Journal of Agricultural Economics, Extension and Rural Development: ISSN-2360-798X, Vol. 3(11): pp 338-350, November, 2015.

Full length Research

The environmental officer, environmental awareness and the trouble with CAMPFIRE in lessons on environmental management in a specific park in Zimbabwe

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Accepted 23rd November, 2015

For the most part of the operations of Zimbabwe's CAMPFIRE appear to have rendered the Community Based Natural Resource Management (CBNRM) irrelevant and dysfunctional around Hwange National Park and in a few other areas. The setbacks in the dysfunctional state of CAMPFIRE gave rise to unprecedented illegal extractions of natural resource products and the widespread silent killing of the prized large wildlife species that include elephant. Whole ecosystems were at risk from annihilation from the chemical cyanide. A state of emergency declared by the Zimbabwe Government elicited urgent turnaround solutions. In an analysis of events the roles played by a mix of different actors and i.e. approach, roles of units, guiding principles, and ethics and assessment methods of the effectiveness of CBNRM did not match the rising challenges of a spiraling poverty cycle of local communities. The metrics used to calibrate performance in environmental management should provide direction of impact of penetration of action in environmental management. An effective environmental awareness and education has been suggested as a starting point in a time-bound mitigation to solve the unfolding livelihood crises by building a foundation and forming the building blocks of a viable CBNRM. This paper examines the dysfunctional state of CAMPFIRE and the most overlooked role of environmental awareness and education by an environmental officer in turning around the livelihood crises. The actions of pedagogy and education and tangible benefit flows should make citizens partners in environmental protection and retrieve the central role of gatekeepers for local identity. Policy makers are urged to marshal resources and reconstitute institutions to meet desirable metrics in environmental protection.

Keywords: Environmental officer, environment awareness and education methods; CBNRM, CAMPFIRE

INTRODUCTION

Zimbabwe has a rich biological diversity, which provides ecosystem services such as food, medicine, energy sources, building and craft materials as well as spiritual, cultural and aesthetic services. The biodiversity also regulates climate, soil fertility, outbreaks of pests and diseases, and maintains functional ecosystems. The parks where much of the biodiversity occur are each visited by thousands of tourists each year hoping to spot Africa's 'Big Five'-lion, elephant, buffalo, leopard and rhino but research shows urgent efforts are needed to secure the future of the parks and their role in tourism. Environmental awareness (EA) and environmental education (EE) are seen as major pillars in environmental management. EA and EE have been invoked to compliment law enforcement in the attempt to reduce genetic drift and maintain ecosystem services with varying degrees of success (Parks and Wildlife Act, 1975). The assumption is that if everyone has good

environmental education then the problem of illegal harvesting and illegal trafficking may be resolved at a big extend. New environmental awareness and education techniques should include metrics that can be calibrated, monitored and evaluated. An example is used here of a relationship between Hwange National Park and adjacent surrounding Tsholotsho local communities where conservation showed an improvement but later declined drastically through lack of understanding of environmental protection. The human-wildlife conflict in the southeast lowveld (low elevation altitude) bordering Gonarezhou National Park has followed a similar pattern to the north of the country but resembles more closely the northwest pattern in the application of pesticides for silent elephant killing. The intensity of wildlife poisoning in the southeast of Zimbabwe has been small scale due to the intensity of vigilance by partnering with a Non-Governmental Organization (NGO), Frankfurt Zoological Society (FZS). FZS injected conservation funds which support organized patrol logistics, aerial reconnaissance of the entire Gonarezhou National Park (GNP), transport and communication assets. FZS ensures the GNP active participation in local Conservation of Biodiversity in Natural Resources Management (CBNRM) of Communal Areas Management Program for Indigenous Resources Management (CAMPFIRE). Around Chirisa Game Reserve in the Zambezi Valley toxic chemicals have been illegally administered on livestock raiding lions.

Advocates of environmental awareness for environmental change argue that environmental management may be assemblage of accessible clustering toolkits, documents, training programs in conservation of biodiversity activities. Lamarque et al (2009) came to the conclusion that environmental awareness and environmental education determine conservation attitudes and behaviour by exposing the causes, for environmental management. Tangible, acute and serious biodiversity losses continue on an upward trend e.g. elephants and rhinoceros (Duroy, 2005, Palmer, 1976, Welz, 2013). Around the world many species are vanishing everyday e.g. tiger (Black, 2010, TRAFFIC, 1997), Giant panda (Briggs, 2006, Widt, 2006).It is uncertain whether the biology of the species alone is the problem or a combination of factors that include absence of adequate proactive environmental toolkits in the decline of wildlife species.

Zimbabwe benefits from an exceptional biodiversity of world significance, but this is under threat. The degradation of the natural resources exacerbated by economic downturn and rapid population growth in areas adjacent to protected areas (Scoones 2010). The failure to implement sustainable natural resources management strategies at local and community levels leads to resource depletion as well as fragmentation of natural habitats and the erosion of genetic diversity of wild and cultivated plants (Chibisa, 2005).

In the last two decades, Zimbabwe has given priority to conservation as tools for development. Over and above the ecological knowledge of local communities, the initiatives should form the basis for innovative methods of control of illegal extractions of natural resources. The objective is to make a reanalysis of local community failure to reduce biodiversity declines, whilst favouring the maintenance or the restoration of biodiversity. This calls for a review of environmental awareness and education to ensure that resources are utilized to meet this objective. The idea is to enhance more holistic and realistic interventions. More critically a rethink of the effectiveness of traditional biodiversity conservation in current socio-economic pressures is required in the light of new invasive technologies.

