Silver linings Challenges and opportunities in the restoration of lowland stream landscapes in the Netherlands

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1. PROBLEM DEFINITION

Lowland stream landscapes are under pressure because of decades of water system modifications.

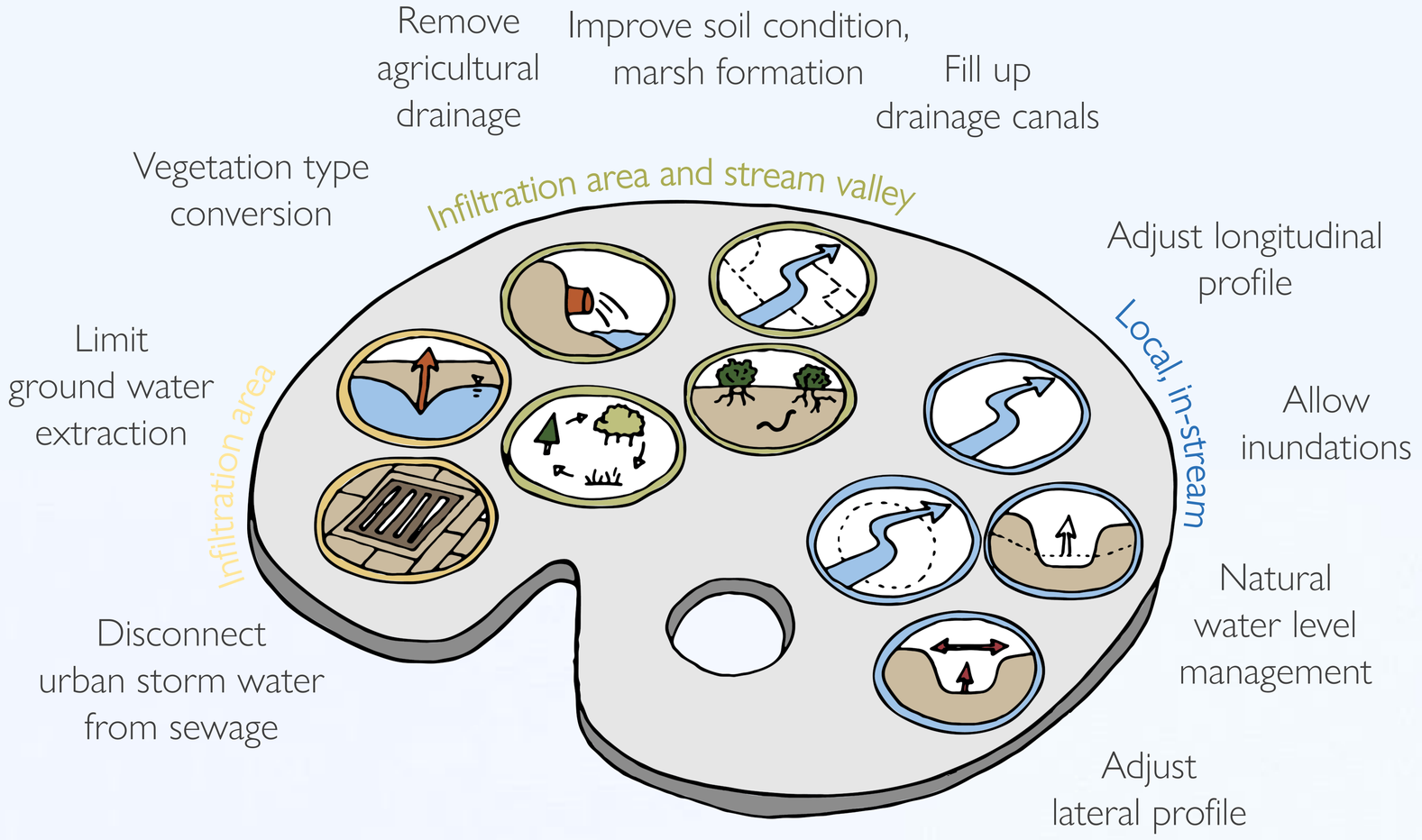
Increased drainage, stream channelisation, major land use changes and groundwater extractions have transformed stream valleys that acted as sponges into discharge channels.

As a result, the infiltration and water storage capacity of the valleys has decreased. Valuable ecosystems have been lost and these areas have become vulnerable to drought and peak flows.

2. RESTORATION POTENTIAL

Individual and local measures are not sufficient to counteract this multi-faceted problem. Therefore, a **system-wide, source-oriented approach** is needed. The focus in this approach is on hydrological restoration through infiltration, temporary storage, and slow release of water.

Integral restoration targets the causes of pressures on multiple scales, and consists of measures taken in infiltration areas, stream valleys and locally in streams (Figure I).



