Strategizing for out-scaling Proven Technologies and Innovations

International Workshop organized in the framework of the project
"Reducing land degradation and farmers' vulnerability to climate change in the highland dry areas of north-western Ethiopia"
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I. Why Worry about Out-scaling?

- Agricultural research is expensive with long gestation period
- Many proven agricultural technologies/innovations:
  - Remain on the shelf
  - Confined to few locations/users

This adds to researchers/donors/governments' frustration

→ A need for understanding the processes of adoption and diffusion;

  - What does the decision making process look like?
  - Who is likely to adopt?
  - What approaches enhance diffusion/adoption at scale?

II. Fundamentals of Adoption and Diffusion

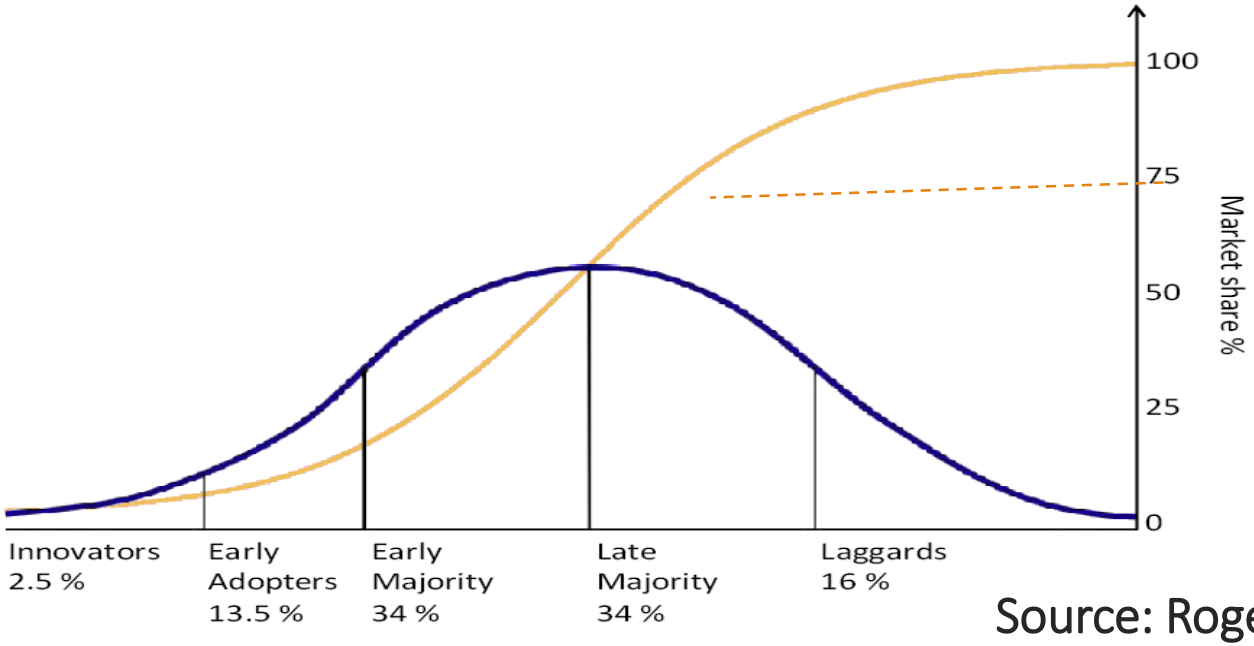
- Adoption is often a long process
  - Awareness
  - Assessment/evaluation
  - Acceptance
  - Testing
  - Usage at scale

Ask farmers' opinion

- Amount of time may vary among farmers:
  - From initial knowledge to first trial and adoption
  - To fully replace the old by the new technology

… Fundamentals of Adoption and Diffusion cont'd

- **Diffusion** refers to the spread across individuals/space



Source: Roger (1962)

- The typical technology **takes between 8 and 12 years** to reach 75% diffusion level.

