

## Incorporating the Signs of Safety Approach in Social Impact Assessment of Acid Mine Drainage (AMD) in West Rand, South Africa—some methodological perspectives

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### ABSTRACT

In South Africa Social Impact Assessment (SIA) is fairly new and finds provided through the 1998 National Environmental Management Act No. 107 and Constitution of South Africa Bill of Rights. As a new discipline, SIA practitioners need to tailor make, indigenise tools or incorporate other scientific disciplines knowledge for robust SIA toolkit. This article explores the potential of harnessing Signs of Safety approach in Social Impact Assessment. It highlights an attempt to borrow tools from the Global North social work profession and adapt and indigenise to apply in the African context. This article tests the Signs of Safety approach's (SoS) application in Social Impact Assessment. The article focuses on Acid Mine Drainage (AMD) in the West Rand District of Gauteng Province in South Africa. SIA implementation gaps in South Africa, has been lack of a rigid framework applicable universally. Participatory and Rapid Rural appraisal methods are widely and vaguely applied research methods in general and in social impact assessment in particular. This article explores Signs of Safety approach within the broader framework of Participatory Rural Appraisal to identify AMD risks and mitigation strategies. The article will further give pathways on how best to apply the Signs of Safety (SoS) model in SIA. This enriches curricula of Social Impact Assessment and Social Ecology or other related applied social science disciplines.

**Keywords:** Signs of Safety, Acid Mine Drainage, Environment, Socio Economic Development

### BACKGROUND

Environmental issues are taking centre stage in local, national and global discourse and policies in a neo-liberal context defined by unprecedented land grabs, increased militarization of natural resource use and governance, and privatization/ commercialization of the environment (Murombedzi, 2014).

Africa contains about one-fifth of all known species of plants, mammals, and birds, as well as one-sixth of amphibians and reptiles. Biodiversity in Africa, which principally occurs outside formally conserved areas, is under threat from climate change, landscape development and other stresses. Savannahs, tropical forests, coral reef marine and freshwater habitats, wetlands and East Africa montane ecosystems are all at risk. (Simms 2005). Southern Africa offers a compelling context from which to reflexively engage with the challenge of sustainable social ecological justice and well-

being (Palmer, et al., 2015). In 2015, the United Nations adopted 17 Sustainable Development Goals (SDGs) with ambitious targets to eliminate extreme poverty and hunger, take action on climate change, provide sustainable cities and communities with affordable, clean energy and infrastructure while maintaining ecosystems and ensuring good health and well-being for all (UN2015). According to the Intergovernmental Panel on Climate Change (IPCC) (2012), Africa will soon experience the consequences of climate change (Chimanikire, 2013). Among these consequences are increased water stress, lower yields from rain-fed agriculture, increased food insecurity and malnutrition, a rise in sea levels and more land becoming arid and semi-arid. Also, The White Paper for Social Welfare (RSA, 1997) drew on a social developmental paradigm viewing social and economic development as interdependent within a broad redistributive policies framework addressing poverty and economic inequality. As

redistributive policies are potentially harmful to well-off groups, the rich will generally have an interest in minimising costs for social transfers and limit the extent of taxation, whereas the poor and low-income groups will have strong interests in benefiting from generous social transfers (Ulriksen 2014). The challenge, therefore, is to consider how to develop large projects in poor countries with rapidly expanding populations, while enhancing the livelihoods of local communities (Symth). A vibrant civil society has played a key role in achieving the progressive realisation of socio-economic rights, through both collaborative and adversarial means. While a rights-based approach undoubtedly sets a solid foundation for social and economic policy (Ulriksen 2014). South Africa is well endowed with vast mineral resources and the wealth created through mining, particularly gold mining, has funded the development of the country. However, as the gold mining industry enters its twilight years we are now beginning to grasp the environmental damage that this industry has caused and will continue to cause in the decades to come. Objective of this article is to explore Signs of Safety approach (SoS) mainstreaming in SIA. Acid mine drainage (AMD) has received considerable coverage in the media of late and the number of short courses and workshops devoted to the topic has mushroomed. The City of Johannesburg's Disaster Management and Relief Forum has flagged Acid Drainage Mine and a high risk. The current interest was prompted mainly by concern arising from the decanting of contaminated water from the old gold mines in the Krugersdorp area into the Cradle of Humankind (McCarthy 2015).

