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Relations between ecological, sociological and economic factors affecting ranching in the North Western Transvaal.

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2015-01-22
http://hdl.handle.net/10539/16708

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The largest group is more heterogeneous and less easily generalized. From case studies however, there emerges within this group a fairly discrete subgroup, a group of "tryers". They have relatively high scores for management ability as well as innovativeness. However, neither rangeland condition score nor relative financial performance are high. These are generally well educated, aware individuals who are characterised by disparity between attitude and action - they "mean well but do badly". There is a sense of frustration at the inability of the resource base to either respond in the desired manner or to provide sufficient income to cater for debt commitments and satisfy lifestyle aspirations.

3.5 Discussion

The implications of the above findings will be addressed. In a subsequent chapter, relations between the various ecological, physical, sociological and economic factors will be explored.

3.5.1 Sociological factors

The hypothesis being tested (H4) was that "poor" human characteristics result in poor veld management.

Implicit in this is the notion on which programmed extension campaigns are based, that better educated mature ranchers with high levels of motivation, having satisfied their lower order needs (Maslow 1970) would be more likely to implement "good" management strategies than "laggards".

The data indicate the following scenario. The majority of ranchers in the area were aware of, and had partially or wholly implemented the recommended veld management system. The overall level of managerial ability was high. The number of camps per herd, grazing management system and animal production system as measured in this study compared most favourably with nationwide averages (de Klerk, 1986) and with the situation in the study area in the past (Coetzee, 1971). Management related variables were highly correlated with the amount of contact with the extension officer. The community in general, with the exception of the small group of subsistence level "laggards", would seem to have been elevated from "poor" levels of ability and aspiration by the past extension campaign (du Plooy, 1980). Whether further extension activities would be able to elevate the laggards to levels of practice adoption would depend on the goals set during the campaign. It would probably be futile to repeat the same messages. The impressions gained during interviews with members of this group were that spiritual and aesthetic higher order needs were met by current lifestyle. It must be borne in mind that financial and lifestyle objective set during extension campaigns are invariably subjective and influenced

by the extensionists own milieu. This is essentially an urban bourgeois world view, with visions of "second car and cottage-by-the-sea". The established rural rancher need not strive for these ideals if his needs are totally catered for by current lifestyle. The idea of "pressure and response" may be totally inoperative in these peoples situation.

The other group identified, the" land barons," are used by the extension service as leader figures. This may however be counter-productive if the following interpretation is correct. As suggested, these ranchers are capitally powerful and are afforded the luxury of being able to indulge higher order needs through their ranching enterprise. They enjoy elevated status in the community, play host to study groups and are praised as example by extension officers and pasture scientists. Feedback from "tryers but failures" however, indicates an amount of resentment, resentment that these "land barons" are not dependent on their ranching enteprises for a living and that the normal constraints experienced by others are not operative on this privileged group. Mc Allister (1981) similarly warns that the farmer who operates too far beyond the accepted boundary of the social milieu will have few empathetic ties with the community, or be given much credence by the community.

The general level of implementation of the recommended

strategy, notwithstanding the specific motives of the individuals involved, would lend support to the modus procedduris of the extension service. The message is clearly formulated, negative forces such as an uncertain climate and money shortage are overcome by financial assistance for fencing and water provision as well as "drought relief" subsidies. Despite the plasticity of human behaviour, the ratio of extensionists to ranchers precludes the possibility of tailoring extension messages to each individuals circumstances or psychological characteristics. What is clear, is that an innovation (in this case the adoption of the practice of controlled selective grazing by means of the erection of a multi camp system) will be implemented by a majority if the constraints are removed. Multi camp systems become the accepted norm in the community as a whole. But, the desired end result of the campaign, and, indeed, the cornerstone of Departmental policy, namely, "more money and better veld" was not achieved at all. Rix (1984) found that "optimum landuse" was largely achieved through adoption of improved practices among ranchers in Natal. The erection of multi camp systems, each with its own water supply became, in the perceptions of ranchers in this study area, however, an end in itself.

Several factors may contribute to this perception, the prime factor being that the risk of ranching in an uncertain environment is minimised by "drought relief" in the form of financial assistance. (This would introduce a cautionary

note to Young's (1980) suggestion that subsidy may be needed to cater for poorer ranchers lower order needs, enabling them to devote effort to management inputs in order to elevate themselves. The peculiarities of the Australian set-up compared with that in the study area would need to be evaluated).

The rancher questions whether time and effort spent in carefully monitoring veld and adjusting stocking rates accordingly, is a beneficial exercise. Should it rain, he may be rewarded, should it not, he will be "bailed out" by drought relief. Clearly the attractive answer is not to bust a gut. Years of natural selection by an unpredictable environment have probably selected for this attitude, which will survive as long as supported by artificial financial aid.

The inference to be drawn from the results of this study is that the H4 (poor human characteristics result in poor management) does not generally hold for the majority of ranchers in this study area.

The failure of the adopted practice to achieve the desired end result is discussed in the final section.

4. RELATIONS BETWEEN ECOLOGICAL AND SOCIO-ECONOMIC FACTORS MEASURED DURING THIS STUDY - CONCLUDING REMARKS

At the outset, this study attempted to determine why ranchers do what they do, and what effect their actions has on the resource. The study attempted to "holistically" analyse the range of ecological and socio-economic factors and their interrelations. The system was viewed from the level of current practice and conventional wisdom within the Department of Agriculture and Water Supply's pasture research and extension sections. That these may be oversimplified has emerged during the analysis and interpretation of the data obtained in the current study. The propagation of a management system advocated by the pasture research section, in accordance with overhead Departmental policy, has gained general acceptance among the target group. The implementation thereof (to a greater or lesser degree) has not achieved the predicted, desired ends of "good" veld (i.e. good as defined by current wisdom or convention) and greater financial advantage. It is suggested that the recommended practice is therefore incapable of achieving the desired end. The practice, as propagated, is simplistic, idealistic and unsupported by either controlled experiment or general real-world experience. The continued propagation thereof, would seem to be an example of "theory tenacity", or per-

sistent belief in a theory despite contrary evidence (Loehle, 1987). This phenomenon is apparently not uncommon in disciplines where theories are in an "immature" state, as is the case in much of ecology (Loehle, 1987).