… Fundamentals of Adoption and Diffusion cont'd

- Huge effort devoted towards understanding and enhancing adoption/diffusion at scale;
  - Innovation platforms;
  - Extension innovations;
  - Partnerships (CBOs, NGOs, etc.)
  - Policy advocacy,…

… Fundamentals of Adoption and Diffusion cont'd

Understanding the adoption/diffusion processes helps to:

- Identify opportunities/niches for the technologies
- Assess the potential by agro-ecology cultures, prod. systems, etc.
- Establish recommendation domains;
- Better technology targeting;
- Identify potential constraints and provide solutions;
  - Providing information for policy reform.
- Improving the speed and intensity of adoption/diffusion.

… Fundamentals of Adoption and Diffusion cont'd

Factors affecting decision and speed of adoption:

1. **Farm** (location, weather, size of operations, plot-level biophysical characteristics …)
2. **Farmer** (demography, labor supply, age, education, technology and risk perceptions of household head, off farm employment, assets,)
3. **Institutions** (access and intensity of extension financial services, membership to CBOs, land tenure, etc.)
4. **Policy** (varies only across wide areas) and markets (distance, structure and conduct)
5. **Inherent properties** of the technology (yield, stability of yield, cost, pest/drought resistance …)
   - **Inherent properties important; Perception even more.**

… Fundamentals of Adoption and Diffusion cont'd

- Unless farmers appreciate the economic and social benefits, they would not adopt any technology.
  - Sorghum story in GM-WS a good example.

➡ Before recommending a technology to farmers, researchers should;

- First provide adequate scientific evidence on target traits
- Engage in participatory evaluation

… Fundamentals of Adoption and Diffusion cont'd

Evidence should take into account:

1. **Biophysical considerations** (soil, farm size, agro-ecology, weather, etc.)
2. **Social and economic contexts** of the region (cultural issues, yield, profit, labor, etc.).
3. **Inherent risk and uncertainty features** (yield, pest, etc.)
4. **Capital and service requirements** (affordability and or presence of financial and service delivery systems)
5. **Institutional and policy** environments.

… Fundamentals of Adoption and Diffusion cont'd

Once the technology's benefits are proven, researchers and extension personnel need to provide:

- Information and increase farmers' exposure
  - Individual and group education
  - On station trials, on-farm demonstrations, field days
- Provide incentives
  - Free access to seeds, equipment, etc. for first use(?)
  - Technical support for implementation
- Phasing out project participants.

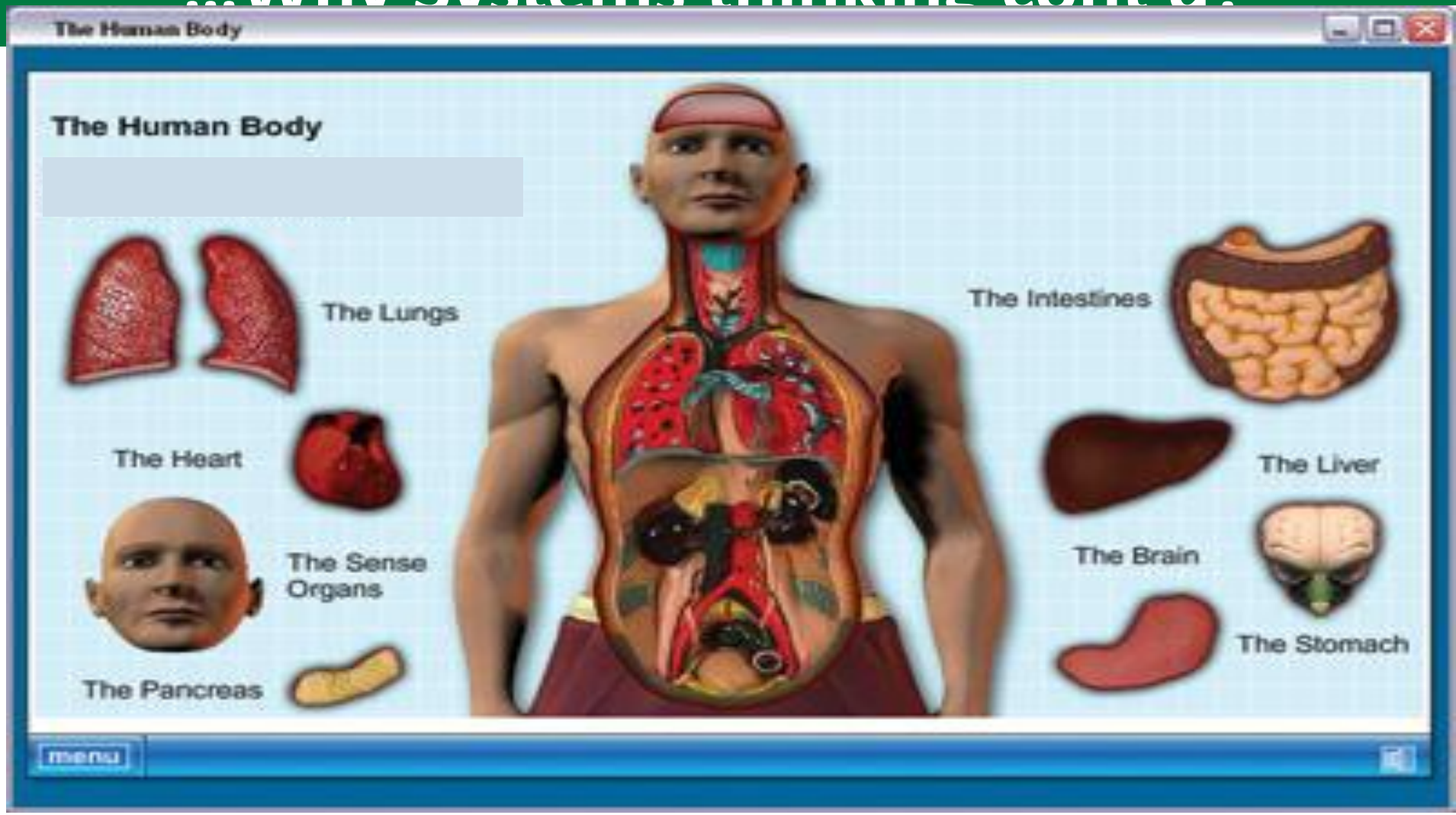
… Fundamentals of Adoption and Diffusion cont'd