Pre-CAMPFIRE environmental awareness development

The Zimbabwe Parks and Wildlife Management was mandated up to the present period by the Government of Zimbabwe through the Parks and Wildlife Act (Chapter 20:14) as amended to preserve indigenous species and habitats and protecting and managing the Parks and Wildlife Estate for the benefit of the public. The Authority is responsible for administering, developing and promoting wildlife management as an economically sustainable land use outside the protected areas. The old methods (classical methods) of environmental awareness and education tools used formal and informal approaches but this was inadequate as large sections of communities remained geographically inaccessible. The identified new environmental threats led to formation of CAMPFIRE (Child, 1996, Taylor, 2009). Elgar (2003) endorsed pathways for negotiating for environmental change and CAMPFIRE became an alternative paradigm for the purpose in CBNRM.

CAMPFIRE

Environmental awareness defined as the growth and development of awareness, understanding and consciousness toward the biophysical environment. This environmental awareness aims to serve environmental quality, species diversity integrity and ecosystem benefit sharing to the society in a transparent manner. For this reason it was the main driver in the establishment of CAMPFIRE (Child, 1996, Taylor, 2009). CAMPFIRE sought to expand the conceptual outline of environmental awareness by adding tangible benefits of household cash dividends, employment, infrastructure

And protein from wildlife harvests. CAMPFIRE was not entirely responsive to local communities needs and did not update the mechanisms of delivering environmental awareness as an aspect that needs urgent attention to counter growing sophisticated cartels on wildlife trafficking. Environmental awareness needs to be recreated through reinvented formal and informal education to all sections of society. Environmental awareness left gaps in the basic needs of local communities that should be fulfilled using CBNRM small business units (SBU's).

Following a sharp country wide economic decline characterized by very high levels of inflation, unemployment and shortage of food local and political instability communities developed ingenious ways of survival. The effects of a poor economy were exacerbated by withdrawal of Non-Governmental support to CAMPFIRE. Campfire functions were crippled and disabled. Local communities ceased to benefit from CAMPFIRE and turned inwardly to illegal extraction and exploitation of natural resources. Species loss continued and accelerated loss of wildlife due to the removal of incentives for conservation unabated within a sophisticated counterculture of conservation. In a more dramatic turn of events in conservation of biodiversity more than 120 elephants were illegally killed by unprecedented application of poison, lethal cyanide and lead salts laced on marula fruit (Sclerocarya birrea (A. Rich) Hochst) and vegetables placed on most frequented wildlife paths in October 2013 in Hwange National Park. The elephant poisoning declared a national disaster had a cascading effect on scavengers (The Guardian, 2015, Wildlife News, 2015). CAMPFIRE became a monumental failure. Mass starvation, malnutrition, disease, unprecedented resource degradation, and unemployment became the hallmarks of CMPFIRE failure and it falls from Garden of Eden to grace.

CAMPFIRE purists blamed mismanagement of funds, opaqueness in hunting and problem animal control administration and lack of transparency, accountability, legitimacy and voice in the decision making processes. The local communities chanted and chanted for a return to sanity to no avail. A cartel of wildlife traffickers offered little value for the slaughter of elephant and these encouraged local communities to kill more wildlife for little extra marginal benefit. The result was unforeseen trophic structure impairment and non-target species mortalities. CAMPFIRE had failed local communities who believed in its environmental redeeming philosophy. CAMPFIRE became consigned to the intensive care unit of environmental awareness and education. The structure and functioning of CAMPFIRE should of necessity be brought to the drawing table de novo.

The lesson in the dysfunctional Tsholotsho CAMPFIRE is a revelation of an acute absence of tangible ecosystem benefit flows to the local communities. The Tsholotsho local communities probably viewed environmental awareness as an exotic luxury that does not address shorter basic needs. This suggests that environmental education alone is incapable of alleviating illegal harvest in adjacent rural areas of the park. There is a strong need to review the methods used in environmental awareness and education. The harvesting of natural resources by a few illegal collectors has been contextualized by Gareth Hardin (1968) in the "Tragedy of the Commons" "that which is common to all is prone to abuse" given their open access nature, wildlife resources are bound to suffer over-exploitation. The underlying reason of the tragedy is best summed up in the conservative dictum "everybody's good is nobody's property" Gordon (1954). To avoid the "tragedy of the commons" additional, comprehensive and proactive environmental awareness methods should be introduced in the short term to long term. The improvements in environmental education may largely depend on directed instructions, self-learning toolkits, group directed learning toolkits and information from new technologies.

Pre-CAMPFIRE

The Zimbabwe Parks and Wildlife Management was mandated up to the present period by the Government of Zimbabwe through the Parks and Wildlife Act (Chapter 20:14) as amended to preserve indigenous species and habitats and protecting and managing the Parks and Wildlife Estate for the benefit of the public. The authorities regulate the harvest, possession, sale and trade of wildlife in all land categories. The principal of Parks and Wildlife Act provides the rules and regulations for licensed hunting and contains schedules specifying specifically protected species, species allowed to be hunted and species classified as problem animals (Barnett and Patterson, 2005). The Authority is responsible for administering, developing and promoting wildlife management as an economically sustainable land use outside the protected areas. In line with promotion of conservation of biodiversity in rural areas the Authority pursued in earnest environmental awareness and education. The traditional methods of environmental awareness and education tools used formal and informal approaches but this was inadequate as large sections of communities remained geographically inaccessible. The identified new environmental threats led to formation of CAMPFIRE.

CAMPFIRE

In the early 1980s, the then Department of National

Parks and Wildlife Management Authority and Wildlife Management developed the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) that was aimed at giving full control of wildlife management to rural communities through devolution and decentralisation of power. The theory behind CAMPFIRE was that communities would invest in environmental conservation if they could exploit wildlife resources on a sustainable basis for their own benefit. CAMPFIRE was operationalized through the giving of Appropriate Authority (AA) status to Rural District Councils who were the land holders in communal lands. To ensure CAMPFIRE was a success models, databases and images of multi species production were used.