Whereas most recommended agricultural practices (eg fertilizer application, crop husbandry, animal husbandry, irrigation etc) are intensively researched and evaluated before being advocated, the system of controlled selective grazing is largely an untested notion. Untested in the strict sense, that replicated long-term comparative trials have not been conducted. The implementation of an unproven system should not necessarily be rejected. In fact, such a step is in accordance with the philosophy of adaptive management (Hollings, 1978; Walters and Hillborn, 1978). To rely on deferred action until irrefutable support for a given system is forthcoming is surely fatuous. There is however surely no justification in propagating a point of view dogmatically. CSG has not achieved the desired result. It is contended that driving forces beyond the control of the land user largely shape the current state of the resource (cf O'Connor, 1985). As Westoby (1980) postulated, the current composition of above-ground herbaceous material reflects the amount and timing of recent rainfall, as well as available propagules. Dye (1983) and Matthews (1984) have demonstrated that timing and amount of rainfall interact with the particular phenology of different species, and thus influence current species composition. The grazing animal,

other than in extreme cases, is best regarded as a "minor modifier" (O'Connor, 1985). The phenomena of "bush encroachment" and "veld degradation" with which pasture scientists and extensionists are preoccupied, are interpretable ecological responses to current driving forces. The notion that multi camp systems employing controlled selective grazing may ameliorate these (from a commercial ranchers viewpoint) "retrogressive" situations does not appear well founded.

It is suggested that the savanna rancher is aware of this, either intuitively through a sub-conscious decision process, or explicitly, through a more formal decision analysis. "If I stock fewer animals, and it rains, then ..... If I stock more animals, and it doesn't rain, then ....."

Human behaviour, other than reflexive or frustrated behaviour, can generally be described as being goal orientated (Payr and Sulzer, 1981). En route to any goal, obstacles may be encountered. In the current situation, the obstacles to the goal of "better veld" would seem to be seated in the abiotic environment, and thus largely out of the hands of the resource manager. As such, he adapts realistically by modifying his goals, which then conflict with those of the extensionist. He becomes an expert stockman, devoting much input to stock selection, herd

hygiene, provision of licks etc. The multi camp system is an aid to his prime objective, stock management, rather than veld management. The "grass farmer" as opposed to the stock farmer is virtually non existent apart from the status-seeking "land barons" (It is worth noting that only a small number of such individuals are regularly touted by the extension service as being examples of success, Mr A of region Z, Mr B of region Y, not, Messrs A B C D E etc of region Z, Messrs H,I,J,K,L, etc of region Y.)

It is suggested that the essence of the problem is that, in dealing with humans (the rancher) and their dependence on "nature" (the resource,) one is dealing with incredibly complex components of a highly complex interaction. Man the farmer seems able to best succeed where systems are relatively simple, with few external variables. In the animal production industry dairy farming off a planted pasture serves as example. Well researched guidelines to pasture (eg Kikuyu grass) exist. Establishment, fertilization, irrigation and grazing practices are laid down. Should however, a further component, eg a legume be introduced into the pasture, the situation is immediately more complex. Should a second animal type, eg sheep be introduced, management evolves from the "strictly scientific" to the realm of art or skill. How less able is man the farmer able to "optimally" produce off a resource such as rangeland, comprising a vast array of "ecologically different" species, driven by a multitude of interacting variables, some poorly

quantified, most largely beyond his control?

The emphasis placed on the "exactness" of science, through teaching of chemistry, physics, mathematics, arouses a feeling of inferiority, of "physics envy" among pasture scientists. Classical texts originate in northern temperate regions, and a home-grown philosophy is still developing (eg Tainton, 1981). Extension science locally, is similarly undergoing a process of development of theory (Duvel 1987). The two components of land use strategy, research and extension, have, it is contended, been forced to oversimplify in order to "sell" their product. A rancher does not wish to be lectured on the dynamic, stochastic nature of semi-arid rangelands. Yet the extensionist is forced to formulate a technical message, which, through necessity, is simplistic.

As Smuts (1926) wrote "the hard, abrupt contours of our ordinary conceptual systems do not apply to reality and make reality inexplicable, not only in the case of causation, but in all cases of relations between things, qualities and ideas". Hence, the seeming paradox that the utopian, ideal "experimental farm" does not flow into the neighbouring real world. Just as Newtonian physics was superceded by Einsteinian views, so should the simplistic message currently propagated be replaced. The most suitable replacement would seem to be adaptive management as underlying

principle. This only if and when the artificial support system of financial aid (widely viewed as being counter productive) is removed, and provided that the land user is sufficiently astute to implement a process of adaptive management.

In terms of the production of livestock from rangeland, it is clear that decades of grazing by domestic stock has resulted in changes (Tainton 1981). Whether these changes are "degradation" or merely shifts in response to current driving forces is perhaps not the main issue. It is clear that the present status of the resource base, in savanna and in other biomes (karoo, grassland) militates against economically viable animal production, unless huge areas of land are available at realistic prices. It is thought that the optimistic view of African rangeland as being a bountiful self perpetuating producer of animals is a popular myth. Early travellers reported abundant game. The numbers alleged have, however, been questioned (eg Liversedge, 1978). Furthermore, early travellers, particularly the Voortrekkers, travelled with horse and ox. They were totally dependent on water, moved from water point to water point, and probably formed an exaggerated image of indigenous faunal densities. It is likely that much of the drier, periodically waterless hinterland was subject to lower game densities than areas around perennial water supplies. Such drier areas could be opportunistically exploited during years of higher rainfall. Permanent occupation with live-

stock has resulted in continuous grazing over time, however, despite rotational grazing within a season. The response has been a change in composition, from the earlier "desirable" to the current "undesirable" (in terms of animal production). Indications are that reversal is not practicable within the rancher's time span. The solution to the complex problems affecting extensive ranching is surely equally complex and demanding of further attention. It is not intended to fully address possible solutions in this thesis, other than to suggest that eco-technical approaches, in isolation, are unlikely to succeed. A combination of an adaptive management approach to veld management, the ending of drought relief subsidies and, where justified by research, the incorporation of any of the vast array of internationally tried but locally neglected arid area forage species, may prove a useful means of achieving "good" veld and economic viability.

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APPENDIX 1

Example of questionnaire used during interview sessions

North-Western Transvaal Farm Survey.

FARM: SIZE (ha) :

FARMER:

DATE:

What is the main farming activity?

What is the main source of income?
(elaborate)

How long have you been engaged in this?
other?

Why do you farm?

What are the major problems associated with your enterprize?

What records do you keep?

What improvements would you like to make?

CATTLE

Number IN Herds

Production system

Average no marketed over each past 5 yr period

1 2 3 4 5 6

Calving % A) Trend B) Absolute

Weaning mass " "

Mortality " "

Husbandry (only record any notable deviations from norms)

OTHER (Small stock or game)

Number 1 2 3 4 5 6

No. Marketed in each past 5 yr period

PHYSICAL LAYOUT

How many camps of what size?

i.e. = ? camps/herd

What determines the placing of camp boundaries?

Placing and no. of watering points?