## **THE HISTORICAL OVERVIEW OF SOUTH AFRICAN GOLD MINING**

Gold mining in South Africa dates back to more than 120 years ago. When gold was discovered in 1886, in the middle of semi-arid area known as the "Highveld", there was a sharp increase in economic development with the formation of Johannesburg. Johannesburg's growth was aided by diamonds from Kimberley, later gold mining expanded east and west of the site of discovery. In 1887 gold mining moved 30 km west of Johannesburg. The first mining company to operate in the goldfield known as 'West Rand' was a company called the West Rand Consolidated (Erasmus, 2004; Robb and Robb, 1998).

Marais (2000) highlighted that the government formed a town known as Krugersdorp to serve as an administrative place for gold mining in the area. Randfontein town was formed in 1890 by Sir JB Robinson who owned the Randfontein Estates Gold Mine (REGM). According to Anderson et al., (1986), Randfontein town was formed to accommodate the large workforce who was needed in the underground mining. Mining activities had an impact in terms of increase in demographics in the West Rand region as mining recruited economic migrants from countries such as Lesotho, Botswana and Mozambique (Wiehahn, 1982). As the majority of people flocked into these mining towns most of them ended up living in single sexed hostels. Mostly the migrants were black people who ended up settling outside the so called "white mining towns" to the "informal townships" of Mohlakeng, Toekomsrus, Bekkersdal and others. These increases in population should not be treated in isolation to urban growth in the region. Chinese migrants also migrated to South Africa to deal with the problem of skilled underground workers.

Although mining had positive effects in West Rand district and South Africa as a whole, mining activities also caused various problems. One of the major problems that was caused by mining is acid mine drainage. AMD is metal-rich water formed from chemical reaction between water and rocks containing sulfur-bearing minerals. AMD (also sometimes referred to as acid rock drainage) arises primarily when the mineral pyrite ('fool's gold' or iron disulphide) comes into contact with oxygenated water. The pyrite undergoes oxidation in a two-stage process, the first producing sulphuric acid and ferrous sulphate and the second orange-red ferric hydroxide and more sulphuric acid. Traces of AMD can be traced back to 1880's. It must be noted that during that time the presence of acid water was noticed as one of the first shafts had water which was highly polluted. However nothing of significance was put down as a measure to curb and find solution to AMD. Hundreds of years later there is still no plans present for this so called 'Black Reef Incline Shaft'. This shows that the problem of AMD dates back to the early years since mining started in the West Rand region and no measures were taken to stop the spread of the problem. The Chinese tried to develop a Social Management and Social Labor program to deal with mining impacts which is

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synonymous to the process of Social Impact Assessment which aids mining activities in dealing with the socio impacts.

Townships of Mohlakeng, Toekomsrus, Bekkersdal are the most affected areas of water contaminated with AMD due to the unattended abandoned mines or closed mines spillage. In 2002 the water that reached the surface showed poor quality due to acid mine drainage (Fourie and Associates 2004). Present generations must seek solutions to a historical issue of AMD which is an illustration of intergenerational or intragenerational problem (McCarthy 2010), where subsequent generations must seek resolution to a historical issue. South African government placed AMD problem on its urgent agenda since 2009 and numerous stakeholders have emerged with varying solutions and concerns in addressing this threat. Mining activities turned rural underdeveloped areas into densely-populated regions and towns as Randfontein, Westonaria and Carletonville improved infrastructure like roads, railway lines, water and electricity systems, schools, hospitals and supermarkets due to gold mining. Gold mines were observed to be indirectly or directly creating employment in the West Rand area. However, these mines were also impacting the social sector of the country negatively due to AMD.

Government realisation of AMD problems severity were noted by the former Minister of Water Ms. Buyelwa Sonjica during the National Assembly speech vote on the 15th of April 2010 in which she stated,

“There is a big problem of acid mine drainage in the Witwatersrand area which threatens our ground water resources and the very integrity of the environment and human survival. Even the famous Cradle of Humankind, a world heritage site, is under threat. We are currently engaged with short-term interventions to alleviate the worst effects, but the time has come for those responsible to account for their actions” (Parliamentary Monitoring Group 2010).

The mining of certain minerals like gold, copper, and nickel is associated with acid drainage problems causing long-term impairment to waterways and biodiversity (Azapagic, 2004).