National Parks, Recreational Parks, Animal Sanctuaries, Safari Areas and Botanical Reserves. The edges of the protected areas are experiencing growing and significant human pressure that is threatening biodiversity conservation. Additional areas protected by the Parks and Wildlife Act include 54 CAMPFIRE Districts, Private Game Ranches and the individually held Wildlife Farms recently integrated under the wildlife land reform policy. Other small but important wildlife areas include captive breeding sites that include wildlife orphanages and the small properties constituted by the large homesteads. That affect communities the public e.g. births, deaths, immigration and emigration the rules and regulations must be actively promoted on a timeless scale. It matters then to borrow the tenets of conservation of biodiversity and sustainable utilization of wildlife resources in order to penetrate the mindsets of the public to resolve human/wildlife issues and ecosystem benefit flows on a generational equity scale so that the wildlife is not lost.

According to Wolmer (2003) and Angwato et al (2013) livelihoods in crisis are in urgent need of renewal and new perspectives on governance in rural development. CAMPFIRE was identified as an alternative paradigm. In the early 1980s, the then Department of National Parks and Wildlife Management Authority and Wildlife Management developed CAMPFIRE aimed at giving full control of wildlife management to rural communities. Using CAMPFIRE local communities would invest in environmental conservation if they could exploit wildlife resources on a sustainable basis for their own benefit. CAMPFIRE was operationalized through the giving of Appropriate Authority (AA) status to Rural District Councils who were the land holders in communal lands. The main sources of income through CAMPFIRE have been through selling of hunting licences and wildlife tourism, with this income being possible through the devolution of governance, responsibility for sustainability, and rights to benefit from natural resources being transferred from the state to lower levels (Child, 2009). A significant amount of money is generated but that there have been problems getting this money down to community level (Taylor, 2009).

Although CAMPFIRE pioneered devolution of authority over wildlife to RDCs, several limitations for effective devolution were encountered. Despite the best of intentions, there has been so many challenges experienced for the past 20 years or so that the programme has been operating. The program, as it now stands, struggles to generate benefits for communities and conservation. Zimbabwe's economic decline contributed to the erosion of CBNRM. The currency in Zimbabwe has been experiencing a rapid decline in value for the past 20 years (AEDI, 2009). Because of hyperinflation, the currency was replaced with multiple currencies that include the Yuan, Rupee, Rand, Pula, Dollar and Sterling pound. Hyperinflation reached 231 million percent with the RBZ on a systematic rampage of removing zeros from the paperbacks (AEDI, 2009). Donor support to CAMPFIRE Rural District Councils was withdrawn at the peak of hyperinflation and this precipitated the demise of local community high expectations. The collapse of Zimbabwe's CAMPFIRE and the withdrawal of local community privileges was met with shock and ewe as people did not expect to eke a living elsewhere.

But even if everyone had a good environmental education this aspect might be questionable given that environmental protection may not be the first priority of the local community/and or the illegal traffickers.There is need for remodelling CAMPFIRE in order to enhance community benefits from natural resources, increase the flow of benefits to communities, reduce encroachment into wildlife areas and improve the sustainability of the wildlife resources. What new technologies do we need for effective conservation of biodiversity?

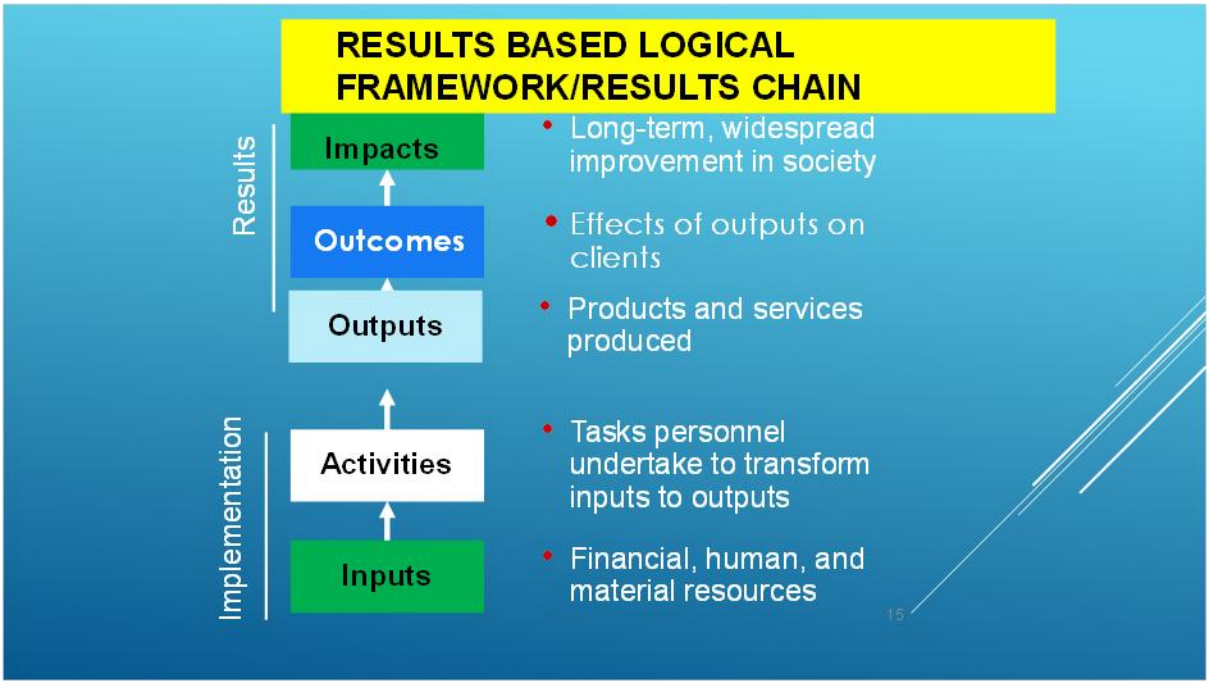

Figure 1: CAMPFIRE's flowchart of the underbelly of the ideal CAMPFIRE's strengths (Credit: Mufute, O., 2013)