" of dips?

Management Philosophy?

What is long term production potential of farm ? (CC)

What is major limiting factor?

What grazing system do you think is best suited to your farm-Why?

What grazing system do you apply?
(elaborate)

Describe prevoius systems, when you used them and what factors induced you to switch?

What are your most important forage species?

Do you have planted pastures What How much ?
" " drought reserve " " " ?

Are droughts common?

Repeat What is major limiting factor?

If you were to stop ranching what would you do/where & what would you farm?

Asi-Is your income between ....

Has it changed?

Is this due to any deterioration in veld?

Describe changes in veld condition and state reasons?

(but rephrase) What are main biophysical limiting factors?

What are undesirable grasses trees and shrubs?

Are they increasing? - Why?

Can anything be done
(elaborate what-why/why not)?

Who would you say is the most successful farmer in the area-why?

How do you view the future, with reference to the past?

Could you indicate the degree of outstanding debt commitments?

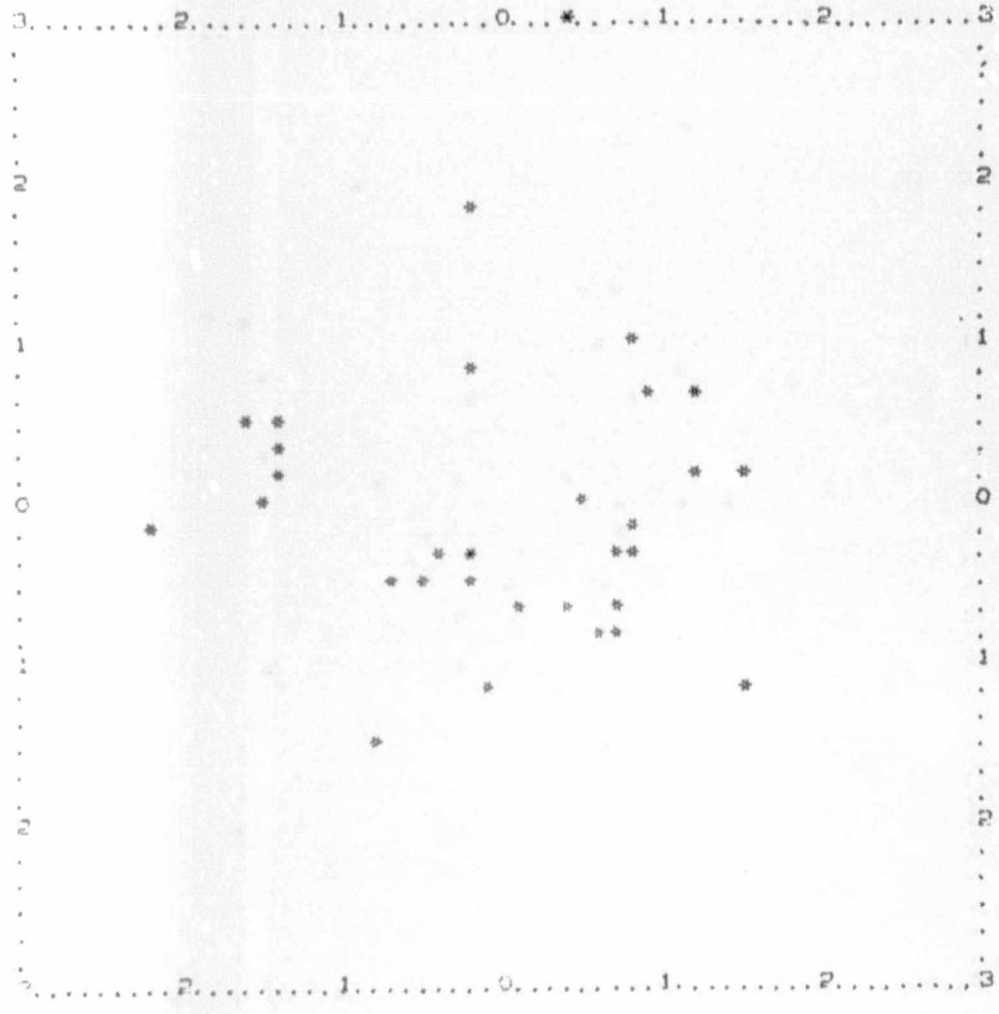
short medium long term

APPENDIX 2

Plots of Factor Combinations

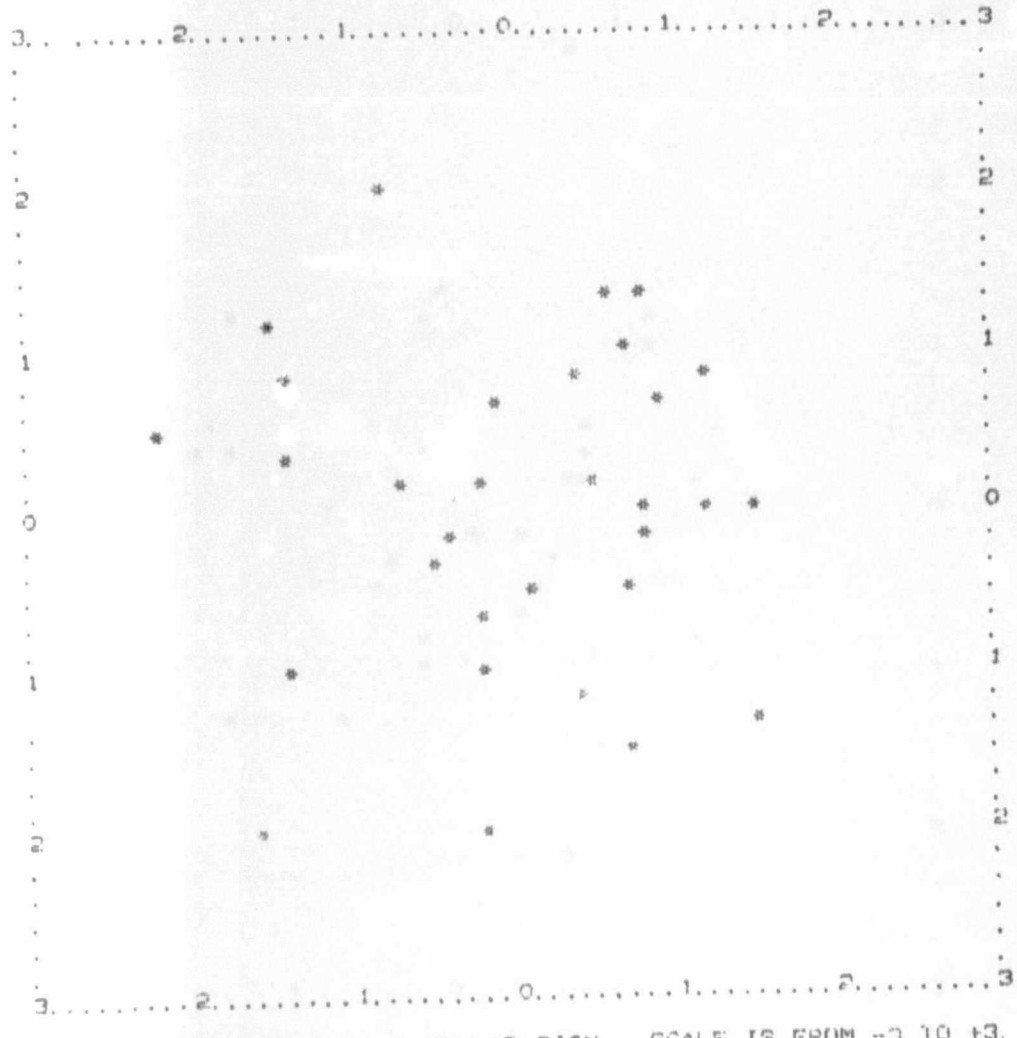
Factor 1	-	"Ability"
Factor 2	-	"Scale of operation"
Factor 3	-	"Maturity of Rancher"
Factor 4	-	"Innovativeness"
Factor 5	-	Veld composition score
Factor 6	-	Mortality

