

BURKINA FASO

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A. Regulation on sources

Source of lead	Relevant legislation/regulation	Government agencies	Data source
1. Lead in paint	1. As of 2020, Government has expressed interest on a law for lead in paint.	a. Government of Burkina Faso	1. Overview of Lead in Paint Laws in Africa , EPA
	No other standards found at this time for lead.		

B. International Agreements

Agreement	Year Ratified
1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1999 (a) ¹
2. Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade	2002
3. Minamata Convention on Mercury	2017
4. Stockholm Convention on Persistent Organic Pollutants	2004

¹ Accession (a)

C. Blood lead-level monitoring programs

Details	Data source
1. No details of a national or regional level structured program for blood lead level testing found. However, published studies point to some presence of testing programs at the local level.	1. Refer to section E on scientific papers that perform blood lead-level sampling

D. Inventory of toxic sites (Toxic Sites Identification Program (TSIP), Pure Earth)

No sites identified yet at this time.

E. Scientific papers on lead exposure (Please contact info@gahp.net for information on studies not in the public domain)

Topic	Authors	Year	Title	Abstract/ description
Lead in food	Rouamba, Sylvain; Guira, Filbert; Nikiema, Fulbert; Sawadogo, Aissama; Kabre, Elie; Sangare, Lassana; Savadogo, Aly	2021	Lead and cadmium contamination level in irrigation water and lettuce (Lactuca sativa L) from market gardening sites of Ouagadougou, Burkina Faso	Abstract: The purpose of this study is to assess the level of lead and cadmium contamination in irrigation water and lettuce (<i>Lactuca sativa</i> L) from six Ouagadougou market gardening sites, including Tanghin dams 1 and 2, Boulmiougou site, Bissigin, and National School of Public Health sites (ENSP). A survey was conducted among 58 market gardeners to determine their perceptions of the quality of irrigation water, the quality of vegetables produced, and the associated health risks. Physical and chemical parameters of irrigation water and lettuce were measured using standard methods. The lead and cadmium levels were determined using atomic absorption in conjunction with a spectrometer. According to the survey results, wastewater from city gutters, dams, and wells was the primary source of water for irrigation activities, with rainwater being the most commonly used. The majority of market gardeners are unaware of the health risks associated with irrigation water quality and the market gardening produced. Lead and cadmium levels were above

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				FAO and WHO recommendations. These vegetable crops may pose a risk to human health.
Lead pollution	Senou, Issaka; Nimi, Mamadou; Sanogo, Souleymane; Nacro, Hassan; Some, Antoine	2020	Study of physicochemical parameters and level of cadmium and lead contamination in irrigation water in market garden areas in West Burkina Faso	Abstract: The market gardening areas of Kodené and Dogona are among the main market gardening sites in the city of Bobo-Dioulasso (Burkina Faso). On these vegetable perimeters, the forms of water mobilization for irrigation are essentially wells for the Kodené site and wastewater from sewers for Dogona. In order to assess the physico-chemical quality and the level of cadmium and lead contamination in these waters, samples were taken at different points on each site and outside the site. The method used is based on the sampling of water in 0.5 liter polyethylene bottles, previously rinsed twice with the sample to be taken. The first samples are used to rinse the bottles and perform physical field analyzes which are pH, electrical conductivity (CE), temperature, salinity, turbidity and total dissolved solids (TDS). Each sample was acidified with pure analytical concentrated nitric acid (HNO ₃) (0.5 cm ³ in 0.5 liters of water) which was used to determine the metals. Physico-chemical analyzes and the level of cadmium and lead contamination were carried out. The results of these analyzes were processed using hydrochemical techniques (Piper diagram). Principal Component Analysis (PCA) has also been used to highlight the phenomena of mineralization of water in these market gardening areas. The results obtained show that these irrigation waters are acidic at the Kodené site (pH = 5.49) and basic for the Dogona site (pH = 7.95). They are weakly mineralized at the Kodené site with an average conductivity of 52.56 4μS/cm and strongly mineralized at the market garden area of Dogona with an average conductivity of 508.4 4μS / cm. The cadmium and lead contents are sometimes higher than those recommended by the WHO (0.01 mg/ L for cadmium and 0.003 mg/ L for lead). The chemical facies give sodium calcium water. The value of the sodium absorption ratio (11.85) of the water at the Dogona site and that of the pH (5.49) at the Kodené site show that the irrigation water is chemically unsuitable for agricultural use during the dry season.
	Sorgho, Brahima; Guel, Bouble; Zerbo,	2018	A study of adsorption of cadmium, copper	Abstract: Water pollution caused by natural and anthropogenic causes become a major problem for many countries around the world in trying to find adequate and accessible means of treating polluted water. For more