Holistic approaches

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) guided by the Parks and Wildlife Act 1975 with its subsequent amendments has 54 protected areas that include the large National Parks, Recreational Parks, Animal Sanctuaries, Safari Areas and Botanical Reserves. The edges of the protected areas are experiencing growing and significant human pressure that is threatening biodiversity conservation. Additional areas protected by the Parks and Wildlife Act include 54 CAMPFIRE Districts, Private Game Ranches and the individually held Wildlife Farms recently integrated under the wildlife land reform policy. Other small but important wildlife areas include captive breeding sites that include wildlife orphanages and the small properties constituted by the large homesteads. Environmental awareness changes may be subject to demographic patterns such as births, deaths, immigration and emigration and the rules and regulations. It means that local communities should be made aware of developments in environmental management all the time. EA and EE are of necessity essential on a timeless scale so that the natural resource base is not lost. Conservation practitioners advocate sound conservation of biodiversity through strict adherences to legislation, policies, ethics, and precautionary principles. Keeley (2003) blamed lack of understanding environmental policy process while Leach and Wayne (2005) felt there was a challenge in the engagement processes of citizens.

The Tbilisi Declaration (1977) paved the way for the introduction of environmental education and awareness in environmental management. The Rio Earth Summit (1992) is implicit in that broader understanding of environmental education is critical to the maintenance of life processes on earth. Kahn (2010) called for a critical pedagogy, eco-literacy in solving the planetary crisis of environmental degradation. The source and principles that guide the environmental education processes and environmental awareness in the ZPWMA as part of the new range of supporting tools are given below:

i. Zimbabwe Government 1975. Zimbabwe Parks and Wildlife Act 1975, policies and principles. Government Printer. Harare
ii. Scientific Services Division 2013. Zimbabwe Parks and Wildlife Management Authority Strategic Plan 2012-2017, Fidelity Printers. Harare.
iii. Zimbabwe Government. 1982. The Zimbabwe Conservation Strategy. Government Printer. Harare.
iv. Scientific Services Division 2013. Environmental awareness and Environmental Education Unit Activity map. Scientific Division. Working Report. Harare.
v. Scientific Services Division 2013.Environmental awareness and Environmental Education Work Plan. Scientific Services Division. Harare.
vi. Scientific Services Division 2013. Environmental awareness and Environmental Research Plan 1992. Harare.
vii. Scientific Services Division 2002. Zimbabwe Wildlife Reform Policy 2002. Zimbabwe Parks and Wildlife

Authority. Harare.

Zimbabwe's conservation initiatives (Zimbabwe Conservation Strategy, 1982) and sustainable wildlife utilization may not be achieved in the long-term if a gamut of effective intervention measures is not implemented by Environmental Education Units. Adequate protection of flora, fauna and landscapes inside and outside the protected areas may be determined by the roles played by new role of units, guiding principles, ethics and assessment methods used. The calibrated metrics are the redeeming features required to raise awareness in the value of natural resources, recreational opportunities and resolve conservation counterculture problems. Counterculture is the antithesis of the noble global conservation movement. On this conservation counterculture problem Kahn (2010) invoked a critical need to evaluate methods used. Elsewhere in Africa strategies for teaching to a changing world have been proffered in Arusha, Tanzania (Boger et al, 2010).

The mechanisms of control of illegal wildlife harvests and wildlife trafficking and its markets have long been known in environmental management. The adoption of cash incentives by illegal wildlife collectors to enhance collection and flow of wildlife products leads to a vicious cycle of the poverty cycle that is difficult to break. These issues raise a red flag and alarm in contemporary environmental stewardship. The adoption of improved environmental methods and education to suit desirable objectives in environmental stewardship has been highlighted by several workers (Wolmer Leach and Wayne, 2005, Craigie, 2010, Welz, 2013, Elgar, 2003). New environmental methods have been invoked to minimise illegal wildlife extractions and promote alternative viable livelihoods such as those centred round small business units (SBUs). The flow chart perceived key to the ideal CAMPFIRE institutional strengths is given below (Figure 1):

In the flowchart in Figure 1 environmental awareness and education should be the platform that opens up possibilities in environmental stewardship of CBNRM initiatives as a means to sustainably manage natural resources. Local community claims for right to information, tangible benefits and to consultation in decision making in the reorganization and regeneration of benefit flows from CAMPFIRE areas need attention.

The Traditional (classical) Methods, Limitations and their Doom

The Zimbabwe Parks and Wildlife Authority has a mandate on all aspects of wildlife matters in Zimbabwe as defined by the Parks and Wildlife Act of 1975 has wide embracing and holistic approaches to secure wildlife in the long-term. Classical methods such indoctrination of local communities in groups/individuals with conservation information, reliance on experiential learning generally conceived as natural forces from parental care and group learning experiences alone could not efficiently tackle the new and ever evolving complex anthropogenic problem.

New technologies proffered by performance automobiles, performance hunting rifles and performance detection equipment including performance rifle silencers and high powered cartridges motivated illegal collectors. Improvements in radio communication equipment also enhanced illegal collectors' efforts. On the contrary of the opposite pole, law enforcement personnel have vintage equipment or usually the lack of it and the balance of the scale in managing environmental integrity and ecosystem health may not be even on the ground.

