Valle JF - ‘Enabling cumulative learning in user-oriented research for root, tuber, and banana crop breeding.’

**Supplementary material**

**Database**: Valle,J.F; Arnaud, E.; Marimo, P.; van Etten, J., (2022), "A review of the scope of farmer participatory research to inform breeding of root, tuber and banana crops", <https://doi.org/10.7910/DVN/TIKPWY>, Harvard Dataverse, V1

**Table S1**. Data extraction template for the database (Valle J. et al, 2022)

|  |  |
| --- | --- |
| Variables | Definition |
| ID | identifier of the individual paper |
| YOP | Year of publication |
| Coordinates | (Yes/No) Availability of coordinates in the paper |
| Site\_ID | Study location identifier |
| Location | Indicates the most precise location for trials and/or survey sites as indicated in the paper |
| Geounit | Administrative unit corresponding to the location name |
| PVE | Participatory Variety Evaluation |
| Preferences | Trait prioritization |
| PRA | Participatory Rural Assessment |
| N/A | Not applicable, variable doesn't apply to data entry |
| N/I | Not informed, data missing in paper |
| FGD | Focus Group Discussion |
| OST | On Station Trial |
| OFT | On Farm Trial |
| KII | Key Informant Interview |
| MLT | Multi Location Trial |
| DEMO | Demonstration trial |
| Mother | is the demonstration trial within Mother and Baby trials |
| Baby | Is the farmer replication trial within Mother and Baby trials |
| N\_Participant | Number of participants |
| Sampling\_gender | (Yes/No) Records if the gender of participants was taken in account during sampling |
| Gender\_disaggregation | (Yes/No) Records if the data was disaggregated by gender of participants during the analysis |
| Gender\_focus | (Yes/No) Records if there was a focus on the gender of participants within the discussion |
| Socioeconomic\_Aspects | Qualitative social and economical traits |
| CO ID | Crop Ontology trait identifier |
| Trait\_feedback\_original | Trait as expressed in the paper |
| Trait\_standardized | Trait after homogenization |
| Trait\_category | See Table S2 for categorization |
| Protocol | Protocol followed for collecting the trait |
| Entity | When the trait followed an evaluation, it indicates the part or stage of the plant observed |
| Preferred\_form | When indicated, it records the preferred phenotypical expression of the trait |

**Table S2:** Trait categories for first analysis and definitions

|  |  |
| --- | --- |
| Abiotic stress tolerance | Tolerance to wind, drought, waterlogging, poor soils and weed competition |
| Biotic stress tolerance (pest and disease) | Tolerance to diseases and pests including vertebrates |
| Post-harvest conservation | Suitability for storage and post-harvest ripening |
| Phenological | Related with plant cycle stages: germination, establishment, flowering, maturing |
| Plant morphology | Related with the plant’s general appearance like architecture |
| Fruit or tuber morphology | Related with the appearance of the main harvestable part |
| Productivity | Harvestable yield and total biomass production |
| Organoleptic | Sensory traits of the fresh and processed foods, excluding those related with sight and touch that fall under fruit or tuber morphology |
| Bromatological | Analytical properties related to food composition |
| Management | Indicators related to the response to management practices |
| Social | Social factors like familiarity and general acceptance |
| Economic | Marketability and other factors related to economic performance |
| Processing | Suitability to processing and quality of the resulting product |

**Table S3:** Number per region of study types cited in the 123 publications.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | East Africa | Central Africa | West Africa | South Africa | Latin America and Caribbean | Asia and Southeast Asia, Pacific | Total of publications citing the  study type |
| TP | 27 | 6 | 20 | 2 | 3 | 0 | 58 |
| PVE | 7 | 0 | 6 | 1 | 4 | 3 | 21 |
| Both | 3 | 1 | 4 | 0 | 9 | 0 | 17 |
| Others | 11 | 0 | 12 | 1 | 1 | 2 | 27 |
| Total publications | 48 | 7 | 42 | 4 | 17 | 5 | 123 |

*TP= Trait Prioritization, PVE= Participatory Variety Evaluation, Both= TP+PVE, Others= clonal evaluation, consumer tests, etc*

**Table S4:** Number of study types per region.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | East Africa | Central Africa | West Africa | South Africa | South America & Caribbean | Asia, Southeast Asia & Pacific |
| TP | 35 | 6 | 31 | 2 | 8 | 0 |
| PVS | 7 | 1 | 10 | 1 | 11 | 4 |
| both | 2 | 2 | 2 | 0 | 5 | 0 |
| others | 47 | 5 | 45 | 4 | 25 | 7 |
| total | 91 | 14 | 88 | 7 | 49 | 11 |

