ABSTRACT: ESA is the secondary centre of genetic diversity and region specific genetic enhancement is in operation using this diversity. Recently, 7 varieties were released in Tanzania (4), Kenya (1), Malawi (1), Zambia (1) and several varieties are in pipeline. The successful dissemination of Fusarium wilt-resistant medium and long duration varieties, coupled with ICM, effective seed systems, export demand and policy support resulted in area and productivity increases. SI through P-micro dosing, intercropping with cereals/legumes had increased yields. Formal and informal seed systems are being strengthened and about 4250 t of seed produced to cover about 0.5 million ha. In order to develop strong breeding pipe-line, genetic enhancement using trait specific/multiple trait donors are being used. Value addition and utilization at house hold, community and village level are being tried to improve the food and nutritional security.

INTRODUCTION: Pigeonpea is the crop of about 6 million smallholder subsistence farmers in Eastern and Southern Africa (ESA) with 1.14 million ha of area and 1.05 million tonnes of production (FAO Stat 2014). Pigeonpea has huge regional and international export potential and India imports about 570,000 t annually. ESA countries export 290,000 t of grain/year worth of $ 203 million. Farmers in ESA used to grow local varieties that were low-yielding, late-maturing and susceptible to pests and diseases. Initial attempts to grow improved germplasm from India, that failed due to poor adaptability, limited resistance to local races of Fusarium wilt, high susceptibility to insect pests and unacceptable grain quality among local communities. ESA has unique genetic diversity and its use in genetic enhancement has provided an opportunity to develop varieties that fit in to ESA agro-ecologies and to meet the farmers and consumer preferences.

MATERIALS AND METHODS: ICRAISAT’s genebanks maintain about 1200 unique germplasm accessions originated from ESA. This genetic diversity is being effectively used in systematic genetic enhancement program with high grain yield, inter-cropping compatibility, photoperiod insensitivity, grain quality, resistance/tolerance to Fusarium wilt, Helicoverpa pod borer and resilience to climate change. Pigeonpea is highly sensitive to photoperiod, temperature, altitude and latitude. Through effective utilization of diverse agro-ecologies and breeding/test locations in ESA, efforts are being made to understand modulation of temperature and photoperiod and to identify suitable medium and long duration varieties for intercropping. Hot spot/sick plot locations in Kenya, Tanzania and Malawi were used to identify Fusarium wilt tolerant lines. Effective seed systems followed to improve awareness and access to quality seed.

RESULTS: • Developed 20 unique Breeding populations (3375 progenies/lines) involving diverse parents • Developed insect-cum-drought tolerant, high yielding and big seeded genotypes (28 g/100 seed mass). • Distributed 165 sets of breeding lines (2608 elite lines) to NARES that resulted in 52 genotypes in to NPT • 436 FPVs, agronomic and utilization evaluations and 981 demos with 9498 farmers resulted in faster dissemination. • 7 varieties were released for cultivation in Tanzania-4, Kenya-1, Malawi-1, Zambia-1 and 17 varieties are in pipeline for release • 4250 t of seed produced and delivered to cover about 0.5 million ha. Much more is produced and distributed at community level • Sustainable intensification of P-micro dosing (BCE ratio- 2.2), intercropping with cereals (1.3 times) and double up legumes (1.6 times) increased yields • Increased household utilization up to 50-73% through locally preferred products like Msito, Balahoa, Githeri, Kiembbe, Bagia, Ng’ande • 15 large scale Dhal processing plants established in Malawi, Tanzania, Kenya and Mozambique • Increased local producer prices by 25-40% in ESA after linking producers to wholesalers. • Increased farmers’ incomes by up to 80% in Kenya, Malawi, Mozambique, Tanzania and Uganda in target districts. • Since the inception of TL-II production increased by 98.9% that both due to productivity(33.8%) and area increases(48.6%) • Women participation in decision making enhanced for nutritional security, sale of produce especially green peas

DISCUSSIONS: • Tremendous yield gains (917 and 1309 kg/ha in ESA and in Malawi) achieved with new varieties, ICM, effective seed systems, export demand and policy support. • ESA germplasm offered greater scope for developing locally adapted genotypes • Market pull from India contributed significantly for increased adoption

Future direction: • Genetic enhancement by use of unique germplasm, genomic resources and hybrid technology that suits to local needs • More focus on medium duration varieties with high ratoonability • Promotion of sustainable seed systems and intensification options • Greater emphasis on utilization, value addition and exports to India
