THE NORTHERN TERRITORY OF AUSTRALIA

Copy No. 1

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CABINET DECISION

NO. 840

Submission No.: 727

Title: CROCODILE FARMING

Cabinet approved:

(a) immediate identification of areas of land suitable for crocodile farming;

(b) preparation of guidelines for persons to tender for the establishment of a crocodile farm or farms;

(c) advertising as quickly as possible for persons, co-operatives or syndicates to establish crocodile farms in the Northern Territory;

(d) approach the appropriate Land Councils to see if they are interested in having a financial stake in a crocodile farming venture; and

(e) that the Co-ordinator General in conjunction with the Territory Parks and Wildlife Commission and Territory Development Corporation oversight implementation of any project.

Cabinet expressed the view that since the farming of crocodylus porosus is taking place in Queensland, these would presumably be suitable to be farmed in the Northern Territory.

(M.R. FINGER),
Secretary to Cabinet.

5 September, 1979.

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THE NORTHERN TERRITORY OF AUSTRALIA

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FOR CABINET

SUBMISSION No: 727

Title:	CROCODILE FARMING
Minister	THE HON. P.A.E. EVERINGHAM, CHIEF MINISTER
Purpose:	To establish a program leading to commercial exploitation of the N.T. Crocodile resource
Relation to existing policy:	The existing full protection policy is re-establishing the crocodile population as a potential economic resource
Timing/ legislative priority:	Growing public pressure to release the crocodile from full protection makes an early decision advisable
Announcement of decision, tabling, etc:	Public media release of the decision should follow advice to other responsible administrations
Acting required before announcement:	Seek concurrence from the Federal Minister responsible for the environment and the Council of Conservation Ministers
Staffing implications, numbers and costs, etc:	One scientist and one technical assistant should be added to N.T.P.S. staff at a total annual cost of: Salary $33 000; On-cost $33 000
Total cost:	Farm: Nett $275 000; Research staff $66 000 annually; Site not costed: Research facilities not costed

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MEMORANDUM

TO: CO-ORDINATOR GENERAL
Through : DIRECTOR-GENERAL

DATE: 24 AUG 1979

FROM: CHIEF MINISTER

REF:

RE: COMMERCIAL CROCODILE BREEDING FARM

Thank you for your memorandum of 20 August.

Although I have signed the attached submission, I cannot say that I am that keen to get the Government involved in crocodile farming. Whilst I am putting it forward to Cabinet, I am doing so on the basis of it being a discussion paper rather than giving it my complete support because I understand the crocodile farms in New Guinea are being run privately.

PAUL EVERINGHAM

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Department/Authority ..... DEPARTMENT OF THE TREASURY

COMMENT ON CABINET SUBMISSION No.

TITLE: ..... CROCODILE FARMING

COMMENTS:

Submission supported. Cabinet should be kept informed of progress on the project, particularly its financial viability, through annual reports.

SIGNED: A B ASHLEY

DESIGNATION: UNDER-TREASURER

DATE: 31 July 1979

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Department/Authority ..... DEPARTMENT OF LAW

COMMENT ON CABINET SUBMISSION No.

TITLE: ..... CROCODILE FARMING .....

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COMMENTS:

There are no constitutional barriers to this proposal.

There appear to be no legal barriers to this proposal providing that the necessary appropriation of funds for the project is made. Consideration may need to be given as to whether the project is to be administered within a Territory Department or by a Territory Statutory Authority.

SIGNED:

DESIGNATION: CROWN SOLICITOR

DATE: 8 August 1979

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Department/Authority ..... PUBLIC SERVICE COMMISSIONER

COMMENT ON CABINET SUBMISSION No.

TITLE: ..... COMMERCIAL CROCODILE FARMING

COMMENTS:

Assessment that the establishment of Commercial Crocodile Farming will require increase in N.T.P.S. staff of 2 plus employment of contract labour appears reasonable.

SIGNED: P. J. Bartholomew

DESIGNATION: P. J. BARTHOLOMEW for Public Service Commissioner

DATE:

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THE ISSUES

1. To decide on a method of implementing Cabinet Decision No. 168 which states approval in principle for the establishment of a commercial crocodile farm in the Northern Territory.

2. Because uncontrolled exploitation by slaughter in the wild put both Australian indigenous species in danger of extinction, the Northern Territory, together with Queensland and Western Australia, has adopted a policy of total protection.

3. Australian crocodiles are now listed in the "International Convention on Trade in Endangered Flora and Fauna" to which Australia is a party.

4. It follows from this protection situation that any proposal for renewed exploitation would need to be instituted in consultation and in co-operation with the Commonwealth, Queensland and Western Australia Governments.

BACKGROUND

5. After consideration of Cabinet Submission 146 on 11 November 1977, the Executive Member for Resources and Health was requested by Cabinet to report back with a firm proposal for implementation. Preliminary research and investigation was undertaken in the Territory Parks and Wildlife Commission.

6. On 30 January 1979, the Chief Minister instructed the Co-ordinator General to obtain in co-operation with the Territory Parks and Wildlife Commission and the Department of Industrial Development (now Department of Primary Production), details of commercial crocodile farming in New Guinea and find a suitable piece of land to be advertised for sale with certain covenants for commercial crocodile farming.

7. The work being done by the Territory Parks and Wildlife Commission was widened to include inquiry into the New Guinea operation. At the same time a consultant with experience in Rhodesia was commissioned to report on the feasibility of farming in the Territory.

8. On 26 March 1979, the Chief Minister further instructed the Co-ordinator General to examine the possibility of suggesting to the people at Garden Point establishment of a farm. The Co-ordinator General advised against such a suggestion pending the outcome of investigations then in progress.

9. The consultancy report was received in late May. On the basis of the costings provided, the prognosis for commercial farming was extremely gloomy. The report was found to be incomplete in essential details concerning labour and plant.

10. Officials of the Department of Primary Production then inquired further into the economic variables available to a farming enterprise and produced the series of options shown at Attachment "B".

11. Whilst the evaluation proved crocodylus porosus (salt-water crocodile) the more profitable animal to use, information received later makes it clear that sufficient numbers of breeders could be trapped only at very great expense (expert opinion $½ million). Crocodylus johnstoni (fresh-water crocodile) in adequate numbers can be trapped at nominal expense (as a by-product at no extra cost during current field research) and a further evaluation using this species has now been made (paragraph 12 refers). A research and experimental annexe to the farm could gradually collect porosus breeders for later development. The annexe could ultimately become the commercial supplier of crocodylus porosus breeders for the whole industry.

12. A development budget for a johnstoni commercial breeding farm using less expensive methods than required for porosus and combined with tourist facilities is at Attachment "C".

CONSIDERATION OF THE ISSUES

13. The issues to be considered are:

- Absence of knowledge of crocodile biology and husbandry;
- Economic viability of farming;
- Protection policy implications if farming is undertaken;

- Future harvesting from the wild when protection stabilizes the natural population; and
- The need for consultative machinery to co-ordinate control in co-operation with Queensland and Western Australia.

14. There are wide gaps in our knowledge of the breeding, morbidity, mortality, distribution and behavioural patterns of both porosus and johnstoni not only in the Northern Territory but also throughout the rest of the extensive Australian habitat. There is a need for full time research not only to evaluate the N.T. resource but also to monitor research and experimental work throughout the rest of Australia and the world. A recent attempt by a private operator to establish a farm-like rearing station failed when all captured hatchlings were lost to predators (eagles). It is noteworthy that the operator has been established on a rural property in the top-end since 1963. Operators with overseas farming experience would be faced with the need to modify their knowledge to suit N.T. animals and conditions. A demonstration farm employing methods developed on commercial breeding farms in other parts of the world and adapting them to local conditions and stock could provide insurance against early, possibly disastrous, establishment losses by private entrepreneurs.

15. Economic farming appears to be feasible only on the basis that an entrepreneur will have the financial stamina to operate for four years before receipts substantially exceed expenditure. The prospects for eventual profitable operation once the initial adaptation of overseas

techniques to N.T. conditions is completed appear to be good; provided managerial skills and technical expertise of the standard so obviously necessary are acquired. The hunt and slaughter methods previously used demanded no such skills.

16. The protection policy implications of renewed production flow from the national commitment to the International Convention referred to in paragraph 3. The Northern Territory Government may deal with its crocodile resource within its borders in any way it sees fit. Porosus is listed in Appendix 1 of the Convention. This means that products can not be exported. Change in this ranking permitting export will be possible only if hide production is from farm raised stock subject to proper supervision and management and provided nothing is done to further endanger wild populations.