African countries and private game reserves are engaging in an increasingly sophisticated arms race against poachers, yet the slaughter of elephants and rhinos continue (Welz, 2013). Governments have given game rangers better weapons, engaged intelligence analysts, and put spotter planes, helicopters, and unmanned drones into the air, and deployed informants on the ground. Despite the best of the budgets in South Africa and Zimbabwe poaching is continuing unabated. South Africa National Parks has an annual budget of about US$7.5 million, much of that spent in Kruger and support worth millions is provided by well-wishers. Yet despite this onslaught against illegal natural resource collectors South Africa lost 668 rhino in 2012 and over 550 in 2013 (Welz,2013), while Zimbabwe rhino population is down to less than 1000 animals (Zimbabwe Department of Parks and Wildlife Management Authority, unpublished report) .

Local communities were largely neglected and conceived as not key actors in natural resource management prior to the emergence of CAMPFIRE in 1982. Local communities were perceived as outsiders in resource management and their contributions was not important. Participatory approaches are dynamic and consider local communities as a vital vehicle in natural resource management. CAMPFIRE uses bottom-up approaches in natural resource stewardship in the attempt to create co-management of natural resources. Environmental management inside/outside parks estate should be dynamically equipped with robust techniques in order to narrow the gap with illegal collectors, illegal hunters and traffickers. The new strategic plan 2012-2017 seeks to narrow opportunities for illegal collectors, illegal hunters and traffickers if it is harnessed by the Environmental Education Unit as a tool in its campaign to reduce the illegal damaging activities inside/outside the parks estates. The new approaches expose the limitations of the traditional approaches by raising the bar in pathways that avoid 'the tragedy of the commons'.

The old traditional methods centered on abstract indoctrination were no longer enough to keep pace with growing human-wildlife conflicts and the increasing proliferation of communication and navigation handsets hence developments in new and robust environmental awareness techniques.

Dilemmas in modern conservation methods

i. Modern methods of bush navigation and communication empower illegal collectors, illegal hunters and traffickers by several folds. Extinction of animal species has occurred at a much faster pace in the modern era of e-handsets e.g. dramatic loss of elephants and rhinoceros in Zimbabwe and neighbouring countries. Availability of GPS handsets, satellite phones and camera phones with night flashes, compasses to illegal hunters and traffickers has the most damaging effects in natural resource management.The new technology may have given illegal collectors a better axis probably due to the fact that wildlife traffickers are well funded cartels who will purchase high performance equipment. New technology may facilitate illegal hunting and trade where environmental awareness is perceived to be low. Data on endangered species are not public.
ii. Local surveillance intelligence needs greater environmental awareness in terms of what needs to be done for adequate environmental management. New challenges include the silent killing of wildlife using poisons such as cyanide and termic poison that are administered at waterholes and bait on wildlife trails. The new wildlife killing techniques have affected elephant, lion, vultures and a large population of antelopes in the Gonarezhou National Park, Hwange National Park and Zambezi Valley.

New ethics

The new ethics is an adaptation of 'ethics' a word that means the right things for environmental management and the putting away of degrading environmental practices.
50 human 50 environment axiom. This model implies giving equal weighting to the user and the resource. It is an option considered in terms of benefits to both sides of the equation. Any violation of the rule in the solution of the equation leads to unproductive and irreversible loss of ecosystem services and poor human health.
i. **Tragedy of the commons.** This is a devils choice in resource use. Everyone in a community wants to maximize use of a limited resource but when it runs out the impacts of it not being found are felt by everyone. Blame is apportioned to everybody and nobody owns the problem or solution. Examples include a grazing pasture resource or a mineral deposit. Gareth Hardin (1968) developed the concept.
ii. **Gravitas in extension.** Environmental information may be assimilated in different ways by different individuals. Some individuals have inertia in applying concepts while some quickly translate environmental instruction into practice e.g. self-restraint in throwing banana peels on streets when the waste could be stored for later disposal in a properly coded litter bag/bin. Slow penetrating instructions that work at slow speeds should be improved for immediate outcome and impact.

Good governance and its principles

Is about how governments and other social organizations interact, how they relate to citizens, and how decisions are taken in a complex world. Thus governance is a process whereby societies or organizations make their important decisions, determine whom they involve in the process and how they render account. Since a process is hard to observe,

Five Principles of Good Governance

345. **Legitimacy and Voice**

Participation – all men and women should have a voice in decision-making, either directly or through legitimate intermediate institutions that represent their intention. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively.
Consensus orientation – good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.

2. Direction

Strategic vision – leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded.

3. Performance

Responsiveness – institutions and processes try to serve all stakeholders.
Effectiveness and efficiency – processes and

institutions produce results that meet needs while making the best use of resources.

4. Accountability

Accountability – decision-makers in government, the private sector and civil society organizations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organizations and whether the decision is internal or external

Transparency – transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.

5. Fairness

Equity – all men and women have opportunities to improve or maintain their wellbeing.

Rule of Law – legal frameworks should be fair and enforced impartially, particularly the laws on human rights.

Natural resources governance can be understood as "the complex set of norms, institutions and processes that determine how power and responsibilities are exercised, how decisions are taken and how citizens participate in the management of natural resources".

- affects management effectiveness
- helps determine the generation and sharing of costs and benefits
- Helps ensure community, political, and financial support for sound natural resources management.

Frame centered learning

Frame centered learning includes assimilation and practice of environmental management that promotes environmental awareness at the ward or district level. Environmental management information may be acquired at the level of a suburb by incorporating as many individuals as possible. The knowledge dissemination and evaluations take place in the locations where the people are found and these usually are districts, villages, townships, schools, community halls and these constitute study frames. It is usually desirable to establish that a community is doing well in environmental management and where it is not specific intervention programs should be organized for remedial action.