Technology promotion in smallholder, subsistence, mixed crop-livestock, rainfed production systems poses special challenges:

- A need for systems thinking
  - Identification of major sub-systems
  - Identification of synergies and tradeoffs between sub-systems
  - Identification of major players/agents
  - Prioritization
  - Competition for resources vs. sustainability of the system
  - Risk management
  - Strategizing for enhancing multiplier effects

III. Why Systems thinking in research?

…Why Systems thinking cont'd?

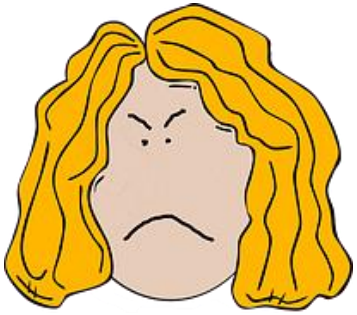


- But the parts are also important: if a part is malfunctioning or missing, the whole system malfunctions or ceases to function.

…Why Systems thinking cont'd?

Every member's happiness determines happiness as a family.

We can consider a watershed as a big family – involving many members/players



If a member is hurting, the whole family suffers.

… Why Systems Research? (cont'd)

- **Farmers think and act in a systems context optimizing:**
  - Current/future: production, consumption, marketing, investment, decisions … subject to:
    - Resources, assets, markets, prices, subsidies, taxes…
    - Risk minimization/management
    - Tradeoffs/synergies among multiple enterprises and multiple species
- Isolated technologies less likely to be appealing
- **Possible reason for low adoption of technologies?**