17. The restrictions concerning johnstoni are not as rigorous. Very briefly, products may be sold on the world market provided it can be shown that production is under scientific management and is not endangering wild populations.

18. Harvesting from the wild, except for breeding, could not be contemplated until the population reaches stability again in consequence of the current protection policy, and both species emerge from endangered status. Adoption then of the pre-protection uncontrolled slaughter method of exploitation would see a speedy return to endangered

status. Adoption of the practices used in New Guinea at present would have a similar result. There are fears that the New Guinea operation will prove to be a conservation disaster.

19. Methods which have been developed in Florida for exploitation of the Mississippi alligator demonstrate that a strictly enforced protection policy can eventually be metamorphosed into a carefully supervised system of harvest from the wild. Recovery will not be achieved in the Northern Territory for several years yet and the question whether or not direct production from the wild should recommence must remain in abeyance until then. In the meanwhile, planning for regulated harvesting can proceed.

20. Co-operation with other authorities is addressed in a draft report by Graham J.W. Webb dated June 1978, on "The Status, Conservation and Management of World Crocodilians, and an Assessment of the Potential for Commercial Exploitation of Crocodiles in Australia". Webb suggests that a central consultative and liaison group should be established with representation from the wildlife authorities in Queensland, Northern Territory and Western Australia. This is supported as the first essential step leading to discharge of the obligation implicit in the Convention referred to above.

OPTIONS

21. Based on the information extracted from the consultancy report, the subsequent detailed economic evaluations, the national and international ramifications of the endangered status of Australian crocodiles, the growing public

awareness of the gradual recovery of the species and the need to fill the gaps in our knowledge of biology and husbandry, it is suggested that the Northern Territory Government has the following options available to it:

- Farming by private enterprise;
- Farming by private enterprise with Government financial and managerial involvement;
- Farming by Government for development and sale as a commercial enterprise;
- Farming by Government for development and sale as a commercial enterprise with a research and experimental annexe wholly Government run;
- Continuous protection without exploitation until population stability is re-established.

22. The range of farming options available does not offer early returns on outlay without the addition of tourist facilities. These must, therefore, be included. None of the options, except the last, relieves the Federal Government of its obligation under the International Convention without further attention to the methods by which trade in crocodile products meets the Convention's terms. All of the farming options are envisaged as commercial breeding farms.

23. Under the whole of the circumstances, the best possible compromise for eventual commercial development of the resource whilst at the same time demonstrating that the Territory is undertaking a comprehensive research and management program, producting good scientific data on

the status of wild populations; and exhibiting very tight control of commercial production, is the option for the Government to establish a commercial breeding farm; with an experiment and research annexe wholly Government run. Profitability of the farm should be established at about the same time as stability of wild crocodile populations is achieved. The farm could then be offered for sale to private enterprise.

24. This combination of initial Government commercial production with an experiment and research annexe and ultimate sale of the commercial breeding farm becomes accordingly the favoured option.

PUBLIC IMPACT

25. Implementation of the favoured option would provide a public demonstration of Government interest in developing the Northern Territory crocodile resource without recreating the indiscriminate slaughter which preceded imposition of the current protection, whilst at the same time accepting our national and international responsibiltiy for conservation of endangered species. By organising the farming operation to include provision for tourist participation, benefits will be created for those segments of the Territory economy which are involved with tourism.

26. Some adverse criticism may be directed at the research aspect of this proposal or the exclusion of private enterprise during the initial stages. Investigations just completed leave no doubt that the management and technical skills needed to run a successful commercial breeding farm do not exist in Australia and certainly were not needed in the earlier

exploitation of this resource by uncontrolled slaughter in the wild. Collection of information on farming methods from all authoritative sources throughout the world and practical application of those methods on a demonstration farm in the Northern Territory should disarm adverse criticism from thoughtful observers.

FINANCIAL CONSIDERATIONS

27. The Development Budget at Attachment "C" shows that the nett cash injection by the Government to establish the farm should be of the order of $275 000 if all assumptions hold good.

28. Expenditure exceeds receipts in the first year by this amount. In years two and three the estimates show a very slight excess of receipts over expenditure with this relationship becoming more firmly established from then on.

29. By year ten nett profits should be running at $100 000+ per annum.

30. Sites are available which meet the criteria specified by the farming consultant. What appears to be the best of these is a private lease at Humpty Doo, the acquisition of which has not been costed. Site cost is raised here as a possible commitment if a suitable area of Crown Land is not available. The proposed research staff will entail an annual salary and on-cost commitment of $66 000.

EMPLOYMENT IMPLICATIONS

31. The proposed farm will provide employment for six

persons including the manager as contract labour when fully established. The cost of such employment has been included in the developmental budget of the farm. The research and experiment annexe is expected to require the services of one professional and one technical employee of the Northern Territory Public Service and a small percentage of support services including administrative and policy oversight from the Territory Parks and Wildlife Commission. A possible further commitment will be the capital cost of buildings and equipment for the research annexe if existing facilities are found to be inadequate. Adequate facilities exist conveniently close to the best site referred to in paragraph 30.

COMMONWEALTH RELATIONS

32. The favoured option raises implications for relations with the Federal Government in the context of the International Convention referred to already. Establishment of our research and monitoring programs will need concurrence of the Commonwealth Minister responsible for the environment. There is, in addition, the need to establish acceptance of our research, experimental and ultimate developmental program with other jurisdictions embracing the Australian crocodile habitat. The forum where relevant questions may be raised is the Council of Nature Conservation Ministers and its standing working groups. The Northern Territory Government is represented on this Council by the Chief Minister with support from officials of the Territory Parks and Wildlife Commission.

CO-ORDINATION

33. This Submission has been prepared in consultation by the Chief Minister's Department (Co-ordinator General), Territory Parks and Wildlife Commission, Department of Primary Production and Territory Development Corporation. The Submission in initial draft form was additionally circulated to the Public Service Commissioner, Treasury, Department of Law and Department of Lands and Housing for their views. With one exception, the conclusions and recommendations which appear herein reflect the views of those agencies. The exception is the question of direct involvement of private enterprise from the beginning. This is advocated by the Department of Lands and Housing and the Territory Development Corporation. It is the majority view of the Departments and Authorities consulted that the favoured option is best suited to reconciling the conflicting and complex influences which bear on this subject and should remain as the recommendation.

LEGISLATION

34. If the favoured option is adopted there will arise no immediate need for amendments to existing legislation. Subordinate legislation may need expansion in the long term.

PUBLICITY

35. There should be no general publicity given to action in pursuit of the favoured option until formal advice has been sent to the Federal Minister responsible for the environment and the Council of Nature Conservation Ministers. Subject to this constraint, a media release along the lines

of Attachment "A" is recommended.

TIMING

36. Whilst the question whether or not a commercial crocodile farm should be established is not urgent, the growing public awareness of the increase in the crocodile population and the concomitant pressure for renewal of production makes it necessary that action be set in train by the Government without unnecessary delay.

RECOMMENDATIONS

37. It is recommended that Cabinet approves:

1. Establishment of a Government run commercial crocodile breeding farm under the administrative superintendence of the Territory Parks and Wildlife Commission.
2. Sale of the farm to private enterprise once commercially established.
3. Establishment in principle of a Government run research and experimental annexe to the farm.
4. Presentation of the proposal for establishment of the farm and annexe to the Council of Nature Conservation Ministers for endorsement.
5. A formal approach to the Federal Minister responsible for the environment for endorsement of the farm and the research and experimental annexe.

6. Approaches to the Governments of Queensland and Western Australia suggesting establishment of a consultative group of officials in relation to the crocodile resource of North Australia.

PAUL EVERINGHAM

MEDIA RELEASE

Commercial prospects for crocodile farming in the Top End of the Northern Territory are to be tested.

The Territory's Chief Minister, Mr. Paul Everingham, said evidence that crocodile populations were recovering from the near extinction of a few years ago, made it necessary to plan for ordered renewal of commercial operations.

"Research over recent years has increased understanding of the two species native to Australia," Mr. Everingham added. "But as both are still classified as in danger of extinction, hides can be exported only if they are taken from farm-bred animals."

Mr. Everingham said that in past years, there had been uncontrolled slaughter in the wild in the search for crocodile hides. This had brought the hunted animals to the brink of extinction.

"Investigations of commercial farming overseas have shown that special management and technical skills are essential for any 'farming' of crocodiles," Mr. Everingham said.