Wards/villages are frames that are examined and queried in resource use. Frames can be anything including schools, hospitals, camps, suburbs, industrial zone, grazing land, crop fields, etc. Wards/villages can query themselves in various approaches they use and benefit from a resource, indeed others too can. Evaluation of environmental education performance in frames should be simple and straightforward and even be modeled. Frame data are amenable to statistical analyses if a criterion for selection includes systematic or random sampling within a stratum (Frame). Different CAMPFIRE areas even districts can be frames that are monitored in benefit flows, resource management and utilization and illegal collections. Internal queries in a frame are revisited and intervention re-jigged/re-tweaked.

Measurements of induction methods in frames

In the pursuit of eco-literacy it is critical to lay bare measures of how really communities are progressing. It is important to develop rigorous and focused Smart targets (Specific, Measurable, Attainable, Relevant and Time-bound) targets for progress monitoring to establish environmental justice. The collapse of CAMPFIRE programme which benefitted the poorest of the poor through cash dividend and food handouts denied local communities of Tsholotsho in the adjacent neighbourhood of Hwange National Park a dependable source of relief. Smart targets for Tsholotsho local community upliftment were neglected. The course was open for the local communities to network with shadowy Cyanide chemical peddlers. Kahn (2010) recommends inclusion of economics and social depth enquiry in the search environmental justice. The Tsholotsho cyanide chemical poisoning episode became a classical example of CBNRM failure in an ambitious program. Learning for sustainability in times of accelerating change should include the following variables:

i. success/failures (economic indicators/resource use indicators) in frame demonstrations: calibrations of metrics determine direction to change in environmental management

ii. peers raise bars in the awareness campaigns: collective awareness in environmental management raises individual responsibility in environmental action

iii. Learning for sustainability should also include the following incentives:

iv. scores: gain/notch in a contest

v. prizes: motivational reward for environmental work

vi. savings: money kept away for a useful cause another day

vii. awards: acknowledgement for excellent service in environmental management

viii. certificates numerical record of a an environmental competitive event

Calibration of induction successes/failures

Certainty of acquisition of environmental information is difficult without routine forms of assessments. Local community environmental management capacity may be determined on different platforms that allow comparisons between periods. District environmental management information may be assessed for feedback using scores, completeness of tasks and performance in competitions.

i. Frame scorecards: score results of an environmental assessment
ii. Frame test results: within district environmental protection evaluation results
iii. Frame quiz championships: outstanding achievers in environmental protection within a district
iv. Frame green champions; environmental caring persons with lead peer approval within a district
v. Frame inspection rankings of performance: some kind of order according to perceived importance e.g. from high to low
vi. Legal transgressions: to cause to act against environmental regulation
vii. Number of arrests: persons apprehended for
viii. Reports: narrative consolidations of environmental activities
ix. Self-reports: an individual or group should be capable of a personal audit/check in environmental protection.
x. Warnings served: reprimands served for an environmental practice omission or practice
xi. Number of seizures/suspensions: items forfeited in contravention of environmental regulations
xii. annual events e.g. shows: specialty calendar days for commemorating an environmental theme
xiii. Incomes: revenue derived from environmental related activities

Lack of metric calibration in environmental management may not give desirable results in environmental action. It can be surmised that CAMPFIRE collapsed due to lack of calibrated environmental awareness metrics. Metric calibration gives basis upon which to judge course of environmental action.

Global experiences in environmental awareness outcomes

Everything about environmental management in community at district level should allow for gradual improvement. A local community's environmental record and commitment to environmental management should be reflected in written, pasted and visual presentations that show progress or bottlenecks in environmental performance.

i. continuous improvements: environmental audits use scores that should indicate an improvements
ii. frame business charters: pathways, vision and mission of environmental protection within a district are captured on posters
iii. frame mission statements: within a district environmental protection objectives are captured
iv. frame reports: within a district all the environmental assessments are consolidated

Nodes and showmanship

Local communities have a natural geography that determines spatial distribution in a district (frame). Nodes are given as specific centers of human occupations or business premises where local communities may congregate for livelihood activities. At particular nodes local communities assemble for entrepreneurial recreational activities where opportunities arise to disseminate and evaluate environmental management information. At a node the following organization of local communities exist for environmental knowledge evaluation and dissemination:

Teams: ideally people should work in groups for peer collaboration and evaluation

i. Clubs: groups of people united by binding rules, obligations and interests working to uplift environmental protection standards in give location.
ii. Promotions: specialty calendar day dedicated to appreciate an environmental activity
iii. Art exhibitions: artwork promotes environmental protection issues
iv. Poetry competitions: narrative accounts that favour ecological themes of a species
v. Music and dance grand slams: dance and sung narratives about environmental protection

Benchmarks in frames/Models

The initial environmental awareness education may be defined as a district baseline nature study that empowers by giving literacy in environmental management. Local community levels of assimilation of environmental management knowledge may be assessed after an interval of time. This gives the environmental educator opportunity for critical assessment. The obtained environmental performance results may be manipulated to create patterns, order and predictive power of impacts of environmental actions. This allows for compliance with environmental regulations

i. performance accelerators: specific factors identified in respondents such as environmental protection enhancements that drive environmental management
ii. goal posts: outcomes and impacts
iii. Gatekeeper quality: factors that allow for perceived

environmental protection.

Synergy CAMPFIRE and Transfrontier Conservation Areas (TFCA's)

Because CAMPFIRE and TFCAs are CBNRM initiatives their role in environmental awareness and education is to extend environmental management on different scales. CAMPFIRE is localized to a local community in a ward or district whereas TFCA incorporates environmental management across a geographical boundary. Environmental awareness and education provides a platform that makes cooperation possible. The result is a strengthening of biodiversity conservation through tangible benefits of cash dividends, employment, and small business units' setup opportunities. Opportunities have arisen in transboundary natural resource management to appreciate new levels of knowledge that relate to management of fugitive resources such as wildlife. Local communities participating in environmental management of fugitive resources may access different learning experiences that contribute to proactive stewardship of shared resources. Synergy is power of knowledge that accrues to environmental management and this may be sourced from formal and informal contacts.