X-AXIS IS FACTOR 1. Y-AXIS IS FACTOR 2



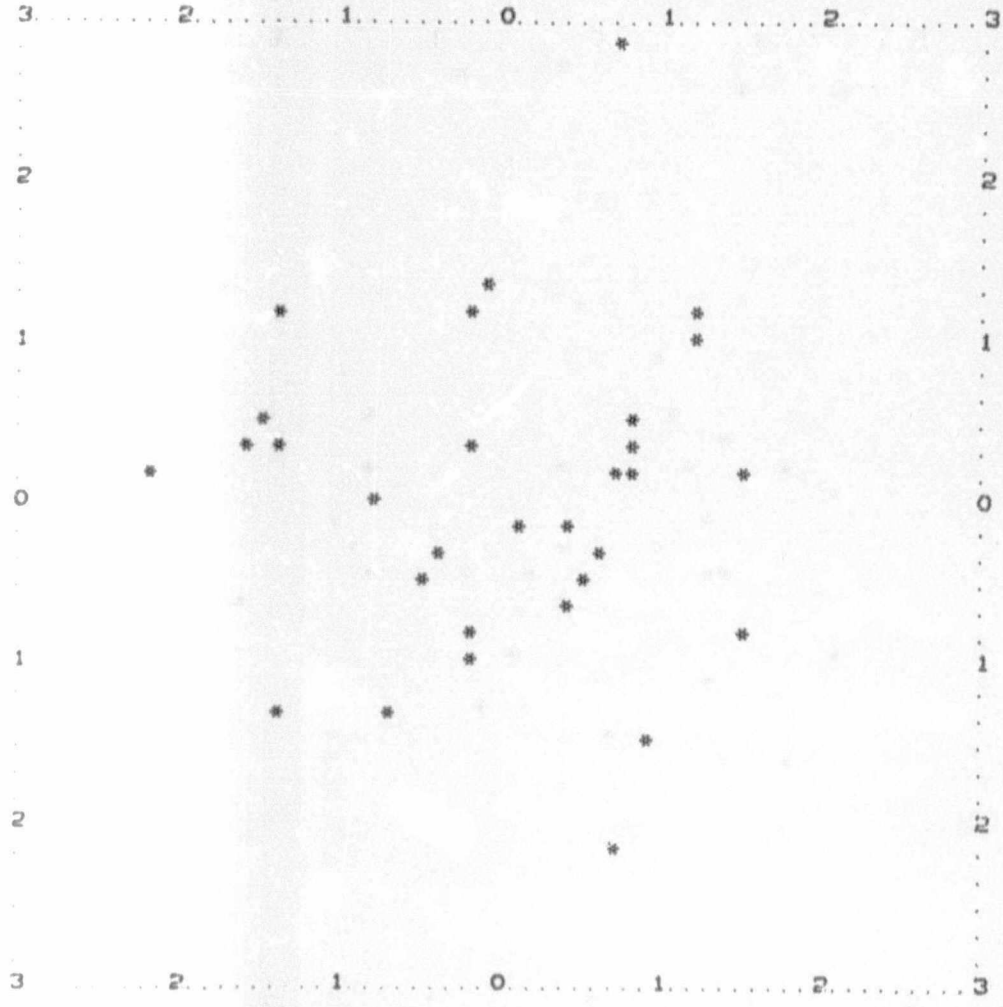
OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3.
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3.