"As this expertise has not previously been developed in Australia, the Government intends to establish a farm to determine and demonstrate the techniques of farming crocodiles profitably so that interested people can learn the skills needed for success.

The farm will be open to the public, and I hope will become a tourist attraction.

Eventually, if it proves to be profitable, the farm will be sold as a going concern."

Mr. Everingham said that when establishing the farm, the Government would set up a research and experiment annexe which would monitor all research activity related to Australian crocodiles. As well, it would carry out investigations to fill gaps in the knowledge of such things as breeding, feeding, morbidity, mortality, and behavioural patterns.

Mr. Everingham pointed out that Australia's endorsement of the International Convention against trading in endangered species of fauna and flora prevented exploitation of crocodiles in the wild and the export of hides and products from them.

However, this did not apply to farm-bred crocodiles which could provide a valuable source of income.

"Apart from this, a policy of full protection will continue", Mr. Everingham emphasised.

"It will be a long time, if ever, before crocodiles will again be hunted in the wild for their hides."

ATTACHMENT "B"

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CROCODILE FARMING IN THE NORTHERN TERRITORY

AN ECONOMIC EVALUATION

By

A HEAP AND G SHIELDS, ECONOMISTS,
DIVISION OF PRIMARY INDUSTRY, DARWIN.

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CROCODILE FARMING IN THE NORTHERN TERRITORY - AN ECONOMIC EVALUATION

1. INTRODUCTION

The two Australian species of crocodile are the saltwater (Crocodylus porosus) and the freshwater (Crocodylus johnstoni).

Over the last ten years the life and habitat of these two Australian species has been closely studied by researchers like Messel and Webb. However very little has been achieved in the establishment of crocodile farming on a sound commercial basis.

While much research still needs to be undertaken into the productive capacities of crocodile under Australian climatic conditions, the opportunity to more rigourously assess the potential has been hastened by the importation of expertise in the field from Rhodesia.

Mr David Higgins, a Rhodesian crocodile farmer has been employed by the Territory Parks and Wildlife to evaluate the conservational requirements of crocodiles and the potential for domesticated farming in the NT. In this capacity he has produced a report in which he attempts to relate his crocodile farming experience in Rhodesia to an assessment of development prospects for crocodile farming in the Northern Territory.

This report has been thoroughly examined and during compilation a close liaison between Higgins and the Division of Primary Industry has been maintained. As a result the Economics and

.../2

Marketing Sub-section have been asked to prepare feasibility budgets under a range of possible development options open to potential crocodile farmers.

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2. AIMS AND OBJECTIVES

1. To assess the feasibility of domesticated crocodile farming inclusive and exclusive of income from tourism.

2. To select the most appropriate options.

3. Make recommendations to government on future development action.

3. CONCLUSION

1. Domesticated farming of Johnstoni (fresh water) and Porosus (saltwater) crocodile does not achieve breakeven profitability under any production and harvesting option without supplementary income due to the cost of capital and servicing cost thereon expended in establishing respective enterprises.

2. While the returns from Porosus harvesting exceed that of Johnstoni by approximately 1/3, without at least $100,000 unencumbered capital to invest, neither enterprise could be contemplated without supplementary income in the development stage.

3. The most profitable option is Porosus farming based on egg collection and livestock catching in year one combined with income from Tourism. The breakeven year assuming all borrowed funds and at an interest rate of 10%, is year 7.

4. The second most profitable option is the combined production of Porosus and Johnstoni with income from Tourism adopting the same catching options as above and in this case breakeven is achieved in Year 9.

5. Production of Johnstoni combined with Tourism

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achieves breakeven returns at around year 13.

6. Little is known about the breeding habits of either species in captivity and therefore may justify the production of Johnstoni and Porosus on research grounds. However such experimentation could not be argued on economic grounds for the Johnstoni species.

In view of the effect of large capital borrowings on repayment ability in the early years of enterprise establishment (Y1-4), the need to derive production returns in minimum time is high. Thus it is suggested that collection of eggs from wild breeding areas as a "once only" exercise be supported. Further owing to the uncertainty surrounding breeding capacities of both species (estimated at not sooner than one year in captivity) egg collection becomes something of a hedge against lower than expected breeding rates in year 2.

OPTION 1 (APPENDIX 3)

FARMING WITH C POROSUS (SALTWATER) SPECIES - Harvesting of eggs and breeding stock from the wild.

PRODUCTION

To produce 2,000 C porosus hatchlings per annum 50 adult females and 10 adult males would be required. This is based on the assumption that the females have settled into their new habitat and are producing eggs at the same level as when they were in their native environment. Also the level of breeding stock has been calculated on the assumption that all males and females captured will be productive. Whilst this is possible, it is by no means certain and some allowance should be made for this contingency (ie by increasing C porosus captures by 2 extra males and 4 extra females).

The number of breeding stock required for the farm will be 54 females and 12 males. Based on the mortality rates provided in Appendix 1 (a) 54 C porosus females should provide the farm with 1,300 3 year old crocodiles which can be used for belly skin production (ie 50 x 26 - allowing for mortalities in both breeding and growing stock, plus infertile breeding stock).

In Years 1 and 2 the adult breeding stock and 2,500 eggs will be taken from the wild.

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The production pattern for both species is shown in Appendix 1 (b).

RETURNS

The current prices offered for C porosus, from the French and Singapore tanneries, is $8.59 per inch and $9.11 per inch respectively and this is ~~as~~ an on farm price. If we assume all skins are marketed in the 12" - 20" range average 14" then the following return per annum from Year 5 onwards may be realised on the two different markets.

France - 1,300 y.o. x 14" (average belly skin) x $8.59 = $156,338

Singapore - 1,300 3 y.o. x 14" (average belly skin) x $9.11 = $165,802

The return on the Singapore market will be used in this report.

CAPITAL REQUIREMENT

In his report Higgins listed most of the capital items and running costs that would be incurred in the operation of a modern crocodile farm.

The main plant and machinery requirements are -

Hatching pens - 6 double pond units

Yearling & grower pens - 13 single pond units (2 ponds each)

Adult breeding pens

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One 30cu ft deep freeze unit

Incubation/Hatchling Room Complex

Butchery/Deep Freeze Complex

Perimeter fencing for 5 acres

One diesel powered generator (10kva)

One 20hp diesel engine and centrifugal pump

500 metres of 100mm diameter "0" polythene piping

One second-hand medium sized tractor and implements

Finance will also be required for the purchase of feed for the crocodiles plus the payment of running costs, wages, electricity, telephone, repairs and maintenance etc.

Buildings [1.]	Construction Year	Cost
Hatchling Ponds - 6 double pond units	1	35796
Yearling 2 y.o., 3 y.o. ponds - 13 single pond units ($7064 each) (2 ponds with fencing in between)	2	91832
Adult breeding pens - 7x¼ acres fenced ponds (3083)	1	21581
Incubation/Hatching Room Complex	1	23000
Butchery/Deep Freeze Complex	1	27000
Perimeter fencing for 5 acres	2	10000
Demountable - toilet, change room, eating area	1	5000

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1. QUOTES PROVIDED BY JOHN HOLLAND

Machinery and Equipment	Construction Year	Cost
One 30cu ft deep freeze unit	1	1500
One diesel powered generator	1	6050
One 20hp diesel engine and centrifugal pump	1	4500
One second-hand medium sized tractor & implements	1	5000
500 metres of 100mm. diameter "0" polythene piping	1	4800
Four wheel drive Toyota	1	5000
Small craft & rigging	1	4000
Other equipment	1	4000

Replacement of generator plus engine and pump in year 7.

Replacement cost = 1979 cost plus 10% per annum compound interest

Generator - replacement cost = $9743

Engine & pump " " = $7248

Replacement of vehicle in year 7 @ an estimated cost = $10,000-

FEED SUPPLY

The cost of feed for the growing stock and adults along with their requirements are shown in Appendix 2.

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LABOUR REQUIREMENT

In years 1 and 2 labour may be required for the capturing of adult breeding stock and harvesting of eggs from the wild. Assume that the owner/operator is assisted by two men in years 1 and 2.

In years 3 to 4 inclusive three men will be needed to carry out the day to day operation of the farm. In year 5 six men will be needed because this is when skin production commences.

Cost of labour [1]. - $12,000 per man per annum - includes group tax but excludes other allowances.