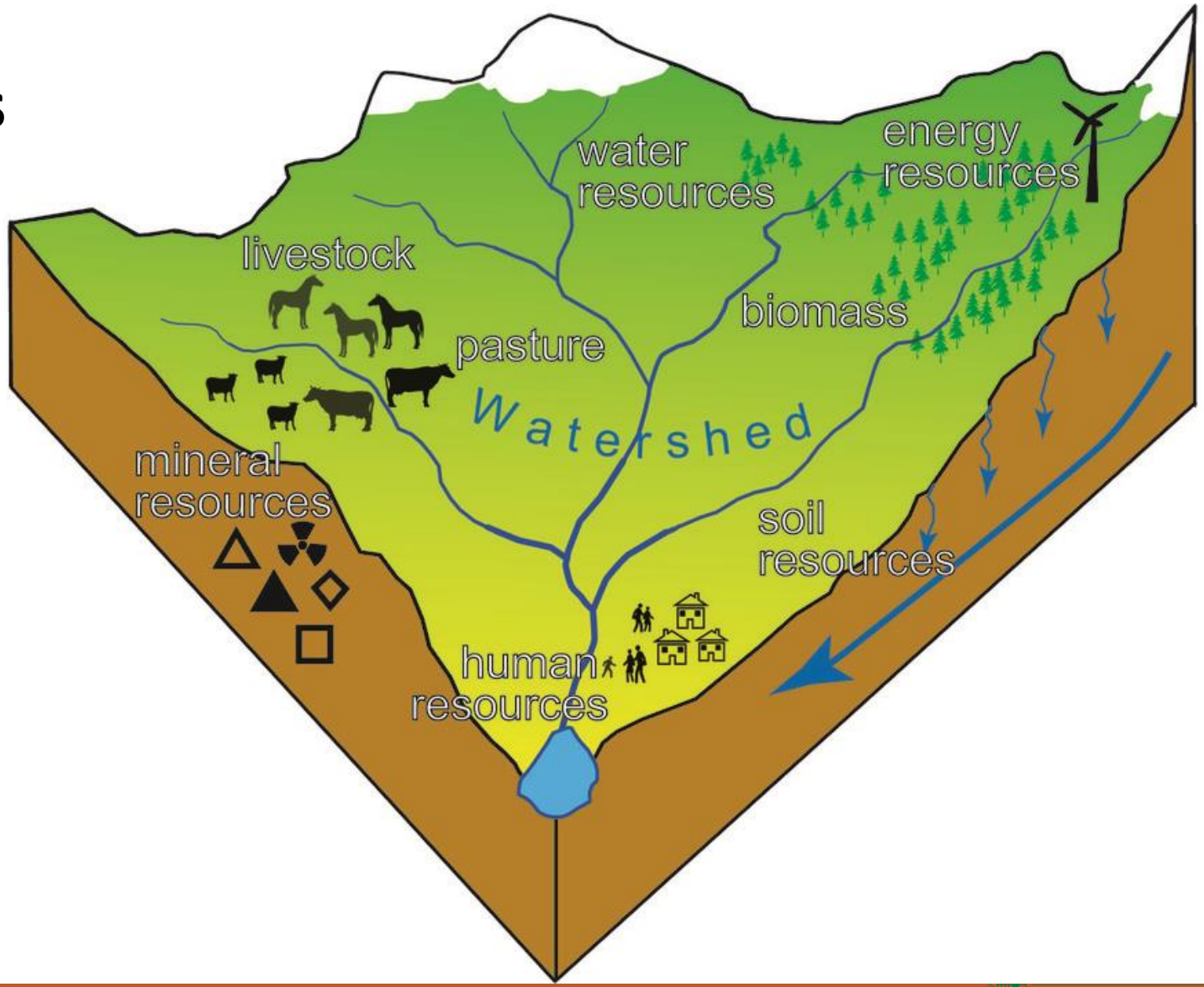
… Why Systems Research? (cont'd)

- System orientation in research probably the only way to:
  - Push scientific frontiers and
  - Bringing meaningful changes in places such as the GM
- Special attention to the process of technology and innovation development and packaging;
  - Menu of options
- The rationale for a new ADA supported project

"Designing effective extension service delivery system for enhancing technology adoption"

…Why Systems thinking cont'd?

