ACTIVITIES AND ACHIEVEMENTS QUESTIONNAIRE

1. Non-Technical Summary
A 1000 word (maximum) summary of the main research results, in non-technical language, should be provided below. The summary might be used by ESRC to publicise the research. It should cover the aims and objectives of the project, main research results and significant academic achievements, dissemination activities and potential or actual impacts on policy and practice.

Background Smallholders in KwaZulu Natal (KZN) are growing the latest genetically modified (GM) maize varieties, supplied by Monsanto, the US multinational. These are pest-resistant Bt varieties, herbicide tolerant (HT) varieties, where and weeding is replaced by chemical weed control and even the latest stacked gene variety which combines both traits. The basic objective of this study was to discover if these US developed technologies could make a useful contribution, or if they would prove to be unsuitable. This requires research to determine the impacts of GM varieties.

Aims and Objectives The first objective was to measure the impact of GM on output growth, employment, wages and livelihoods. The second was to assess the overall impacts on labour incomes and finally on poverty reduction. The third was to inform the policy process by providing national and provincial agriculture departments and national agricultural research services with an understanding of the likely outcomes of adopting the different GM options.

Results The main outcome of this project is not what we expected as we began with an idea that Bt varieties were suitable for a semi-subsistence environment, such as these farmers in KZN, since they provide built-in crop protection, which must improve yields, as farmers tend not to use enough pesticide, due to its cost and uncertain availability. The HT varieties are far less clearly useful, as they were developed in the USA with the express intention of eliminating weeding costs. With rural unemployment running at as much as 50%, saving labour could be just increasing unemployment and reducing social welfare. This does not allow for the flexibility with which HT has been applied in KZN. The HT varieties prove to be only moderately labour saving and instead are being used in conjunction with minimum tillage to reduce soil erosion. This is a serious problem locally and the provincial agriculture department has been pushing minimum tillage for some time. The HT variety has made this much more attractive to farmers as they no longer need to hire expensive tractor services to kill weeds before planting. Instead, they use herbicide (far less toxic than the pesticide Bt displaces) to kill the weeds and then shallow plough with oxen. The yields have increased considerably and thus the extra labour for harvesting the bigger crop practically makes up for the weeding labour that is saved.

Thus, the HT variety has not displaced labour and so has not damaged livelihoods of hired workers. It has improved the incomes of farmers and increased the sustainability of farming by reducing soil loss. This accounts for the increasing popularity of HT, which has proved far more popular with farmers than Bt. This is also well understood as drought in about four years in five is the norm and our results show that it is only in the occasional wetter year that Bt seed increases yields enough to cover its extra costs. If fact, it is Bt that displaces ore labour, not HT, because the saving in spraying labour is not counter balanced by more harvest labour in most years. However, the twenty-two
impact of the release of GM and NK maize. A larger extent based on higher assay responses. We have assessed ex-post the actual
commercialization effects (impacts) of should receive a general release (commodity commercialization impacts) and associated (impact) to the
during the decision making process on whether certain GM producer should be given
South African OGM regulatory authority into consideration socio-economic issues.

**Impacts**
The most important impact in terms of the presence of the species are

Dissertation

The study has so far produced four conference presentations and three

Academic Importance

The data have assembled covers 248 maize in the first year.

wages and have a negative overall impact

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The model shows that HT technology could lower

This model shows that HT technology could also be adopted in varieties and could

The limitation of these results is that they apply only to KZN which is not typical of the

next year, the current sample is so small that the economic results

become the dominant factors. The compensation impacts need to be assessed again

not much greater than the HT variety, it seems likely that stacked gene maize will

cost of this most expensive variety was taken into account. Product that the price is not

farmers who used the stacked gene maize had the best results of all, even when the extra

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