**Activity**: Conduct Participatory variety and hybrids selection trials across target agro-ecologies in Kenya, Tanzania, Ethiopia

**Output**: 8-10 high yielding cultivars each for varieties and hybrids tested on farmers’ fields for adaptation and farmer preference and at least 2 of each selected for NPT

**Materials and methods**

Participatory variety (7 entries) and hybrid (7 entries) trials were established in Singida and Iramba districts in central Tanzania. The trials were established either as sole crop with tied ridges or intercropped with cowpea without use of tied ridges. Each farmer hosted either 7 hybrids or 7 varieties non-replicated.

**Results and interpretation**

In singida district, variety with tied ridges had mean grain yield of 2.017 t ha-1 compared to 1.596 t ha-1 for variety without tied ridges which was a 26% yield advantage. Varieties ASARECA 24-4-1 (1.983 t ha-1) and IESV 92174 DL (1.933 t ha-1) had grain yields significantly similar to improved released variety NACO Mtama 1 (2.133 t ha-1). Hybrids with tied ridges gave better yields (mean 2.340 t ha-1) compared with no tied ridges (mean yield 2.00 t ha-1) (Table 2), a 17% yield advantage. Hybrids IESH 22009 (2.750 t ha-1), IESH 29010 (2.683 t ha-1) had statistically similar yields to released hybrid NACO SH 2 (2.533 t ha-1). Under intercropping hybrids with cowpea, mean performance (2.518 t ha-1) was better than hybrids with tied ridges (2.340 t ha-1). Hybrids NACO SH 2 (3.148 t ha-1), IESH 22009 (3.027 t ha-1) and IESH 25007 (3.022 t ha-1) had the best grain yields. The average cowpea yield was 0.914 t ha-1 (Table 3). The yield advantage of intercropping and tied ridges (water conservation) was demonstrated. However returns to investment (gross margins analysis) has be determined.

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| **Table 2. Mean performance of sorghum hybrids grown with tied ridges in Singida district, Tanzania 2016** | | | | | | | | | |
| **Treatment** | **Days 50% flowering** | | **Plant height (cm)** | **Agronomic score (1-5)** | | | **Plant stand at harvest** | **Grain yield (t ha-1)** | |
| Hybrids | 74 | | 179.2 | 2.4 | | | 79 | 2.000 | |
| Hybrids with tied ridges | 74 | | 184.3 | 2.3 | | | 81 | 2.340 | |
| **SE** | **16.74** | | **38.3** | **0.679** | | | **9.84** | **0.607** | |
| **CV%** | **22.7** | | **21.1** | **28.6** | | | **12.3** | **28** | |
| **Table 3. Mean performance of sorghum hybrids intercropped with cowpea in Singida district, Tanzania 2016** | | | | | | | | | | | |
| **Hybrid** | | **Days 50% flowering** | | | **Plant height (cm)** | **Agronomic score (1-5)** | | | **Plant stand at harvest** | | **Grain yield (t ha-1)** |
| IESH 29010 | | 71 | | | 170.4 | 2.4 | | | 93 | | 2.622 |
| IESH 28002 | | 71 | | | 169.7 | 2.0 | | | 104 | | 3.148 |
| IESH 28009 | | 69 | | | 181.1 | 2.0 | | | 97 | | 2.844 |
| IESH 25007 | | 71 | | | 172.4 | 2.2 | | | 97 | | 3.022 |
| IESH 25008 | | 69 | | | 149.4 | 2.0 | | | 101 | | 2.498 |
| IESH 22009 | | 73 | | | 172.8 | 2.4 | | | 108 | | 3.027 |
| IESH 22023 | | 71 | | | 203.4 | 2.2 | | | 105 | | 2.996 |
| Local variety | | 110 | | | 256.0 | 2.4 | | | 99 | | 1.587 |
| Legume | | 58 | | | 45.4 | 2.6 | | | 50 | | 0.914 |
| **Grand means** | | **74** | | | **169.0** | **2.2** | | | **95** | | **2.518** |
| **SE±** | | **13.8** | | | **18.05** | **0.5413** | | | **9.74** | | **0.5956** |
| **Cv%** | | **20.7** | | | **15.7** | **22.6** | | | **12.9** | | **32.9** |

**Next steps**

Determine returns to investment for tied ridges and intercropping and promote tied ridges and sorghum-cowpea intercropping technologies. Hybrids IESH 22009 and IESH 25007 recommended for NPT.