Year	Cost($)
1	24000
2	24000
3	36000
4	36000
5	72000
6	72000
7	72000
8	72000
9	72000
10	72000

1. No allowance has been made for the owner/operator.

.../11

LAND

A number of potential sites are being investigated. Two options are open to the proponent -

1. Buy land
2. Be given a special purpose lease

In the budget I have used option 2 where a special purpose lease is granted for a period of time say 40 years at a yearly rental of $200.

Year 1 - year 10 lease rental at $200 pa

ELECTRICITY AND TELEPHONE

Estimate $2,000 per annum

RUNNING EXPENSES

Repairs and maintenance - plant and machinery

Year 2-6

Generator - 10% x $6050	= $605
Engine & pump - 10% x $4500	= $450
Tractor - 10% x $5000	= $500
Vehicle - 10% x $5000	= $500

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Year 7-10

Generator - 10% x $9743	= $974
Engine & pump - 10% x $7248	= $725
Tractor - 10% x $5000	= $500
Vehicle - 10% x $10,000	= $1000
Fuel - diesel, petroleum, oil & grease	= $4000 per annum

Sundry Expenses

Accountants Fee	$500 per annum
Stationery	$100 per annum
Workers Comp	10% of Gross Salary

DEVELOPMENT BUDGET

The feasibility budget for option 1 is shown in Appendix 3.

The deficit after 10 years is $673,226-

.../13

OPTION 2 (APPENDIX 4)

FARMING WITH C JOHNSTONI (FRESHWATER) SPECIES - Harvesting of eggs and breeding stock from the wild.

PRODUCTION

To produce 2,000 C johnstoni hatchlings per annum 188 adult females and 38 adult males would be required. This is based on the assumption that the females have settled into their new habitat and are producing eggs at the same level as when they were in their native environment. Also the level of breeding stock has been calculated on the assumption that all males and females captured will be productive. Whilst this is possible, it is by no means certain and some allowance should be made for this contingency (ie by increasing C johnstoni captures by 6 extra males and 12 extra females). The number of breeding stock required for the farm will be 200 females and 44 males. Based on the mortality rates provided in Appendix 1 (a), 200 C johnstoni females should provide the farm with 1,300 3 year old crocodiles which can be used for belly skin production (ie 188 x 6.9 - allowing for mortalities in breeding and growing stock, plus infertile breeding stock).

In years 1 and 2 the adult breeding stock and 2,500 eggs will be taken from the wild.

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RETURNS

The current prices offered for C johnstoni, from the French and Singapore tanneries is $2.25/ inch and $6.63/inch respectively and this is an on-farm price. If we assume all skins are marketed in the 12" - 20" range average 14" then the following returns per annum from Year 5 onwards may be realised on the two different markets.

France - 1,300 3 y.o. x 14" (average belly skin) x $2.25 = $40,950

Singapore - 1,300 3 y.o. x 14" (average belly skin) x $6.63 = $120,666

The return on the Singapore market is used in this report.

CAPITAL REQUIREMENT

The capital requirement for construction for C johnstoni will be much the same as for the C porosus with one exception. An extra 22 adult breeding pens will be required in year 2, to house the adult males and females. 22 adult breeding pens @ 3,083 = 67,826. Also on the feeding site additional food will be required for the extra adult breeding stock.

Extra adult C johnstoni breeding stock -

146 females

32 males

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Extra feed requirement/annum - male - 146 x 102 kg = 14,892kg
female - 32 x 408kg = 13,056kg
27,056

The total feed requirement and cost is shown in Appendix 2.

All other costs will be the same as for the C porosus farm alternative.

DEVELOPMENT BUDGET

The feasibility budget for option 2 is shown in Appendix 4.

The deficit after 10 years is $1,368,346-

.../16

OPTION 3 (APPENDIX 5)

C POROSUS AND C JOHNSTONI FARM (50-50) - Harvesting of eggs and breeding stock from the wild.

PRODUCTION

To produce 1,000 C porosus hatchlings and 1,000 C johnstoni hatchlings the following breeding stock will be required.

C porosus[1.] - 27 adult females
6 adult males

C johnstoni[1.] - 94 adult females
19 adult males

1. An allowance has been made for mortalities in breeding stock.

The above level of production will mean that 650 C porosus and 650 C johnstoni will be available for hide production in Year 5.

In years 1 and 2 adult breeding stock will be captured along with 1250 eggs of both species.

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RETURNS

Crocodiles

Based on Singapore prices the following return may be achieved.

C porosus - 650 3 y.o. x 14" x $9.11	=	$82,901
C johnstoni - 650 3 y.o. x 14" x $6.63	=	$60,333
Total Return		$143,234

TOURISM

Year	Income ($)
1	NIL
2	74370
3	80692
4	87550
5	94992
6	103066
7	111826
8	121372
9	130434
10	140868

CAPITAL REQUIREMENT

Compared to C porosus (option 1) extra capital will be needed for the construction of additional adult breeding pens and for the purchase of additional food requirements.

Adult breeding pens - year 1 - extra 10 required @ 3083 = $30,830

Feed required - extra 67 females @ 102kg/annum @ 30¢/kg = $ 2,050

(Yr 1 - Yr 10) extra 13 males @ 408kg/annum @ 30¢/kg = $ 1,591

$ 3,641

DEVELOPMENT BUDGET

The feasibility budget for option 3 is shown in Appendix 5.

The deficit after 10 years is $1,003,842.

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OPTION 4 (APPENDIX 4)

FARMING WITH C POROSUS (SALTWATER) SPECIES - No harvesting of eggs from the wild.

If no eggs are harvested from the wild no income will be generated in year 5 and associated with this will be a saving in feed and labour costs.

Saving in feed cost - Year 2 = $3300
Year 3 = $3780
Year 4 = $7581
Year 5 = $4290
$18951

Saving in labour cost - 3 men @ 12,000 = $36,000
+ worker's compensation = 3,600
$39,600

Therefore the deficit at the end of Year 10 will be $780,517 (ie 673,226 + 165,802 - 18951 (saving in feed cost) -39600 (saving in labour cost)).

This is $107,291 more than the deficit at the end of Year 10 for the C porosus enterprise where eggs are harvested from the wild.

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OPTION 5 (APPENDIX 4)

FARMING WITH C JOHNSTONI (FRESHWATER) SPECIES - No harvesting of eggs from the wild.

No income will be received in Year 5 and the savings in feed and labour costs will be the same as Option 4.

∴ Deficit at the end of Year 10 = 1368346 + 120666 - 18951
- 39600

= $1,430,461

This is $62,115 more than the deficit at the end of Year 10 for the C johnstoni enterprise where eggs are harvested from the wild.

OPTION 6 (APPENDIX 5)

FARMING WITH C POROSUS (SALTWATER) AND C JOHNSTONI (FRESHWATER) - No harvesting of eggs from the wild.

No income will be received in Year 5 and the savings in feed and labour costs will be the same as option 4 and option 5.

∴ Deficit at the end of Year 10 = 1003842 + 143234 = 18951
- 39600

= $1,088,525

This is $84,683 more than the deficit at the end of Year 10 for the combined enterprise where eggs are harvested from the wild.

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OPTION 7 (APPENDIX 6)

FARMING WITH C POROSUS (SALTWATER) SPECIES - Harvesting of eggs and breeding stock from the wild + tourism.

PRODUCTION

See Option 1.

RETURNS

Crocodiles

Year 5 - Year 10 inclusive - $165,802 per annum.

TOURISM

In 1977/78 90,248 tourists visited the Top End of the Northern Territory. A fair percentage of these tourists use organised tours to familiarize themselves with the Top End and these tours usually have specified ports of call.

If a crocodile farm was established it would probably be incorporated as a point of call and thus if an estimate could be placed on the number of people using organised tours then a reasonably accurate estimate passing through this new attraction could be calculated. In personal communication with Michael Grant of the NT Tourist Board he stated that a large number of people used packaged tours when they visit the Top End. Also some of the people arriving via their own means use the services of local tour operators. He could not place a concise figure on the number using organised

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tours but he stressed that the figure used by Higgins (20%) seemed to be a bit low. A figure of 35% would seem to be more realistic and this figure will be used in the calculation of returns from the tourist side of the project. A growth rate of 8.5% will be used for the yearly increase in the number of tourists visiting the Top End (see page 54 Higgin's report).

Income from Tourism will commence in Year 2 where eggs are taken from the wild and in Year 3 if this is not allowed.