X-AXIS IS FACTOR 1, Y-AXIS IS FACTOR 4

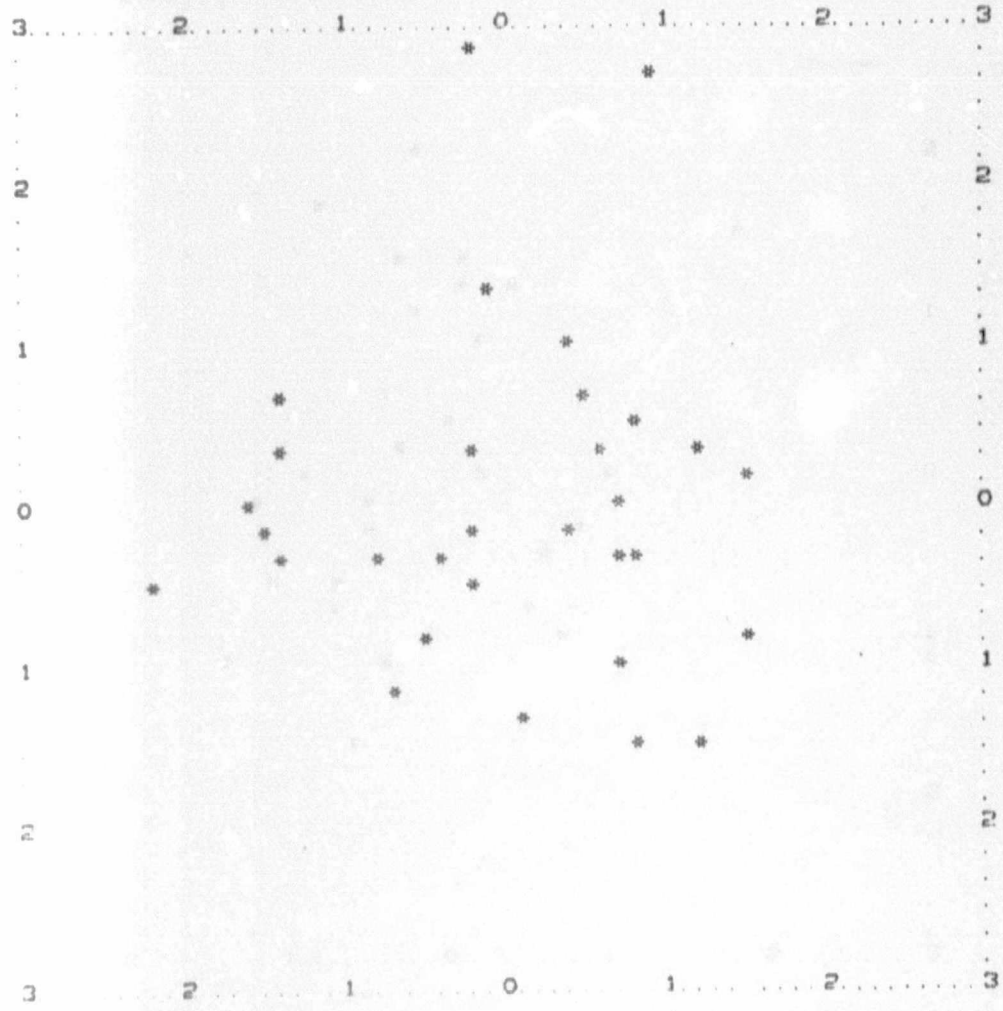


OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3

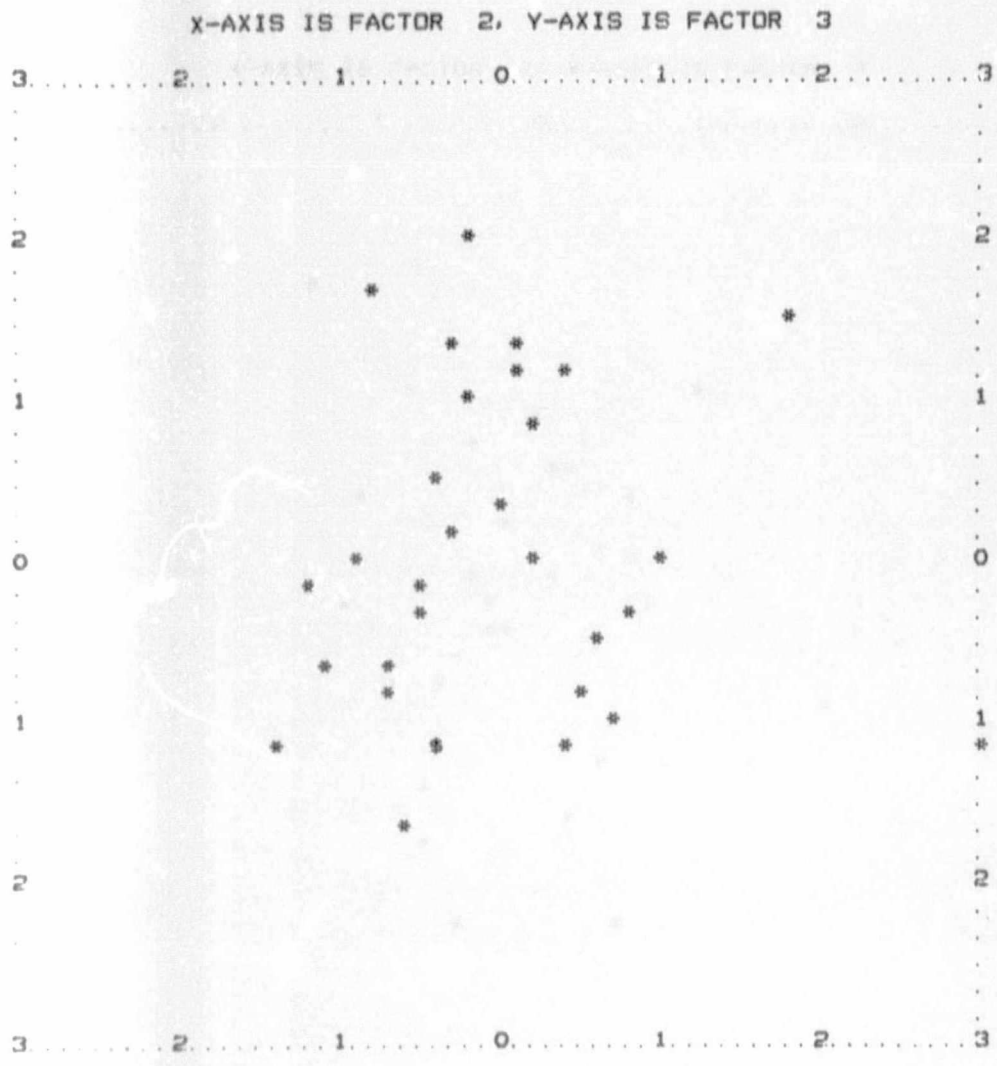
X-AXIS IS FACTOR 1, Y-AXIS IS FACTOR 5