South African mining activity has created dangerous situations for the nearby communities

through AMD. AMD is a result of oxidation of sulphide minerals in mine ore bodies, such as pyrite, exposed by mining results in acid water that dissolves heavy metals, can also become saline when AMD is neutralised through its reactions with rocks and is promoted by mining activities. AMD is categorised as one of the type of toxic pollution caused by acidic water flowing from disused mines. The water flows out of the mine to trickle into waterways causing contamination

The mining process contaminates underground water when chemicals mix with the water. AMD turns water sources acidic and is problematic in disused/used mines, because it is believed that underground shafts mines are filled with water which is later discharged into the subsurface or surface water resources. West Rand has many dumps causing extensive soil and water pollution. AMD from gold mining in the West Rand has destroyed water and soils system. With ground and surface systems in South Africa interconnected, AMD has a potential to pollute a massive volumes of water which poses a threat to major different industries which uses large volume of water. The mine water passes through decanting steam known as Tweelopiesruit which pours into India Ocean.

Historically West Rand mining activities have left behind numerous toxic footprints such as AMD caused by mining companies abandoning mining shafts. This resulted in the mines pumping water out of the inactive shafts and discharging it into the environment. The use of signs of safety approach in the social impact assessment process will help in identifying impacts, risks and strengths associated in mining activities. From this context, the authors analysed a range of conceptual, theoretical, and methodological tools to explore AMD's threats to social and ecological wellbeing.

### **CURRENT SOCIO ECONOMIC DOMAINS OF GAUTENG, WEST RAND**

The Gauteng economy is the driving force behind the South African economy and contributed 33.8 per cent to the GDP in 2013. The economy of the province has diversified significantly since the early 1990s when it was dominated by activities in the mining and manufacturing sectors (Gauteng Provincial Treasury 2015).

The West Rand District Municipality is located on the south-western edge of Gauteng Province.

Figure 1.1 presents the locality of the West Rand within the Gauteng Province. The WRDM consists of four local municipalities namely Mogale City Local Municipality, Randfontein Local Municipality, Westonaria Local Municipality and Merafong City Local Municipality. A large portion of the Cradle of Humankind World Heritage Site also falls within the boundaries of the WRDM, but are however managed by the Cradle of Humankind Management Authority. The West Rand District is 4 095 km<sup>2</sup> in size (West Rand District Municipality 2014).

West Rand Municipality Development Plan further notes. The economy of WRDM was previously characterised and driven by mining and mineral assets. The district, in fact, developed due to the presence of an extensive gold reef. The mines currently operating with the WRDM includes Anglo Gold, Harmony Gold, Durban-Roodepoort Deep, Goldfields, JCI Limited, Placer Dome – South Deep.

### **THE ISSUES, THEMES IN SIGNS OF SAFETY (SOS) AND SOCIAL IMPACT ASSESSMENT (SIA)**

The Signs of Safety model was created in Western Australia during the 1990s by Andrew Turnell and Steve Edwards. Originally, the Signs of Safety is used in the child protection social work sector in the western world or what is termed in sociological scholarly as global north. It originated in Australia and popularised in the United Kingdom. The use of SoS in early intervention child protection social work has become widespread internationally. Its widespread use has generated much interest about its potential application in the field of applied social research. Social Impact Assessment is one of the fields of applied social sciences. The approach is based on the use of Strength Based interview techniques, and draws upon techniques from Solution Focused Brief therapy (SFBT).

‘It aims to work collaboratively and in partnership with families and children to conduct risk assessments and produce action plans for increasing safety and reducing risk and danger by focusing on strengths, resources and networks that the family have’ (Bunn 2013).

The Signs of Safety approach is now being used in at least 50 jurisdictions in 12 different

countries across Australasia, North America and Europe. The National Society for the Prevention of Cruelty to Children (NSPCC) in 2011 explored where the approach is used in England, it was found that 35 local authorities used Signs of Safety in child protection social work and concluded that it was mostly useful with neglect cases. The above demonstrate that this approach can be used in Social Impact Assessment as it focuses on vulnerability and fragile environments. Before drawing applicability, the following is the definition and background of Social Impact Assessment.

In conceptualising Social Impact Assessment (SIA) Burdge and Vanclay (1996), define it as advance assessment process of estimating the social consequences that are likely to follow from specific policy actions or project development, particularly in the context of appropriate national, state, or provincial environmental policy legislation. SIA is an exercise that is conducted within the environmental management milieu and is anticipatory, futuristic and predictive and less retrospective in assessing planned development or social change. This view is further supported by Burgde and Vanclay (1996) who emphasise that;

“SIA is normally undertaken within the relevant national environmental policy framework...”

