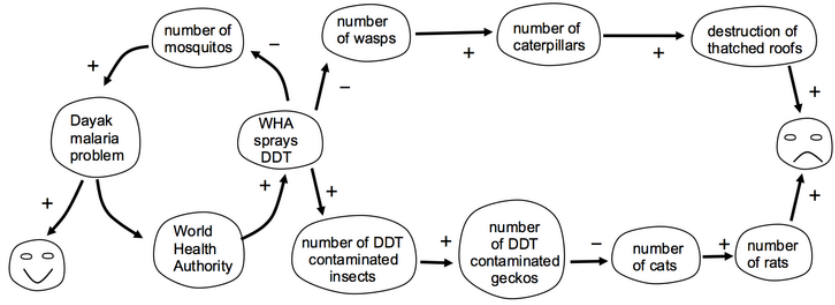


Jeffrey Johnson LEAD EDUCATOR

Critiquing systems diagrams towards an emerging consensus

Many of the comments from participants on this *Systems Thinking and Complexity* course make the course team reconsider what is written and make changes. An example is the (incorrect) systems diagram below



Patricia Sims wrote

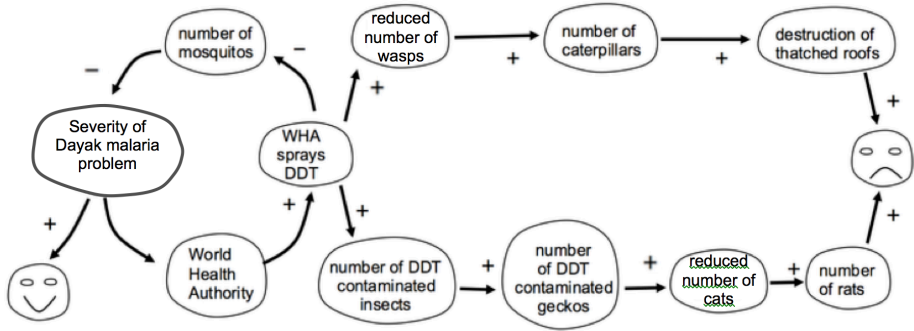
I don't agree with the diagram shown:-

1. Shouldn't the face in the b.l.h corner be unhappy (more malaria -> more unhappy people) and I don't think unhappy people should appear twice.
2. The flow between number of wasps and number of caterpillars should be - (more wasps fewer caterpillars) also the flow between number of cats and number of rats should be - (more cats fewer rats).

We agree with the first point. Part of the issue is that 'Dayak malaria problem' is not clearly quantifiable, so it has been changed to 'Severity of Dayak malaria problem'. Then spraying DDT decreases the number of mosquitoes which *decreases* the severity of the problem which increases the happiness of the people. In the original diagram the plus was intended to mean that the problem got better, but it was ambiguous. Hopefully the revised version is more precise and conveys better the system behaviour.

The second point is more tricky. The original diagram was trying to indicate that spraying DDT decreases the number of wasps, and a smaller number of wasps increases the number of caterpillars. A *reduced* number of wasps increases the number caterpillars. Spraying DDT 'increases the reduction' of the number of wasps, so the minus sign has been changed to a plus.

Similar considerations led to "number of cats" being changed to "reduced number of cats" where the increase in the number of DDT contaminated geckos 'increases the decrease' in the number of cats which increases the number of rates. My revised diagram is given below (and replaces the original on FutureLearn).



This diagram now shows a reinforcing path to unhappiness on the top as roofs are destroyed, and a reinforcing path to unhappiness on the bottom as the number of rats increases. This expresses much better the point of this story and I think the revised diagram is a big improvement. This illustrates the contingent nature of systems diagrams, and that they can be improved by people working together.