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	Lamine; Gomina; Moussa; Blanchart, Philippe		and lead by two clays from Burkina Faso	than a decade, research is focused on local adsorbent materials such as clays. It is in this dynamic that two clays extracted in Burkina Faso and referenced KORO and SIT were used to evaluate their capacities to reduce the content of heavy metals in aqueous solutions simulating waste water. The monitoring of the removal processes uses electrochemical characterizations, as voltammetry, evidencing a removal degree of heavy metals exceeding 90%. Characterizations of the process were also obtained by X-ray diffraction, Infrared Spectroscopy and Scanning Electron Microscopy. It is shown that the removal process occurs through the formation of clay-heavy metals complexes with both KORO and SIT. The three major mechanisms that were evidenced are complexation, ion-exchange and precipitation.
	Pare, Samuel; Persson, Ingmar	2017	Sorption mechanisms of Chromium(III), Copper(II) and Lead(II) on two natural mixed clays from Burkina Faso as determined by extended X-ray absorption fine structure (EXAFS) spectroscopy	Abstract: Chromium (III), copper(II) and lead(II) are among the heavy metals produced and released in large amounts by anthropogenic sources worldwide, including Burkina Faso. Previous studies have demonstrated the successful application of domestic natural mixed clays for the removal of these metal ions as a cheap and environmentally friendly method. Qualitative mineralogical characterization of the clays revealed that they consist of kaolinite, illite, orthrose and quartz, and minor quantities of albite and montmorillonite. pHPZC for the clays, as determined by potentiometric titrations, are in the range 6.8 to 7.3. In this study, the interactions of chromium(III), copper(II) and lead(II) ions with these clay minerals were examined by the use of extended X-ray absorption fine structure (EXAFS) spectroscopy. Cr ³⁺ forms tetrameric hydrolysis complexes on the mineral surface with a Cr–O bond distance of 1.98 Å, and two Cr···Cr distances at 3.02 and 3.62 Å. This is indicative of a tetrameric [Cr ₄ (OH) ₆ (H ₂ O) ₁₂] ⁶⁺ entity bound to the clay mineral surface. A distance of 3.17 Å, regarded as a Cr···Fe distance, indicates that one Cr ³⁺ ion in the hydrolyzed tetramer binds to two oxygens in the mineral surface which are bound to either one or two iron(III) ions in the surface. Pb ²⁺ binds two oxygen atoms at an average bond distance of 2.31 Å, with a significant contribution of linear multiple scattering from the PbO ₂ entity. The EXAFS results of Cr ³⁺ sorption are consistent with the presence of a hydrolysis product of polymeric Cu ²⁺ species with a surface complex or precipitate.

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	Kagambega, Nicolas; Sawadogo, Sayouba; Bamba, Ousmane; Zomber, Prosper; Galvez, Rosa	2014	Acid mine drainage and heavy metals contamination of surface water and soil in southwest Burkina Faso – West Africa	Abstract: In Southwest Burkina Faso, a decade of gold mining at Poura left large stockpiles of mine wastes. Once exposed to the atmosphere and water, these wastes may be oxidized leading to generation of a highly acidic effluent known as Acid Mine Drainage containing a series of potentially toxic dissolved metals. In the present study, surface water, groundwater, soil and mine waste samples were collected around the Poura Gold mine, to assess a possible release of heavy metals in the surrounding environment. The low pH values (~2.23) and high heavy metal contents measured in some surface water originating from oxidized zones of the waste stockpiles attested that the site has been subject to the acid mine drainage. Furthermore, geo-accumulation index of soil and mine waste samples indicated that the surrounding soils are contaminated by heavy metals. That is, it has been established that the soils were moderately contaminated by arsenic, cobalt, chromium, copper, lead and nickel, whereas they are moderately to strongly contaminated by arsenic. Likewise, mine wastes samples were moderately contaminated by arsenic, cobalt, chromium, copper, lead, zinc and nickel in one hand and moderately to strongly contaminated by arsenic, copper and lead in the other hand. Arsenic is the most polluting element and induces high contamination of the mine wastes (strongly contaminated: Igeo class 4 with Igeo value ranging from 3 to 4). The source of these heavy metals is sulfides e.g. arsenopyrite: FeAsS, chalcopyrite: CuFeS, galena: Pb encountered in the mineralized host rocks at Poura which was operated and has produced several tons of mine wastes and waste rocks stored since many years.