According to Burdge and Vanclay (1996), after the realisation that altering the environment of the natural ecosystem also altered the culture and social organisation of human populations, Social Impact Assessment emerged within the field of Environmental Impact Assessment (EIA). The field of SIA grew out of a need to apply the knowledge of sociology and other social sciences in an attempt to predict the social effects of environmental alterations by development projects that were subject to National Environmental Protection Act (NEPA) legislation in USA. According to the Anthropological Survey of India (2011), the World Bank, African Development Bank, International Monetary Fund and United Nations Development Programme, most of the multilateral and private agencies, including local commercial banks now insist prior social impact appraisal for projects that they finance. Social Impact Assessment is centred on social care principle which is domiciled within the ambits of social democracy, just like in social work

practice. The convergence of Social work practice (where the Signs of Safety is borrowed) and Social Impact Assessment is that both share critical objectives of creating a caring and just society where right to life, dignity and equity.

### **INTERNATIONAL OVERVIEW AND LEGISLATIVE FRAMEWORK FOR SOCIAL IMPACT ASSESSMENT**

Barrow (2000), insists that legislation in the form of the NEMA, 1969 of United States helped establish SIA. Like many countries which have enshrined SIA in the environmental laws, South Africa administers SIA through the South African Environmental Management Act of 1996. The Australian Environmental Protection Act of 1986 (Part 4), Canadian Environmental Assessment Act of 2012, Indian Environmental Protection Act of 1986 and the China Environmental Impact Assessment Law are also pieces of legislation in different countries that promote SIA through the ambit of EIA. The Anthropological Survey of India, (2011) indicates that by 1983, most US Federal agencies had formalized environmental and social assessment procedures in agency regulations and further notes that the European Economic Community began to recommend Environmental Impact Statements (EIS) for their members in 1985, and by 1989 the recommendation became a requirement. However there is still need for more legislation in most countries to support SIA (Boggs; 1994).

The Constitution of South Africa (1996), National Environmental Management Act No. 107 (1998) and Water Act are landmark documents for South African EIA and SIA practice. EIA and SIA are not explicitly mentioned in the Constitution, but founded on the bill of rights in Chapter 2 where the right to human dignity, equity, equality and freedom are mentioned. These rights and the principles enshrined in the NEMA (Act 107 of 1998) have a bearing on the social and biophysical environment (ecosystem). One of the principle in the NEMA (Act 107 of 1998) is that "social, economic and environmental impacts of all activities including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in light of such consideration and assessment".

### **EMPIRICAL APPROACH**

In gathering information on AMD's social impact in Westrand, the researchers adopted a

qualitative research approach within a case study phenomenological research design where the West Rand was chosen as the area of study. Participatory Rural Appraisal was also used which is compatible with the Signs of safety approach; in the form of Focus Group Discussions with affected and interested persons. The work also applied both content and document analysis where relevant sources were carefully selected for consideration and analysis, thus yielding a thick description of the events, processes as well as the effects of AMD in the Westrand. Since the AMD in the West Rand is a classic example of an inter-generational and intra-generational problem, trend analysis was also applied to understand the historical processes so as to be able to suggest and propose possible ways of solving the social problems emanating from AMD through using the Signs of Safety Approach. The study set out to combine concepts of SIA with those of wellbeing, drawing on conceptual insights derived from Signs of Safety.

Given the severity of the problem of AMD, numerous stakeholders have currently emerged with varying solutions and concerns and the present generation is seeking solutions to a historical issue of pursuant to that, the methodology put into consideration all the relevant factors to accurately and informatively determine the spatial, conceptual and temporal scope of the problem in order to propose meaningful solutions at the end. A specific objective was to develop and test SOS tools' appropriateness to SIA implementation.

### **CONCEPTUAL FRAMEWORK FOR SIGNS OF SAFETY PRINCIPLES INCORPORATION IN SOCIAL IMPACT ASSESSMENT**

From a theoretical and conceptual perspective The SoS approach to assessment and planning encompasses four principal domains of inquiry: Worries or Danger; Existing Strengths and Safety; Future Safety or Goals and Judgement. Each area of inquiry is further broken down into elements related to each domain. Past harm, future danger (also known as danger statements) and complicating factors are the elements explored on the Danger side of the original form (Turnell & Edwards 1999; Turnell 2012). Existing strengths and safety are explored within the safety side. Within the Signs of Safety assessment process the practitioner should gather and analyse the information from

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both of these sides of the danger/safety equation, to best inform the judgement that is recorded in the form of a safety scale continuum. This assessment work then lays the foundation to explore and develop the agency and family goals that will articulate what it is the agency need to see happening that will satisfy them the child is safe and what next steps are needed to realise the goal. A context scale can also be utilised to assess the seriousness of the case being assessed and planned for in comparison to others they have and/or are working with.