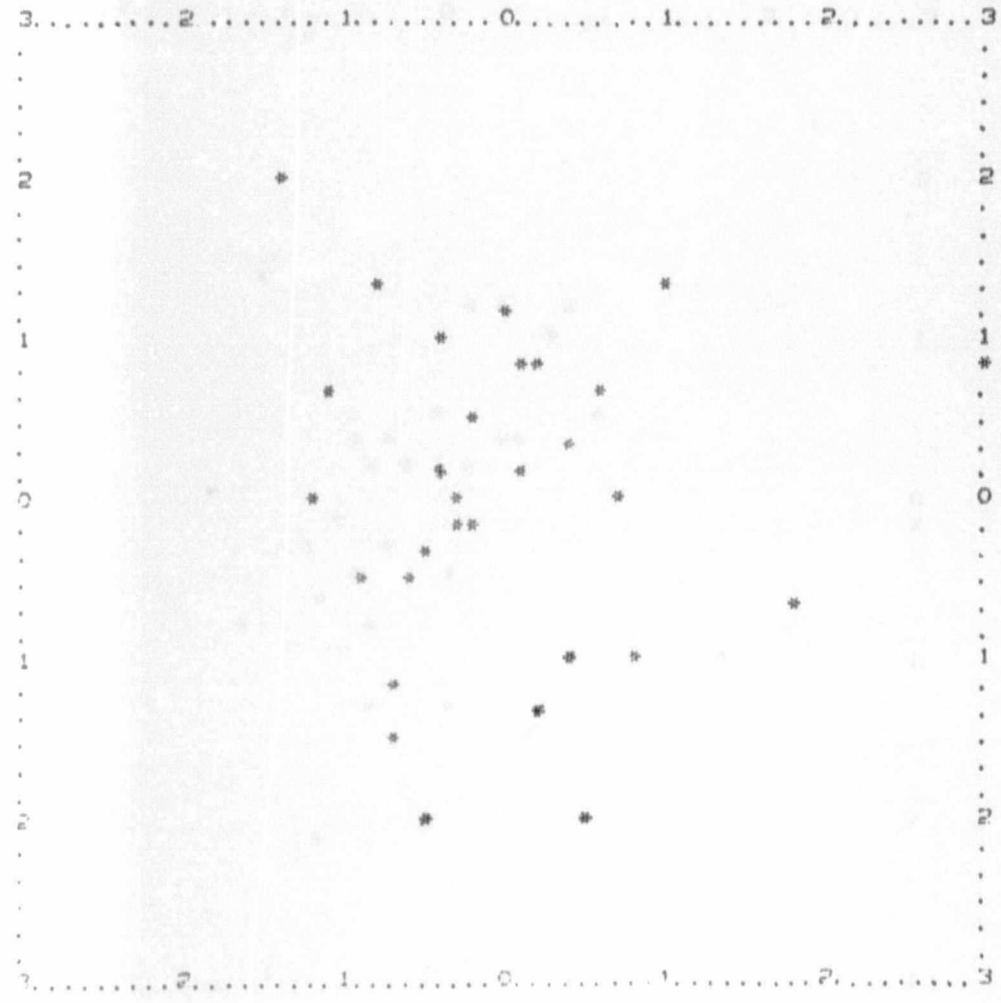
X-AXIS IS FACTOR 1, Y-AXIS IS FACTOR 6



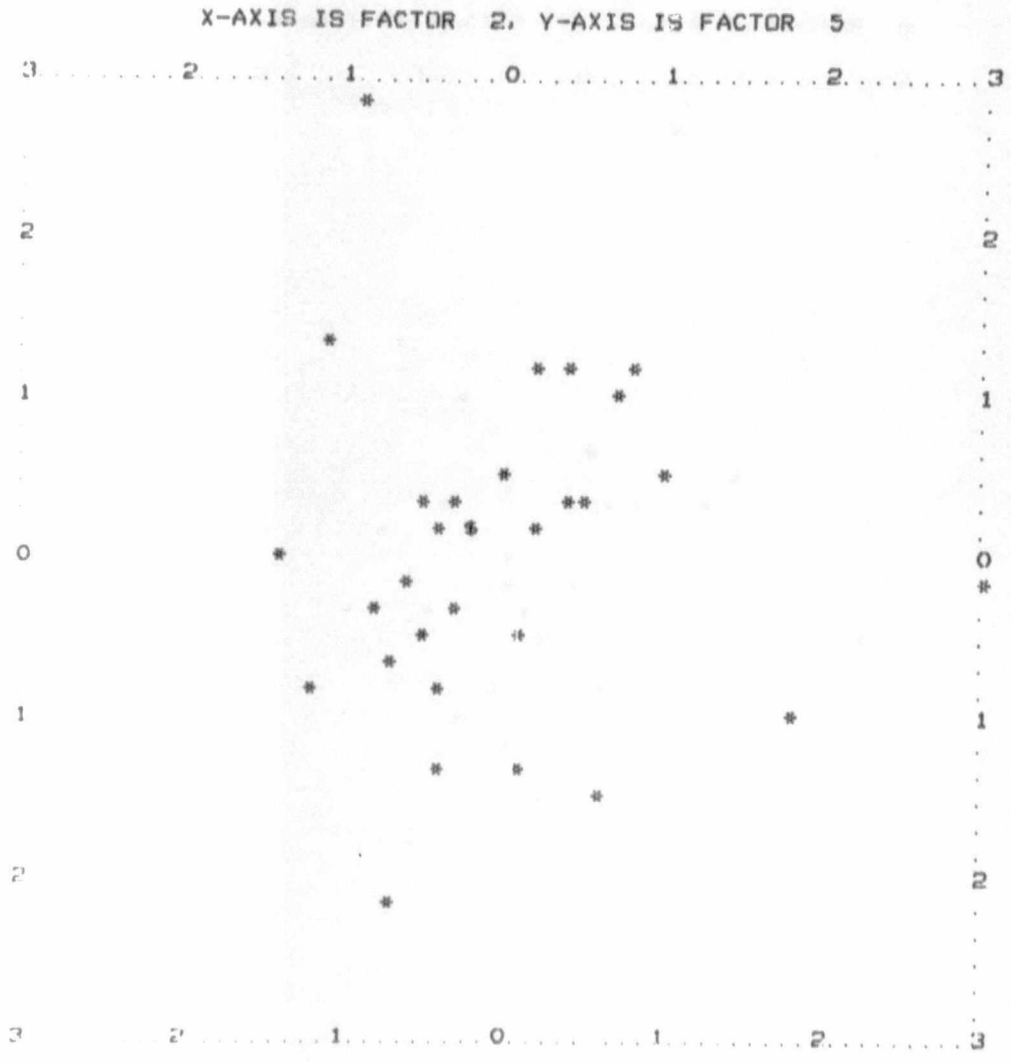
OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3.
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3.