Players



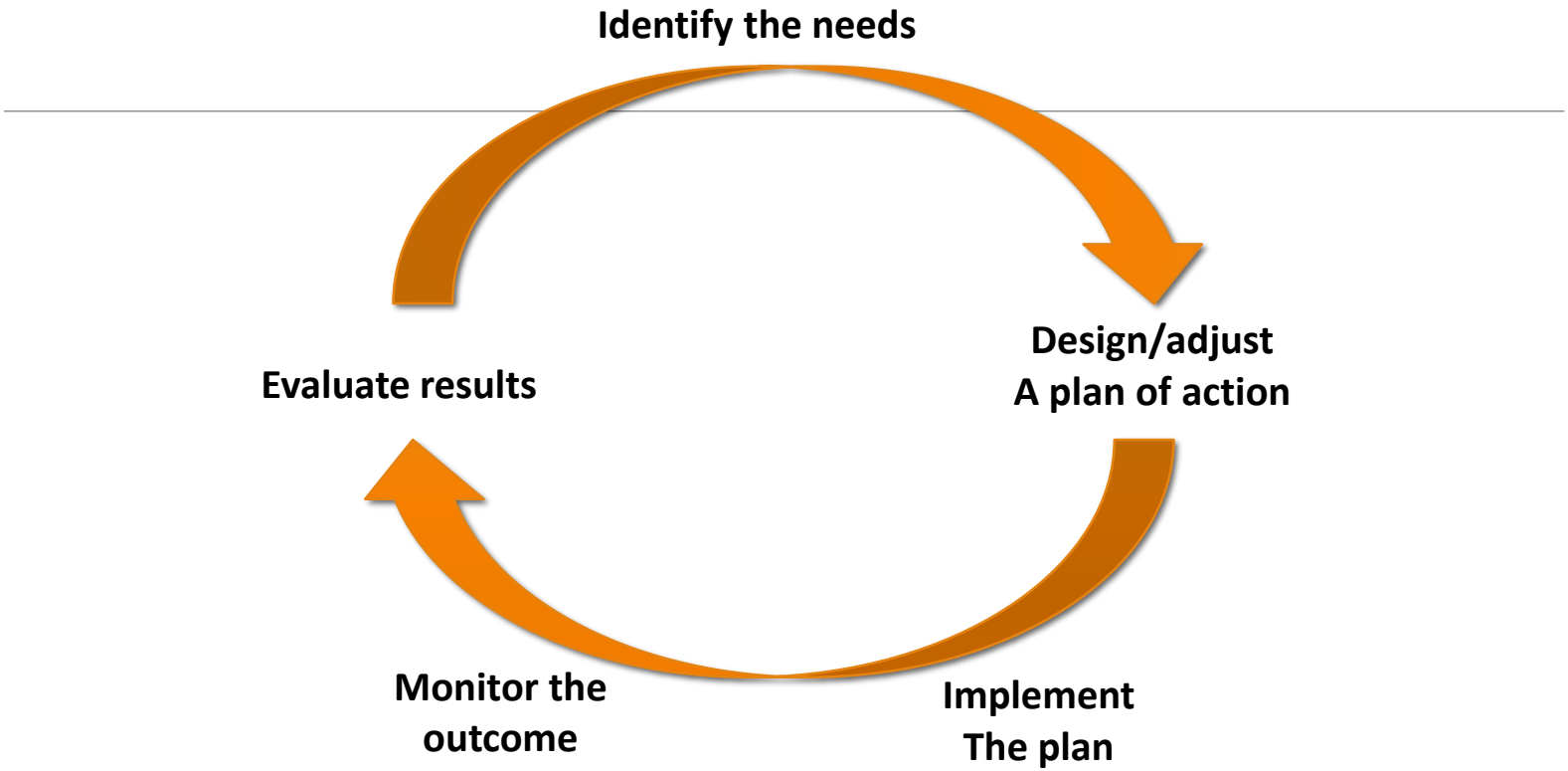
Sustainable utilization of the ecosystem services

Sustainability

- Utilizing/targeting the 'Provisioning' (or eco-system) services for increasing rural livelihood
- Requires the establishment of an environment that can continue to provide adequate eco-system services in the face of growing demand with reasonable tolerance to different shocks.

