This is the second of the series of newsletters that will capture our efforts to develop an approach that will accelerate the scaling of innovations in the CGIAR Research Program on Roots, Tubers and Bananas (RTB). The newsletters will capture the major concepts of Scaling Readiness, activities, and information about the RTB cases in which we are developing and testing the approach. The Scaling Readiness project is an Earmarked Funded project under RTB Cluster 5.4 and is implemented by Wageningen University, IITA, Bioversity International, CIAT and CIP.

Innovations are packages
In our Scaling Readiness project we perceive innovations as packages of technological, organizational and institutional components that can include new crop varieties, processing equipment, fertilizer blend, best crop, pest, soil management practices and new legislation, collaborations or market arrangements. Consequently, scaling of innovation requires the scaling of the package of components. Whether an innovation is perceived as useful depends the spatio-temporal context in which it is supposed to contribute to achieving specific livelihood objectives.

Further details about innovation packages can be accessed in the previous newsletter.

Technology, Innovation and Scaling Readiness
The Scaling Readiness approach investigates three levels of readiness that are relevant for Research for Development (R4D) interventions: Technology Readiness, Innovation Readiness and Scaling Readiness.

1. **Technological Readiness** provides information about how ready a tangible products, machine or technique is to fulfil a specific livelihood function. It helps R4D interventions to formulate effective and step by step development strategies for enhancing the readiness of technologies and other tangible products.

2. **Innovation Readiness** provides information about the readiness of an innovation package consisting of technological, organizational and institutional components as a whole. Innovation readiness helps R4D interventions to formulate effective development strategies
3. **Scaling Readiness** provides information about how ready an innovation package is for scaling. Mature innovations – those with a high level of readiness – have a higher chance of scaling. However, high innovation readiness does not guarantee widespread use. In some situations, innovation packages with a high level of readiness may have very low use. On the contrary, innovation packages with relative low readiness may be used by many. Therefore, Scaling Readiness measures the position of each individual innovation component in terms of both its readiness and use. Scaling Readiness is determined by the multiplication of readiness and use scores of the component with minimum readiness and use scores. Since all the components of an innovation package are interrelated and necessary for scaling the innovation, the package’s scaling readiness is determined by the component that is least ready. Identifying such key bottlenecks for scaling can help R4D interventions to formulate effective scaling strategies.

### A network approach to innovation use

Scaling Readiness defines the use of innovations based on a network approach. Stakeholders are grouped into four embedded groups based on their connectivity to the R4D initiative (Figure 2). The first group of stakeholders that use innovations are the project partners. They are directly involved in the activities of the R4D projects and their involvement is supported by the R4D initiative. Project partners can include researchers, local politicians and farmers hosting demonstration fields.

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**FIGURE 1:** Scaling Readiness approach entails three major embedded readiness concepts. Each readiness concept informs about various aspects of scaling processes and guides research for development projects. Expressions left side of the measures indicate the aspects targeted by the corresponding measure.

**FIGURE 2:** Scaling readiness uses a network based approach to investigate the use of innovations among different user groups. Use of innovations spread from inner network of project partners towards stakeholders in innovation networks, later to stakeholders in innovation system and finally to stakeholders positioned in the outmost circle, livelihood systems during the courses of R4D projects.

- **Project Partners (PP)**
  - Direct project partners
- **Innovation Networks (IN)**
  - PP + their direct connections
- **Innovation System (IS)**
  - IN + other innovation networks
- **Livelihood Systems (LS)**
  - IS + users of innovation
The second group of stakeholders consist of project partners and the stakeholders that directly collaborate with the R4D initiative. Since this group is directly linked to the project partners, they have a higher likelihood of being aware of the innovation, or influencing the R4D or innovation agenda. The project partners and their direct linkages form a so-called innovation networks that can consist of researchers, farmers, extension officers, etc.

The third group contains of the innovation network surrounding a specific R4D initiative plus the other innovation networks, working on similar or completely different innovation packages. These other innovation networks may offer synergies, or obstacles for the scaling of a specific innovation package. Different innovation networks combined constitute an innovation system. The fourth and final group adds those actors who are not involved in innovation development processes. They are the ones who assess the contribution of the innovations and use them if they see their added value for their livelihoods. These actors form the livelihood system.

**Indicators of Readiness and Use**

Readiness indicators are used to measure the readiness of all individual innovation components. It is a number that can range from 1 to 9 along a progressive ladder that moves all the way from idea (level 1) to something that is functional and used in a uncontrolled environment and without any external support (level 9) (Table 1). The 9 levels are based on the technological readiness approach used by the United States National Aeronautics and Space Administration (NASA) and the European Union (EU) Horizon 2020 Program.

<table>
<thead>
<tr>
<th>Readiness Score</th>
<th>Readiness level</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Idea</td>
<td>Genesis of the idea. Development of the key elements of the initial concept (e.g. objectives, functions, intended users)</td>
</tr>
<tr>
<td>2</td>
<td>Discovery research</td>
<td>Research on the principles and conditions under which the component can be developed and may work.</td>
</tr>
<tr>
<td>3</td>
<td>Formulation</td>
<td>Component designed as a solution to an applied problem. Key properties and functions have been described as well as the potential intended and unintended effects of its application.</td>
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<tr>
<td>4</td>
<td>Proof of concept</td>
<td>Validation of component using existing evidence.</td>
</tr>
<tr>
<td>5</td>
<td>Working model</td>
<td>Testing of the component in controlled environment by the development team</td>
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Similar to the innovation readiness, also indicators for measuring the innovation use have been developed. If innovation components are only used by project partners it has the lowest score, level 1. If they are also used by direct connections of the project partners, i.e. innovation network, they are level 2. If they also penetrate other innovation networks, they are level 3, and if they are used by stakeholders who are not involved in innovation development processes, they are level 4.

**Management of Data for Scaling Readiness**

Data for the Scaling Readiness approach are collected and managed by using LESARD which is a data management and decision support system for R4D projects. Data is collected by using 5 short consecutive surveys. Survey number 2 to 5 are administered on a periodic bases and survey 1 is implemented when new stakeholders enroll in the project. The major data collection tool is open data kit (ODK) (Figure 3). Whenever ODK is not feasible, paper surveys or interviews are utilized. Currently, LESARD surveys are available in English, French, Spanish, Khmer and Vietnamese.

<table>
<thead>
<tr>
<th>Survey No</th>
<th>Survey Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Stakeholder Profile</td>
<td>Profiles individual stakeholders based on their gender, education profile, expertise, organizations and interventions they are involved in.</td>
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<tr>
<td>2</td>
<td>Innovation Profile</td>
<td>Profiles core innovation components focused by R4D projects, complementary components that are necessary for scaling core components and identifies specific background necessary to assess the technologies using the results of Survey 1.</td>
</tr>
<tr>
<td>3</td>
<td>Innovation Assessment</td>
<td>Assesses the readiness and use of components based on customized questions formulated using Survey 1 and 2.</td>
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What is the added value of using the Scaling Readiness approach?
The scaling readiness approach provides a systematic and action-oriented way to:

- Unwrap innovation packages into technological, organizational and institutional innovation components
- Identify which of the components form the key barriers for scaling of the innovation packages
- Develop better informed scaling strategies, and guide R4D investment to overcome scaling barriers

The next newsletter introduces the four RTB case study projects in which the Scaling Readiness approach is being tested and validated.