The Signs of Safety framework aims to address four domains:

- What are we worried about? (past harm, future danger and complicating factors)
- What’s working well? (existing strengths and safety)
- What needs to happen? (future safety and next steps)

- Where we are on a scale of 0 to 10 where 10 means there is enough safety for the child

Protection authorities to close the case and 0 means it is certain the child will be re-abused. 0 also often indicates the situation is so dangerous the child will be re housed. When taken to Social Impact Assessment field, it means 0 is when communities are at imminent risk and need relocation, where Resettlement Action Plan and Social Management Plans have to be put in place in the safety plan.

The following section of the article will methodologically present Acid Mine socio ecological dynamics grounded in SOS analysis. To establish a common SOS and West Rand SIA anchor point, findings are summarised in Table 1 on what the different study themes were generated in terms of knowledge and impacts concerning West Rand SOS based SIA

**SOS APPLICATION TO SOCIAL ECOLOGICAL DYNAMICS OF AMD IN SOUTH AFRICA**

| <b>Situation Analysis of the community</b>  |   |  |
|---|---|--|
| <b>What are we worried about?</b>   | <b>What is working well?</b>  | <b>What needs to happen?</b>   |
| <p>AMD threatens ground water sources which are used by communities</p> <p>Community involvement was very restricted in mining projects</p> <p>Mostly the mining closure leave people impoverished and ghost towns present in the area</p> <p>Unskilled personnel are left stranded as more skilled personnel are reabsorbed into other mining activities.</p> <p>People living close to Tudor dam need to deal with contaminated polluted water and affected soil.</p> <p>West Rand mines will be flooded with leaking acid water if government and mining corporations do not rehabilitate mines. The rivers will run dry and the groundwater will be undrinkable.</p> <p>AMD will continue to flow uncontrollably from underground entering the watercourse on the surface of West Rand. No preventative or remedial measures were put in place by the government.</p> | <p>Mining activities turned rural underdeveloped areas into densely-populated regions.</p> <p>Gold mines were observed to be indirectly or directly creating employment in the West Rand area.</p> <p>Mining activities creates wealth for the country</p> <p>Change in population dynamics</p> <p>Increase in employment and infrastructure development was historically contributed by the activities of the mines.</p> | <p>Mining companies to account for their actions</p> <p>By predicting the impacts it gives the mining corporations and communities closure plans which might be sustainable to the community and are cost effective to the company.</p> <p>Open consultation with the community which helps identify problems of Acid Mine Water Drainage on a timely manner and helps to address the issue earlier.</p> <p>If mines can look for community ownership during mining closure process, it gives the communities power to deal with problems like Acid Mine Drainage as they will have been involved in the solutions and implementation of the closing process</p> <p>Sustainability is measured when a mine has managed a successful closure plan which does not involve community being affected by the Acid Mine problems</p> |