TFCA uses EA and EE learning points (Fig. 1) to strengthen transboundary natural resource management. TFCAs seek to harness the excess energy expended in poaching activities in the core conservation areas to income opportunities that bring food to the table and a secure stable rural lifestyle. In the TFCA nodes located on tourist circuit routes small scale projects have capacity for innovations of services in community handicrafts. TFCAs are a new concept in a move towards a global village or virtual world in environmental management. Zimbabwe has abundant and diverse tropical animals including bird species, mammals, reptiles, amphibians and fish species. This biodiversity is found in forest areas, sanctuaries, botanical reserves, recreational parks, conservancies and farm lands.

Because of the ever growing list of environmental problems such as climate change, desertification, physical, biological and chemical threats to the quality of life and environment and ecosystems there is greater need for environmental awareness in environmental management. Palmer (1970) suggests strong need for managing change in attitudes and behaviour in relation to the environment. From Palmer's standpoint a need has arisen to encourage people to appreciate and enjoy the world around them and for equipping policy makers of both present and future with knowledge and skills and attitudes that encourage them to adopt environmental responsive approaches. EPA (2013) raises the bar in the motives of environmental education by suggesting that it increases public awareness and knowledge about environmental issues or problems. In doing so it provides the public with the necessary skills to make informed decisions and take responsible action. There is constant need to invoke holistic strategies for enlightening people to a changing world. Around the world there is active debate on how best to achieve these goals and on the most appropriate strategies for developing and implementing programs of environmental education.

At a global level, debate and activity in the field of environmental education is indeed healthy; yet there remain numerous ongoing issues to resolve and serious challenges ahead (EPA, 2013). Despite the optimistic tone adopted, quite rightly, by many environmental educators, it is nevertheless clear that education is far from realizing its maximum potential in terms of helping people understand and appreciate the environment and their role as producers and consumers. In the light of unprecedented wildlife poisoning in the environs of Hwange the effectiveness was quickly questioned.

The need to increase the conceptual framework of the environment has been emphasized in order to achieve a high level of environmental management (EPA, 2013). The issue of empowerment of poor local communities in the lucrative tourist circuits around protected areas, CAMPFIRE areas and TFCAs should enhance small business units in service areas that benefit visitors. This sucks poaching energy into profitable ventures that bring monetary benefits and food to the high table in the family homes.

Traditional (classical) methods

Classical methods in EA and EE have been concerned with an assemblage of familiar environmental learning processes without the inclusion of a gamut of new platforms. It is conceivable to think of the following learning sources:

- Meetings, Workshops and Seminars
- Exhibitions
- Distribution of pamphlets
- Radio and TV programs
- Newspapers
- Promotional materials such DVDs for showing events and updates

New methods

New methods in environmental awareness and education have been facilitated by visible symbols of change such as aircraft (drones), mobile technology, smart tags and internet information. The pace of change

In grasping key issues that people deal with has been accelerating in about everything and there are both pros and cons in social change. The rules of how biodiversity is managed is also seen to change, Classical methods have been rapidly superseded by new trends in information transfer. The cell phones, computers and their new software platforms facilitate instant global communication. New technologies facilitate new ways of messaging rules and this is done by the sophisticated criminal persons and the genuinely innocent environmental instructor. New technologies provide powerful wildlife protection by deploying in areas where elephant and rhinos roam (Marks, 2014).

New tools provided in social media, internet and GOOGLE maps enhance improvements in deliveries of environmental awareness information. By providing enhanced lines of communication, assessment, agility and feedback loops environmental protection can be secured. Modern communication social devices allow for pinch zooming and swipe-scrolling of data, maps and applications on state of the environment and local communities become interested and easy consumers of environmental actions. The social devices are backed up by voice and gesture controls, touch controls using logically ordered buttons in a multimedia framework combining compass, cameras, telescopic lenses and Global Positioning Systems (GPS). Social media technologies if harnessed efficiently cue local communities to infinite possibilities of environment information and invoke interest in environmental protection and make individuals self-reporters. Social media access is constrained by shortage of relay base stations. Surveillance drones offer a highly effective way to catch wildlife criminals in the act. Namibia's Ministry of Environment and Tourism (MET) came to this conclusion after trying a raft of wildlife crime-fighting technologies, with expertise from conservation group WWF and funding from GOOGLE for a wildlife surveillance drone (Marks, 2014). Smart radio tags attached to rhinos allowed the drones to home in on each herd's current location. It is crucial that people conduct field trials of the various methods to find the most cost-effective, practical, and sustainable strategy or combination of strategies.

WWF estimates that illegal poaching in Africa nets criminals $10 billion each year – with some 22,000 elephants killed annually and 1000 rhinos killed last year in South Africa alone in South Africa alone (Craigie, 2010). The continued illegal harvesting of both forest non-forest timber products in protected and terrestrial and aquatic commons indicate a growing inadequacy of environmental protection systems. The unsustainable loss of white and black rhinoceros despite mounting environmental awareness led to the establishment of intensive protection zones (IPZ's) for a few surviving animals (Welz, 2013). This means that traditional environmental awareness methods were not enough to guarantee survival of rhinoceros species outside IPZ's. Similarly the African elephant has come under increasing illegal hunting pressure. Environmental awareness education of wildlife species conservation has continued to target protection of a wide spectrum of wildlife with some animal being given greater conservation status than others depending on severity of threats.

