

Multipurpose Harvesting Bag: Mitigating Drudgery in Harvesting Operation

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Abstract—Harvesting is the operation of cutting, picking, plucking, digging or a combination of these operations for removing the crop from under the ground or removing the useful part or fruits from plant. Various postures such as reaching, bending, kneeling and squatting are adopted while harvesting variety of fruit crops and vegetables. Furthermore the produce also has to be carried from the picking point to the collection point over and over causing the repetitive cycle of the harvesting posture, loading & lifting, walking and bending & unloading posture. L5/S1, cervical and thoracic vertebrae of spinal cord will be under bending and compression stresses due to these awkward postures. A gender friendly multipurpose harvesting bag was designed to increase the picking capacity of harvest and also to correct postural issues occurring during the loading and unloading of harvest. The bag reduced the RULA and REBA score of unloading operation from 7 & 12 to 4 & 2 respectively. After biomechanical analysis it was found that the use of bag reduces the effort of the extensor muscle by 23.10 per cent (384.64 N) at the start of unloading and at the end of operation the reduction in effort is 55.1 per cent (1557.47 N). Thus the bag is reducing the effort required by the muscle and also reducing the force exerted on the L5/S1 joint. The picking capacity for all the postures (reaching, standing, bending, and squatting) increased due to use of the harvesting bag, ranging from 16.23 to 85.31 per cent.