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|   |  |   |
|---|--|---|
| <p>West Rand communities will continue to be deprived of clean water in households due to the pressure from AMD pollution not immediately addressing AMD results in long health risk to residents in that region. Polluted Acid Mine Water may lead to cancer, decreased cognitive function appearance of skin lesions (Adler and Rascher 2007).<br/> <i>One of the residents who used borehole water highlighted the water had “orange color” which is suspected to sulphur compounds from Acid Mine Drainage</i></p> <p>We are worried that long term exposure of AMD can increase rates of cancer, decreased cognitive function, skin lesions, and low concentrations on pregnant women, neural problems and possible mental retardation. (Classen, 2006).</p> <p>We are worried that Acid Mine Drainage affects the soil which in turn affects farming in West Rand and those who are involved in farming are disturbed due the pollution of the soil. The communities in the West Rand are exposed to the following health hazards radon exhalation, radiation, dust and other tailings-related hazards from the old slimes dams.</p> <p>In 2006 University of North West (NWU 2006) made ad hoc interviews for residents in Carletonville where mining was still prevalent, the majority of were able to identify mining related risks such as sinkholes and water pollution.</p> <p>We are worried that unsustainability mining practices can threaten the water scarcity in West Rand since South Africa is a water scarce country We are worried that AMD from abandoned mines could “result in catastrophic ground and surface water pollution” (McCarthy, 2010).</p> <p>Younger (1997) believes that AMD poses a short and long-term pollution threat. The short term is viewed as in that the generation of AMD resulted in re-watering of underground works of disused mines. The long term is viewed within seepage of acid water into the water table from current and future waste dumps.</p> |  | <p>South African environmental laws needs to set precautionary principles that stipulate that mining corporations that would have polluted the environment will be made to pay for the harm caused.</p> <p>More extensive research is needed to determine what healthy impact AMD has on the communities living in the vicinity or close proximity of such mining activities.</p> |
| <p>On a scale of 0 to 10, where 10 mean everyone knows the community is safe enough for the authorities to close the case and zero means things are so bad for the community they can’t live in it, where do we rate this situation? If different judgements place different people’s number on the continuum.</p>  |  |   |
| <p style="text-align: center;">0 ←—————→ 10</p>   |  |   |

### **PATHWAYS FOR ENRICHED RESPONSE TO AMD BASED ON SOS ORIENTED SIA**

The above section explored AMD grounded in SOS approach in, the following section the article offers pathways for enhanced AMD impacts mitigation. Pathways are proposed for usage by policy makers, government technocrats and frontline social development practitioners to safeguard biodiversity in natural resources extraction, and livelihoods promotion. Humans all over the planet are struggling and aspiring to engage with the scale and scope of the challenge of achieving human well-being and environmental stewardship for all (Palmer and Briggs 2014).

#### **SOS Mainstreaming in SIA**

SOS approach mainstreaming in the social impact assessment process aids assessors in identifying, avoiding, mitigating and enhancing outcomes for communities. It is most effective as an iterative process across the life cycle of developments, rather than a one-off activity at the outset of mining (Vanclay 2003; Becker and Vanclay 2006; Franks 2011; Esteves et al.2012).

The prevalence of Acid Mine Water drainage negative effects on populations is accounted by the fact that SIA was none existent during the era when mining first took place in the 1800s. The article recommends further enhancement of natural resources extraction by incorporating SIA. The rationale is that if SIA is considered during the planning stage of mining activities potential negative impacts like the Acid Mine Water can be proactively mitigated. SIA is regarded a useful tool in the mining life cycle and should form mines' operational activities as a management tool. Wider Social Impact Assessments adoption by mining companies potentially eliminates social problem associated with AMD impacts.

In the realm of social development, practitioners as Bhatasara notes the need to move beyond concern with given issues with a distinct social character to pose transdisciplinary questions. For instance about ecological, social and technological systems, meaning trans-disciplinary collaboration such that sociologists work with for example, oceanographers, biologists, environmental scientists and physical geographers to tackle climate change (Bhatasara, 2015).

Contemporary African environmental debates focus on issues such as land and related agrarian

questions; the poverty-environment nexus; climate change mitigation and adaptation; the relationship between global political forces and environmental change; environmental security (Murombedzi, 2014). South African government frontline technocrats in the social, extractive sectors must collaborate in addressing AMD by facilitating alternatives water sources for the affected communities. Continual polluted water usage by residents in future causes health problems.

#### **Dynamic SIA Knowledge Management**

As Mbigi suggests, questionnaires, case studies, empiricism, philosophy and interviews are redundant research techniques and participation action research discourse analysis, phenomenology, critical theory, cooperative enquiry, grounded theory, appreciative inquiry and critical rationalism are more dynamics (Mbigi, 2014).

In the same vein, local people's active participation in development instills a sense of confidence, empowers and unlocks hidden treasures of indigenous knowledge (Tanyanyiwa, 2016). Community participation in most cases is inhibited by lack of mobilisation skills on the part of the implementing agency and this is coupled by arrogance among some of the officials who subsequently, negatively label those opposed to their development plans as enemies of development, agents of imperialists (Tanyanyiwa, 2016).

#### **Proactive Policies Development**

Policy provides enabling framework for development and implementation of legislation in an integrated, harmonious manner, but underpinned by more specific objectives varying from country to country depending on the prevailing and historic circumstances, socio-economic development, and bio-physical environment (Manjengwa 2006).