Figure source: Wikipedia

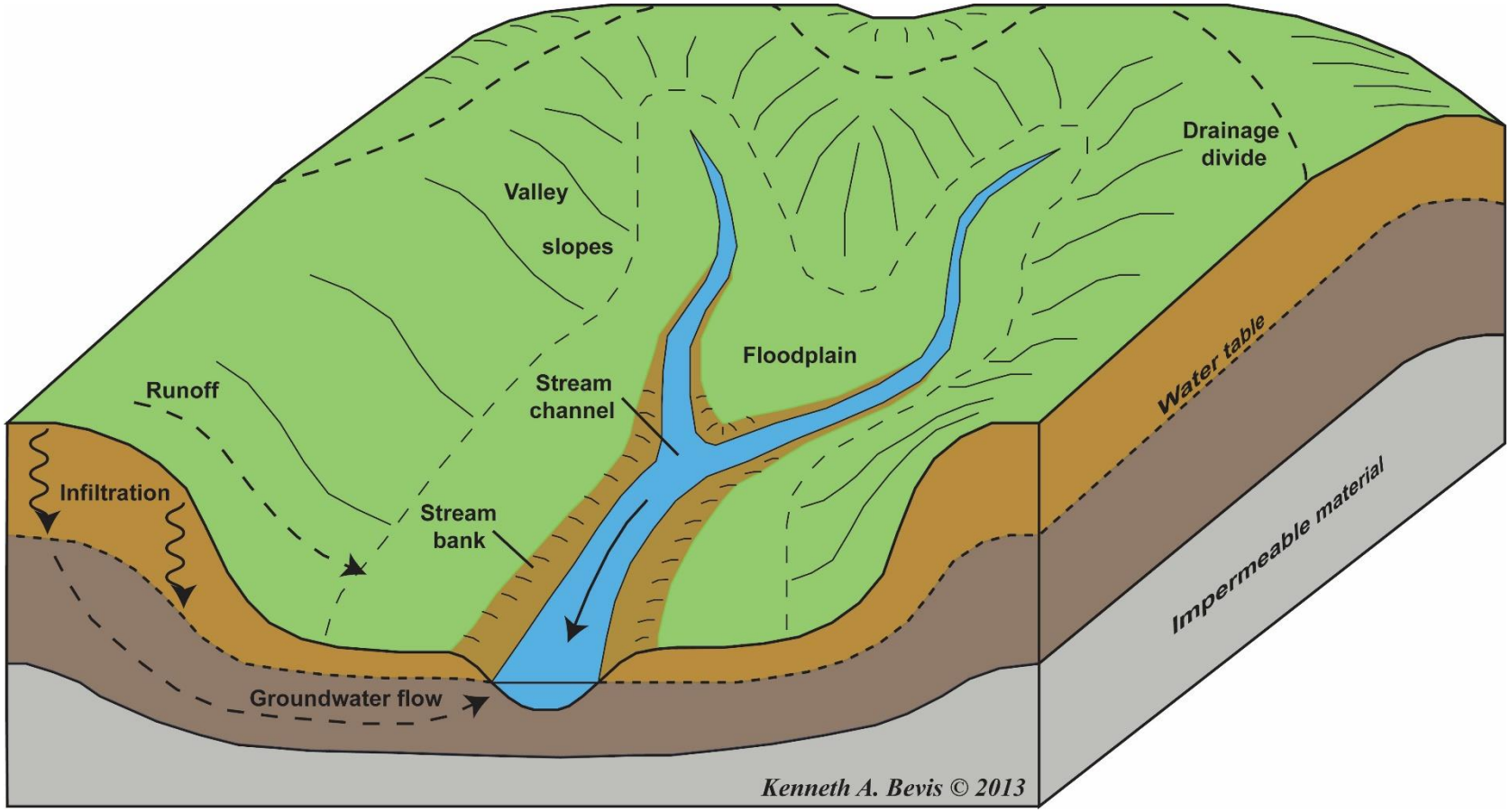
Sustainable utilization of the ecosystem services



Source: Vicente L. Lopes. Collaborative Watershed Management. University of Arizona