	Total Tourists	Croc Farm (35%)
Year 1		
Year 2 - 1981	106,242	37,185
Year 3 - 1982	115,273	40,346
Year 4 - 1983	125,071	43,775
Year 5 - 1984	135,702	47,496
Year 6 - 1985	147,237	51,533
Year 7 - 1986	159,752	55,913
Year 8 - 1987	172,532	60,386
Year 9 - 1988	186,335	65,217
Year 10 - 1989	201,241	70,434

Assume the average tourist expenditure is $2 per head over the ten years made up of an entrance fee and the purchase of souveniers.

Entrance Fee : $2.00 head adults
50¢ head for children

Souvenier : $1.00 per head

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INCOME FROM TOURISM

	Income ($)
Year 1	Nil
2	74,370
3	80,692
4	87,550
5	94,992
6	103,066
7	111,826
8	121,372
9	130,434
10	140,868

CAPITAL REQUIREMENT

An extra $50,000 will be needed for the Tourist Shop/Kiosk/Toilet block complex and this will be staffed by a female on a wage of $10,000 per annum from Year 1 onwards.

DEVELOPMENT BUDGET

The feasibility budget for option 7 is shown in Appendix 6.

The surplus after 10 years is $428,537.

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OPTION 8 (APPENDIX 7)

FARMING WITH C JOHNSTONI - Harvesting of eggs and breeding stock from the wild + Tourism.

PRODUCTION

See Option 2.

RETURNS

Crocodiles

Year 5 - Year 10 inclusive - $120,666.

TOURISM

Year	Income ($)
1	Nil
2	74,370
3	80,692
4	87,550
5	94,992
6	103,066
7	111,826
8	121,372
9	130,434
10	140,868

.../25

CAPITAL REQUIREMENT

An extra 50,000 will be needed for the Tourist Shop/Kiosk/Toilet Block complex and this will be staffed by a female on a wage of $10,000 per annum from Year 1 onwards.

DEVELOPMENT BUDGET

The feasibility budget for option 8 is shown in Appendix 7.

The deficit after 10 years is $142,563.

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OPTION 9 (APPENDIX 8)

FARMING WITH C POROSUS AND C JOHNSTONI - Harvesting of eggs and breeding stock from the wild + Tourism.

PRODUCTION

See Option 3.

RETURNS

Crocodiles

Year 5 - Year 10 inclusive - $143,234.

TOURISM

Year	Income ($)
1	Nil
2	74,370
3	80,692
4	87,550
5	94,992
6	103,066
7	111,826
8	121,372
9	130,434
10	140,864

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CAPITAL REQUIREMENT

An extra 50,000 will be needed for the Tourist Shop/Kiosk/Toilet block and this will be staffed by a female on a wage of $10,000 per annum from Year 1 onwards.

DEVELOPMENT BUDGET

The feasibility budget is shown in Appendix 8.

The surplus after 10 years is $165,238.

OPTION 10

FARMING WITH C POROSUS (no harvesting of eggs from the wild) + TOURISM

If no eggs are harvested from the wild then no income will be generated from the sale of skins in Year 5 and associated with this will be a saving in feed and labour costs.

Therefore the surplus at the end of Year 10 will be 321,286 (428537 - 165802 + 18951 + 39600).

This is 107,251 less than the surplus at the end of Year 10 for the C porosus and tourism enterprise where eggs are harvested from the wild.

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OPTION 11

FARMING WITH C JOHNSTONI (No harvesting of eggs from the wild) + TOURISM

If no eggs are harvested from the wild then no income will be generated from the role of skins in Year 5 and associated with this will be a saving in feed and labour costs.

Therefore the deficit at the end of Year 10 will be 204,678. (ie 142563 + 120666 - 18951 - 39600).

This is $62,115 more than the deficit at the end of Year 10 for the C johnstoni and tourism enterprise where eggs are harvested from the wild.

OPTION 12

FARMING WITH C POROSUS AND C JOHNSTONI (No harvesting of eggs from the wild) + TOURISM

If no eggs are harvested from the wild then no income will be generated from the role of skins in Year 5 and associated with this will be a saving in feed and labour costs.

Therefore the surplus at the end of Year 10 will be $80,555 (ie 165238 - 143234 + 18951 + 39600).

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This is $84,683 less than the surplus at the end of Year 10 for the combined enterprise where eggs are harvested from the wild.

APPENDIX 1(a)

PRODUCTION - SALTWATER (C porosus) AND FRESHWATER (C johnstoni)

The number of eggs produced (clutch) by the two different species in their native habitat is shown below -

	C porosus	C johnstoni
Mean clutch size	50	13.3
Range	40 to 62	11 to 15
Sample	18	4

The mortality rate for both species in captivity is based on Rhodesian figures.

SALTWATER (C porosus) FEMALE

	Mortality Rate (%)
50 eggs (42-62 range)	
	20
40 hatchlings	
	30
28 yearlings	
	5
27 2 y.o.	
	2
26 3 y.o. for belly skin production	

FRESHWATER (C johnstoni) FEMALE

13.3 eggs (11-15 range)	
	20
10.6 hatchlings	
	30
7.4 yearlings	
	5
7.0 2 y.o.	
	2
6.9 3 y.o. for belly skin production	

Newly captured adult stock will generally only "settle" to mating in their second season after capture. The first year can be regarded as the establishment period, when the readjustments to the new surroundings are being made.

APPENDIX 1(b)

CROCODILE PRODUCTION PATTERN

Year	Eggs	Hatchlings	Yearlings	2 y.o.	3 y.o.
1					
2	2500	2000			
3	2500	2000	1400		
4	2500	2000	1400	1330	
5	2500	2000	1400	1330	1300
6	2500	2000	1400	1330	1300
7	2500	2000	1400	1330	1300
8	2500	2000	1400	1330	1300
9	2500	2000	1400	1330	1300
10	2500	2000	1400	1330	1300

Assumptions

1. In years 1 and 2 adult breeding stock are captured and eggs are harvested.

2. No production of belly skins will occur until year 5.

3. The crocodiles will be slaughtered for belly skin production at the age of 3 years and 3 months.

APPENDIX 2

FEED REQUIREMENTS & COST - BOTH SPECIES

Requirements	Requirement/Crocodile Unit
Hatchlings (0-12 months)	5.5kg per annum
Yearlings (12-24 months)	9.0kg per annum
2 year olds (24-36 months)	19.0kg per annum
3 year olds (36-40 months)	11.0kg per annum
Adults - Male	408kg per annum
Adults - Female	102kg per annum

Cost

Several sources of feed supply were investigated by Higgins (see his report page 52). A cost of 30¢/kilo seems reasonable and this will be used in the development budget.

Feed Requirements - C porosus

	Kgs			Adults		
Hatchlings	Yearlings	2 y.o.	3 y.o.	Male	Female	Total
				2448	2754	5205
11000				4896	5508	21404
11000	12600			4896	5508	34004
11000	12600	25270		4896	5508	59274
11000	12600	25270	14300	4896	5508	73574
11000	12600	25270	14300	4896	5508	73574
11000	12600	25270	14300	4896	5508	73574
11000	12600	25270	14300	4896	5508	73574
11000	12600	25270	14300	4896	5508	73574
11000	12600	25270	14300	4896	5508	73574

Year 1 - 6 months feeding of adult stock.

Total Consumption & Cost

Year	Kgs Total Feed Consumption	Cost/kg	Total Cost ($)
1	5202	30¢	1561
2	21404	30¢	6421
3	34004	30¢	10201
4	59274	30¢	17782
5	73574	30¢	22072
6	73574	30¢	22072
7	73574	30¢	22072
8	73574	30¢	22072
9	73574	30¢	22072
10	73574	30¢	22072

Feed Requirements - C johnstoni

Year	Kgs				Adults		
	Hatchlings	Yearlings	2 y.o.	3 y.o.	Male	Female	Total
1					8976	10200	19176
2	11000				17952	20400	49352
3	11000	12600			17952	20400	61952
4	11000	12600	25270		17952	20400	87222
5	11000	12600	25270	14300	17952	20400	101522
6	11000	12600	25270	14300	17952	20400	101522
7	11000	12600	25270	14300	17952	20400	101522
8	11000	12600	25270	14300	17952	20400	101522
9	11000	12600	25270	14300	17952	20400	101522
10	11000	12600	25270	14300	17952	20400	101522

Year 1 - 6 months feeding of adult stock.