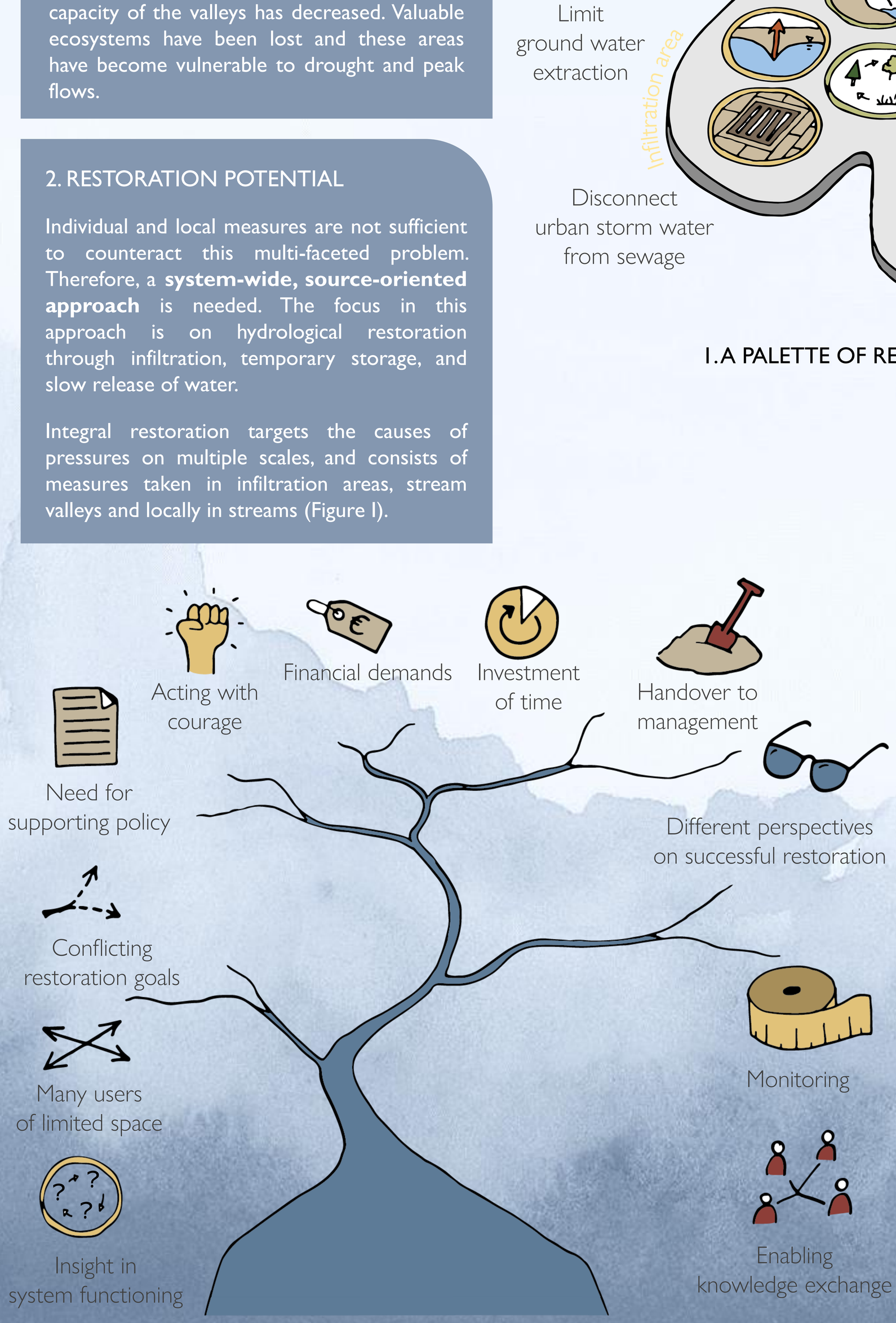
I. A PALETTE OF RESTORATION MEASURES

3. CHALLENGES AND OPPORTUNITIES

In large-scale restoration of lowland stream landscapes, water managers experience several **challenges.** We recorded these during a series of 13 interviews and listed them in Figure II.

In many cases, these stem not solely from hydrological issues, but from the complexity of dealing with multiple users and goals in the limited space.

These challenges also point at **opportunities** where we can take action to improve effective restoration.



II. CHALLENGES AND OPPORTUNITIES
in large-scale restoration of lowland stream landscapes

4. CONCLUSIONS

Developing a stream landscape centred around hydrological functions is possible: we need a transition in and a broad reconsideration of **landscape planning** which covers the needs of the natural, agricultural and urban environment.

5. DISCUSSION

What are your experiences with (stream) restoration projects? Which challenges and opportunities do you observe?

How can we deal with conflicting goals: Rewetting or creating space for storage of water? Protecting species/habitat versus restoring natural processes (rewilding)?

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