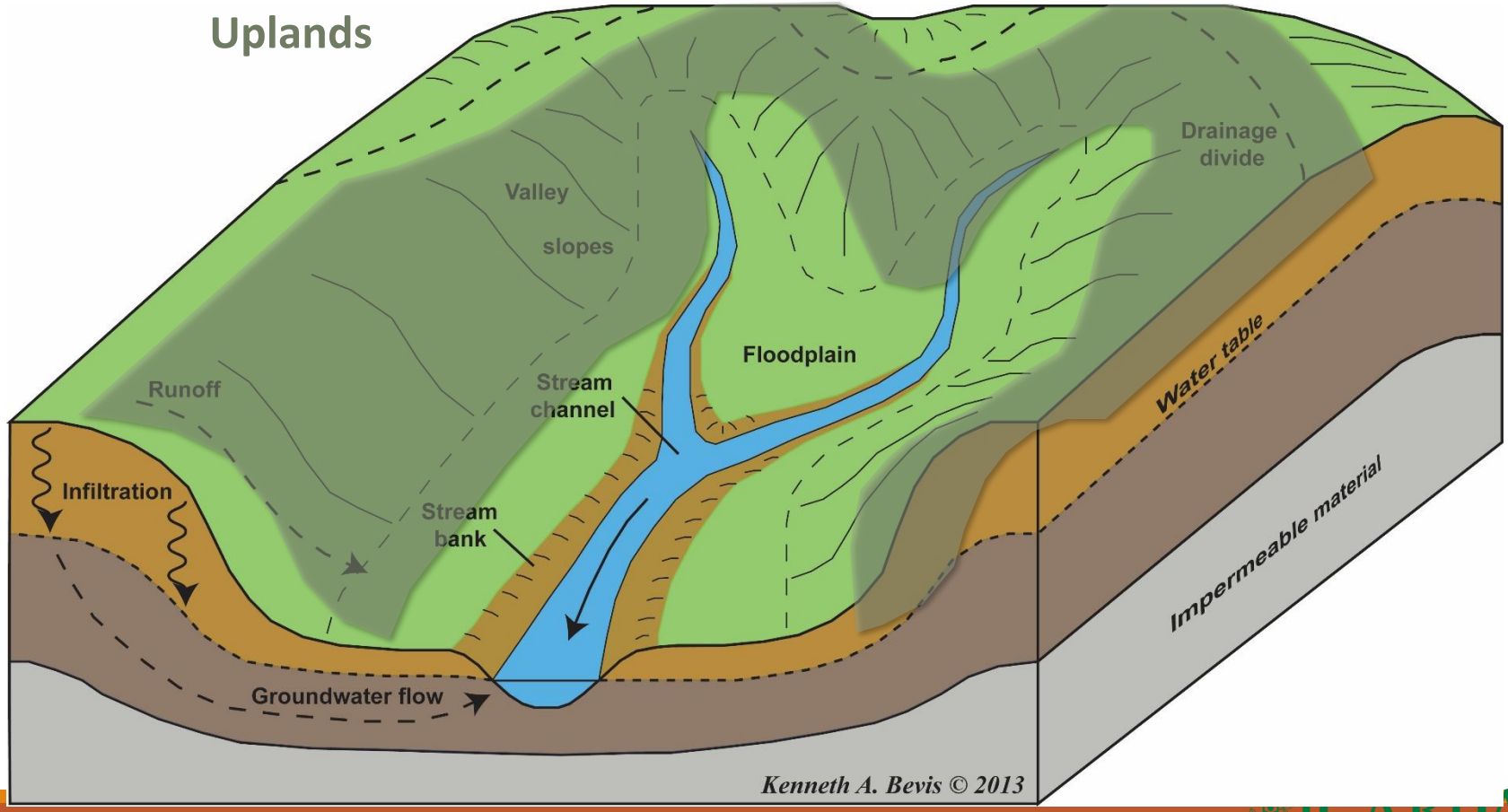
Water management strategy – a watershed level approach

- **Best strategy: keep rainfall where it occurs and prevent quick drainage of rainwater.**
- **Land restoration requires consideration of the entire landscape and its variability.**