X-AXIS IS FACTOR 2, Y-AXIS IS FACTOR 3
3 2 1 0 1 2 3
2
1
0
1
2
3

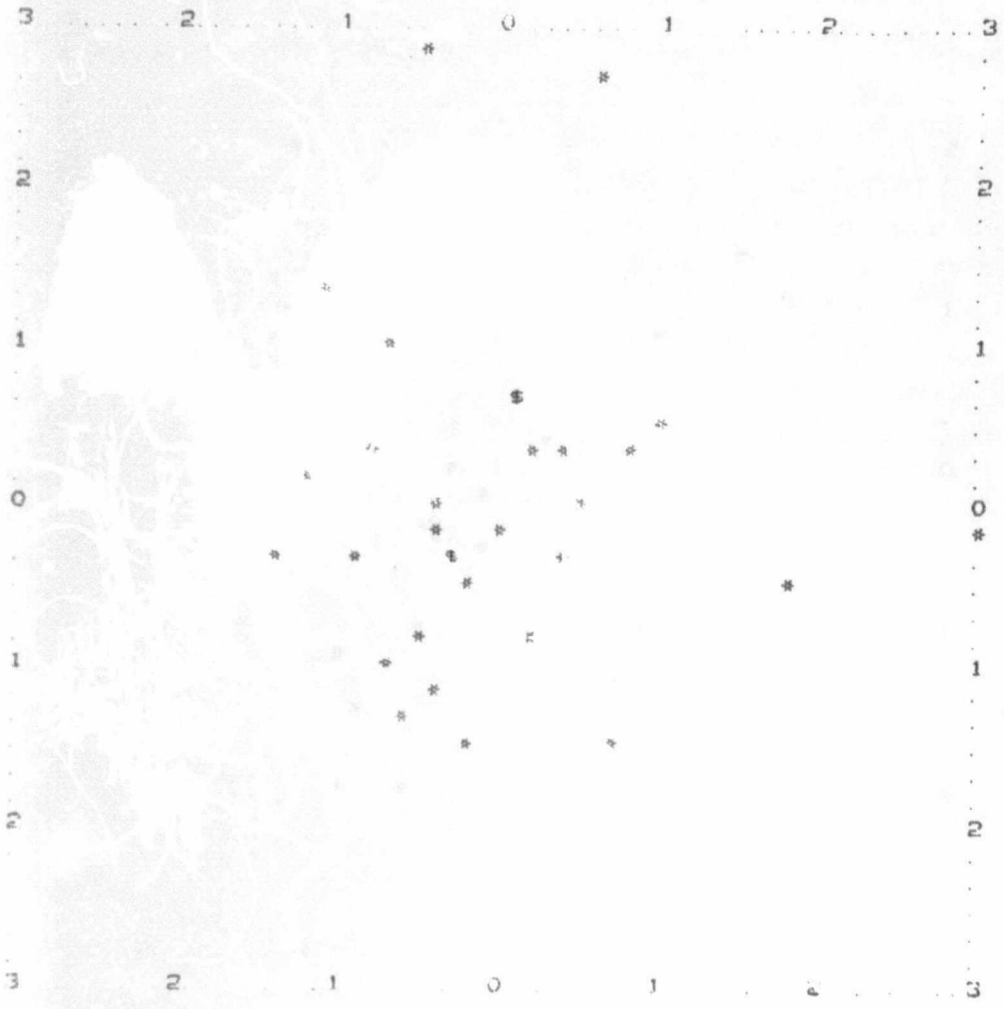
X-AXIS IS FACTOR 2, Y-AXIS IS FACTOR 4



OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3.
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3.