Total Consumption & Cost

Year	Kgs Total Feed Consumption	Cost/kg	Total Cost ($)
1	19176	30¢	5753
2	49352	30¢	14806
3	61952	30¢	18586
4	87222	30¢	26167
5	101522	30¢	30457
6	101522	30¢	30457
7	101522	30¢	30457
8	101522	30¢	30457
9	101522	30¢	30457
10	101522	30¢	30457

APPENDIX 3

OPTION 1 C POROSUS (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD)

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Construction	123,879	101,832								
Machinery & Equipment	34,850						26,991			
	158,729	101,832					26,991			
OPERATING										
Land	200	200	200	200	200	200	200	200	200	200
Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
Feed	1,561	6,421	10,201	17,782	22,072	22,072	22,072	22,072	22,072	22,072
Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Running Expenses - R & M	2,055	2,055	2,055	2,055	2,055	2,055	3,199	3,199	3,199	3,199
- Fuel	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Sundry Expenses - Accountant	500	500	500	500	500	500	500	500	500	500
- Stationery	100	100	100	100	100	100	100	100	100	100
- Worker's Comp 10%	2,400	2,400	3,600	3,600	7,200	7,200	7,200	7,200	7,200	7,200
	36,816	41,676	58,656	66,237	110,127	110,127	111,271	111,271	111,271	111,271
Capital & Operating	195,545	143,508	58,656	66,237	110,127	110,127	138,262	111,271	111,271	111,271
Returns - Crocodiles	-	-	-	-	165,802	165,802	165,802	165,802	165,802	165,802
Yearly Balance	195,545^{-}	143,508^{-}	58,656^{-}	66,237^{-}	55,675^{+}	55,675^{+}	27,540^{+}	54,531^{+}	54,531^{+}	54,531^{+}
Accumulated Balance	195,545^{-}	358,608^{-}	453,125^{-}	564,675^{-}	565,468^{-}	566,340^{-}	595,424^{-}	600,446^{-}	605,959^{-}	612,024^{-}
Opportunity Cost of Capital @ 10%	19,555	35,861	45,313	56,468	56,547	56,634	59,543	60,044	60,596	61,202
Deficit/Surplus (End of Year)	215,100^{-}	394,469^{-}	498,438^{-}	621,143^{-}	622,015^{-}	622,974^{-}	654,977^{-}	660,490^{-}	666,555^{-}	673,226^{-}

OPTION 4 C porosus (no harvest of eggs from the wild)

If no eggs are harvested from the wild then no income will be received for skins in Year 5. This increases the deficit at the end of Year 10 to $780,517 (ie 673,226 + 165,802 - 18,951 (saving in feed cost) - 39,600 (saving in labour cost)).

APPENDIX 4

OPTION 2 C JOHNSTONI (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD)

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Construction	191,705	101,832								
Machinery & Equipment	34,850						26,991			
	226,555	101,832					26,991			
OPERATING										
Land	200	200	200	200	200	200	200	200	200	200
Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
Feed	5,753	14,806	18,586	26,167	30,457	30,457	30,457	30,457	30,457	30,457
Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Running Expenses	6,055	6,055	6,055	6,055	6,055	6,055	7,199	7,199	7,199	
Sundry Expenses	3,000	3,000	4,200	4,200	7,800	7,800	7,800	7,800	7,800	7,500
	41,008	50,061	67,041	74,622	118,512	118,512	119,656	119,656	119,656	119,656
Capital & Operating	267,563	151,893	67,041	74,622	118,512	118,512	146,647	119,656	119,656	119,656
Returns - Crocodiles	-	-	-	-	120,666	120,666	120,666	120,666	120,666	120,666
Yearly Balance	267,563⁻	151,893⁻	67,041⁻	74,622⁻	2,154⁻	2,154⁺	25,981⁺	1,010⁺	1,010⁻	1,010⁺
Accumulated Balance	267,563⁻	446,212⁻	557,874⁻	688,234⁻	754,958⁻	828,300⁻	937,111⁻	1,029,812⁻	1,131,783⁻	1,243,951⁻
Opportunity Cost of Capital @ 10%	26,756	44,621	55,788	68,828	75,496	82,830	93,711	102,981	113,178	124,395
Deficit/Surplus (end of Year)	294,319⁻	490,833⁻	613,662⁻	757,112⁻	830,454⁻	911,130⁻	1,030,822⁻	1,132,793⁻	1,244,961⁻	1,368,346⁻ Deficit

OPTION 5 C johnstoni (no harvest of eggs from the wild)

If no eggs are harvested from the wild then no income will be received for skins in Year 5. This increases the deficit at the end of Year 10 to $1,430,461.
(ie 1,368,346 + 120,666 - 18,951 (saving in feed cost) - 39,600 (saving in labour cost)).

APPENDIX 5

OPTION 3 C POROSUS AND C JOHNSTONI (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD)

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Construction	154,709	101,832								
Machinery & Equipment	34,850						26,991			
	189,559	101,832					26,991			
OPERATING										
Land	200	200	200	200	200	200	200	200	200	200
Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
Feed	3,382	10,052	13,842	21,423	25,713	25,713	25,713	25,713	25,713	25,713
Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Running Expenses	6,055	6,055	6,055	6,055	6,055	6,055	7,199	7,199	7,199	7,199
Sundry Expenses	3,000	3,000	4,200	4,200	7,800	7,800	7,800	7,800	7,800	7,800
	38,637	45,317	62,297	69,878	113,768	113,768	114,912	114,912	114,912	114,912
Capital & Operating	228,196	147,149	62,297	69,878	113,768	113,768	141,903	114,912	114,912	114,912
Returns - Crocodiles	-	-	-	-	143,234	143,234	143,234	143,234	143,234	143,234
Yearly Balance	228,196⁻	147,149⁻	62,297⁻	69,878⁻	29,466⁺	29,466⁺	1,331⁺	28,322⁺	28,322⁺	28,322⁺
Accumulated Balance	228,196⁻	398,165⁻	500,279⁻	620,185⁻	652,738⁻	688,546⁻	756,070⁻	803,355⁻	855,369⁻	912,884⁻
Opportunity Cost of Capital @ 10%	22,820	39,817	50,028	62,019	65,274	68,855	75,607	80,336	85,537	91,256
Deficit/Surplus (end of year)	251,016⁻	437,982⁻	550,307⁻	682,204⁻	718,012⁻	757,401⁻	831,677⁻	883,691⁻	940,906⁻	1,003,842⁻ Deficit

OPTION 6 C porosus and C johnstoni (no harvest of eggs from wild)

If no eggs are harvested from the wild then no income will be received for skins in Year 5. This increases the deficit at the end of Year 10 to $1,088,525. (1,003,842 + 143,234 - 18,951 - 39,600)

APPENDIX 6

OPTION 7 C PO[illegible]S (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD) + TOURISM

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Crocodiles - Construction	123,879	101,832								
Machinery & Equipment	34,850						26,991			
Tourism - Construction	50,000									
	208,729	101,832					26,911			
OPERATING										
Crocodiles - Land	200	200	200	200	200	200	200	200	200	200
- Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
- Feed	1,561	6,421	10,201	17,782	22,072	22,072	22,072	22,072	22,072	22,072
- Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
- Running Expenses	6,055	6,055	6,055	6,055	6,055	6,055	7,199	7,199	7,199	7,199
- Sundry Expenses	3,000	3,000	4,200	4,200	7,800	7,800	7,800	7,800	7,800	7,800
Tourism - Labour	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	46,816	51,676	68,656	76,237	120,127	120,127	121,271	121,271	121,271	121,271
Capital & Operating	255,545	153,508	68,656	76,237	120,127	120,127	148,262	121,271	121,271	121,271
Returns - Crocodiles	-	-	-	-	165,802	165,802	165,802	165,802	165,802	165,802
- Tourism	-	74,370	80,692	87,550	94,992	103,066	111,826	121,372	130,434	140,868
					260,794	268,868	277,628	287,174	296,236	306,670
Yearly Balance	255,545⁻	79,138⁻	12,036⁺	11,313⁺	140,667⁺	148,741⁺	129,366⁺	165,903⁺	174,965⁺	185,399⁺
Accumulated Balance	255,545⁻	360,238⁻	384,226⁻	411,336⁻	311,803⁻	194,242⁻	84,300⁻	68,173⁺	243,138⁺	428,537⁺
Opportunity Cost of Capital @ 10%	25,555	36,024	38,423	41,134	31,180	19,424	8,430			
Deficit/Surplus (end of year)	281,100⁻	396,262⁻	422,649⁻	452,470⁻	342,983⁻	213,666⁻	92,730⁻	68,173⁺	243,138⁺	428,537⁺

