Natural resource base and agricultural potentials

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Introduction

The intent of this chapter is to set the stage by providing a description of the physical environment and the quality of natural resources that are available to the people of Guquka and Koloni. I describe climate and rainfall patterns, topography, vegetation, soils of the veld and arable fields, water bodies and streams. Further, models and yield gap analyses are referenced in order to examine the agricultural potential of the two study areas. Thus, the chapter serves to compare and contrast the two villages with regard to opportunities, constraints and options for land-based livelihoods. The actual nature of such livelihoods are dealt with in chapters 8 through 13.

This chapter is based largely on literature and secondary sources, including soil surveys and related data collection carried out in both villages in 1998 (Bonroy 1999, Bonroy and Verdoost 1999, Bonroy et al. 2000, Verdoost 1999, Verdoost et al. 2000 and Verdoost et al. 2003). These studies involved surveys of the soils on the arable allotments on a scale of 1: 5000. The results of this survey and topographic information about the area were captured in a GIS (Geographic Information System). An analysis of the local climate was also conducted, including rainfall, temperature, radiation, and potential evapotranspiration. A detailed account of the methodology employed in the soils inventory and mapping and the modelling exercises appears in Verdoost (1999) for

Rainfall data were extracted from the CIRADA database (Austin 1989a), and further details appear in Bonroy and Verdoordt (1999). This digital database covers the former Ciskei portion of the Central Eastern Cape and interpolates rainfall observations between neighbouring meteorological stations. Specifically, for Guquka, data were extrapolated from the 20-year database of observations at the University of Fort Hare Farm, a meteorological station situated about 25 km downstream of Guquka. For Koloni, Bonroy (1999) also used data from the weather station on the Fort Hare Research Farm, situated about 20 km west of Koloni. Since both Koloni and the Research Farm are situated on the Coastal Plateau it was assumed that climatic conditions at Koloni were generally similar to that at the weather station.

**Guquka**

Guquka lies in a cluster of villages in the upper reaches of the Tyume River catchment at an elevation of approximately 900 m (Map 4.1) at the foot of the 400 m high Hogsback Escarpment. Above the escarpment lies an extensive plateau and above that, the dolerite-capped Amatola Mountains reach almost to 2000 m in places, including the Hogsback Peaks at 1824 and 1937 m and Gaika’s Kop at 1963 m.

The sedimentary rocks are of the Beaufort Group, laid down 230 million years ago and consisting of the Katberg formation of pinkish grey sandstones, and the Balfour formation, which consists of 70% grey mudstones, 25% fine sandstones and 5% grey shales. Between 150 and 190 million years ago igneous intrusions formed dolerite sheets, dykes and sills. Alluvial terraces were laid down in the river basins about 2 million years ago. The most recent formation consists of unconsolidated and highly erodible colluvium found on valley side-slopes around the community (Hill, Kaplan, Scott & Partners 1977).

Because of its elevation on the upper reaches of the Tyume River Guquka is at the very upper limits of the Coastal Plateau agro-ecological zone described in chapter 3; only a few hundred m farther up the river lie the lowest reaches of Afro-montane forests.

The true River-valley Unit or zone, described in chapter 3, begins downstream from the village. The arable allotments of Guquka extend down to the Tyume River, the main tributary of the Keiskamma River. The Keiskamma in turn enters the Indian Ocean near the town of Hamburg. Flow from the Tyume River feeds Binfield Park Dam located about 5 km downstream from Guquka. This Dam has a capacity of 19 million m$^3$ but as of 2004 was under-utilised, having a surplus capacity of about 9 million m$^3$ (Amatola Water Board 2005). Despite the proximity of this abundant water resource Guquka does not benefit; the limited irrigation developments (chapter 3) and all provisions for domestic consumption are directed downstream.