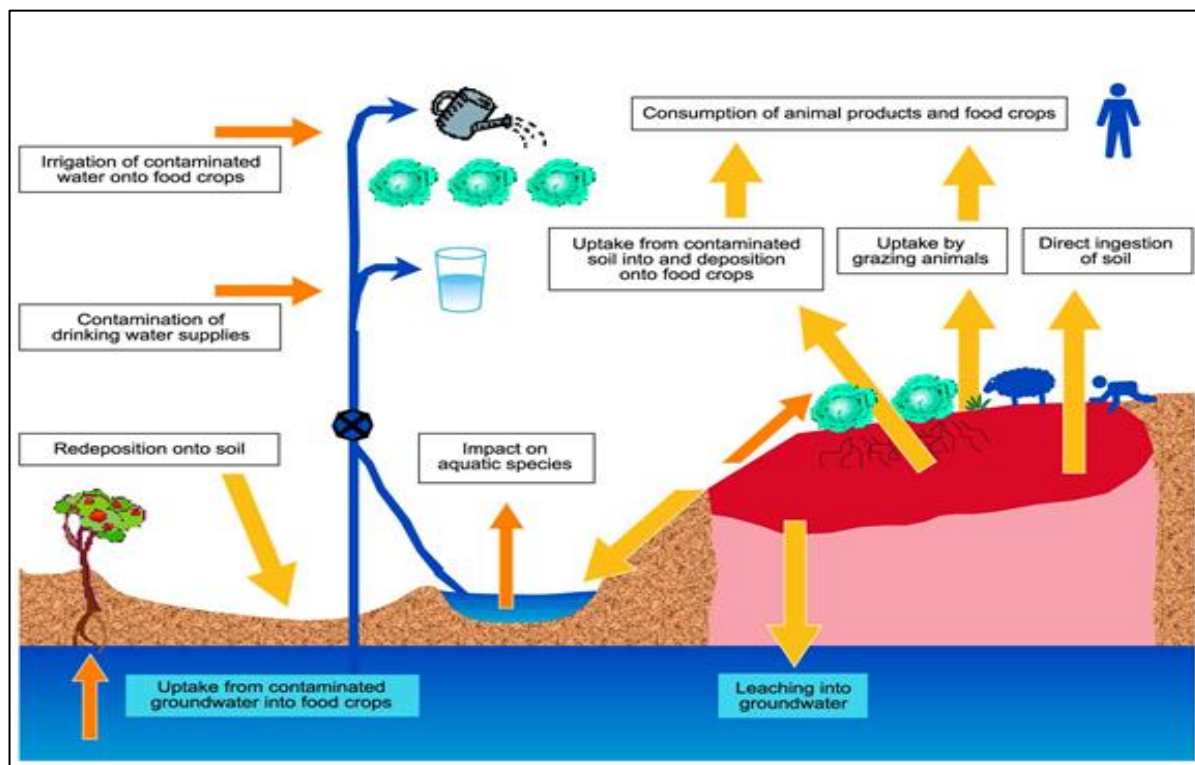


# Understanding Risk and Exposure Pathways



Throughout life we make decisions based on our understanding of risk. As children we are taught how to cross a road safely: look right, then left then right again to check for oncoming traffic. By following this process we assess the risk of being run over, and while we cannot 'guarantee' that we won't be, if we judge the risk is acceptable we commit to action and cross the road.

A similar sort of risk assessment is used when thinking about contaminated land. We know some compounds such as arsenic or dioxin are bad for us. But we need to be exposed to a certain or **critical** amount before we get sick. Remember all chemicals, such as salt or alcohol will be bad for us at a certain level.

So biological systems can hand a very small concentration of a bad chemical such as dioxin. Science allows us to define what this critical concentration is. If our **exposure** exceeds this amount, then the risk of being exposed to this chemical becomes unacceptable. When this happens we have to take action to prevent this exposure.

When we think about exposure we need to think about **exposure pathways**. The figure here is reproduced from a Ministry for the Environment booklet that describes environmental problems associated with historic sheep dip sites around the country.

Coming into contact with pesticides such as DDT and arsenic at sheep dip sites can be bad for our health. This contact can be direct, when we touch the soil, or indirect if we eat vegetables that have been irrigated with water contaminated by the site. You can follow the direction of arrows to trace the exposure pathways from the red contaminated soil. Contaminants can wash into water with soil particles if they tightly bind to soil (this is what happens to dioxin and DDT). Or can leach through the soil profile to groundwater if they are soluble (this is what happens to arsenic).

While soil contaminants are bad, removing them from soil is not always the best idea. If there are no exposure pathways, and the soil contaminants are not causing a problem to health of people or the environment, or to the Mauri of a place; or we consider the risk of a problem happening at some stage in the future to be acceptable (because we can manage the risk), then we are often best leaving the land alone.

By using these principles of risk and exposure pathway we can make good and guided decisions about how we use our scientific and cultural resources to **heal Papatūānuku**.

The Figure in this fact sheet is reproduced with the permission of the Ministry for the Environment (2006). Identifying, investigating and managing risks associated with former sheep-dip sites. A guide for local authorities. Report 775, Ministry for the Environment, Wellington. <http://www.mfe.govt.nz/publications/hazardous/risks-former-sheep-dip-sites-nov06/html/figure-4.html>