### **CONCLUSION**

The article exploration of SoS incorporation in SIA using the lens of AMD West Rand, South Africa illustrates significance of conduct SIA as essential component of sustainable development. Rational and current thinking in SIA implementation in the context of South Africa was explored. Conceptual underpinnings and perspective of SoS were also applied in the context of AMD in West Rand. Recommendations on pro suitable development SIA



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implementation by technocrats and beneficiary communities were also proposed.

### REFERENCES

- [1] Adler, R. & Rascher, J., 2007. A Strategy for the Management of Acid Mine Drainage from Gold Mines in Gauteng. CSIR report Number CSIR/NRE/PW/ER/2007/0053/C. Pretoria: CSIR
- [2] Anthropological Survey of India. 2011. Social Impact assessment Draft Module. Kolkata
- [3] Bunn, A. 2013. Signs of Safety in England. An NSPCC commissioned report on the Signs of Safety model in child protection. Available at: <https://www.nspcc.org.uk/globalassets/documents/research-reports/signs-safety-england.pdf> accessed 20 May 2017
- [4] Burdge, R. & Vanclay, F. 1996. Social Impact Assessment: A Contribution to the State of the Art Series. *Impact Assessment* 14(1):59-86
- [5] Barrow, C. J. 2000. *Social Impact Assessment: An Introduction*. London: Arnold
- [6] Becker, H. & Vanclay, F., (Eds). 2006. *The International Handbook of Social Impact Assessment: Concept and Methodological Advances*. Cheltenham: Edward Elgar
- [7] Bhatasara, S., 2015. Debating sociology and climate change. *Journal of Integrative Environmental Sciences*, 12(3), pp. 217-233.
- [8] Claassen, M., 2006. Water Resources in Support of Socio-Economic Development. In: VAALCO Supplement: Water for a Sustainable Future, Nov: 21-21.
- [9] Esteves, A. M., Franks, D.M. & Vanclay, F. (2012). The State of the Art of Social Impact Assessment. *Impact Assessment and Project Appraisal*, special issue on 'Impact Assessment: a global review of the state-of-the art'
- [10] Gauteng Provincial Treasury (2015) *Socio-Economic Review and Outlook 2015*
- [11] Mbigi, L., 2014. Innovation, Culture and African Management. In: A. Nyanguru, ed. *Promoting Social Work for Zimbabwe's Development*. Bindura: Bindura University of Science Education, pp. 21-34.
- [12] Murombedzi, J., 2014. *The Environment in Social Science and Humanities in Africa*. [Online]
- [13] Available at: [http://www.codesria.org/IMG/article\\_PDF/article\\_a1970.pdf](http://www.codesria.org/IMG/article_PDF/article_a1970.pdf) [Accessed 24 January 2014].
- [14] Mc Carthy, T., 2010. *Decanting of acid mine water in the Gauteng city-region*. Johannesburg: GCRO.
- [15] Mc Carthy T (2011) The impact of acid mine drainage in South Africa. Available from [www.sajs.co.za/impact-acid-mine-drainage-south-africa/mccarthy-terence/format/pdf](http://www.sajs.co.za/impact-acid-mine-drainage-south-africa/mccarthy-terence/format/pdf) Accessed 20 April 2017
- [16] Manjengwa, J. (2006) *Natural resource management and land reform in southern Africa*, University of Zimbabwe, Harare.
- [17] Palmer, C. G., R. Biggs, and G. S. Cumming. 2015. Applied research for enhancing human well-being and environmental stewardship: using complexity thinking in Southern Africa. *Ecology and Society* 20(1): 53.
- [18] Simms, A. (2005) *Africa Up in smoke*. Available from <http://policy-practice.oxfam.org.uk/publications/africa-up-in-smoke-the-second-report-from-the-working-group-on-climate-change-a-121076>. Accessed 10 April 2017
- [19] Tanyanyiwa S. (2016) *Participation vital in development*. Available from <http://www.financialgazette.co.zw/participation-vital-in-development/> Accessed 20 May 2017
- [20] West Rand Economic Development Plan(2014) available from <http://www.wrdm.gov.za/wp-content/uploads/2014/07/WRDM-Regional-EDP-Final.pdf> accessed 21 June 2017
- [21] Vanclay, F., (2003). *International Principles for Social Impact Assessment, Impact Assessment and Project Appraisal*. 21(1), pp.5-1

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