OPTION 10 C Porosus (no harvesting of eggs from the wild) SURPLUS = $321,286

APPENDIX 7

OPTION 8 C JOHNSTONI (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD) + TOURISM

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Crocodiles - Construction	191,705	101,832								
- Machinery & Equipment	34,850						26,991			
Tourism - Construction	50,000									
	276,555	101,832					26,991			
OPERATING										
Crocodiles - Land	200	200	200	200	200	200	200	200	200	200
- Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
- Feed	5,753	14,806	18,586	26,167	30,457	30,457	30,457	30,457	30,457	30,457
- Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
- Running Expenses	6,055	6,055	6,055	6,055	6,055	6,055	7,199	7,199	7,199	7,199
- Sundry Expenses	3,000	3,000	4,200	4,200	7,800	7,800	7,800	7,800	7,800	7,800
Tourism - Labour	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	51,008	60,061	77,041	84,622	128,512	128,512	129,656	129,656	129,656	129,656
Capital & Operating	327,563	161,893	77,041	84,622	128,512	128,512	156,647	129,656	129,656	129,656
Returns - Crocodiles	-	-	-	-	120,666	120,666	120,666	120,666	120,666	120,666
- Tourism	-	74,370	80,692	87,550	94,992	103,066	111,826	121,372	130,794	140,968
					215,658	223,732	232,492	242,038	251,460	261,634
Yearly Balance	327,563⁻	87,523⁻	3,651⁺	2,928⁺	87,146⁺	95,220⁺	102,836⁺	112,382⁺	121,444⁺	131,978⁺
Accumulated Balance	327,563⁻	447,842⁻	488,975⁻	534,945⁻	501,294⁻	456,203⁻	398,987⁻	326,504⁻	237,710⁻	129,603⁻
Opportunity Cost of Capital @ 10%	32,756	44,784	48,898	53,495	50,129	45,620	39,899	32,650	23,771	12,960
Deficit/Surplus (end of year)	360,319⁻	492,626⁻	537,873⁻	588,440⁻	551,423⁻	501,823⁻	438,886⁻	359,154⁻	261,481⁻	142,563⁻

OPTION 11 C johnstoni (no harvest of eggs from the wild) DEFICIT = $204,678-

APPENDIX 8

OPTION 9 C POROSUS AND C JOHNSTONI (HARVESTING EGGS AND BREEDING STOCK FROM THE WILD) + TOURISM

COSTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
CAPITAL										
Crocodiles - Construction	154,709	101,832								
- Machinery & Equipment	34,850						26,991			
Tourism - Construction	50,000									
	239,559	101,832					26,991			
OPERATING										
Crocodiles - Land	200	200	200	200	200	200	200	200	200	200
- Labour	24,000	24,000	36,000	36,000	72,000	72,000	72,000	72,000	72,000	72,000
- Feed	3,382	10,062	13,842	21,423	25,713	25,713	25,713	25,713	25,713	25,713
- Electricity & Telephone	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
- Running Expenses	6,055	6,055	6,055	6,055	6,055	6,055	7,199	7,199	7,199	7,199
- Sundry Expenses	3,000	3,000	4,200	4,200	7,800	7,800	7,800	7,800	7,800	7,800
Tourism - Labour	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	48,637	55,317	72,297	79,878	123,768	123,768	124,912	124,912	124,912	124,912
Capital & Operating	288,196	157,149	72,297	79,878	123,768	123,768	151,903	124,912	124,912	124,912
Returns - Crocodiles	-	-	-	-	143,234	143,234	143,234	143,234	143,234	143,234
- Tourism	-	74,370	80,692	87,550	94,992	103,066	111,826	121,372	130,434	140,368
					238,226	246,300	255,060	264,606	273,668	284,104
Yearly Balance	288,196⁻	82,779⁻	8,395⁺	7,672⁺	114,458⁺	122,532⁺	103,157⁺	139,694⁺	148,756⁺	159,192⁺
Accumulated Balance	288,196⁻	399,795⁻	431,380⁻	466,846⁻	399,073⁻	316,448⁻	244,936⁻	129,736⁻	6,046⁺	159,192⁺
Opportunity Cost of Capital @ 10%	28,820	39,980	43,138	46,685	39,907	31,645	24,494	12,974		
Deficit/Surplus (end of year)	317,016⁻	439,775⁻	474,518⁻	513,531⁻	438,980⁻	348,093⁻	269,430⁻	142,710⁻	6,046⁺	165,228⁺

OPTION 12 Combined (no harvest eggs from the wild) - SURPLUS = $80,555

ATTACHMENT "C".

CROCODILE FARMING - AN ALTERNATIVE OPTION - JOHNSTONI "FRESHWATER" CROCODILES ONLY UNDER NEW ASSUMPTIONS AS FOLLOWS

1. NUMBER OF STOCK REQUIRED

(i) Production Capacity

	Eggs
Mean Clutch Size	13.3
Range	11.15
Sample	11.15

(ii) Mortality

Years	Eggs to Harvest		%
	13.3	(11-15) Range	20
0-1	10.6	Hatchless	30
1-2	7.4	Yearlings	5
2-3	7.0	2 - 3 years	2
3-4	6.9	3 yrs + (Belly skin production)	

(iii) Estimated Farm Size

To produce 2000 c JOHNSTONI HATCHLINGS/ANNUAL, allowing for:

- the above mortality rates;
- a percentage infertility;

approximately 200 females and 44 males will be required. We Can assume that 25% of adult females will be gravid and produce eggs in the first year (according to the experts).

Approximately 500 eggs within first year of captivity will be produced.

(iv) According to the experts, capacity of Johnstoni to produce in Year 1 is likely to be far better than for Porosus which we have allowed 1 year of settling in and production in Year 2 (in the original working).

(v) According to Wildlife representatives, they consider that in addition to catching Johnstoni breeding stock, that juvenile animals are now plentiful and can be caught from high risk areas.

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Estimated number - 300 head 2-3 yr old crocs
- 300 head 1-2 yr old crocs

*This additional capacity has important implications for the feasibility as production can be realised earlier.

2. CAPITAL COSTS

Owing to the greater capacity of Johnstoni to congregate, the capital cost of "breeder" and "raising" pens could be reduced by stocking at a higher rate.

The effect of overstocking would be expected to reduce the growth rate of juvenile stock and for breeders; they may not lay eggs as quickly.

Estimated pen capacity (for breeders) with a size in the order of 250' x 100' (¼ of an acre) is 13 head of breeders + 3 males. Thus for the total population approximately 16 pens are required. At this capacity it would be possible to devote one or two pens to 'Porosus' as those estimates are conservative.

For juvenile stock 2 double pens (4 pens) are proposed and at 100 head per pen (mainly of males because they grow faster) would appear adequate, but they are covered in the initial capital cost. The difference is that they must be available in Year 1.

3. FEEDING RATES

Age	Johnstoni Consumption kg	Porosus Consumption kg
Adult - females	42	102
- males	60	408
3-4 yrs of age (4 months to slaughter)	6	(34 kg for whole year)
2-3 years of age	10	19
1-2 years of age	5	9
Hatchlings	2 (2 portion of year 8 months)	5.5

Note: "Johnstoni" consumption has been calculated on the age/weight relative to "porosus"
Cost of feed estimated at 30¢/kg

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4. HERD PRODUCTION Assuming given mortalities & 5% Culling Rate

Year	Eggs	Hatchlings	1-2 Years	2-3 Years	3-4 Years	Adults
1	500	400	300 hd	300 hd	-	200 female 44 male
2	2500	2000	280 hd	285 hd	294(284)	"
3	2500	2000	1400 hd	266 hd	280(270)	"
4	2500	2000	1400 hd	1330 hd	260(250)	"
5	2500	2000	1400 hd	1330 hd	1300(1290)	"
6	2500	2000	1400 hd	1330 hd	1300(1290)	"
7	2500	2000	1400 hd	1330 hd	1300(1290)	"

5. HERD FEED CONSUMPTION Assumption - No delineation between Males & Females in Quantity Consumed. ((Production - Mortality) x Consumption)

Year	Eggs Producted (no feed)	Hatchlings 0 - 1 (2 kg)	Weaners 1 - 2 (5 kg)	Yearlings 2 - 3 (10 kg)	Marketable Age 3 - 4 (6 kg)	Adults 42 fem. 60 male	Total
		kg	kg	kg	kg	kg (1)	kg
1	-	800	1500	3000	-	12444	17744
2	-	6000	1400	2850	1764	12444	24458
3	-	6000	7000	2660	1620	12444	29724
4	-	6000	7000	13300	1560	12444	40304
5	-	6000	7000	13300	7800	12444	46544
6	-	6000	7000	13300	7800	12444	46544
7	-	6000	7000	13300	7800	12444	46544
8	-	6000	7000	13300	7800	12444	46544
9	-	6000	7000	13300	7800	12444	46544
10	-	6000	7000	13300	7800	12444	46544

Note (1) - Accounts for Adult Herd Consumption of 11 040 kg annually plus consumption by 'culled' and replacement breeder stock.