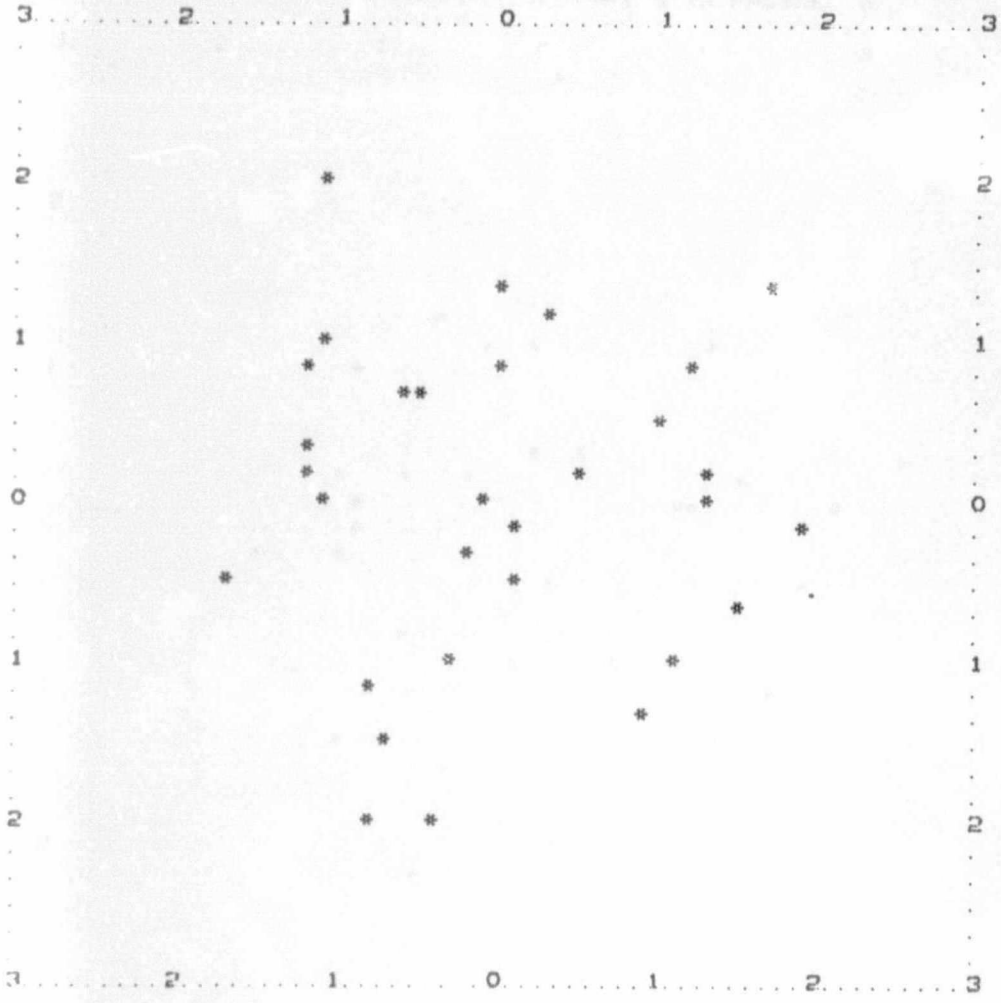

X-AXIS IS FACTOR 2, Y-AXIS IS FACTOR 5
3 2 1 0 1 2 3
2
1
0
1
2
3

X-AXIS IS FACTOR 2, Y-AXIS IS FACTOR 6

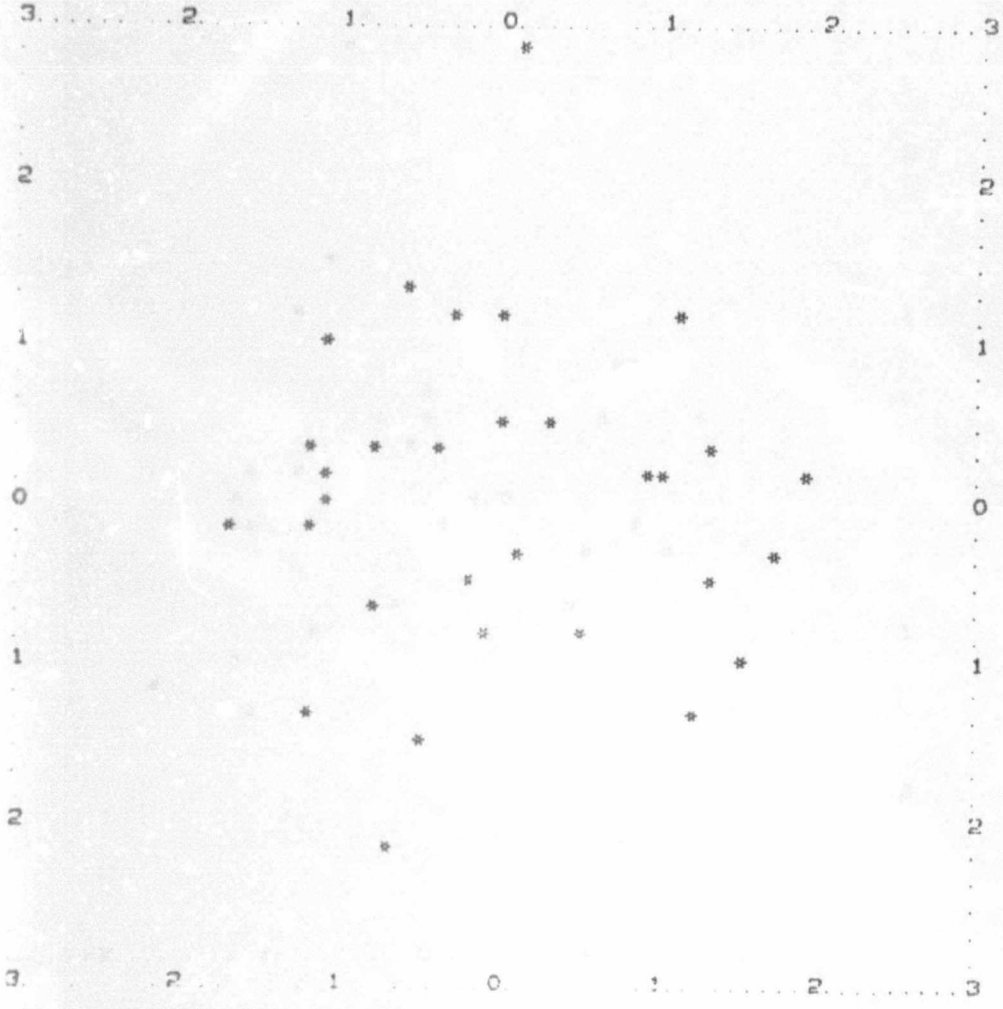


OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3.
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3

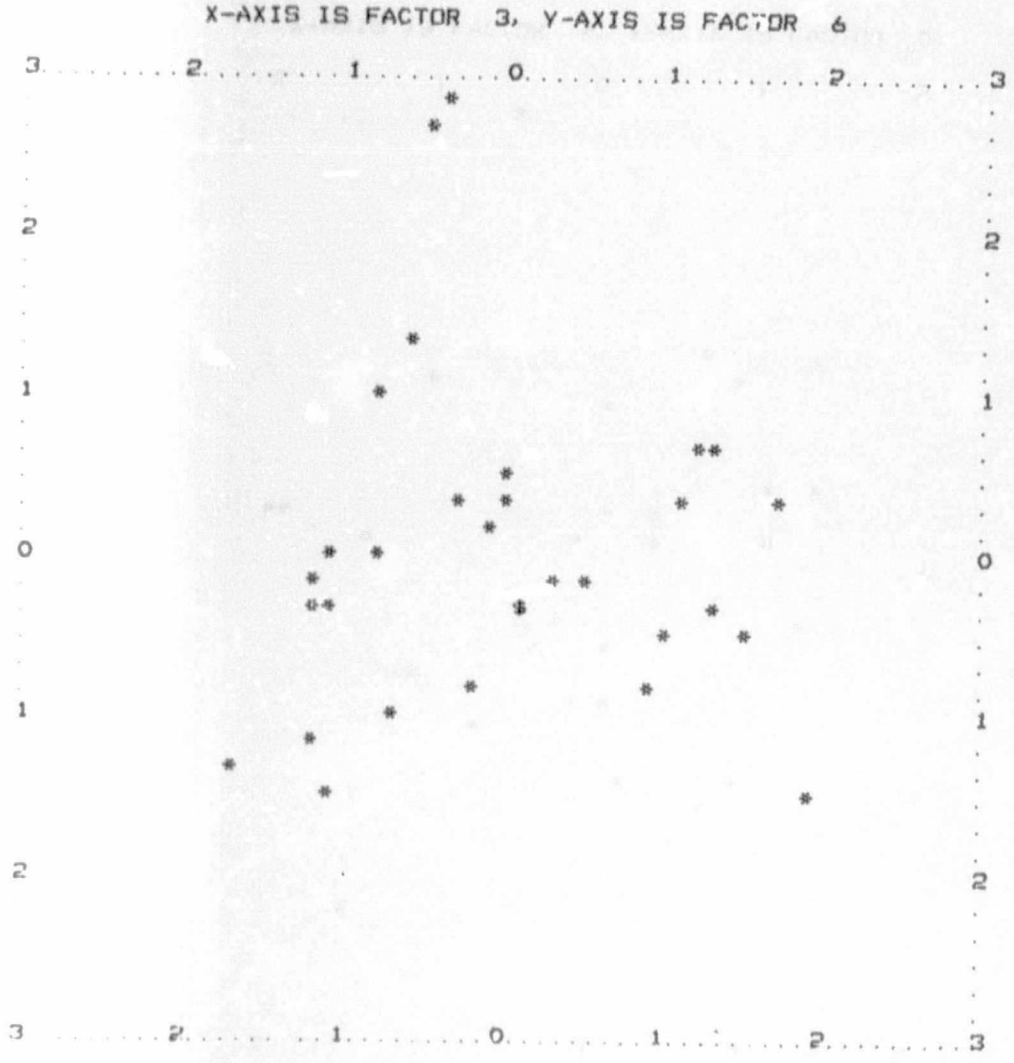
X-AXIS IS FACTOR 3, Y-AXIS IS FACTOR 4



X-AXIS IS FACTOR 3, Y-AXIS IS FACTOR 5



OVERLAP IS INDICATED BY A DOLLAR SIGN. SCALE IS FROM -3 TO +3.
FACTOR SCORES GREATER THAN 3 ARE PLOTTED AS 3.
FACTOR SCORES LESS THAN -3 ARE PLOTTED AS -3.


X-AXIS IS FACTOR 3, Y-AXIS IS FACTOR 6
3 2 1 0 1 2 3
2
1
0
1
2
3

Author Grossman David
Name of thesis Relations Between Ecological, Sociological And Economic Factors Affecting Ranching In The North Western Transvaal. 1988

PUBLISHER:
University of the Witwatersrand, Johannesburg
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