The world has seen a greater innovation in hunting tools and technology that has sometimes ended up as a toolkit of illegal hunters. Without investment in similar or better technological equipment protected areas law enforcement persons lose a competitive advantage. New independent powerful outreach formats propagate a rich variety of options for a wide menu of selection. An environmental officer simply has to design a packet of environmental instructions and stream them to audiences using e-gadgets to the remotest regions. This reduces operational costs of the environmental officer. The wildlife visuals, films, drama, and entertainment in the follow me on Tweeter, Face book, Messenger, We chat, What's app, You Tube, i-tunes, etc can be engaging in the delivery of environmental management information. Some aspects of new technologies provide music, videos, personal contacts and movie films which may disengage a purposeful environmental worker from his responsibilities.

Community members in frames feel empowered with ever present options and soon assume roles as efficient self-reporters of environmental nuances in daily/ real time relay of poachers and traffickers. The availability of GPS in handset form has facilitated and eased navigation. GPS is valuable a modern day tool in the creation of custom maps. A gamut of technological options make it possible to self-report environmental hazards such as pollution, illegal collections, droughts, rainfall amount, floods, tsunamis, windstorms, heat waves, groundwater level and quality, forest fires, epidemics and peer demonstration case studies. On a more positive note the Environmental Officer is also at the forefront of promoting the amazing and awesome aesthetics of landscapes, all forms of responsible tourism and the sustainable utilization of natural resources inside/outside parks estates. .

Several authors (Welz, 2013, Craigie, 2010) suggest caution in the adoption of new technologies in environmental management and general use. The dangerous side effects of new technologies must be kept in the public eye, and there is an urgent need to develop workable monitoring systems (Ehrenfield, 2003). Paul Ehrlich and John Holdren (1971) incorporated affluence into IPAT equation to describe the impact of humans on the natural environment.

I=PxAxT

In words:

Human impact (I) on the environment equals the product of P=Population, A=Affluence, T=Technology. This describes how a growing population, affluence, and technology contribute toward environmental impact (Chertow, 2003).The amount of environmental damage to the Earth each person does grows with increasing population, biodiversity as consequence becomes more and more negatively affected.

Environmental management is not mentioned in the IPAT equation. Although biodiversity is not mentioned in the equation it is intimately linked to environmental health (Ehrenfield, 2003).

A range of other activities may lift emotions and other highly sprung wild experiences of local communities. Community billboards capture state of the environment. Environmental awareness techniques should be harnessed on community dashboards and the results obtained during interrogations benchmarked for continual improvement in environmental performance. The dashboards should benchmark environmental record for a ward, village, school or even district. Billboards are widely used on the roadsides to advertise recreational opportunities. Little information on warnings and implications of collecting forest and non-forest timber products may be seen on roadside billboards.

Environmental competition winning groups may be rewarded as environmental educators and eco-ambassadors. Evidence based environmental awareness may be obtained from remotely and hand positioned cameras. The continued growth of the wildlife industry anchors on cooperation with countries in matters such as CITES, birdlife protection, wetland protection, Green certification of environmental services and TRAFFIC among others. Environmental awareness in natural resource management and its measures are major forces that unite all the facets necessary for continued wildlife industry. Classical and new environmental awareness methods should reverse the gains of illegal collectors and traffickers in the immediate term and long-term

Synergy from TFCA's

Because of the ever growing list of environmental problems such as climate change, desertification, physical, biological and chemical threats to the quality of life and environment and ecosystems there is greater need for environmental awareness in environmental management. Palmer (1970) suggests strong need for promoting change in attitudes and ehavior in relation to the environment. From Palmer's standpoint a need has arisen to encourage people to appreciate and enjoy the world around them and for equipping policy makers of both present and future with knowledge and skills and attitudes that encourage them to adopt environmental responsive approaches. EPA (2013) raises the bar in the motives of environmental education by suggesting that it increases public awareness and knowledge about environmental issues or problems. In doing so it provides the public with the necessary skills to make informed decisions and take responsible action. There is constant need to invoke holistic strategies for enlightening people to a changing world. Around the world there is active debate on how best to achieve these goals and on the most appropriate strategies for developing and implementing programs of environmental education.

At a global level, debate and activity in the field of environmental education is indeed healthy; yet there remain numerous ongoing issues to resolve and serious challenges ahead (EPA, 2013). Despite the optimistic tone adopted, quite rightly, by many environmental educators, it is nevertheless clear that education is far from realizing its maximum potential in terms of helping people understand and appreciate the environment and their role as producers and consumers within it in the light of unprecedented wildlife poisoning in the flagship protected areas.

It is recognized around the world, the need to increase the environmental education research base and broaden approaches to research in this field is fundamental (EPA, 2013). The issue of empowerment of poor local communities in the lucrative tourist circuits around protected areas, CAMPFIRE areas and TFCAs should be approached by establishing small business units (e.g. community based tourism) in areas that benefit visitors. This sucks poaching energy to profitable ventures that bring monetary benefits and food to the high table in the family home.

CONCLUSION

Zimbabwe's CBNRM initiatives have been challenged by various factors related to eco-literacy and this is shown by large scale cyanide poisoning of wildlife at waterholes and the continued illegal hunting of wildlife. New methods in environmental awareness enlisting improved metrics, field surveillance and social media should sharply increase awareness in environmental protection. The engagement of communities in formal and informal dialogues and surveys of the perception and image of protected area management plans should reduce conflict in environmental management. It is in the sharpness of details of the new tools that strategies and tactics should be re-configured. A new awareness program should kick in desirable environmental awareness and education metrics in environmental action. Policy makers are urged to marshal resources and reconstitute institutions to meet desirable metrics in environmental protection.

ACKNOWLEDGEMENTS

An anonymous reviewer and Professor Georgio Sarantakos are gratefully thanked for useful comments that have improved the original draft. Many thanks go to other colleagues for proof reading the manuscript and suggesting useful comments.

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