DEVELOPMENT OF NUTRITIONALLY BALANCED AND ACCEPTABLE ARMY RATION PACKS

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ABSTRACT

Nutritionally balanced and consumer acceptable one man ration packs were developed for the N.Z. Army. The rations were designed quantitatively, using firstly mixed integer linear programming and secondly, menu planning techniques with spread sheet analysis.

For the mixed integer linear programming model, nutritional and food quantity constraints were obtained from a literature search and from a consumer survey on the present ration packs. The four menus of the first prototype ration pack, developed using mixed integer linear programming model, were consumer tested with a small group of soldiers during a field exercise in New Zealand. Focus groups determined the soldiers' attitudes to the new pack. The results showed that the first prototype ration pack was superior to the present ration pack, though improvements were still required.

Redesigning of the ration pack menus included the selection of commercially available foods and the development of 5 canned meat meals with army personnel consumer groups. The final menu planning used spreadsheet analysis, as it provided a quicker output of results. A second prototype ration pack, with four menus, was finally developed.

This second prototype ration pack was consumer tested with larger groups of soldiers in Malaysia and New Zealand, on separate field exercises. Both trials indicated high acceptance of the second prototype ration pack, with only the weight and the bulkiness being major problems.

A final prototype ration pack was developed based on the foods included in the second prototype. This pack included two main meals in the form of canned meat meals, several snack foods and

beverages. The average weight and cost of this final prototype ration pack were 1.411 kg and $10.62, compared to 1.275 kg and $8.10 for the present ration pack.

The nutritional composition of this final prototype did not meet all the human requirements, as it was based on the foods in the second prototype ration pack. Some of these foods, particularly the canned meals, need to be reformulated to ensure that the pack provides the complete requirements of the soldiers over the period of an exercise.

Quote from Emperor Haile Selassie in 1935 before the Ethiopian Mobilisation order against Mussolini's forces in World War II:

> "Everyone will be mobilised and all boys old enough to carry a spear will be sent to Addis Ababa. Married men will take their wives to carry food and cook. Those without wives will take any woman without a husband."

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