Papers in French

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Lead in mines	Bamba, Ousmane; Pelede, Souleymane; Sako,	2013	Impact de l'artisanat minier sur les sols d'un environnement	Résumé: Au Burkina Faso, l'orpaillage contribue aux revenus des populations rurales. Cependant, cette activité utilise des technologies mal adaptées qui causent des impacts négatifs sur l'environnement et les ressources naturelles, en l'occurrence les sols. Dans un contexte du cours de l'or favorable, le nombre de mines artisanales s'est accru et il est

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	Aboubakar; Kagambega, Mariette; Miningou, Mariette		Agricole aménagé au Burkina Faso	pertinent de s'appesantir sur la question, étant entendu aussi que peu d'études ont été menées, jusque-là, sur l'orpaillage en relation avec la dégradation des sols. La présente étude consiste alors à évaluer les impacts physiques de l'orpaillage sur les terres dans la zone agricole aménagée de Bomboré. Pour appréhender le phénomène et le quantifier, il s'est agi d'opérer une analyse combinatoire de la morphopédologie, de l'aptitude culturale des sols, de l'occupation spatiale des activités de l'orpaillage ainsi que les compositions chimiques des sols. Les résultats obtenus indiquent que les impacts négatifs de l'orpaillage sur les sols vont de modéré à élevé avec une diminution des terres arables. Par ailleurs, les données hydrochimiques de la nappe souterraine ont été utilisées pour établir l'hydrofaciès des eaux. Les valeurs alcalines du pH et la teneur très élevée en cations basiques des eaux souterraines, ont montré que la nappe a une grande capacité tampon qui lui permet de fixer les substances potentiellement toxiques telles que les métaux lourds. Toutefois, en l'absence des mesures d'atténuation adéquates, la dégradation des terres agricoles sera exacerbée entraînant une diminution de la capacité tampon de la nappe et une mobilisation transversale des métaux lourds.
Lead in soil	Adjagodo, A; Ahouangnivo, N; Kaki, C; Tchibozo, M; Tometin, L	2016	Spéciation chimique du plomb et du cuivre par extraction séquentielle des sédiments et de l'eau de la retenue de l'Okpara au Bénin	Abstract: L'étude porte sur l'extraction séquentielle des échantillons d'eau et de sédiment de la retenue de l'Okpara. Elle a pour objectif de mettre en évidence les différentes formes de plomb et de cuivre dans les eaux et les sédiments de cette retenue. La démarche méthodologique a consisté à un échantillonnage, à une extraction du plomb et du cuivre dans l'eau et dans les sédiments prélevés et au dosage de ces métaux à l'aide d'un spectrophotomètre d'absorption atomique à flamme. La méthode d'extraction séquentielle utilisée a été celle de Tessier. Les résultats obtenus indiquent que dans l'eau, seul le cuivre est détecté avec une valeur de 0,004mg/l ; la teneur en plomb est inférieure à la limite de détection de l'appareil qui est de 0,01mg/l. Dans le sédiment, le cuivre est présent dans tous les prélèvements et sur toutes les fractions tandis que le plomb ne se révèle que sur certaines fractions (la fraction oxydable et la fraction acido-soluble). Ces différents résultats confirment l'influence de la contamination de cette retenue par ces deux métaux lourds. La présence des métaux surtout du plomb dans les échantillons, interpellent les dirigeants à divers

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				niveaux à une prise de décision en vue de réduire la contamination de ce plan d'eau.

F. Blood testing in National Health Surveys

National Health Survey	Non-Communicable Diseases Risk-Factors Surveillance	Source
Purpose	To provide updated estimates of basic demographic and health indicators related to malaria.	Enquête sur les Indicateurs du Plaudisme (EIPBF)
Sample size	Women aged 15-49 years old; children 6-59 months;	
Blood sample testing	Hemoglobin, anemia, and malaria testing.	
Latest round	2019	
Next round	2021 (ongoing)	