*TP= Trait Prioritization, PVE= Participatory Variety Evaluation, Both= TP+PVE, Others= clonal evaluation, consumer tests, etc*

**Table S5:** Number of publications citing method types for each crop.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Crop | Banana (n=41) | Cassava (n=31) | Sweetpotato (n=24) | Potato (n=13) | Yam (n=16) |
| Method type |  |  |  |  |  |
| TP | 25 | 15 | 9 | 2 | 9 |
| PVs | 2 | 4 | 7 | 6 | 5 |
| Both | 2 | 8 | 1 | 2 | 0 |
| Others | 12 | 4 | 7 | 3 | 2 |
| Total per crop | 41 | 31 | 24 | 13 | 16 |

*TP= Trait Prioritization, PVE= Participatory Variety Evaluation, Both= TP+PVE, Others= clonal evaluation, consumer tests, etc*

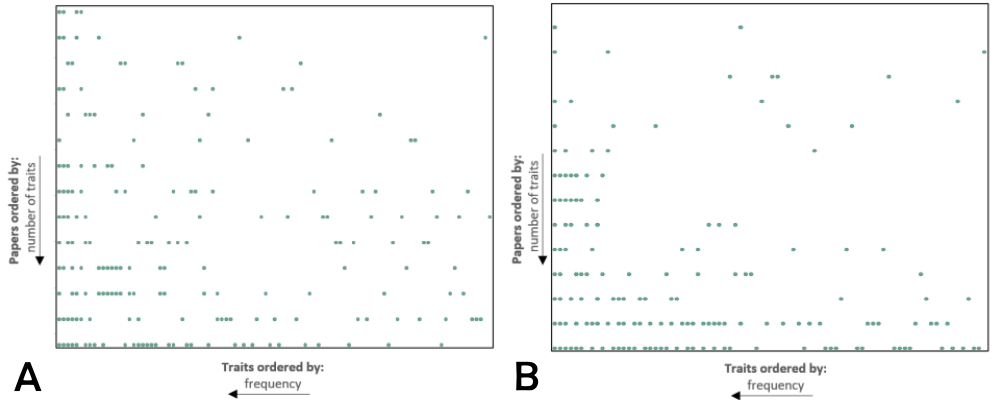
**Table S6:** % of study types per crop in all regions (Total study types=260). *TP= Trait Prioritization, PVE= Participatory Variety Evaluation, Both= TP+PVE, Others= clonal evaluation, consumer tests, etc*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | banana (n=69) | cassava (n=79) | sweetpotato (n=44) | potato (n=34) | yam (n=34) |
| TP | 46 | 34 | 20 | 9 | 32 |
| PVS | 7 | 14 | 16 | 21 | 15 |
| Both | 0 | 9 | 2 | 9 | 0 |
| Others | **46** | **43** | **61** | **62** | **53** |

*TP= Trait Prioritization, PVE= Participatory Variety Evaluation, Both= TP+PVE, Others= clonal evaluation, consumer tests, etc*

**Table S7.** Percentage of publications including gender disaggregation of data by crop and region

|  |  |
| --- | --- |
| Crop | % Publications including gender disaggregation |
| Yam | 37.5 |
| Banana/plantain | 37.1 |
| Potato | 33.3 |
| Sweet potato | 22.7 |
| Cassava | 13.3 |
| Region | % Publications including gender disaggregation |
| Central Africa | 57.1 |
| Southern Africa | 40 |
| South America and Caribbean | 28.6 |
| East Africa | 25 |
| West Africa | 22.5 |
| Asia and Pacific | 0.4 |
| Total | 27.8 |



**Figure S1**. Trait (y-axis) vs publication (x-axis) unique frequency matrix plot for researcher traits in banana*.* (A) and cassava (B), axes are in descending order

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**Figure S2**. *Musa spp.* traits listed by decreasing frequency across all publications in percentage, farmer-prioritized (A) and researcher-prioritized (B). Farmers selected traits through elicitation exercises (mainly free listing), whereas researchers selected traits to be included in PVS trials.

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**Figure S3**. Cassava traits listed by decreasing frequency across all publications in percentage, farmer-prioritized (A) and researcher-prioritized (B). Farmers selected traits through elicitation exercises (mainly free listing), whereas researchers selected traits to be included in PVS trials.