6. ESTIMATED COST ANNUALLY @ 30¢/kg

Year	1	2	3	4	5	6	7	8	9	10
$Cost/Annum	5323	7333	8917	12091	13963	13969	13963	13963	13963	13963

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7. CAPITAL COSTS

(i) Construction (John Holland)

	Year	Cost
(a) Hatching Ponds		
(Initially) 2 double hatching ponds	1	
(Delayed) 4 double hatching ponds	1	$35 796
(b) Yearling Ponds (2 - 3)		
2 single ponds	1	14 128
5 single ponds	2	42 384
	3	35 320
		$91 832
(c) Adult Breeding Pens		
14 x (250' x 100') pens @ $3083	1	43 162
Incubation/hatching room complex	1	23 000
Butchery/deep freeze complex	1	27 000
Perimeter fencing for 5 acres	1	10 000
Demountable toilet, changeroom, eating area	1	7 500
		$110 662

Cost of Construction by Years

Year 1	$160 586
Year 2	42 384
Year 3	35 320

(ii) Machinery & Equipment (John Holland)

In the main these items are necessary for the performance of operational aspects in day-to-day management and all will be required in Year 1.

Item	Cost
1 30 cub. ft. deep freeze	1 500
1 Diesel powered generator (depending on location)	6 050
1 28 H.P. diesel engine and centrifugal pump	4 500
1 Second-hand medium-sized tractor and implements	7 500
500 metres of 100 mm diameter '0' polypipe	4 800
1 4-wheel drive Toyoto	5 000
1 small motored craft and rigging	4 000
Sundry other items	4 000
	$37 350
Additional replacement costs will be incurred (year 7) by way of a pump and engine plus vehicle	7 248
	12 000
	$19 248

8. LABOUR COSTS @ $14 000 PER MAN

Year	1	2	3	4	5	6	7	8	9	10
Cost	28000	28000	42000	42000	84000	84000	84000	14000	84000	84000

In Present Values only (including Workers Compensation)

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9. OPERATING EXPENSES

	Cost
- Electricity and Telephone	
- Repairs & Maintenance @ 20% to Cost	
	$2,000
Years 1 - 2	
- Generator	
- Engine & Pump	1,605
- Tractor	900
- Vehicle	1,000
	1,000
	6,505
Years 7 - 10	
- Generator	
- Engine & Pump	1,900
- Tractor	1,450
- Vehicle	1,000
	2,000
	12,855
Sundries	2,000
TOTAL (No allowance for depreciation)	$14,855

10. RETURNS

Johnstoni Skins (Average Skin Price) $4
(There is a large discrepancy between markets)

(See Budget attached as Appendix)

11. CONCLUSION

- Development prospects would appear reasonable if this option was adopted;
- The analysis has "erred" on the side of conservation making no allowances for possible additional income from -
  1. Sale of Porosus Skins ("Salties")
  2. Sale of stuffed and mounted artifacts (hatchlings)
- The importance of efficiency and technical know-how in day-to-day management cannot be over-emphasized.

ATTACHMENT "C"

DEVELOPMENT BUDGET FOR C. JOHNSTONI (FRESHWATER SPECIES) & TOURISM. ATTACHMENT "C"

YEARS	1	2	3	4	5	6	7	8	9	10
	$	$	$	$	$	$	$	$	$	$
Construction & Equipment Costs										
-Hatching Ponds	35 796									
-Rearing "	14 128	42 384	35 320							
-Breeding "	43 162									
-Construction	67 500									
-Machinery (on Hand)	37 350	-	-	-	-	-	-	19 248	-	-
A	197 936	42 384	35 320	-	-	-	-	19 248	-	-
Operating Costs										
(General) R & M	8 505	8 505	8 505	8 505	8 505	8 505	10 350	10 350	10 350	10 350
Labour	28 000	28 000	42 000	42 000	84 000	84 000	84 000	84 000	84 000	84 000
Feed @ 30¢/kg	5 323	7 333	8 917	12 091	13 963	13 963	13 963	13 963	13 963	13 963
Land lease rental	200	200	200	200	200	200	200	200	200	200
B	42 028	44 038	59 622	62 796	106 668	106 668	108 513	108 513	108 513	108 513
Income										
Returns from Crocodiles	-	15 904	15 120	14 000	72 240	72 240	72 240	72 240	72 240	72 240
C										
Tourism (costs)										
Construction Exp.	50 000	-	-	-	-	-	-	-	-	-
D	50 000	-	-	-	-	-	-	-	-	-
Returns Tourism										
E	15 000	74 370	80 692	87 550	94 992	103 066	111 826	121 372	130 424	140 868
Taxidermy is another option										
Total Expenditure A,B & D	289 964	86 467	94 942	62 796	106 668	106 668	108 513	108 513	108 513	108 513
Total Returns (C + E)	15 000	90 274	95 812	101 550	167 232	175 306	184 066	193 612	202 664	213 108
Balance	-274 964	+3 807	+870	+38 754	+60 564	+68 638	+75 553	+85 099	+94 151	+104 595

CONTINUATION OF DEVELOPMENT BUDGET

ATTACHMENT "C"

YEARS	1	2	3	4	5	6	7	8	9	10
Yearly Balance	$ (-274 964)	$ +3 807	$ +870	$ +38 754	$ +60 564	$ +68 638	$ +75 553	$ +85 099	$ +94 151	$ +104 595
Opening Balance		-302 460	-328 518	-360 413.13	-353 825.04	-322 587.14	-279 344.05	-224 170.16	-152 978.28	-64 710
		-298 653	-327 648	-321 659.13	-293 621.04	-253 949.14	-20 379.06	-139 071.16	-58 827.28	-39 884.99
Opportunity cost of Capital	27 496.40	+¯29 865	+¯32 765.13	+¯32 165.91	+¯28 966.10	+¯25 394.91	+¯20 791.10	+¯13 907.12	+¯5 882.72	+¯3 988.49
Accumulated Balance + 10% Opportunity cost of Capital	-302 460	-328 518.30	-360 413.13	-353 825.04	-322 587.14	-279 344.05	-224 170.16	-152 978.28	-64 710	-35 896.50
Balance on Operating a/c including cost of Capital at 10% interest on current a/c Capital	247 936	42 384	35 320	-	-	-	-	19 248	-	-
Operating Balance	-27 028	+46 236	+36 190	38 754	60 564	68 638	75 553.05	85 099	94 151	104 595
Servicing cost on Capital at 12%	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67	-43 884.67
	-7 955.47	-7 955.47	-7 955,47	-7 955.47	-7 955.47	-7 955.47	-7 955.47	-7 955.47	-7 955.47	-7 955.47
		-7 109.91	-7 109.91	-7 109.91	-7 109.91	-7 109.91	-7 109.91	-7 109.91	-7 109.91	-7 109.91
	-43 884.67	-51 840.14	-58 950.05	58 950.05	58 950.05	58 950.05	58 950.05	62 356.94	62 356.94	62 356.94
	-70 912.67	-83 607.68	-114 728.50	-146 397	-159 423.14	-165 947.50	-165 939.20	-159 790.84	-143 975.86	-116 135.86
+ 10% Opp. Cost on Total	-78 003.94	-91 968.45	-126 201.35	-161 037.08	-175 365.45	-182 542.25	-182 532.90	-175 769.92	158 373.45	127 748.92
Actual cost on Outstanding Balance + 10%	29 730.80	+46 236	36 190	38 754	60 564	68 638	75 553.05	85 099	94 151.00	104 595.00
Capital Repayment	43 884.67	51 840	58 950	58 950.05	58 950	58 950.05	58 950.05	62 356.94	62 356.94	62 356.94
		-5 604	229 600	20 196.05	+1 614	10 687.90	16 603.00	23 742.06	31 794.06	42 238.06
Current A/c Balance	-73 614.47	-87 140	-121 110.35	-155 437.1	-169 205.41	-158 517.51	-156 105.91	-145 600.29	-125 186.85	-91 243.67