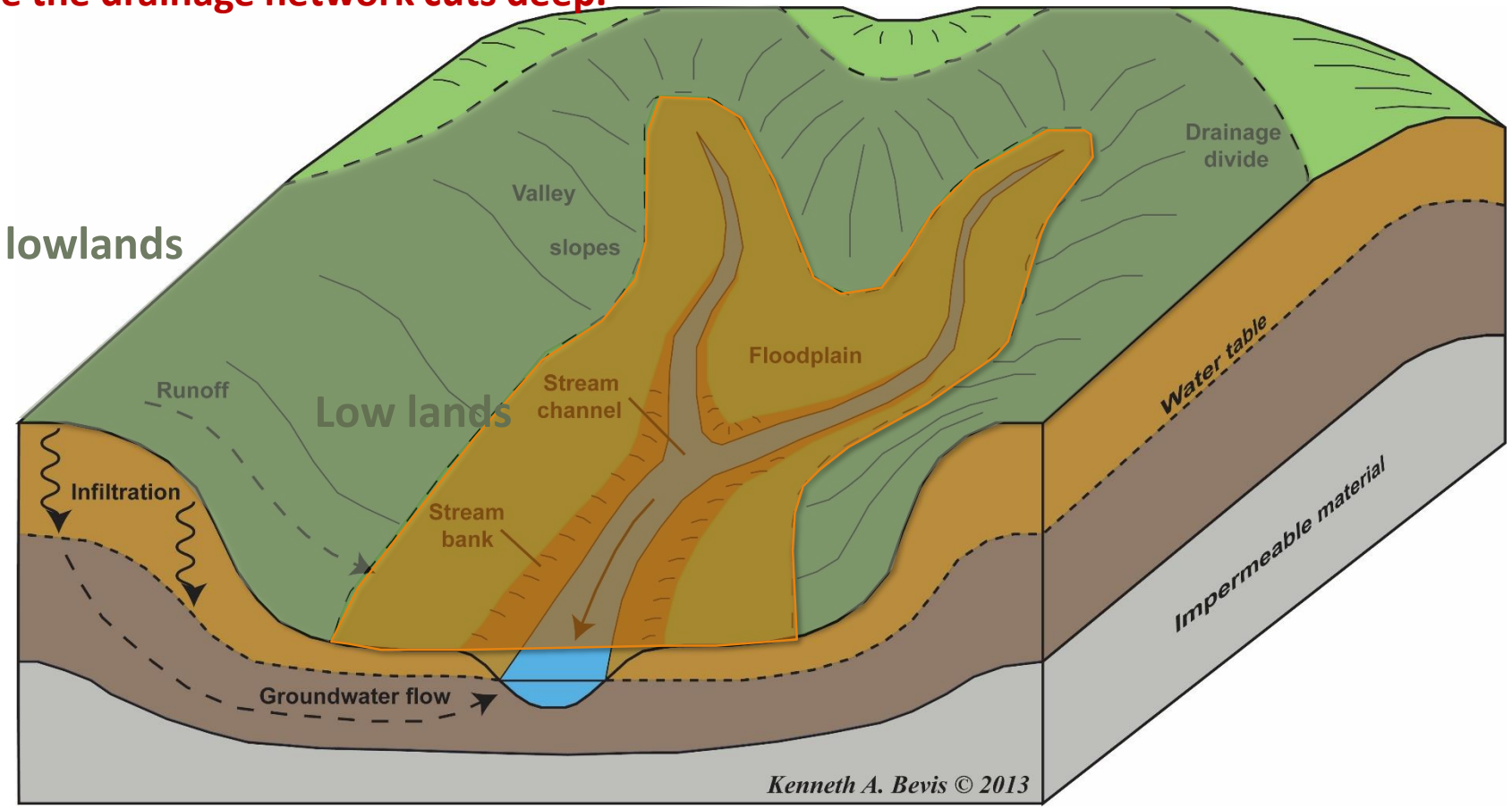
Water management strategy – a watershed level approac

Uplands: runoff producing; Especially if poor vegetation cover; shallow soils or rocky; home for shrubs and resistant species; fragile ecosystem; re-vegetation often difficult; prone to erosion.



Water management strategy – a watershed level approach

Lowlands: surface runoff consolidates; the erosive force of non-buffered runoff can cause gully deep-cutting gradually moving upwards. Peak and non-decelerated flood events get routed through the channels quickly – no access of the flood plains (and areal infiltration) once the drainage network cuts deep.



IV. Introduction to working groups tasks

Objective: to develop out-scaling strategies

- Identify **PROVEN** technologies/innovations from the GM-project that are ready for out-scaling;
- Identify recommendation domains;
- Important considerations for packaging;
  - Other complementary technologies/innovations;
  - Determine guiding principles for packaging?

… Introduction to working groups cont'd

- Develop out-scaling strategies in a system/watershed context with due attention to:
  - Synergies/tradeoffs among system components (crops, livestock, soil, water and other eco-system services);
  - Incentives, barriers to overcome, approaches to employ, partnerships, etc.
  - Key research questions on out-scaling (for the new project to address)
- Assignment of responsibilities for out scaling
  - Which institution/group/committee should spearhead
  - Which institutions/groups/committees should be involved